# THE EFFECTS OF GRADE, POWER, AND SEX COMPOSITION OF TETRAD GROUPS ON THE DEGREE OF COOPERATION AMONG YOUNG CHILDREN ENGAGED IN A MIXED-MOTIVE GAME

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# CHAPTER I

## INTRODUCTION

> While the law of competition may be sometimes hard for the individual, it is best for the race, because it insures the survival of the fittest in every department.
>
> Andrew Carnegie (Wrightsman, 1973, p. 97)

> The law of life should not be competition of acquisitiveness, but cooperation, the good of each contributing to the good of all.
>
> Jawaharlal Nehru (Wrightsman, 1973, p. 97)

In many everyday situations individuals are faced with the choice of cooperating or competing. Depending on the situation and the participants, some people will choose to cooperate, and some will choose to compete. For example, observe two people headed for the same seat in a crowded football stadium. Does one yield while the other pushes ahead? The motives behind such a choice are not observable and must be inferred from the individual's behavior, but a preference for one way of behaving can be established for any given individual if subjected to systematic observation.

Most psychologists would agree that the rudiments for such a preferred way of behaving develops from motives that are learned in childhood. As a child becomes socialized, s/he develops characteristic motives.

This socialization process normally does not get underway until the child overcomes egocentrism and develops an awareness of the existence of other persons. Maudry and Nekula (1939) have shown that children of 25 months were more attracted to a toy than to another child, but after this age the infants began responding to the existence or activity of another playmate. Rudimentary forms of cooperative play and of mutual aid in the solution of problems requiring collaborative efforts first appear in older preschool children between the ages of four and six (Gottschaldt and Fruharif-Ziegler, 1958; Hirota, 1951; Meister, 1956; Wolfe and Wolfe, 1939; and Zak, 1968). Though appearing at a somewhat earlier age, studies of competitive behavior also indicate that children characteristically do not compete with others prior to these years (Greenberg, 1932; Kagan and Madsen, 1971, 1972; Leuba, 1933; McClintock and Nuttin, 1969; McKee and Leader, 1955; and Parten, 1932-33). However, both behaviors and types of play--cooperative and competitive--increase dramatically after this age period, particularly during the elementary school years (Alvy, 1968; Azrin and Lindsley, 1956; Baldwin, 1955; Fry, 1967; Graves, 1937; and Vinacke and Gullickson, 1964).

Robert J. Havighurst (1972) suggests that of these two kinds of behavior, learning to cooperate with age-mates is the primary developmental task of these middle-childhood years between the ages of six and twelve. He describes the

nature of this task in terms of learning the give-and-take of social life among peers; that is, learning how to make friends and get along with enemies. Increasing numbers of psychologists, anthropologists, and sociologists seem to agree with Havighurst and the importance he places on this developmental task--getting along with others. In today's modern world it seems to be a far more essential skill for coping successfully than learning how to make it on your own. The technological and overpopulated state of our world appears to be bringing a rapid end to the Andrew Carnegie days of the "self-made man". Few people can survive economically today in an isolated, extended family, agrarian setting, or even a small town, nuclear family, entrepreneur setting. Out of economic necessity more and more people have been forced to abandon the "American Dream" and face the realities of life together in the cities and their factories, shopping centers, and freeways. Arthur Toffler's "future shock" (1970) is here and we have yet to consider the necessary social changes man must make if s/he is to survive as a species.

Our schools are still teaching our children during those critical middle childhood years that competing rather than cooperating is the means for survival. Being better than everyone else is still valued more than a successful group effort. Our schools transmit this societal value in numerous ways, a few of which include our comparative grading practices, our homogeneous ability grouping practices, our

employment of individualistic reward structures rather than promotive interdependent structures (Deutsch, 1949), and the competitive atmospheres fostered in most of our physical education and athletic programs. All these and many more popular teaching methods communicate to our children that one's self-worth is determined by how one performs in comparison to one's peers. Erikson (1963) would suggest that it is competitive arenas, such as these in our schools, which cause many children to develop senses of inferiority and inadequacy in their strivings for a sense of competency and industry in their social world.

Even our female children, who have traditionally been socialized to become cooperative and altruistic individuals, seem to be receiving a more competition-oriented socialization today. This reversed social conditioning for females is aimed at improving their lot and eliminating women's feelings of incompetency and fears of success. The liberation movement's eventual goal is to provide social and economic equality between the sexes and put an end to discrimination by sex. Though the goals of this movement are admirable indeed, the paradox lies in the means by which proponents of it appear to be trying to achieve their ends. These means include giving young women in our society more of the same outmoded, maladaptive competitive and rivalrous training and preparation that our young men have been subjected to for centuries. An assumption with the reasoning value of the proverbial saying "What is good for the goose

is good for the gander!" seems to have been made here. There is no evidence to suggest that an evaluation of the appropriateness or applicability of this type of socialization for our young people has any validity for success, adjustment, and survival in the tomorrows of the future.

The perpetuation of this societal value for competition via new, impetutous social trends such as this, and old, traditional teaching practices and priorities as those mentioned previously, seems to need more careful consideration and scrutiny. Jonas Salk, a biologist and author of a book insightfully entitle, The Survival of the Wisest, seems to have aptly summarized the situation: "A complete inversion of values is necessary if man is to move from the Darwinian era to the epoch of cooperation; the alternative is species suicide" (Phi Delta Kappan, 1975, p. 667).

The social, economic, and ecological needs of our times clearly indicate that sound reasoning and foresight would be demonstrated if more of our time, energies, and monies were spent on trying to understand and promote the conditions which foster cooperation amongst people and deter competition. Since it appears that these motives and subsequent behaviors begin at an early age, then it would seem logical that both our investigation and intervention efforts are concentrated on populations of young children. In a review of the research on cooperation and competition as early as 1957, Phillips and DeVault noted this need:

> The developmental and antecedent aspects of cooperation and competition have not been sufficiently investigated. . . (although) the studies which are available suggest such factors may be important in understanding cooperation and competition (pp. 291-292).

In a more recent review of the literature in this area (Cook and Stingle, 1974), the authors found that in the past several years there has been an increased interest in studying cooperative behavior though they add that this kind of research is still at a minimal level. They also concur with this author's position that in a world with today's social and political problems, it seems reasonable to devote extensive effort to the investigation of cooperative behavior. With these factors in mind, the present investigation into the antecedents and conditions for the development of cooperative behavior was undertaken.

## Statement of the Problem

As McClintock and Nuttin (1967) note, one of the major problems in studying coperative behavior in children is finding reliable and valid measures of such behavior. Most of the adult research on cooperative behavior has employed the Prisoner's Dilemma Game (Galls and McClintock, 1965), a dyadic or two person, forced-choice game. Recently, Tedeschi, Hiester, and Gahagan (1969) have developed a modified version of the Prisoner's Dilemma Game for use with preadolescent populations. Unfortuantely, studies using modifications of the Prisoner's Dilemma Game suitable for

children have produced conflicting results suggesting that such games are not appropriate for measuring cooperative behavior in children (Lindskold, Cullen, Gahagan and Tedeschi, 1970; Tedeschi, Hiester, and Gahagan, 1969).

Other studies of children's cooperative behavior have been carried out using measuring procedures developed by Madsen and his colleagues (Kagan and Madsen, 1971, 1972a, 1972b; Madsen, 1967, 1971; Madsen and Shapira, 1970; Nelson and Madsen, 1969; Shapira and Madsen, 1969, 1974). These procedures, which include the Cooperation Board, Circle Matrix Board, and Marble-Pull Game, are similar to the Prisoner's Dilemma Game in that they are dyadic and forced-choice in nature. Although use of these measuring techniques has revealed some interesting cross-cultural, and subcultural differences, they have also produced a large number of discrepant results suggesting that these games may not be the best measures of cooperative behavior in children (Kagan and Madsen, 1971; Nelson and Madsen, 1969; Spiro, 1965; McKee and Leader, 1955; and Szal, 1972).

It is this author's belief that conflicting results have been produced by studies utilizing modifications of the Prisoner's Dilemma Game, or one of the games of Madsen et al., because these games are not very representative of real-life situations involving cooperation and competition. First, they are designed to allow interaction between only two persons. In the real world individuals have the freedom to choose between interacting or not interacting with any

number of different people. Second, these games allow for no communication, or only minimal communication, between players, a restriction non-existent in the real world. Third, these games are forced-choice in nature; that is, the players are forced to choose between cooperating or competing. In the real world, this either-or restriction does not exist and people are free to both cooperate and compete as much as they want. Engaging in cooperative behavior does not preclude engaging in competitive behavior and vice versa. These criticism make questionable the value of the data that have been produced by studies using dyadic, forced-choice measuring devices.

