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Age-and Sex-Differences in
the Formation of
Coalitions

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ABSTRACT

**Age- and Sex-Differences in the Formation
of Coalitions**

W. Edgar Vinacke and Gary R. Gullickson

A simple competitive board game was used to determine changes in strategy as a function of age. Data were collected from 10 triads of each sex at the 7-8 and 14-16 year age-levels, and compared with results previously obtained from 30 groups of each sex at the college level. For this purpose, three power-patterns were employed, namely, when all three players are equal in strength, when all are different but any two can win, and when one player is all-powerful (that is, can win without alliance.)

Inter-sex and inter-age comparisons were made of the kinds of outcome reached, incidence of 50/50 deals, the relation of bargaining and outcome to relative strength of players, amount of bargaining, and overall strategy (employing a special index to accommodative strategy.) It was found that the female groups differ little from age-to-age, consistently displaying a high degree of accommodative strategy. By contrast, the youngest male groups manifest significantly more accommodative strategy than do older male groups. There is, thus, evidence of a developmental change in competitive behavior among males.

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Age- and Sex-Differences in the Formation of Coalitions

W. Edgar Vinacke and Gary R. Gullickson

The development of experimental research with small social groups has witnessed an increasing interest in the effects of various intra-group relationships on the performance both of individual members and of the group-as-a-whole (Thibaut and Kelley, 1959). Although there have been a considerable number of studies that employ children of various ages, it continues to be true that developmental trends in social interaction have been insufficiently investigated. With respect to competition and cooperation, for example, May and Doob in 1937 suggested several specific problems that arise in conjunction with variations in age (May and Doob, 1937, p. 149-151.) That little has been done to settle these issues is reiterated by Phillips and DeVault (1957).

Available studies have mostly been concerned with such questions as whether cooperative or competitive conditions provide better incentives to perform effectively (Hurlock, 1927; Maller, 1929; Stendler, Darrin, and Hayes, 1951); or the effect of various conditions upon the quantity or quality of competitive behavior (e.g., socio-economic status, McKee and Leader, 1955; or leadership, Merei, 1949); or the development of rules (Piaget, n.d.; Urgural-Semin, 1952.) In these studies, both sex- and age-differences have been noted.

With respect to sex, girls have been reported as less aggressive and more conforming to the social situation than boys (Murphy, Murphy, and Newcomb, 1937; Maller, 1929; Mussen and Conger, 1956, p.279; Kuhler, 1952, pp. 162-163.), although it is possible that these differences are becoming less marked (Rosenberg and Sutton-Smith, 1960.)

With respect to age, McKee and Leader (1955) who employed pre-school children, found greater competitiveness in older than younger children, and

also among boys than girls. Ugural-Semin (1952) reported that "selfish" acts tend to diminish up to the age of 12, at which time "equalitarian" decisions tend to predominate over "generous" ones; she did not find any sex differences.

Piaget identifies four stages in the development in boys of concepts of rules. (1) In very young children, play tends to have a motor and individual character, with no genuine recognition of rules or of relationships between persons. (2) In somewhat older children (pre-school), an egocentric stage appears, in which rules may be followed (as imposed from without), but each child plays in his own way in parallel fashion. (3) Between 7 and 8 a cooperation stage develops, marked by competition, but with only a vague conception of the rules; that is, children attempt to govern each other's behavior and to arrive^{at}/means to achieve mutual control. (4) At the 11-12 year level, there emerges a codification stage, in which there is great attention to procedure and an interest in rules for their own sake.

In observing the play of little girls, Piaget notes differences from boys. The games that girls play seem to be simpler, and they seem to play more for the fun of it. In their case also a stage of cooperation is described for the 6-7 year level. It is marked by high tolerance for the way other people treat the rules, and by less concern for the technicalities of procedure.

Piaget's analysis is oriented more to an understanding of the social system and the development of social control, rather than to the competitive behavior with which this study is concerned. However, it provides an excellent point of departure for hypothesizing both age and sex differences

in intra-group competition, and, as will be seen, there are certain affinities between the stages he identifies and the strategies we have defined.

Thus, there have been tantalizing results that point to significant relations between age and sex and intra-group behavior, but very little direct comparison of one age-level with another. Some recent experiments with triads have employed a simple competitive negotiable game, which offers a situation in which this kind of comparison can readily be made. This research has employed college students as subjects. The fact that clearly defined strategies appear, especially in the form of differences between the sexes, naturally raises questions about their specificity to the age-group investigated. Although these questions also arise with regard to older ages, the present report confines itself to younger subjects.

In the game, three persons compete for a single prize. Weights are assigned in such a manner as to vary the relative strength, or power, that each player has to the other two. They are permitted to form coalitions, if they wish, together with deals for the division of a prize; bargaining to accomplish alliances is a key feature^{of} play. A fuller description of the game is set forth below.

Under these general conditions, a variety of striking phenomena may be observed, as reported elsewhere (Vinacke and Arkoff, 1957; Vinacke, 1959; Cheney and Vinacke, 1960; Bond and Vinacke, 1961; Vinacke, 1962.) Two points are particularly pertinent to the present investigation. (1) The incidence of coalitions and the kind of bargaining behavior vary with the pattern of power that characterizes the group. Thus, equal division of the prize is more likely when the three players are equal in strength than when

they differ in strength; the weaker players tend to ally against the stronger person, even though any pair of players can defeat the third; and few coalitions occur when one player is "all-powerful" (i.e., can win without forming a coalition)--and those alliances that do occur tend to involve the all-powerful player. (2) Highly significant differences between the sexes in strategy are apparent. Females typically adopt an "accommodative" style of play, apparently oriented more towards the social situation itself than towards winning, and marked by the arrangement of outcomes along mutually satisfactory, rather than highly competitive, lines. Males, on the other hand, manifest an "exploitative" strategy, characterized by ruthless, "cutthroat" competition, and oriented strictly towards winning the prize. Further details of these differences will be spelled out below.

In view of the research findings available on children, it may well be asked to what extent these kinds of behavior are limited to particular age-ranges and, further, whether there may not be a trend correlated with age that might reveal a critical point at which differences between the sexes in strategy emerge. This study was designed to cast some light on these issues. Since we did not feel confident about making definite predictions, the experiment began with the formulation of the foregoing problems without stating formal hypotheses. We chose the two age-levels, 7-8 years and 14-16 years, as appropriate ones to compare with previously obtained college samples (age 18-30, but largely concentrated in the range 18-22 years).