To avoid these problems this study employed a negotiable essential game, called Sticks and Chips, which is a game in which it is necessary to be a member of a winning coaliation in order to bargain for any of the payoff. Although negotiable essential games have been used extensively to study adult coalition formation (Bond and Vinacke, 1961; Caplow, 1956; Mills, 1953, 1954; Shears, 1966; Vinacke, 1959; Vinacke and Arkoff, 1957), such games have only been used in a few studies of cooperative behavior in children (Shears, 1967; Shears and Behrens, 1968, 1969; Vinacke and Gullickson, 1964). The negotiable essential game used in this study, that is, Sticks and Chips, was developed by Loyda M. Shears (1967).

The advantages of using Sticks and Chips over the more popular dyadic, forced-choice games are as follows: (1) it

allows for small group interactions, (2) it involves a lot of verbal and nonverbal communication amongst players, and (3) it allows players to cooperate and compete independently of each other. The Sticks and Chips game simulates the real world social interactions involving cooperative and competitive behavior to a much greater extent than modifications of the Prisoner's Dilemma Game or similar dyadic games. It was felt that by employing Sticks and Chips in this study, two things would be accomplished: (1) useful information concerning children's cooperative behavior would be obtained and (2) the construct validity of the Sticks and Chips game would be further extended. To accomplish these ends the Sticks and Chips game was employed to investigate three specific problems concerning children's cooperative behavior: (1) the relationship between age and cooperation, (2) the relationship between group sex composition and cooperation, and (3) the relationship between power and cooperation.

Reviews of the literature on the relationship between age and cooperative behavior have come to conflicting conclusions. On the one hand Cook and Stingle (1974, p. 922) concluded that "both cooperative behavior and competitive behavior have been found to increase with age" and, on the other, Wrightsman (1973, p. 107) stated that "in comparison with 14- to 16-year-olds children from ages 7 to 8 bargain less actively, establish unnecessary alliances more frequently, and make more cooperative efforts to achieve mutual satisfaction." The reason for this contradiction may lie in

the kinds of studies examined by the two reviews. Cook and Stingle primarily reviewed observational studies and studies employing dyadic, forced-choice games like the Prisoner's Dilemma Game, while Wrightsman reviewed studies employing negotiable essential games. Although the present study did not propose to resolve this controversy, it did attempt to find out whether the negative relationship between age and cooperative behavior, previously found when negotiable essential games were used (Shears and Behrens, 1969; Vinacke and Gullickson, 1964), could be replicated. Furthermore, to gain additional information on the relationship between age and cooperative behavior, the range of ages investigated in this study was extended downward from that examined in previous studies. The first hypothesis of this study was that younger children would demonstrate significantly more cooperative behavior when engaged in a mixed-motive game than older children.

The second problem that was investigated in this study was the relationship between group sex composition and cooperation. Literature reviews of cooperative behavior in children by both Cook and Stingle (1974) and Maccoby and Jacklin (1974) have concluded that surprisingly few studies of cooperative behavior in children have looked at sex differences. Cook and Stingle (1974) speculate that the absence of data on this variable may be due to the fact that "the samples were too small to perform reasonable separate analyses (which was frequently the case), because no

differences emerged, or because this variable was not of primary interest" (1974, pp. 922-923). The few studies which do examine this variable with populations of young children have not shown conclusively that sex is a variable influencing cooperative behavior. However, a trend supporting the popularist notion that females are more cooperative and males are more competitive is observable (Maccoby and Jacklin, 1974). These results have been found both by studies employing dyadic, forced-choice and negotiable essential games.

In light of the scarcity of studies examining the effect of the sex variable on cooperative behavior, it is not surprising to discover that only one previous study could be found that examined the effects of sex composition of groups on cooperative behavior and this study involved adults (Bond and Vinacke, 1961). In view of what has been observed about children's changing preferences with regards to sex of peer associates during the middle school years (Elkind, 1971), examining the effect of group sex composition on cooperation would seem to be appropriate. This task was undertaken in the present study. Specifically, this study sought to find out whether the homogeneous or heterogeneous sexual makeup of children's groups has any effect on cooperative behavior. Since there was some evidence to suggest that females are more cooperative than males, it was predicted that all female or predominantly female groups would be more cooperative than subjects in all male, predominantly

male, or equal sex groups. The second hypothesis of this study was that both the all female and female majority sex composition groups would demonstrate significantly more cooperative behavior than the equal sex, all male, or male majority sex composition groups.

The third problem that was investigated in this study was the relationship between power and cooperation. Although the effect of power on cooperation has been extensively studied with adult subjects (Bond and Vinacke, 1961; Caplow, 1956; Mills, 1953, 1954; Shears, 1966; Tedeschi, Lindskold, Horai, and Gahagan, 1969; and Vinacke and Ankoff, 1975), it has received little attention with children (Cook and Stingle, 1974). The few studies which have examined the effect of power on the cooperative behavior of children found a negative relationship between the two variables. In general, as power increased cooperative behavior decreased (Shears and Behrens, 1968, 1969; Vinacke and Gullickson, 1964). The expectation was that the present study would replicate these results. The third hypothesis of this study was that players holding the high power position would demonstrate fewer cooperative behaviors than players holding either the moderate or low power positions.

Interestingly enough the same few studies (Shears and Behrens, 1968, 1969; Vinacke and Gullickson, 1964) which examined the effect of power on cooperation within children's groups also found that there appears to be an age by power interaction. That is, with age children become less

cooperative when they possess a high power status within the group. This finding is understandable from the standpoint that older children probably place more importance on the value of winning and have a better understanding of the effect of power in this society to accomplish that end than younger children. In an effort to further establish this minimally validated rationale, it was predicted that power would decrease cooperative behavior amongst older children to a greater degree than it would decrease cooperative behavior amongst younger children. The fourth hypothesis of this study was that the high power position would decrease cooperative behavior amongst fourth graders to a greater degree than it would amongst first graders.

## Theoretical Approach

In terms of reaching an understanding of the development of cooperative motives and behavior based on some existing theoretical framework, the best approach appears to be to combine a number of explanations, for no one theory adequately describes its development. This is largely due to the fact that no one has attempted to write a theory specifically dealing with cooperation. This behavior is usually explained by extrapolating from more general and broader psychological frames of reference.

In view of this state of the theoretical information available on cooperation, it was necessary to use parts of both the cognitive-theorists and the social-learning

theorists explanations of human behavior to reach any logical understanding of cooperative behavior. The cognitive-theorists seem to offer the best explanation as to why cooperative behavior is not observable in children until the later preschool years (Gottschaldt and Fruharif-Ziegler, 1958; Hirota, 1951; Maundry and Nekula, 1939; Meister, 1956; Wolfe and Wofe, 1939; and Zak, 1968), and why competitive behavior is observable at somewhat earlier ages and remains more characteristic of children until at least the beginning of elementary school and the middle childhood years (Greenberg, 1932; Kagan and Madsen, 1971, 1972; Leuba, 1933; McClintock and Nuttin, 1969; McKee and Leader, 1955; and Parten, 1932-33). Their explanation for this phenomena is in terms of cognitive growth and maturational propencities. That is, they suggest that prior to these later preschool years, and sometimes not until as late as the elementary years, children are basically egocentric in their thinking and behavior. Initially infants and young toddlers have little awareness of the existence of others or their relationships to themselves; they are described as lacking object permanence (Phillips, 1974). Once object permanence is obtained children move into a stage of cognitive development in which they begin to understand their relationship to others and the effects they can have on their environment, but they are still unable to comprehend that what they are thinking or feeling may not be what someone else is thinking or feeling. Their thinking, and likewise their behavior, is

very egocentric and prelogical in nature (Phillips, 1975).

One of the most significant developmental psychologists of our times, Jean Piaget, put forth a theory of cognitive development in which he describes in great detail the changes which take place in children's thought processes from birth through adolescence and the effect these cognitive abilities and limitations have on their behavior (Piaget, 1928, 1952a, 1952b, and 1972). His theory has received wide recognition and has been empirically tested and supported by numerous followers of his beliefs (Inhelder and Piaget, 1958; Laurendeau and Pinard, 1962; Saltz, 1971; and Snedslund, 1961).