Procedure

Subjects. The study was conducted during the summer vacation, which made it necessary to contact subjects in several ways. The younger children

were recruited largely through park recreation centers, the older youngsters largely through summer high school programs. In the former instance, the game was set up in a well-equipped room at the park building, in which it was possible to maintain the privacy of the experimental session. The high school children all met at the University psychology laboratory by special appointment.* Since all the youngsters came from the same general suburban area, it is unlikely that there were significant demographic differences among them. However, no effort at direct matching was made and the groups should probably be regarded as rather heterogeneous. (The same statement applies to the college students.)

Ten groups of children and ten groups of adolescents of each sex were used, each group consisting of three subjects (or a total of 120.)

The college triads were those employed in the original investigations (Vinecke, 1959). They consisted of 30 groups of each sex (a total of 180), all recruited from undergraduate courses.

Game-Situation. A board was constructed on which was drawn a simple pathway, running from "Start" to "Home" (similar to those used for games like parcheesi.) The boards used for the age-levels were very similar, except for the number of spaces: 33 for the 7-8 year olds, 50 for the 14-16 year olds, and 60 for the college students. The objective was merely to reach "Home" first, and complications were introduced beyond that entailed in moving from space-to-space. All three players moved simultaneously, following the cast of a single die thrown by the experimenter. Each player moved his counter the number of spaces determined by his weight (see below).

*We wish to express our appreciation to Miss Betty Ann Lim, Manoa Valley Recreation Center for her kind assistance in recruiting subjects.

The younger children added their weights to the value of the die, whereas all other groups multiplied these two quantities. For example, if a player had a weight of $\frac{1}{2}$ " and the die came up "5", a child moved seven spaces, but the older subject moved ten spaces. This variation was introduced to make the arithmetic problem easier for the children. The game was concluded whenever a win occurred, that is, when one player, or a combination of players, reach "Home", or when one or more players conceded defeat. The older groups soon learned that the final outcome of a game can be settled without actual play, so that moving the counters was abandoned in most instances, after the first few games. At that point, outcomes were simply settled by the result of bargaining. The youngest triads, however, played each game through to conclusion.

Power-Patterns. Although most of the experiments in this series have employed six different combinations of weights, only three really important variations have been involved, namely, when all three players have equal strength, when there are differences in weight but any combination is stronger than the third, and when one player is all-powerful. In the present investigation, one version of each of these three patterns was employed, defined as follows:

Players and		
<u>Type</u>	<u>Weights</u>	<u>Relationships</u>
I. All-Equal	$A = 1; B = 1; C = 1$	$A = B = C$
II. All-Different	$A = 4; B = 3; C = 2$	$A > B > C; A < (B + C)$
III. All-Powerful	$A = 3; B = 1; C = 1$	$A > B; B = C; A > (B + C)$

It can be seen that, if coalitions are permitted, any pair can defeat the third in Patterns I and II, whereas in Pattern III, player A can win without coalition. In fact, in the first two patterns, no one can win without coalition; in Pattern III, on the other hand, it is not to A's advantage to ally with either of the other two players, and a coalition of B and C is ineffectual. Previous reports in this series have spelled out the implications of these power-patterns in detail, and summarized the predictions yielded by various theoretical strategies.

The requisite weights were inscribed upon the counters used in moving around the board. The set required was presented to the members of the triad, with weights concealed. Each drew in turn, with the order rotated so that each player drew first equally often. For the children and adolescents, four games in succession of each type were played, rotating the order in which the types occurred. For the college triads, the data were drawn from a previous experiment, conducted under somewhat different conditions. In this case, the three power-patterns described were interspersed during a series of 18 games, three each of six patterns. As will be seen below, it is quite unlikely that this difference in any way distorts the comparisons to be made, but it does, nevertheless, render the comparison less precise than might ideally be demanded.

Play. All of the conditions of the game were presented to the subjects before play began. In addition to the features explained above, players were told that coalitions might be formed, if they wished, but that the terms must be agreed upon, and further, that, once established, a coalition could not be broken during that particular game. No tangible reward was offered for winning (a contingency not found to affect the basic character of

strategy, Vinacke, 1962), but the winner(s) would be given 100 points. Bargaining, therefore, concerned the allocation of this score. The actual instructions were typed on cards, which the older subjects read; they were explained orally to the younger subjects. In both cases, all questions were answered before play commenced, avoiding, however, any answers not contained in the instructions (for instance, no suggestion that coalitions should or should not be formed was given.) Appendix A presents the complete instructions.

Once play began, the experimenter did not participate further in the activities of the group, acting only as referee (i.e., taking care of the drawing of counters, tossing the die, ascertaining that the few simple rules were followed, etc.), and keeping a record of the transactions.

If an offer to form a coalition was accepted, the players involved combined their counters (as making "kings" in checkers), and thereafter moved as a pair (or as a triple), with the sum of their weights specifying the distance they could move.

Results

As in our previous experiments, it is possible to derive a variety of measures from the behavior that occurs in the game just described. These aspects of play include the kind of outcome (i.e., how winning is accomplished), the sorts of deals reached in allocating the prize, and the character of the bargaining sequence. We shall examine some of these variables, and then consider the overall strategy typical of the several age-sex groups. It should be noted, in comparing the three ages that data were obtained in four games of each type for the children and adolescents, but in three games for

the college students. In conducting analyses involving the latter, therefore, the fourth game is omitted for the younger groups. As is apparent in the tables, where figures are given both for three and for four games, interpretations are not affected. In fact, variation in the two figures is almost entirely a function of the divisions it is possible to make when percentages are used (e.g., when chance is one-third, above-chance is 67% for three games, but 50% for four games.)

Consider, first, the final outcome of play, as shown in Table 1. Decision may be reached in any of three ways, by failure to arrive at an alliance ("no coalition"), by establishing a coalition between two players against the third ("two-person alliances"), or by triple alliance, in which the three players agree to tie (nearly always with an equal split of the prize.) Here, as in all subsequent tables, comparisons are shown for the two sexes at each age-level, as well as for each sex between age-levels.

There are no significant differences between the male and female groups at the youngest agelevel. The two sexes at the other age-levels, however, manifest significant differences. For the adolescents, the males arrive at a higher proportion of two-person outcomes in the all-equal pattern, and a lower proportion of triple alliances in the all-different pattern. For the college students, there are very similar differences, but, in addition, the male triads less often fail to arrive at coalition in the all-different pattern, more often establish two-person coalitions in the all-different pattern, and less often establish alliances in the all-powerful condition. (In this latter pattern, there is logically no advantage in allying, insofar as winning is concerned.)