What is important about Piaget's theory and other cognitive explanations to our understanding of cooperation is that their position suggests that children are not cognitively capable of making a true cooperative response until they have overcome these early maturational limitations and passed through what Piaget called the "heteronomous" stage of cognitive and moral development (Piaget, 1932). In his book, The Moral Judgment of the Child, Piaget presents a two-stage theory of moral development which is based on his observations of the way cognitive factors effect the moral reasoning and judgments of children given a series of paired short stories calling for a moral judgment about the actions of the characters in these stories. On the basis of age differences in the responses to these stories, Piaget concluded that it is not until the second stage of moral

development, the "autonomous" stage, which he estimates that most children do not enter until around eight years of age, that children are capable of mutual respect and genuine cooperation with one another (Ausubel and Sullivan, 1970). He would suggest that any act, which appears cooperative in nature and occurs during the "heteronomous" state, was probably imposed on the child by parents or served some hedonic function (Kay, 1968). Havighurst (1972) uses several references to Piaget and his theory of moral development to support his contention that middle childhood is the crucial period for learning the morality of cooperation, and thus, the most important developmental task during the elementary school years. Havighurst suggests that it is through social interactions with his peers that the child:

> . . . learns that rules are necessary and useful to the conduct of any social enterprise, from games to government, and thus learns a 'morality of cooperation or agreement' which is true moral autonomy and necessary in a modern democratic society. . . (1972, p. 28).

Another well-known cognitive theorist, Lawrence Kohlberg, became interested in this area of moral development and after twelve years of very systematic examination of peoples' judgments to moral dilemma stories has proposed his own stage theory of moral development (Kohlberg, 1963a, 1963b, 1969, and 1971). His elaborate six stage theory suggests that Piaget's two-stage theory might be too simplistic to explain all the factors behind peoples' moral reasoning and decisions. Though he probably would agree with Piaget's characterization of the earliest stage of moral

development (what Kohlberg calls the "preconventional" level), he would not agree with the rudimentary way Piaget explained all moral reasoning and behavior after that stage. Kohlberg (1963a, 1963b, and 1971) suggests that after the egocentric and hedonic phase of cognitive and moral growth, the individual moves into a "conventional" level of morality in which his thinking and behavior is based on what society dictates as being right or wrong, good or bad. He divides this conventional level into two separate, and yet highly similar oriented stages, which he calls the "good-boy, good-girl" stage and the "law and order" stage.

Here is where an understanding of both Kohlberg's and Piaget's theories would suggest that they would differ in their explanation of why children choose to cooperate or compete. Whereas Piaget's theory implies that now that the child is capable of a genuine cooperative act s/he will begin to make decisions based on reciprocity and equity (Kay, 1968), Kohlberg's theory suggests that such a change is not as automatic and will not necessarily follow. Instead a child of conventional morality will be more likely to formulate moral judgments based on whatever the majority and the rules say is right or wrong, or on whatever will receive social approval. Therefore, Kohlberg would suggest that children functioning at this level of moral development will behave in whatever manner is necessary to obtain recognition and reinforcement from authority figures and their peer groups. At this level what is right becomes

"what everybody else would do," or "what the teacher or the law says is right." Since research has shown that most elementary-aged children function at this conventional level of morality (Kohlberg, 1963a), the decision to behave cooperatively once the ability is acquired becomes largely a matter as to whether or not such an act is rewarded, gains approval, or is the norm.

On the basis of these theoretical assumptions, it is not difficult to see how children at this stage of development could be easily influenced by models--both adult and peer--in their environment. Social-learning theorists suggest that in their efforts to seek approval from significant others, children will imitate the social behaviors of both adult and peer models whether or not there is any direct reward or reinforcement for such imitative behavior (Bandura, 1969). These theorists claim that many social behaviors--aggression, fear, disobedience, altruism--are learned merely through observation of a potent model and that if a behavior is observed being rewarded it will more than likely be imitated (Bandura and Walters, 1963). To illustrate how pertinent modelling behavior can be towards our understanding of cooperation, studies by Hartup and Coates (1967) should be carefully considered. In their study of four- and five-year-old children, they demonstrated that the mere observation of an altruistic peer model (a confederate child who gave away his trinkets) significantly increased the altruistic behavior of their subjects. In

another study of altruistic behavior (1964a, 1964b), these same social-learning theorists showed that children are more willing to copy and imitate popular children; that is, those peers that are generous with praise and approval and also get a good deal of it themselves. It seems reasonable to assume that the same learning principles operate in the acquisition of cooperative behavior. Thus, it is evident that whether a child cooperates or competes is greatly determined by which type of behavior is more valued by his adult and peer models. Since competitive behavior is modeled and rewarded more frequently in our society than cooperative behavior, as children are socialized they become more and more competitive.

In summary, it was on the basis of such theoretical positions about the nature of human development and the observation of the predominance of competition over and above cooperation in our society (Wrightsman, 1973, p. 107), that the predictions for this study on the development of cooperation were made.

## Value of Study

The immediate value of this study lies in the fact that it will provide valuable information concerning some of the variables which effect cooperation in children, as well as construct validation data concerning the measure of cooperative behavior, Sticks and Chips. This study will provide information concerning the effects of age, group sex

composition, and power on cooperative behavior. In so doing, it will serve the function of further establishing the developmental sequence of cooperation which previous studies have noted a need for. Of these variables, no previous research has been carried out on group sex composition and, thus, this information will be especially valuable.

The long range value of this study lies in the application of the information it will provide. As noted in the introduction, cooperative behavior appears to be more adaptive in our current world than competitive behavior. Thus, all of the information available on cooperative behavior could be used to facilitate such behavior. If it is shown that older children are less cooperative than younger children, the socialization processes responsible for this trend could be examined and modified so that children do not become less cooperative as they grow older. If it is shown that all female and female majority groups are more cooperative than equal sex, male majority, or all male groups, it might be beneficial for the male socialization process to be modified to conform more closely to the female socialization process. Thus, making it possible for both male and female children to exhibit high levels of cooperative behavior without fearing failure or, in the case of males, a loss of masculinity. Finally, if it is shown that differential power decreases cooperative behavior, steps might be taken to decrease power differentials amongst children (and adults,

for that matter) and, thus, facilitate more cooperative behavior.

## Limitations

The scope of this study was limited in several ways. One of these limitations was the fact that only one subject population was used--students from one of the elementary schools in Stillwater, Oklahoma. Whether the results obtained with this population are generalizable to other populations, cultures, or even subcultures, within the United States is not known. Another limitation is that only a female experimenter was used. This may have inflated overall cooperative behavior or may have had differential effects on cooperative behavior for male and female subjects. A third limitation of this study was that only two age levels, first graders and fourth graders, were used. A more complete picture of developmental trends would have been obtained if older and younger age groups had also been used. A fourth limitation was that only a single measure of cooperative behavior, Sticks and Chips, was used. As noted earlier, different measures of cooperative behavior seem to produce different results, especially with respect to the age variable. It would be interesting to include several measures of cooperative behavior within a single study to find out the extent to which the various measures produced similar results. Unfortunately, the scope of this study was not large enough to permit the accomplishment of this end.

One of the greatest limitations of this study, however, was that it looked only at cooperative behavior and not also at competitive behavior. One of the advantages of using the Sticks and Chips game over the Prisoner's Dilemma Game and other forced-choice games is that it does not force subjects to choose between cooperating and competing. Subjects playing Sticks and Chips can both cooperate and compete at the same time. Thus, it is possible that research utilizing Sticks and Chips could show that both cooperation and competition increase or decrease with age or that one increases and the other decreases. Unfortunately, this one question was not tested in the present investigation and will have to await examination through future research.

# CHAPTER II

## REVIEW OF RELATED LITERATURE

For convenience and organization this review of the literature will be presented in terms of the four hypotheses being tested in this study. The first section of this review will deal with studies which have looked at the relationship between age or grade and cooperative behavior. The second part of this review will present the research which has dealt with sex composition of group and cooperative behavior in children. The third and final section will deal with the literature on power position and cooperative behavior and those studies which have looked and/or found interactions between grade and power with respect to cooperative behavior.

### Grade (Age) and Cooperative Behavior

This section presents the literature relevant to the first hypothesis that first-graders would demonstrate significantly more cooperative behavior when engaged in a negotiable essential mixed-motive game than fourth-graders. As noted in Chapter I of this dissertation, the relationship found between age and cooperative behavior seems to depend on the procedure used to measure cooperative behavior. Thus,

this part of the literature review will be presented in terms of the three measurement procedures used most frequently to measure cooperative behavior in children: observation; dyadic, forced-choice games (e.g., modifications of the Prisoner's Dilemma game); and negotiable essential, mixed motive gamse such as the Sticks and Chips game.

## Observation Studies

Studies using observation as the method for measuring cooperative behavior have generally found that cooperative behavior increases with age though there seems to be a great deal of disagreement concerning the age when "true" cooperative behavior first appears. One of the earliest studies utilizing observation was carried out by Parten (1932) who studied cooperative behavior in preschool children. Parten found that cooperative behavior did not occur until late in the preschool years and that it was preceded by solitary play, looking on, parallel play, and associated play. A replication of this study by Barnes (1971) found the same sequence in preschoolers with one significant qualification --the preschoolers of today are less sociable in their play than those of forty years ago. These results suggest that our society has become more competitive and less cooperative over the past forty years. Studies by Wolfe and Wolfe (1939) and Gottschaldt and Fruharif-Ziegler (1958) have also found that rudimentary forms of cooperative play and mutual

aid in the solution of problems first appear in older preschool children.

Other observational studies, however, have found that cooperative behavior does not arise until later; that is, during the early elementary school years (ages six and seven) after which time it gradually increases with age (Alvy, 1968; Fry, 1967; Hirota, 1951; Zak, 1968). Finally, Meister (1956), using a very stringent definition of cooperative behavior in which it was equated with egalitarian activity, found that cooperative behavior among American children did not arise until the twelfth year or later.

In summary, although observational studies are not in agreement concerning the age at which cooperative behavior arises, they all agree that the relationship is a positive one; that is, as age increases so does cooperative behavior.

## Studies Using Dyadic, Forced-Choice Games

Contrary to studies employing observation, in general though not always, studies using dyadic, forced-choice games to measure cooperative behavior have found that cooperative behavior decreases with age. Before these studies are reviewed, it should be recalled that dyadic, forced-choice games are probably not the best measures of cooperative behavior. As noted in Chapter I, such games force subjects to choose between cooperating and competing, involve only two people, and allow for only a minimum amount

of communication. Furthermore, Vinacke (1969) even questions whether the "cooperative choice" in such games really stems from cooperative motives. He suggests three reasons, other than the desire to cooperate, for choosing the "cooperative choice": (1) the player could be trying to maximize his own gain by manipulating the other players into making a certain choice, (2) the player could actually be competing against the experimenter, and (3) the player could be wanting to defect but no such alternative response is available to him. Keeping these criticisms in mind, the literature concerning age and cooperative behavior as defined by dyadic, forced-choice games will be reviewed.

Madsen and his associates using the dyadic, forced-choice games such as the Cooperation Board, the Circle Matrix Board, and the marble-pull task to measure cooperative behavior have found that the cooperative behavior of American children decreases with age. Kagan and Madsen (1971) found that American four- and five-year-olds were less "irrationally competitive" than seven-, eight-, and nine-year-olds. In another study, this one cross cultural in nature, Madsen (1971) again compared four- and five-year-olds with seven-, eight-, and nine-year-olds. He found that Anglo-American children but not Mexican children became more "non-adaptively competitive" with age. Kagan and Madsen (1972b) studied rivalry and found that older children (eight- to ten-year-olds) engaged in significantly more rivalrous behavior than younger children (five- and

six-year-olds) in a choice task with the difference across age being the greatest in the American, not the Mexican, children. Consistent with these results, McClintock and Nuttin (1969) found that when American and Belgian children from three grade levels (second, fourth, and sixth) engaged in a maximizing difference game, the young American children made more competitive choices than the young Belgians, but that by the sixth grade both were equally competitive. The results of these studies all show that American children become more competitive and less cooperative with age. However, these results also show that this trend is not universal; that is, that culture is extremely important in determining the relationship between age and cooperative behavior, at least when cooperative behavior is measured by dyadic, forced-choice games.

Not all of the studies employing dyadic, forced-choice games to measure cooperative behavior have found that such behavior decreases with age. A study by Sampson and Kardush (1965) employing a modification of the Prisoner's Dilemma game found that older pairs of boys were more collaborative than younger pairs.

In summary, most of the studies which have employed dyadic, forced-choice measures of cooperative behavior to look at the relationship between age and cooperation have found that American children become less cooperative with age. One study exists, however, which found opposite results. Furthermore, this negative relationship between

age and cooperation has not been found in Mexican children.

### Studies Employing Negotiable Essential, Mixed-Motive Games

Both of the studies which have employed negotiable essential, mixed-motive games to measure cooperative behavior have found that cooperation decreases with age. A study by Vinacke and Gullickson (1964) found that with age boys become increasingly more exploitative and less cooperative. Another study by Shears and Behrens (1969) which looked at the cooperative behavior of third and fourth grade boys and girls found that subjects moved away from accommodative toward expoitative behavior between these two ages.

In general, observational studies have found that cooperation increases with age while studies employing games, both dyadic, forced-choice and negotiable essential, mixed-motive games, have found that cooperation decreases with age. It may be that these conflicting results have been found because children are taught cooperation with respect to everyday social interactions and competition with respect to game playing.

## Sex Composition of Group and Cooperative Behavior

In this section, the literature will be reviewed which is relevant to the second hypothesis that the all female and female majority sex composition groups would demonstrate

significantly more cooperative behavior than equal sex, all male, or male majority sex composition groups. The effects of group sex composition on cooperative behavior has been looked at in only one study. This study which was conducted by Bond and Vinacke (1961) was carried out with adult subjects, not children. In introducing their study, Bond and Vinacke point out the importance of research on group sex composition:

> In the experimental study of small groups little attention has been paid to the problem of differences between groups homogeneous and heterogeneous with respect to sex. A typical procedure, in fact, is to control for the effect of sex, as by constituting groups all of the same sex. Nevertheless, not only are mixed-sex groups just as natural in their occurrence as any other combination of persons, but these are ample grounds for supposing that mixed-sex groups will act differently from same-sex groups (p. 61).

Elsewhere, Bond and Vinacke suggest that research looking at the effects of mixed-sex groups on cooperative behavior is especially valuable because it provides an opportunity to study the interactions of majority and minority segments of such groups. Although the rationale put forth by Bond and Vinacke for studying group sex composition had research with adult subjects in mind, the rationale seems equally applicable to studies involving children.

In carrying out their study, Bond and Vinacke found that sex composition of group actually did have an effect on cooperative behavior. The general playing style of the male majority in comparison to the female majority was found to be significantly more exploitative. Consequently, the

accommodative strategies (bargaining and allying) of the female participants resulted in better final outcomes for them than the male participants. The males in this study, whether in the majority or minority, seemed to be concerned with maximizing their own immediate gains even though in the long run this strategy was self-defeating.

The results of the Bond and Vinacke (1961) study suggests that the effects of group sex composition can probably be reduced to or explained in terms of sex differences in cooperative behavior. In other words, female majority groups are more cooperative than male majority groups because women are more cooperative than men, not because something unique occurs when men and women are grouped together in different majority and minority configurations. With this in mind, it seems reasonable to review studies on sex differences in cooperative behavior in children in order to obtain an understanding of the effects of group sex composition on the cooperative behavior of children. The remainder of this part of the review will be devoted to such studies.

In general, studies which have looked at sex differences in cooperative behavior in children have found that girls are more cooperative than boys, though several studies have found no differences and one found that boys were more cooperative than girls. Spiro (1965) observing children one to five years of age in an Israeli Kibbutz found that girls were more integrative (giving, helping, sharing, affectionate,

cooperative, etc.) than boys. McKee and Leader (1955), using a block construction game with middle and lower class same-sex pairs of boys and girls, found that the boy pairs were more competitive and less cooperative than the girl pairs. Tedeschi, Hiester, and Gahagan (1969) used a modified version of the Prisoner's Dilemma game to investigate cooperative behavior in third and fourth grade girls and boys. They found that male dyads more frequently made double competitive choices than did female dyads. On the other hand, female dyads had more unilateral cooperative outcomes over trials, displayed more trust, and were more forgiving than male dyads.