Table 1. Outcomes in a Three-Person Competitive Game,, Comparing Three Age-Groups.*

<u>% of Games</u>	N	7-8 Year Old		14-16 Year Old		College	
		Children		Adolescents		Students	
		Male	Female	Male	Female	Male	Female
		<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
No Coalition							
1 or more		70(60)	90(90)	10(10)	20(20)	23	34
0		<u>30(40)</u>	<u>10(10)</u>	<u>90(90)^a</u>	<u>80(80)^b</u>	<u>77</u>	<u>67^c</u>
		100	100	100	100	100	100
Inter-Sex		No difference is significant					
Inter-Age		^a vs. 7-8, P = .05; ^b vs. 7-8, P = .02; ^c vs. 7-8, $\chi^2 = 9.66$ P < .01.					
Two Person Alliances							
67 or more		10(70)	40(40)	100(100)	60(70)	93	54
66 or less		<u>90(50)</u>	<u>60(60)</u>	<u>0(0)^d</u>	<u>40(30)</u>	<u>7^e</u>	<u>47</u>
		100	100	100	100	100	101
Inter-Sex		n.s.		P = .02		$\chi^2 = 8.14$ (P < .01)	
Inter-Age		^d vs. 7-8, P < .002; ^e vs. 14-16, $\chi^2 = 13.39$ (P < .001)					
Triple Alliances							
1 or more		80(70)	50(40)	0(0)	60(50)	7	50
0		<u>20(30)</u>	<u>50(60)</u>	<u>100(100)^f</u>	<u>40(50)</u>	<u>53^g</u>	<u>50</u>
		100	100	100	100	100	100
Inter-Sex		n.s.		P = .02		$\chi^2 = 13.88$ (P < .001)	
Inter-Age		^f vs. 7-8, P < .001; ^g vs. 14-16, $\chi^2 = 12.71$ (P < .001)					

Table 1. (Continued)

<u>% of Games</u>	<u>7-8 Year Old Children</u>		<u>14-16 Year Old Adolescents</u>		<u>College Students</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
ALL DIFFERENT: No Coalitions						
1 or more	50(50)	90(90)	30(30)	40(30)	7	33
0	<u>50(50)</u>	<u>10(10)</u>	<u>70(70)</u>	<u>60(70)^h</u>	<u>93ⁱ</u>	<u>67^j</u>
	100	100	100	100	100	100
Inter-Sex	P = .10		n.s.		$X^2 = 6.68 (P < .01)$	
Inter-Age	^h vs 7-8, P = .02; ⁱ vs 7-8, P = .01; ^j vs 7-8, $X^2 = 7.53 (P < .01)$					
Two-Person Alliances						
100	10(20)	10(10)	70(70)	60(70)	93	63
99 or Less	<u>90(80)</u>	<u>90(90)</u>	<u>30(30)^k</u>	<u>40(30)^l</u>	<u>7^m</u>	<u>36ⁿ</u>
	100	100	100	100	100	100
Inter-Sex	n.s.		n.s.		$X^2 \sqrt{7.96 (P < .01)}$	
Inter-Age	^k vs 7-8, P < .02; ^l vs 7-8, P = .02; ^m vs 7-8, $X^2 = 16.56 (P < .001)$ ⁿ vs 7-8, $X^2 = 8.54 (P < .01)$					
Triple Alliances						
1 or more	60(50)	40(30)	0(0)	0(0)	0	7
0	<u>40(50)</u>	<u>60(70)</u>	<u>100(100)^p</u>	<u>100(100)^p</u>	<u>100^q</u>	<u>93</u>
	100	100	100	100	100	100
Inter-Sex	No difference is significant.					
Inter-Age	^o vs 7-8, P = .05; ^p vs 7-8, P = .08; ^q vs 7-8, P = .001.					

*To facilitate comparisons among groups, results are cast into percentages; in computing Chi Square, actual frequencies were used, as necessary employing correction for continuity or the Fisher Exact Test (two-tailed). Although median tests were employed to determine significance, data are shown in the same categories for convenience. Figures in parentheses are for the first three games only, to permit comparison with the college students.

Table 1. (Continued)

<u>% Of Games</u>	<u>7-8 Year Old Children</u>		<u>14-16 Year Old Adolescents</u>		<u>College Students</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
ALL-POWERFUL: <u>No Coalition</u>						
51 or more	0(10)	20(40)	0(0)	20(20)	76	47
50 or less	<u>100(90)</u>	<u>80(60)</u>	<u>100(100)</u>	<u>80(80)</u>	<u>23^{rs}</u>	<u>53</u>
	100	100	100	100	100	100
Inter-Sex	n.s.		n.s.		$\chi^2 = 5.70$ ($P < .02$)	
Inter-Age	χ^2 vs 7-8, $\chi^2 = 11.03$ ($P < .001$) χ^2 vs 14-16, $\chi^2 = 14.85$ ($P < .001$)					
<u>Two Person Alliances</u>						
67 or more	50(70)	50(50)	90(100)	80(80)	23	50
66 or less	<u>50(30)</u>	<u>50(50)</u>	<u>10(0)</u>	<u>20(20)</u>	<u>77^{tu}</u>	<u>50^v</u>
	100	100	100	100	100	100
Inter-Sex	n.s.		n.s.		$\chi^2 = 4.58$ ($P < .05$)	
Inter-Age	χ^2 vs 7-8, $\chi^2 = 5.10$ ($P < .05$); χ^2 vs 14-16, $\chi^2 = 14.85$ ($P < .01$); χ^2 vs 14-16, $\chi^2 = 4.08$ ($P < .05$)					
<u>Triple Alliances</u>						
1 or more	40(40)	30(30)	0(0)	10(0)	0	3
0	<u>60(60)</u>	<u>70(70)</u>	<u>100(100)^w</u>	<u>90(100)</u>	<u>100^x</u>	<u>97</u>
	100	100	100	100	100 ^x	100
Inter-Sex	No difference is significant					
Inter-Age	^w vs 7-8, $P = .08$; χ^2 vs 7-8, $P = .004$.					

Because so many comparisons are involved for the inter-age analyses, the following table may serve as a convenient summary. Blank cells indicate that no significant difference occurred, and the adjective describes the first-named group.

	7-8 vs 14-16		7-8 vs College		14-16 vs College	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
<u>All-Equal:</u>						
No Coalition	More	More			More	
2-Person	Fewer		Fewer			
Triple Alliance	More		More			
<u>All Different:</u>						
No Coalition		More	More		More	
2-Person	Fewer	Fewer	Fewer		Fewer	
Triple	More	More	More			
<u>All-Powerful:</u>						
No Coalition			Fewer		Fewer	
2-Person			More		, More	More
Triple Alliance	More		More			

Quite a clear picture emerges. In the first place, there is very little difference between the adolescents and the college students. The exceptions occur in the all-powerful pattern, in which condition the adolescents are more likely to resemble the younger group by establishing a relatively high proportion of two-person alliances. This could be

indicative either of less understanding of the character of the all-powerful condition (i.e., that one person can win without an alliance), or that, in this respect, the adolescents manifest a tendency towards the accommodative strategy, to be discussed below.