In contrast to the studies presented above, Harford and Cutter (1966), carried out a study which involve a simple cooperative choice task (selecting the same color of poker chip as one's partner) and found no significant sex differences for white children, six to twelve years of age. However, for black children of similar ages, Harford and Cutter found that boys made significantly fewer cooperative moves than girls. Other studies which have failed to find sex difference in cooperative behavior include those of Nelson and Madsen (1969); Wasik, Senn, and Epanchin (1969); Brotsky and Thomas (1967); and Kagan and Madsen (1971). Another exception is a study by Lindskold, Cullen, Gahagan, and Tedeschi (1970). Using a modification of the Prisoner's Dilemma game in an effort to replicate the previous findings of Tedeschi et al. (1969), these researchers found that

fifth and sixth grade boys were more cooperative than fifth and sixth grade girls. These researchers attempted to explain the contradictory nature of their results by the field dependent nature of this age population and the fact that a female experimenter was used. (The study by Tedeschi et al. (1969), which found that girls were more cooperative than boys employed a male experimenter.)

A few studies which have looked at sex differences in cooperative behavior have found that sex and age interact to effect cooperation. These studies have generally found that sex differences are exaggerated with age; that is, young girls are more cooperative than young boys and that for older children this difference is even greater. One study was carried out by Sampson and Kardush (1965). Using a non-zero sum game, these investigators found that with age the females in their study became more conservative in their willingness to take risks while the reverse was found for males; that is, with age females made more cooperative choices while males made fewer cooperative choices. Similarly, Vinacke and Gullickson (1964) found a sex by age interaction. These experimenters looked at sex differences in cooperative behavior over a wide range of ages (seven- and eight-year-olds, twelve- through fourteen-year-olds, and college students) and found that females of all ages tended to be accommodative in their behavior while males became increasingly more exploitative and less cooperative with age. Shears and Behrens (1969), using the negotiable

essential, mixed-motive game, Sticks and Chips, found a similar age by sex interaction in their third and fourth grade, mixed-sex tetrad (four person) groups. The female subjects in this study maintained a highly cooperative playing style across the two grades while male subjects showed a shift from cooperative playing (third grade) to competitive playing (fourth grade). A final study which found an age by sex interaction is one carried by Kagan and Madsen (1972b). These researchers studied the cooperative behavior of male and female, same-sex pairs of Anglo-American and Mexican children, ages seven through nine and found that for Anglo-American children, boys became increasingly rivalrous with age while girls did not. However, this age by sex interaction was not found for the rural Mexican children.

In summary, the results of this part of the literature review support the conclusion of Maccoby and Jacklin (1974) that there is a trend in the direction that supports the popularist view that males are the more competitive sex. In addition, this review found that sex differences in cooperative behavior become exaggerated with age. The fact that sex differences in cooperative behavior become exaggerated with age for American children and that this interaction is not found in all cultures suggests that sex differences in cooperative behavior are probably a product of sex role socialization. Little boys are taught that they must compete and little girls are taught that they must cooperate

and with age children master these differences more and more successfully.

## Power and Cooperative Behavior

The last section of this literature review will deal with studies which are related to the third and fourth hypotheses of the present investigation. The third hypothesis states that subjects holding the high power position (4) will demonstrate fewer cooperative behaviors than players holding either the moderate (2) or low (1) power positions. The fourth hypothesis predicts a power by age interaction in the direction of a significantly greater decrease in cooperative behavior amongst fourth graders holding the high power position (4) than amongst first graders. Since the number of previous studies looking at the effects of power on children's cooperative behavior is minimal the review for these two related hypotheses will be combined.

Cook and Stingle (1974), in their review of the research on cooperative behavior in children, note that "a variety of other subject variables have shown significant relation to cooperation and competition in adults, but very few have been studied in children" (p. 928) and suggest that one of these subject variables is power. A host of studies utilizing negotiable essential, triad games with adults have demonstrated that players in these games ally in terms of their initial perception of relative strengths (Bond and

Vinacke, 1961; Caplow, 1956; Mills, 1953, 1954; Shears, 1966; Vinacke, 1959, 1961; Vinacke and Arkoff, 1957). Both Caplow (1956) and Vinacke (1969) have proposed elaborate game theories to explain the results of this kind of research. Adult studies utilizing other game techniques, such as the Prisoner's Dilemma with asymmetrical matrices, have also shown that power effects the playing behavior of game participants (Galls and McClintock, 1965; Tedeschi, Lindskold, Horai, and Gahagan, 1969; Wrightsman, O'Connor, and Baker, 1972). However, only a few studies have examined the effects of power on children's game behavior.

One study which has looked at the effects of power on children's game behavior was carried out by Vinacke and Gullickson (1964). These investigators looked at the effects of three different power patterns, all equal (1-1-1), all different (4-3-2), and all powerful (3-1-1) on the coalition formation strategies of three different age groups--seven- and eight-year-olds, fourteen- to sixteen-year-olds, and college age subjects. They found that seven- and eight-year-old males, though not females, preferred "weak" alliances (a coalition involving the two weakest members against the strongest) in the all powerful but not the all different condition. For fourteen- to sixteen-year-old males and females this preference was also found. However, for college students this pattern was reversed in that weak alliances were preferred in the all different but not the all powerful condition. They concluded that males' playing

strategies become increasingly more exploitative with age while females' strategies remain accommodative. Although Vinacke and Gullickson (1964) did look at the effects of differential power patterns on coalition formation, strategies (accommodative or exploitative, alliance preferences) they did not look at the effects of power on cooperative behavior.

The only two studies which have looked at the effects of power on children's cooperative behaviors have been carried out by Shears and Behrens (1968, 1969). To investigate the effects of power these researchers used the negotiable essential, tetrad game, Sticks and Chips, a game which involves four power positions--a high power (4) position; two moderate power (2) positions, and a low power (1) position. The pattern of power weights in this game closely approximates the all powerful pattern (4-3-2) used in triad game research. However, in this experimental game these weights are rotated amongst the players an equal number of times within a given game to determine what effect a change in power will have on each subject's cooperative behavior.

The object of Sticks and Chips is to form a power coalition that is stronger than any other individual or coalition (e.g., a coalition of powers four and two is stronger than the coalition of powers one and two; the coalition of powers two, two, and one is greater than the four power, etc.). Following coalition formation, players in the winning alliance decide how to divide 20 poker chips

which they have won and then another round is played, randomly shifting power positions among players. This continues until eight rounds have been completed and every player has held each power position twice. Cooperation was measured in terms of payoff demand; the higher the payoff demand, the less cooperative the behavior. Using this game, Shears and Behrens (1968) found that, in general, when third grade players held the high (4) power position, they were less cooperative than when they held the moderate or low power positions. Furthermore, this uncooperativeness was exaggerated for players having moderate or high, as opposed to low, I.Q.s. In another study, Shears and Behrens (1969) used Sticks and Chips to look at the effects of power on the cooperative behavior of third and fourth grade boys and girls. They found that power and age interacted, such that when third grade players held the high power position they were less cooperative than when they held one of the moderate or low power positions and this effect became significantly more predominant for the fourth graders. These researchers concluded that "these results strongly suggest that there is a developmental shift in social perception at about age 10" (Shears and Behrens, 1969). They also noted a need for further research to establish the developmental sequence of cooperative-competitive behavior in children of other ages.

In summary, although a number of adult studies have looked at the effects of power on cooperative behavior, only

two children's studies have looked at this topic. These studies found that power decreases cooperation and that this relationship becomes exaggerated with age. Since the present investigation employed the same tetrad game, Sticks and Chips, as the two children's studies that looked at power and cooperation (though cooperative behavior was measured in a slightly different manner), similar results were expected. That is, high power players were expected to be less cooperative than moderate or low power players (hypothesis three) and this difference was expected to increase with age (hypothesis four). It should be noted that Sticks and Chips easily allows for the study of the effects of power on cooperative behavior, something which dyadic games, like the Prisoner's Dilemma, do not do.

# CHAPTER III

# METHODOLOGY

## Description of Sample

The subjects for this study were obtained from one of the five neighborhood elementary schools of a public school system located in Stillwater, Oklahoma. This community is situated in Payne County, a rural area in the north central part of the state. It is the home of Oklahoma State University, the second largest state institution for higher learning in Oklahoma. According to the 1973-74 Chamber of Commerce Census, the total population of Stillwater, excluding the 18,560 students residing there and enrolled at the University, is approximately 33,900.

It is predominantly a middle-class socio-economic community. Most of Stillwater's residents make their livelihoods as farmers, factory workers, or employees for the University. It is a heavily religious community with Protestantism being the majority's reported religious affiliation. The racial and ethnic composition of this community is largely white, Anglo-Saxon but also includes representative numbers of two minority groups, American Negroes and Indians.

The total enrollment of this community's public school system during the year (1973-74) in which the present study was undertaken was 14,610 students. This figure represented all the students from five elementary schools (grades kindergarten - fifth), one middle school (grades sixth - eighth), and one junior-senior high school (grades ninth - twelfth). At that time approximately 200 teachers and other student personnel workers were employed for the entire school system.

Forty children, 20 first-graders (6-7 year olds) and 20 fourth-graders (9-10 year olds) were randomly selected from the total first (77 children in all) and fourth (76 children in all) grade populations of one of the five neighborhood elementary schools. A random numbers table was used to aid in this selection until an equal number of boys and girls from each grade was acquired. The enrollment at this particular elementary school was 434 students which represented 21 percent of the total number of elementary school children. This school is located in one of the middle to upper-middle class neighborhoods in the city.

The names of 10 male and 10 female subjects were then placed separately into a bowl and drawn at random for assignment to one of the sex composition treatment groups. These groups included the following treatment levels: all male, all female, equal sex, male majority, or female majority. Each grade-sex composition group consisted of four subjects (a tetrad) resulting in a total of five,

first-grade tetrads and five, fourth-grade tetrads, or ten experimental groups in all.

## Procedure

Each group of subjects was individually called out of their respective classrooms and given the identical cover-story. They were told that they had been selected from their classmates to try out a new children's game for a national toy manufacturing company. It was then explained to them that four representatives from the company were present in the building and would be observing and taking notes as they played the game. They were told this was to make sure that there were no defects in the game before it was put on the market. (This story was given in an effort to minimize any distraction which might be caused by the presence of four judges.)

The subjects were assured that if they agreed to participate in testing out this new game that it would take only a few minutes of their time and that their teacher had already given permission for them to be excused from class for that time period. None of the subjects refused to participate, though sickness or absence necessitated replacing some of the originally selected subjects with subjects from a randomly selected "back-up list".

One at a time, each tetrad group was then escorted by the experimenter to the video-tape studio in their building. There, the subjects were asked to form a circle on the

carpeted floor by selecting one of the marked seating positions. These positions were carefully arranged and marked by Xs on the floor prior to the actual experiment. This was done in order to insure an unobstructed view of each player for both the judge and the camera which was in an adjacent room and was used to tape the proceedings through a one-way mirror for purposes of later determining interjudge reliability.

The judges included three females and one male, graduate students from Oklahoma State University. They were each assigned to one of the four seating positions (labelled A, B, C, or D) and given the responsibility to record the responses of every subject who took that seat throughout the duration of the experiment. Their chairs were situated outside the children's circle and across from the seating position to which they were assigned. This provided an optimum observational view of each subject's behavior and interactions during the course of each game.

Once the children were seated and had become adjusted to their surroundings, the experimenter took a seat on the floor directly between the children's circle and the judges' circle. This position provided her easy access to the game materials and optimal eye contact with each of the players without blocking the view or reach of any one player from any other player. At this point the experimenter brought out the materials for the game, introduced the game, and delivered the playing instructions. After the instructions

were completed the experimenter asked for and addressed any clarification questions from the players. Once the game was in progress, the function of the experimenter became that of score keeper, distributor, and collector of the game materials. Any additional request for information, guidance, or feedback from the experimenter once the game began were handled in a very non-directive manner.

When each group completed the game and the winner or winners were established, subjects were thanked by the experimenter for participating and asked for any criticism about the game which might be helpful to the company. No tangible reward was offered for winning, a contingency found not to effect the basic character of playing strategy (Vinacke, 1962). The groups were each escorted back to their respective classrooms and before being dismissed instructed not to discuss the game with the other children in their class until such time that everyone who had been selected by the company to try out this new game had had his turn.

This procedure was repeated in its entirety ten times during the course of one school day, until all ten experimental groups had been run. The experimenter then visited each of the classrooms from which subjects had been drawn and delivered a short debriefing explanation and thanked them once more for their cooperation.

## Instrument

The primary measuring instrument for this investigation

was a modified version of an experimental game referred to by the name of "Sticks and Chips" (Shears, 1967; Shears and Behrens, 1968, 1969). It is a children's adaptation of an adult, negotiable, essential game which has been extensively utilized in previous research into the behavior of individuals in small groups, particularly the study of coalition formations (Bond and Vinacke, 1961; Caplow, 1956; Mills, 1954, 1956; Vinacke, 1959; Vinacke and Gullickson, 1964). According to the description offered by Shears and Behrens (1968), a negotiable, essential games is as follows:

> A negotiable game is one in which actual division of the prize or payoff is determined by bargaining among the players themselves. In an essential game a player must be a member of the winning alliance or coalition to share in the prize. The amount of bargaining power each player has is determined by the arbitrary assignment of power weights (p. 514).

In "Sticks and Chips" the differing power or status positions are represented by sticks of varying lengths. These sticks were constructed in such a way that they could be connected, or "pegged" together at either end, to make one long stick. The pattern of weights (1-2-2-4) in this experiment was represented by four sticks of the following lengths: 3 inches, 4 inches, 4 inches, and 10 inches. Each player of this four-person game was assured possession of each of the weight positions an equal number of times (twice) during a series of eight trials or rounds of play.

The object of the game as it was presented to the children is to form a coalition to build a stick longer than any remaining possible combinations; that is, "to make the

longest stick possible." Thus, winning combinations in this game could include (1) any pair containing the "4" power weight, (2) an alliance of the three low weights ("1", "2", and "2"), (3) any other triple alliance ("1", "2", and "4"), (4) a coalition of all four players to join together. If no coalition is formed, the rules of the game allow the "4" power weight player to win by default. (Thus, a real competitive player who has been assigned the "4" could use the strategy of "holding out" during the round of play hoping for a victory by default to maximize his own gain.) Any player may propose an alliance and accept or reject the offers made to him. Each round of play ends when negotiations cease and the members of a winning combination consistently adhere to the alliance (Shears and Behrens, 1968). The 20 poker chips are then awarded to the winning coalition (or the "4" winner) to be distributed in any way agreeable to its members. There is no obviously appropriate division of chips dictated by the game situation (Shears and Behrens, 1968). In the present investigation the chips symbolized points to the players and the experimenter recorded the score of each player at the end of each round of play. These scores were totaled at the conclusion of the game, or after eight rounds of play. (See Appendix A.)

Several minor modifications of this game as it was designed and used by Shears (1967) were made for the purpose of the present study. Because an effort was being made to obtain observations and recordings of children's natural

preferred game behavior, no encouragement for competition or striving to beat other players was offered, nor were any tangible rewards available as in the previous studies (Shears, 1967; Shears and Behrens, 1968, 1969). The game instructions were presented in as neutral terms as possible, so as to minimize as much as possible any influencing effect on the children's motivation or behavior in either a competitive or a cooperative direction. An effort to minimize the effects of cognitive or comprehension differences amongst the subjects was also attempted by demonstrating every possible stick combination as part of the instructional procedure. The specific game and demonstration instructions for this study were as follows:

> You are about to play a new game called 'Sticks and Chips.' I have just handed you your stick for this round of the game. Altogether there will be eight rounds of play to this game and before each round of play I will give you a different length stick to play with.
>
> The object of this game is to make the longest stick possible. You may keep the stick you are given at the beginning of each round or you may join your stick together with the stick or sticks of any of the other players to make the longest stick possible. Here are some of the ways that these sticks may be joined together to make the longest stick possible. (The experimenter then demonstrated all of the possible stick combinations, including an example of default.)
>
> The 20 chips I have just placed in the middle of the circle go to the player or players who end up with the longest stick combination. One person may win all the chips by default, or there may be two or three winners for any one round of play, or all four players may win if you should all decide to join together. If there is more than one winner, then those players will decide how to divide up the 20 chips. When you have decided amongst yourselves how you are going to do it, place the longest stick

> here in the center of your circle so I will know that you have agreed and are finished.
>
> After the chips are passed out I will write down on this score sheet the number of chips or points you win for each round of the game. At the end of eight rounds of play the game will be over and I will then add up everybody's score and we will see how many chips each of you won during the game.
>
> Are there any questions? You may begin the game now and remember when you have finished making the longest stick possible place it in the center of your circle and then pass out the chips to the winners. Ready? Begin.