In the second place, the children differ markedly from both older age-levels and in consistently the same ways--more often failing to arrive at coalition when this is the means to win (all-equal and all-different patterns), and agreeing more often on triple alliances.

In the third place, there are generally more differences between the youngest male triads and their counterparts at old ages, which, as will become apparent, is perhaps the single outstanding feature of the results. Boys of this age, one might say, behave more like girls than they do like young men (at least in this game.)

Turning now to the deals consummated in coalitions, we may consider the results shown in Table 2. It gives the incidence of 50/50 deals; although agreements range up to partnerships in which one player receives only one or two points (occasionally even zero!), this is the most convenient basis on which to effect the comparison. It can be seen that only the college students manifest a significant sex difference, with the female triads arriving more often at equal deals--a regular result in our experiments. The female adolescents arrive significantly more frequently at 50/50 deals only in the all-equal pattern, and there is no significant difference in the case of the children. In this respect, therefore, the adolescents tend to fall in between the other two age-levels.

Table 2. Incidence of 50/50 Deals in Triads at
Three Age-Levels.*

<u>% of Games</u>	<u>7-8 Year Olds</u>		<u>14-16 Year Olds</u>		<u>College Students</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
ALL EQUAL						
N*	8	9	10	7	30	25
100	88(100)	89(89)	40(60)	100(100)	33	80
99 or less	<u>13(0)</u>	<u>11(11)</u>	<u>60(40)</u>	<u>0(0)</u>	<u>67^a</u>	<u>20</u>
	101	100	100	100	100	100
Inter-Sex	n.s.		n.s.		$\chi^2 = 11.97$ ($P < .001$)	
Inter-Age	^a vs	7-8, $P < .001$.				
ALL-DIFFERENT						
N	10	7	10	9	30	30
100	90(100)	71(100)	20(20)	56(56)	20	60
99 or less	<u>10(0)</u>	<u>28(0)</u>	<u>80(80)^b</u>	<u>44(44)</u>	<u>80^c</u>	<u>40</u>
	100	99	100	100	100	100
Inter-Sex	n.s.		n.s.		$\chi^2 = 10.00$ ($P < .01$)	
Inter-Age	^b vs 7-8, $P = .02$;		^c vs 7-8, $\chi^2 = 16.48$ ($P < .001$)			
ALL-EQUAL + ALL-DIFFERENT						
N	10	10(9)	10	9	30	30
100	90(100)	80(89)	20(20)	56(56)	10	57
99 or less	<u>10(0)</u>	<u>20(11)</u>	<u>80(80)^d</u>	<u>44(44)</u>	<u>90^e</u>	<u>43^f</u>
	100	100	100	100	100	100
Inter-Sex	n.s.		n.s.		$\chi^2 = 6.70$ ($P < .01$)	
Inter-Age	^d vs 7-8, $P < .01$;		^e vs 7-8, $\chi^2 = 9.79$ ($P < .01$);			
	^f vs 7-8, $\chi^2 = 4.51$ ($P < .05$)					

Table 2. (Continued)

<u>% of Games</u>	7-8 Year Olds		14-16 Year Olds		College Students .	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
ALL-POWERFUL						
N	9	7(6)	10	8	20	24
100	78(89)	86(71)	30(30)	75(100)	50	58
99 or less	<u>22(11)</u>	<u>14(28)</u>	<u>70(70)^g</u>	<u>26(0)</u>	<u>50</u>	<u>42^h</u>
	100	100(99)	100	101(100)	100	100
Inter-Sex	No difference is significant					
Inter-Age	^g vs 7-8, P = .05; ^h vs 14-16, P = .08					

*See note to Table 1. The difference in "N" occurs because in some groups no two-person alliances occurred.

The inter-age comparisons demonstrate that it is chiefly the 7-8 year old male triads who differ from the older males, agreeing upon 50/50 deals more frequently than their counterparts at the other ages. Although the 7-8 year old female triads also display this tendency, it is significant only in the all-different pattern and when the total is determined for the two patterns in which any pair can win. Thus, it is, again, the youngest males who manifest a distinctive difference, tending to resemble more closely the female, than the male groups.

In previous experiments, the bargaining situation has typically been characterized by a tendency for the weak players to ally against the stronger one. Tables 3 and 4 present the facts with regard to age-levels. In the all-powerful pattern, no coalitions would be expected, if players are solely concerned with winning. Nevertheless, alliances are by no means absent. On the one hand, a weak player may succeed in inducing the all-powerful player to take him into partnership out of the kindness of his heart or for some other reason. Or, on the other hand, the two weak players may ally simply as a gesture of social solidarity. Finally, players may misunderstand the actual power relationships and thus establish alliances out of ignorance. Table 3 shows that both of the younger male groups establish coalitions at better than chance expectancy between the two weak (and losing) players; the same tendency appears in the adolescent female groups. However, none of the inter-sex comparisons is significant. With regard to age, the 7-8 year old males arrive at the weak partnership significantly more often than do college students, whereas the strong alliance is less frequent in the 14-16 year old male triads than in the case of the female adolescent groups. It is interesting that only the youngest

female group yields a result closely in line with theoretical expectation, since they show the lowest frequency of the ineffectual (and losing) weak alliances.

A markedly contrasting picture appears under the all-different condition in which any pair can win. In this case, the two older age levels, of both sexes, arrive at the weak alliance in a very high (and significant) proportion of the games. This does not occur for the 7-8 year old females and only at the 10% level of significance for the 7-8 year old males. There are no significant sex differences within age-levels. The only significant difference between age-levels shows the adolescent female groups producing a higher proportion of weak alliances than the college females.

In general, as in the case of the all-powerful pattern, it is the youngest female groups who fall outside the typical result, since they do not show a preference for the weak coalition. This point will require later discussion, since there are at least three important reasons for its occurrence. (1) The children could disregard (or fail to understand) the weights. (2) Despite the weight-differences, the girls might merely prefer to treat each other equally (a typical aspect of accommodative strategy). (3) Treating the weights as equivalent might reflect a more "realistic" approach, since, in point of fact, winning is a function of reaching an alliance, regardless of weight.

Another way to look at the bargaining situation is to examine which player initiates the sequence of offers. Table 5 presents the pertinent data, for those patterns in which there are differences in weight. Here, "strong" refers to the person who held the largest weight, and "weak" refers

Table 3. Strong and Weak Alliances in the
All-Powerful Pattern (311).

% of Groups*	Male Groups		Female Groups	
	With Strong Member	Between Weak Members	With Strong Member	Between Weak Members
7-8 Year Old Children				
	N	9	7(6)	
Above Chance	0(11)	78(89)	43(33)	29(50)
Chance, or Below	<u>100(89)</u>	<u>22(11)</u>	<u>57(67)</u>	<u>71(50)</u>
	100	100	100	100
	Strong vs Weak: P = .01		n.s.	
14-16 Year Old Adolescents				
	N	10	8	
Above Chance	10(0)	80(80)	13(0)	88(88)
Chance, or Below	<u>90(100)</u>	<u>20(20)</u>	<u>88(100)</u>	<u>13(13)^d</u>
	100	100	101(100)	101
	Strong vs Weak: P = .02		P = .02	
College Students				
	N	20	24	
Above Chance	55	45	42	50
Chance, or Below	<u>45^b</u>	<u>55^c</u>	<u>58^d</u>	<u>50</u>
	100	100	100	100
	Strong vs Weak: n.s.		n.s.	

Inter-Sex: No difference is significant

Inter-Age: ^avs 7-8, $\chi^2 = .10$; ^bvs 14-16, $\chi^2 = 6.74$ ($P < .01$); ^cvs 7-8, $P = .01$, vs 14-16, $P = .01$.

*For alliances with strong member, chance = 67%; for alliances between weak members, chance = 33%. See note to Table 1 for other notations.

Table 4. Strong and Weak Alliances in the
All-Different Pattern (432).

% of Groups	Male Groups		Female Groups	
	With Strong Member	Between Weak Members	With Strong Member	Between Weak Members
7-8 Year Old Children				
N	10		7(6)	
Above Chance	20(40)	70(50)	43(33)	57(50)
Chance or Below	<u>80(60)</u>	<u>30(50)</u>	<u>57(67)</u>	<u>43(50)</u>
	100	100	100	100
	Strong vs Weak: P = .10		n.s.	
14-16 Year Old Adolescents				
N	10		9	
Above Chance	20(10)	80(60)	0(0)	100(100)
Chance or Below	<u>80(90)</u>	<u>20(40)</u>	<u>100(100)</u>	<u>0(0)</u>
	100	100	100	100
	Strong vs Weak: P = .05		P < .01	
College Students				
N	30		30	
Above Chance	7	73	7	67
Chance or Below	<u>93</u>	<u>27</u>	<u>93</u>	<u>33^a</u>
	100	100	100	100
	Strong vs Weak: $\chi^2 = 27.78$		23.24	
	P < .001		< .001	
Inter-Sex Inter-Age	No difference is significant ^a vs. college students, P = .01.			

Note: See preceding tables for explanation of notations.

to the other two members of the triad. It can be seen that three possibilities exist; namely, an offer made by the strong player to one of the two weak players, an offer directed by one of the weak players to the strong player, and an offer directed by one of the weak players to the other weak player. Since, in each case, there are two possible offers, each of these events has a one-third chance of occurring, if no preference were operating. The table shows the number of groups in which each of the three events occurred at better than this chance incidence.

In the case of the all-different pattern, differences between the sexes at all three age-levels are not significant. It is evident, however, that there is a marked difference between ages, since in triads at both older age-levels, the first offer is far more often made by one weak player to the other weak player, whereas the other two kinds of offer are rarely made. Although a similar tendency exists for the 7-8 year olds, it is not significant. Thus, the weights to a large degree are ignored by the children.

In the all-powerful pattern, however, the result is quite different. At the college level, there is a significant tendency for the weak players to initiate offers to the strong player (and secondarily to each other), a characteristic of this pattern which accords with remarks given above. The youngest female groups do not show a preference in this pattern, either, but the two younger male groups and the adolescent female groups tend to make "weak-to-weak" offers. Thus, three features stand out: (1) the youngest female groups seem to disregard the weights entirely; (2) the youngest male groups either fail to understand that weak alliances in this case are ineffectual, or the weak players endeavor to establish social

Table 5. Initiation of First Offer
to Ally, Showing Percentage of Groups Above Chance
in Each Kind of Offer.

Kind of Offer	7-8 Year Old Children		14-16 Year Old Adolescents		College Students	
	Male	Female	Male	Female	Male	Female
	<u>10</u>	<u>10</u>	<u>10</u>	<u>9</u>	<u>30</u>	<u>30</u>
ALL DIFFERENT						
N	<u>10</u>	<u>10</u>	<u>10</u>	<u>9</u>	<u>30</u>	<u>30</u>
Strong to Weak	1	2	1	0	4	3
Weak to Strong	4	3	2	1	0 ^a	3
Weak to Weak	5	6*	8*	8*	23*	21*
Within Sex*	n.s.	n.s.	P < .01	P < .01	P < .01	P < .01
Inter-Sex	No difference is significant.					
Inter-Age	^a vs. 7-8, P < .01.					
ALL-POWERFUL						
N	<u>10</u>	<u>10</u>	<u>10</u>	<u>9</u>	<u>28</u>	<u>27</u>
Strong to Weak	1	3	2	1	3	2
Weak to Strong	0	5 ^d	3	2	20* ^c	15*
Weak to Weak	8*	4	8*	8* ^b	11 ^d	12 ^f
Within Sex*	P < .01	n.s.	P < .01	P < .01	P < .01	P < .01
Inter-Sex	No difference is significant.					
Inter-Age	^b vs. 7-8, P < .01, ^c vs. 7-8, X ² = 12.35 (P < .01); ^d vs. 7-8, X ² = 4.88 (P < .05); ^e vs. 14-16, X ² = 4.88 (P < .05); ^f vs. 14-16, X ² = 3.86 (P < .05)					

*By the binomial test, as described in S. Siegel, Non parametric statistics. New York: McGraw-Hill, 1956. (Two-tail.)

Table 6. Amount of Bargaining.

Number of Offers	7-8 Year Olds		14-16 Year Olds		College Students	
	Male	Female	Male	Females	Male	Female
<u>Offers</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>30</u>	<u>30</u>
ALL-EQUAL						
6 or more	60(30)	50(0)	60(40)	20(10)	37	24
5 or less	<u>40(70)</u>	<u>50(100)</u>	<u>40(60)</u>	<u>80(90)</u>	<u>63</u>	<u>77</u>
	100	100	100	100	100	101
Inter-Sex	n.s.		n.s.		$\chi^2 = 4.44 (P < .05)$	
Inter-Age	No difference is significant.					
ALL-DIFFERENT						
6 or more	70(30)	40(20)	70(30)	30(20)	53	26
5 or less	<u>30(70)</u>	<u>60(80)</u>	<u>30(70)</u>	<u>70(80)</u>	<u>46</u>	<u>73</u>
	100	100	100	100	99	99
Inter-Sex	n.s.		n.s.		$\chi^2 = 4.44 (P < .05)$	
ALL-EQUAL + ALL-DIFFERENT						
12 or more	80(40)	40(10)	70(30)	20(10)	50	20
11 or less	<u>20(60)</u>	<u>60(90)</u>	<u>30(70)</u>	<u>80(90)</u>	<u>50</u>	<u>80</u>
	100	100	100	100	100	100
Inter-Sex	n.s.		n.s.		$\chi^2 = 6.58 (P < .02)$	
ALL-POWERFUL						
6 or more	80(40)	40(30)	100(50)	20(10)	13	13
5 or less	<u>20(60)</u>	<u>60(70)</u>	<u>0(50)</u>	<u>80(90)</u>	<u>86</u>	<u>87</u>
	100	100	100	100	99	100
Inter-Sex	n.s.		$P < .01$		n.s.	
Inter-Age	No difference is significant.					