Besides delivering these instructions and keeping all the players' scores, the experimenter also collected and redistributed the sticks at the beginning of each new round of play. This was necessary in order to make sure that every player possessed each of the power positions an equal number of times (twice) during the course of the game. Other than this one limitation the sticks were distributed in a random manner so that negotiations associated with a given trial would not be contaminated by a player's ability to predict future power distributions.

The most important modification made on this instrument for the purposes of this study was in its scoring. In previous studies (Shears, 1967; Shears and Behrens, 1968, 1969) payoff demands, that is, the amount of the prize a player would find acceptable for his collaboration in an alliance or coalition, were measured. A mean acceptable score based on payoff amounts which a subject proposed for himself or accepted when proposed by another player was computed for each subject at each round of the game and then analyzed.

The negotiation process in these studies consisted not only of players' offers to ally but also included the proposed payoff division for each nominated player and the answers given by these invited members of the coalition. The previous studies using negotiable, essential games were primarily interested in the effects of power on a player's strategy during the game. These studies hypothesized and found that players ally in terms of their initial perception of their relative strengths in the situation; that is, they play either accommodatively or exploitatively depending upon their relative status (1-2-2-4) for each round (Caplow, 1956; Shears and Behrens, 1968, 1969; Vinacke and Arkoff, 1957; Vinacke and Gullickson, 1964). These researchers also found that payoff demands were significantly effected by the players' age, their sex, and their I.Q.'s.

In this study cooperative behavior was measured. Cooperative behavior was operationally defined as the mean number of collaborative negotiations made by a player in each round of play. A collaborative negotiation included both a player's initiated and/or accepted proposal to ally, or "join together," with the other players. Although the payoff division (the distribution of chips at the end of each round by the members of the winning coalition) was recorded, it was not the primary variable under investigation. No special instructions for making payoff division proposals during the negotiation process of the game were administered as in previous studies utilizing this particular

game (Shears, 1967; Shears and Behrens, 1968, 1969). The payoff division aspect of the Sticks and Chips game was employed in this study only as a means of providing a game incentive and a way of accumulating game points (chips) and designating winners.

Since cooperative behavior was the only dependent variable under investigation in this study, no measurement of competitive or exploitative behavior was made. Thus, all attempts to collaborate, whether accepted or rejected by another player, were considered scoreable responses for the purposes of this experiment while any refusal to negotiate or rejection of an offer to ally was not scoreable.

## Validity

Since the procedure that was employed in this study to score Sticks and Chips was unique to this study, previous data concerning the validity of this measuring instrument do not exist. Even so, a good case can be made for the face validity of this instrument. First of all, for the purposes of this study cooperative behavior was defined as any group oriented activity in which the individual collaborates with another or others to attain some common goal (Ausubel and Sullivan, 1970). Counting proposed and accepted offers to form a coalition conforms much more closely to this definition of cooperation than counting proposed and accepted payoffs. Counting proposed and accepted offers to form a coalition gets at collaborative activity while counting

proposed and accepted payoffs seems to get at how effective an individual is in bargaining. Secondly, the present modification of Sticks and Chips simulates real world opportunities to cooperate more closely than the more popular measure of cooperative behavior, the Prisoner's Dilemma Game. The Prisoner's Dilemma Game is limited to only two people while Sticks and Chips is not. Furthermore, Sticks and Chips allows for verbal and nonverbal communication before deciding whether or not to cooperate while the Prisoner's Dilemma Game does not.

The confirmation of several of the hypotheses proposed in this study provides some firm evidence for the face validity of this modified version of Sticks and Chips. Further research employing this version, however, is needed before any conclusions concerning its construct validity can be made.

## Reliability

The reliability of this instrument and its modified scoring procedure was determined by a three-step procedure. The first step was to pilot test the game, its instructions and materials, and the "Collaborative Negotiations Recording Sheet" (see Appendix B). This was done one afternoon with the assistance of one of the judges and four experimental groups of young children randomly selected from a different elementary school than the one from which the actual sample was later drawn. This pilot resulted in some major

improvements in both the wording of the game instructions and the form of the recording sheet.

The second step entailed the training of the judges, four graduate students from the educational psychology program at Oklahoma State University, in the use of the Collaborative Negotiations Recording Sheet (see Appendix B). This was done in two separate training sessions. The first was approximately two hours in length and was largely didactic in nature. The judges were briefed on the purpose of the research, given a description and demonstration of the experimental game, and given detailed descriptions of both the verbal and nonverbal behaviors that were to be recorded. During a second session which lasted approximately 45 minutes the judges were given the opportunity to practice the observational and recording procedures in a trail run with actual subjects.

The third step which took place during a post-experimental session involved having the original four judges view video tapes of the experiment. During this session they were instructed to record the responses of a single subject, the subject occupying seating position A of each of the experimental groups. The recordings of each judge for that subject were then correlated using Scott's formula (Flanders, 1966) with the recording of every other judge. The average correlation for this interjudge reliability was computed to be .85 with the coefficients ranging

from .6571 to .964. This degree of interjudge reliability was deemed to be sufficient for this study.

## Design

A 2 x 5 x 3 factorial analysis design, with one repeated measures (power), was employed in this study. The non-repeated independent variables were: (1) two levels of the grade/age variable--first graders (six and seven year olds) and fourth graders (nine and ten year olds); and (2) five levels of group sex composition--equal sex (EqS), male majority (MM), female majority (FM), all male (AM), and all female (AF). Ten tetrad (four persons) groups, five first grade and five fourth grade groups, were analyzed for their between-subject variance. Forty subjects in all also received the within-subject treatment for three levels of power--low power (weight 1), moderate power (weight 2), and high power (weight 4). Each of these power weights was assigned to every subject two times during a series of eight rounds of play in the game Sticks and Chips.

Cooperative behavior, the dependent variable, was measured as the mean number of collaborative negotiations, both initiated and accepted, made by each subject for each round of play.

# CHAPTER IV

## RESULTS

The results of this experiment were analyzed by means of a 2 x 5 x 3 split-plot analysis of variance with the last factor being the within-subjects variable (Kirk, 1968). The between-subjects, independent variables consisted of grade (first, fourth) and group sex composition (all male, male majority, equal sex, female majority, all female) while the within-subjects independent variable consisted of power position (low power (1), moderate power (2), high power (4)). The dependent variable was cooperative behavior as measured by the number of initiated and accepted collaborative negotiations. The summary of this analysis of variance and the cell means are presented in Tables I and II, respectively. The results will be discussed in terms of the hypotheses they tested. Each hypothesis was tested for significance at the .05 level of probability.

Hypothesis 1: First graders will demonstrate significantly more cooperative behavior when engaged in a mixed-motive game than fourth graders. This hypothesis predicted a main effect for grade with first graders being more cooperative than fourth graders. As Table I indicates this main effect was found ($F = 5.19$, $df = 1/30$, $p \leq .05$) and as

TABLE I

SUMMARY OF THE ANALYSIS OF VARIANCE ON NUMBER OF COLLABORATIVE NEGOTIATIONS

| Source | Degrees of Freedom | Mean Square | F |
|---|---|---|---|
| Grade | 1 | 16.14 | 5.19* |
| Sex Composition | 4 | 13.27 | 4.27** |
| Grade x Sex Composition | 4 | 26.19 | 8.42*** |
| Error (between) | 30 | 3.11 | |
| Power Position | 2 | 1.82 | 1.16 |
| Power Position x Grade | 2 | .83 | .53 |
| Power Position x Sex Composition | 8 | 3.02 | 1.93 |
| Power Position x Sex Composition x Grade | 8 | 1.82 | 1.16 |
| Error (within) | 60 | 1.56 | |

*p < .05

**p < .01

***p < .001

TABLE II

COLLABORATIVE NEGOTIATION MEANS FOR VARIOUS TREATMENT CONDITIONS

| | | Power Positions | | |
|---|---|---|---|---|
| | | Low (1) | Moderate (2) | High (4) |
| Grade 1 | Equal Sex | 4.50 | 5.13 | 5.50 |
| | Male Majority | 4.25 | 5.00 | 3.75 |
| | Female Majority | 2.75 | 3.63 | 3.88 |
| | All Male | 5.25 | 5.38 | 5.75 |
| | All Female | 7.50 | 8.00 | 7.75 |
| Grade 4 | Equal Sex | 3.00 | 3.88 | 5.00 |
| | Male Majority | 6.50 | 5.50 | 4.50 |
| | Female Majority | 5.75 | 4.88 | 4.50 |
| | All Male | 3.00 | 3.63 | 3.75 |
| | All Female | 3.50 | 4.00 | 5.75 |

Table II shows the means were in the predicted direction. First graders were significantly more cooperative ($\overline{X} = 5.20$) than fourth graders ($\overline{X} = 4.48$) and, thus, the first hypothesis was supported.