Table 7. Mean Number of Offers in the
Bargaining Sequences of Three Age-Levels, in the
First Three Games.

	7-8 Year old		14-16 Year Old		College	
	Children		Adolescents		Students	
	Male	Female	Male	Female	Male	Female
N	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>30</u>	<u>30</u>
All-Equal	5.7	3.2 ^a	5.6	3.6	5.1	4.2
All-Different	4.7	3.2	8.0	4.0	5.7	4.5
All-Equal +						
All Different	10.4	6.4 ^b	13.6	7.6	10.8	8.7
All-Powerful	5.2	3.6	6.2	2.8 ^c	3.1 ^{de}	3.0

Inter-Sex- ^at = 2.45 (P .02); ^bt = 2.34 (P .01); ^ct = 3.91
(P < .01)

Inter Age- ^dvs. 7-8 year olds, t = 2.25 (P .02);

^evs. 14-16 year old, t = 3.65 (P .01)

solidarity against the strong player. (The former interpretation is reinforced if we consider the sheer numbers involved--there may well be greater perceived difference between the numbers "3" and "1", than between "4" and either "3" or "2."); (3) the adolescent groups do not treat the all-powerful pattern any differently from the all-different pattern, again for any of several possible reasons.

The bargaining situation may also be viewed in simple quantitative terms, merely by determining the number of offers made before a final decision is reached. Table 6 presents the data by the incidence of various lengths of bargaining sequence. In this respect, the only significant differences occur between the male and female triads at the college level, in the all-equal and all-different patterns, with males manifesting more frequently longer sequences.

If we argue that number of offers may be regarded meaningfully as a score, then it would be legitimate to conduct an analysis by t-test. This is shown in Table 7. It is evident that there is a very consistent tendency for the male groups at all three age-levels to bargain more extensively than do the female groups, although this reaches statistical significance in only three instances. There is also a difference in the all-powerful pattern, since both the younger male groups tend to bargain more in this situation than do the college males.

As in our other experiments, it is possible to compute a general index to strategy. To do so, we have found it meaningful to employ six signs that regularly distinguish male from female groups. We have cast these signs in the form that typifies feminine, or accommodative strategy, as follows:

1. Frequent failure to arrive at coalition in patterns when any two can win, here, all-equal and all-different (one or more "no coalitions".)
2. Frequent formation of triple alliances (one or more).
3. Unanimous agreement upon 50/50 deals in two-person alliances, when any two can win (100% agreement upon 50/50 deals).
4. Less active bargaining under the most competitive condition (3 or fewer offers in the all-different pattern.)
5. More bargaining when none is necessary (3 or more in the all-powerful pattern).
6. More frequent occurrence of "altruistic" offers, that is, one player suggests that the other two ally to his or her disadvantage (one or more).

It should be noted that a survey of the foregoing tables does not fully accord with this description (e.g., in the case of Number 5). We retain the index, however, as it has previously been employed, for the present analysis. As this series of studies has continued, there have been various suggestions that these aspects of play enter quite differently into the character of strategy, depending upon conditions of the game; perhaps the first three signs provide the best measures. (Exploratory research is underway to develop a better assessment of strategy.) It happens, to anticipate the results, that the index based on the first three signs yields results, at least in this case, identical with the total for all six signs. Certain variations in procedure, as mentioned above, reduce the precise comparability of the data. The two younger groups played the games of a given power-pattern in succession, whereas a randomized succession was followed with the college students. This change in procedure was

prompted by an effort to increase familiarity with the relationships among the weights, as suggested by other experiments (see Kelley and Arrowood, 1960) In general, we have found little difference between these variations, but of course, it must be considered a possible influence on the results.

Scoring is simple: one point is assigned to each group for each of the signs in each of the three games of the specified pattern(s), and the sum determined. Table 8 presents the result.

With respect to sex differences, the female college students show a far greater incidence of accommodative strategy than the males in each game and for the total of the three games. The difference is in the same direction for the high school students, but it is significant only when the total for the three games is determined ($P = .05$, by the Fisher Exact Test.) The difference for the youngest subjects is not significant, and there is actually a tendency for the male triads to display more accommodative strategy than is the case for the female groups.

When we look at inter-age comparisons, there is little difference between the high school and college females. The high school male groups, however, tend to manifest more accommodative strategy than do the college males. In the youngest age-groups, the males are not significantly different from the 14-16 year old males, despite a general tendency to be more accommodative. They do, however, differ in this respect to a highly significant degree from the college male triads. The youngest female groups show significantly less accommodative strategy than the high school females only in the first game, with a tendency for this to be reversed in later games. The youngest females differ from the college females only in the first game.

Table 8. Incidence of Accommodative Strategy
at Three Age-Levels (in % of groups.)

No. of Signs	N	7-8 Year Old Children		14-16 Year Old Adolescents		College Students	
		Male	Female	Male	Female	Male	Female
		<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>30</u>
GAME 1							
3 or more		30	0	40	50	10	57
2 or less		<u>70</u>	<u>100</u>	<u>60</u>	<u>50_a</u>	<u>90_b</u>	<u>43_c</u>
		100	100	100	100	100	100
Inter-Sex		n.s.		n.s.		$\chi^2 = 23.24$ ($P < .001$)	
Inter-Age		$\text{avs. 7-8, } P = .05; \text{ bvs. 7-8; } \chi^2 = 4.82 \text{ (} P < .05\text{);}$ $\text{cvs. 7-8, } \chi^2 = 7.90 \text{ (} P < .01\text{)}$					
GAME 2							
3 or more		60	50	10	10	10	34
2 or less		<u>40</u>	<u>50</u>	<u>90_d</u>	<u>90_e</u>	<u>90_f</u>	<u>66</u>
		100	100	100	100	100	100
Inter-Sex		n.s.		n.s.		$\chi^2 = 10.74$ ($P < .001$)	
Inter-Age		$\text{dvs. 7-8, } P = .10; \text{ evs. 7-8, } P = .01;$ $\text{fvs. 7-8, } \chi^2 = 7.53 \text{ (} P < .01\text{); gvs. 14-16, } \chi^2 = 4.82$ $\text{(} P < .05\text{)}$					
GAME 3							
2 or more		100	90	50	80	20	86
1 or less		<u>0</u>	<u>10</u>	<u>50</u>	<u>20</u>	<u>80_h</u>	<u>14</u>
		100	100	100	100	100	100
Inter-Sex		n.s.		n.s.		$\chi^2 = 25.90$ ($P < .001$)	
Inter-Age		$\text{hvs. 7-8, } \chi^2 = 16.49 \text{ (} P < .001\text{); ivs. 14-16, } P = .01.$					
*N = 29, after Game 1, since one group established a permanent alliance.							

Table 8. (Continued)

<u>No. of Signs</u>	7-8 Year Old		14-16 Year Old		College	
	Children		Adolescents		Students	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
TOTAL						
8 or more	60	30	10	20	7	41
7	10	50	10	20	7	24
6	30	10	0	40	3	24
5	0	10	60	0	0	3
4	0	0	10	20	20	7
3 or less	<u>0</u>	<u>0</u>	<u>101</u>	<u>0</u>	<u>63k1</u>	<u>0</u>
	100	100	100	100	100	100

Inter-Sex

n.s.

P = .05

 $x^2 = 31.49$
 (P < .001)

Inter-Age

 j vs. 7-8, P = .10; k vs. 7-8, $x^2 = 12.06$ (P < .001);

 l vs. 14-16, $x^2 = 8.54$ (P < .01)

Thus, we find quite a consistent picture revealed by the general index to accommodative strategy, with sex differences increasing with age. At the 7-8 year age-level the two sexes do not differ significantly, although the females actually tend to display less accommodative strategy than their male counterparts. At the 14-16 year age-level there are distinct indications that the sex difference is becoming clearly established. It has become highly significant at the college level.

Discussion

The consistent results presented in the foregoing tables enable us to arrive at a clear interpretation of how strategy in intra-group competition changes from childhood to adulthood. Since there are many specific details to consider, we have brought the salient points together in the accompanying summary table. Each variable is shown in a fashion which describes as simply as possible the general trend of the data.

The differences between the sexes which we have often found before (Vinacke, 1959; Bond and Vinacke, 1961; Vinacke, 1962) are quite apparent at the oldest age-level. The female triads often arrive at triple alliances and 50/50 deals (in two-person coalitions), thus manifesting a distinct preference for decisions based on equal treatment of members of the group. Females tend to bargain less actively than males--at least when alliances are necessary to win. Furthermore, they tend more often to establish alliances in the all-powerful pattern, when coalitions are not necessary to win--and, in fact, when it could be argued that any sort of alliance is futile. Although this behavior could be interpreted as lack of understanding of the conditions of playing the game (i.e., the relative weights), the general

Summary of Age- and Sex Differences

	7-8 Year Old		14-16 Year Old		College	
	Children		Adolescents		Students	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
In Patterns When						
<u>Any Two Can Win</u>						
No Coalition	Many	Many				
Triple Alliances	Many	Many		Many		Many
50/50 Deals	Very Many	Very Many		Many		Many
Type of Alliance			Many Weak	Many Weak	Many Weak	Many Weak
Initiation			Often Weak-Weak	Often Weak-Weak	Often Weak-Weak	Often Weak-Weak
Amount of Bargaining		More than Female		More than Female		More than Female
In All-Powerful						
<u>Pattern</u>						
Two-Person Alliances	Many	Many	Very Many	Very Many		Many
50/50 Deals	Very Many	Very Many		Very Many		
Type of Alliance	Many Weak			Many Weak		
Initiation	Often Weak-Weak		Often Weak-Weak	Often Weak-Weak	Often Weak-Strong	

Summary of Age- and Sex Differences
(continued)

	7-8 Year Old Children		14-16 Year Old Adolescents		College Students
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u> <u>Female</u>
In All-Powerful Pattern					
Amount of Bargaining			More than Female	More than Female	
<u>Accommodative Strategy</u>			High	(Higher than College)	High

trend of our experiments suggests that the essential character of accommodative strategy is responsible. Females evidently orient their efforts more towards the mutual satisfaction of the members of the group than towards the goal of winning itself.

Much of the same picture appears in the case of the adolescent groups, which closely resemble their older counterparts. There are, however, some exceptions that occur in the all-powerful pattern. This situation, apparently, is managed quite similarly to the patterns in which any pair can win, although this characteristic is manifested to a much greater degree in the female adolescent triads. The difference between the two older age groups is especially striking with respect to bargaining. Male college students strive to induce the all-powerful player to enter into partnership ("weak-to-strong" initiations), whereas bargaining begins with offers of one weak player to the other weak player in the high school ^{groups,} similarly to the all-different pattern. The reason for this contrast is not really clear from the present study, since it could be a function either of a tendency towards accommodative strategy or of misunderstanding the weight. Both may be involved, and we must await further research to resolve the issue. We have introduced questionnaire procedures, following, for example, the work of Kelley and Arrowood (1960), to seek clarification.

It is the two youngest groups that provide perspective on the development of strategy. There are both important similarities and differences between the two sexes. They are alike in their tendencies to avoid coalition, to establish triple alliances, and to reach 50/50 deals. They are alike, also, in failing to differentiate among the weights, as shown in both types of power-pattern in which weight-differences occur. They differ, however, in

other ways. The youngest male groups tend to bargain more than the females (thus resembling older males). Furthermore, in the all-powerful pattern, the males act more nearly as they would be expected to act in the all-different pattern, by preferring to establish relationships between the two weak players. From this standpoint, at least, it would appear that the children actually understand the function of the weights, but simply fail to realize that in this instance alliances are ineffectual. We suggested above that there may be a sharper perceived difference between 3 and 1 than among the numbers 432. If this be true, then the younger children, as we might expect, are more deficient in simple arithmetic than in ability to grasp the game itself. Final clarification, however, must await the sort of questionnaire study indicated above.

Scrutiny of the summary table suggests that an age-by-age trend exists in these data, with the adolescent triads falling between the children and college students, resembling the oldest groups in some respects, the youngest groups in others. When we compute an overall index of strategy, however, it becomes clear that this trend is considerably more marked for the three male groups than for the females. In fact, the latter are closely similar in their general tendency to manifest the signs we have associated with accommodative strategy. This behavior is more typical of the youngest females in later than in earlier games in a sequence, but nevertheless the difference in total score is not significant.

In the case of the male groups we find a steady progression with age. Both the 7-8-year-old and 14-16-year-old triads display a significantly higher incidence of accommodative strategy than do the college triads. However, although the youngest triads are higher in this respect than the

adolescents, the difference reaches only the 10% level of significance.

Thus, to a remarkable degree, the girls at all three age-levels display the characteristics of accommodative strategy. Boys, however, appear to change drastically from behavior quite similar to that of girls to the contrasting strategy which we have called "exploitative." Competitiveness, intensive effort to defeat one's opponents, the driving of as hard a bargain as possible, the capitalization upon strength and power (if necessary by the pooling of resources)--such behavior so typical of adult males appears to exist only in rudimentary form in small boys.

There is a possibility, of course, that the results reported here could be accounted for by saying that sex-differences are tending to become less marked in our society. Thus, the similarity between boys and girls at the 7-8 year level would be explained. However, it is rather difficult to believe that so great a change could occur during an interval of only 4-7 years.

This exploratory study, of course, only points out an area for research by revealing that strategy in coping with competitive situations changes with increasing age. Innumerable questions remain to be answered. We should like to trace these changes in more precise detail by filling in the age-gaps between the periods we have chosen, perhaps to pinpoint some critical stage at which males become exploitative. This experiment suggests that it lies either in later childhood (at about age 10), or somewhat later. (Cf., in support, Piaget, op. cit.)

In an experiment by Bond and Vinacke (1961), exploitative and accommodative strategy were brought together by the formation of mixed-sex triads.

Under these conditions, rather decided advantages emerge for accommodative strategy, since exploitative tactics tend to be self-defeating: opponents may succeed, so to speak, in defeating each other, but in the process another party may easily come out ahead. Obviously, it would be desirable to confirm these findings at other age-levels than the college age.

It has become evident in other experiments that the behavior to be observed in a competitive game like that employed here varies markedly in other situations. For instance, Uesugi and Vinacke (1963) and Vinacke and Stanley (1962) have made use of a quiz game in which the content is designed to be especially appealing either to males or females. Although the two sexes still manifest the same kinds of difference, feminine content tends to increase accommodative strategy (especially in the female groups.) One could adapt this procedure to age differences, by devising situations with special relevance to the subjects studied. Until this step is taken, we must allow for the possibility that our game is not pertinent to the experience of young children (at least to boys).

In still another experiment, yet to be reported, we have investigated inter-group competition in special games in which the intra-group power-relationships employed in our other experiments are retained. Under such conditions, the objective of defeating the opposing group become paramount, and the intra-group differences in strength are practically ignored. In fact, virtually all decisions are unanimous and deals become almost exclusively triple alliances. It would be interesting to replicate this experiment with subjects of different ages.

Finally, in discussions of our research, speculations have arisen repeatedly about the behavior that would be typical of persons beyond the college age. Is exploitative strategy primarily a mark of the young male adult? Do older men, in the course of the softening influences of family and community life (and of working through a career)--if they be, in fact, "softening"--tend to become more accommodative? Do older women, by contrast, tend to become more exploitative, as they complete their families and participate more actively in other affairs? Or do males become increasingly exploitative and females increasingly more accommodative? And to what extent do such possible trends differ in various situations, for example, in same-sex versus mixed-sex settings, and in homogeneous-age versus heterogeneous-age groupings?

Future research must clarify these points.

Summary and Conclusions

Following the finding in previous experiments that male and female triads contrast in the strategy typically displayed in a competitive game, an experiment was conducted to explore such differences as a function of age. Ten triads of each sex at the two age-levels, 7-8 years and 14-16 years, played the same game (slightly modified) as had previously been employed with college students (30 triads of each sex.) Four games, each, were played of three power-patterns: three players equal in strength, three players different in strength (but no player stronger than the other two in alliance), and one player all-powerful (that is, stronger than the other two in alliance.) Coalitions were permitted. Comparisons by sex and age were conducted for the incidence of coalitions, 50/50 deals, the effect of relative strength on bargaining, amount of bargaining, and overall strategy

Numerous significant differences between the sexes and between age-levels in the above-mentioned variables were found. In general, results for the two-older ages show consistent differences between the sexes in the several aspects of strategy, with females high in accommodative strategy and males low in accommodative strategy (or high in exploitative strategy). For the youngest age-level, however, these differences do not appear, and, in fact, the 7-8 year old males actually show more accommodative strategy in some respects. Thus, females at all three age-levels are rather similar in their behavior in this game, whereas the youngest males differ markedly from older males.

It is concluded that there are significant age-differences in male ^{this} strategy in/competitive situation, with some evidence for a shift from accommodative to exploitative characteristics between the 7-8 year and 14-16 year levels. Females at the ages studied, however, do not differ very much in strategy, but manifest a high degree of accommodative strategy throughout the age-range.

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Appendix. Instructions

At the beginning of a session, the experimenter would act in the role of a friendly, but objective mentor. He would introduce the players to each other, help them settle in the three seats open around the board, and so on. He would arrange the game-materials in proper form, explaining in a conversational way that the board would be used for a game, that he would explain the situation/^{to}them in a moment, or uttering other informal comments. Then the standardized instructions would be presented. For the youngest age-level (7-8 year olds), E delivered the instructions orally, but at the two older ages, he had the subjects read them from identical cards. In both cases, every effort was made to promote understanding of the very few major characteristics of the game, by asking for questions and answering any that were raised. Of course, E avoided any suggestions concerning play, by simply restating instructions, when a question concerned the rules, or generally remarking to the effect that the players could decide for themselves, etc. At each age, E was careful to point out features of the board--"Start", "Home", numbered spaces--and to explain that the objective was to get "Home" first.

Instructions presented to the younger groups (7-8 and 14-16 years) ran as follows:

This is a game among three players. Before each game, each player will draw a number. This number will determine the player's strength for that game. You will move by multiplying* your number times the value of a die, thrown by the experimenter. For example, if you draw the number "2" and the die comes up "3", you will move six spaces.

* For the 7-8 year groups, read "adding your number to".....

A prize of 100 points will be given to the winner or winners, except that it will be divided in the case of ties.

At any time during the game any player may join forces with any other player if the other player agrees. If you do this you must decide upon how you will divide the prize if you win. After joining forces you add your numbers and proceed the number of spaces of the combined numbers. From then on the two players use their combined numbers in moving.

Any player may admit defeat if he feels he cannot win.

Instructions to the college students were as follows:

This game is a contest between three players. Before each game each player will draw a counter out of a hopper. The number on this counter will determine the player's strength for that game. You will move by multiplying your weight times the value of a die, thrown by the experimenter. For example, if you draw a weight of "2" and the die comes up "3", you will move six spaces. A prize of 100 points will be given to the winner or winners, except that it will be divided in the case of ties.

At any time during the game any player may form an alliance with any other player. In this event, players entering into alliance must decide upon how they will divide the prize if they win. After forming an alliance, players join forces and proceed to the position represented by their combined acquired spaces; thereafter, they use their combined weights in moving.

Any player may concede defeat if he or she considers his or her position to be hopeless.