Hypothesis 2: Both the All Female (AF) and Female Majority (FM) sex composition groups will demonstrate significantly more cooperative behavior than the Equal Sex (ES), All Male (AM), or Male Majority (MM) sex composition groups. This hypothesis predicted a main effect for group sex composition which, as Table I shows, was found ($F = 4.27$, $df = 4/30$, $p = <.01$). However, as an inspection of Table III shows, the means of the five sex composition groups did not conform to the order predicted by Hypothesis 2. Although subjects in the all female groups were significantly more cooperative than subjects in the equal sex and the all male groups, they were not significantly more cooperative than the subjects in the male majority groups. Furthermore, subjects in the female majority groups were not significantly more cooperative than subjects in the equal sex, male majority, or all male groups. Hypothesis 2 was not supported.

Hypothesis 3: The players holding the high power position (4) will demonstrate fewer cooperative behaviors than players holding either the moderate (2) or low (1) power positions. This hypothesis predicted a main effect for power. As Table I indicates, this main effect was not found

TABLE III

COLLABORATIVE NEGOTIATION MEANS FOR THE GROUP SEX COMPOSITION TREATMENT CONDITIONS

| | Group Sex Composition Conditions | | | | |
|---|---|---|---|---|---|
| | Equal Sex | Male Majority | Female Majority | All Male | All Female |
| Collaborative Negotiation Means | $4.50_{b}$ | $4.91_{ab}$ | $4.22_{b}$ | $4.45_{b}$ | $6.08_{a}$ |

NOTE: Means having different letter subscripts differ significantly from each other at the .05 level of significance (Newman-Keuls Test).

($F = 1.16$, $df = 2/60$, $p > .10$) and, thus, this hypothesis was not supported.

Hypothesis 4: High power (4) will decrease cooperative behavior amongst fourth graders to a greater degree than it will decrease cooperative behavior amongst first graders. This hypothesis predicted a grade by power interaction which, as Table I shows, was not found ($F = 0.53$, $df = 2/60$, $p > .10$). This hypothesis was not supported.

Although not predicted, two other interactions were found, one of which was a grade by group sex composition interaction ($F = 8.42$, $df = 4/30$, $p < .01$). The means of this interaction are presented in Table IV and plotted in Figure 1. A simple main effects analysis of variance performed on these means and summarized in Table V demonstrated that for all male and all female groups, first graders were significantly more cooperative than fourth graders, but that for mixed sex groups (female majority, male majority, equal sex) no significant differences were found. In carrying out the simple main effects analysis, the alpha value, .05, was reapportioned amongst the five tests for grade differences within group sex composition conditions (i.e., the .01 level was used for each test) so that significant differences resulting from any of these tests would be significant at the .05 level. Similarly, the alpha value, .05, was reapportioned amongst the two tests for group sex composition differences within grades (i.e., the .025 level was used for each test) so that any significant differences resulting from

TABLE IV

COLLABORATIVE NEGOTIATION MEANS FOR GRADE BY GROUP SEX COMPOSITION INTERACTION

| | Group Sex Composition Conditions | | | | |
|---|---|---|---|---|---|
| | Equal Sex | Male Majority | Female Majority | All Male | All Female |
| Grade 1 | 5.04 | 4.33 | 3.41 | 5.50 | 7.75 |
| Grade 4 | 3.95 | 5.50 | 5.04 | 3.46 | 4.42 |

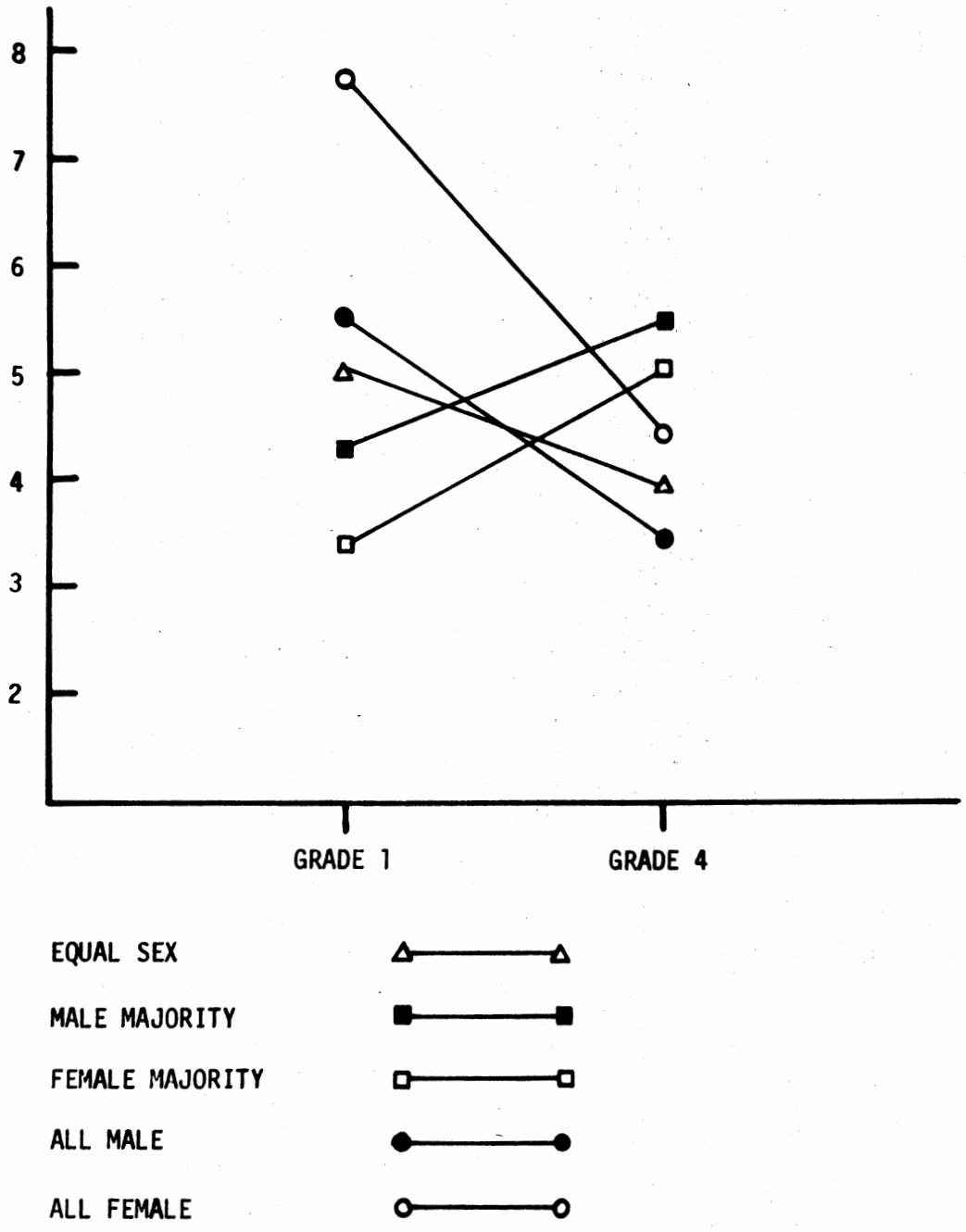


Figure 1. Mean Number of Collaborative Negotiations as a Function of Grade and Group Sex Composition Conditions

TABLE V

SUMMARY OF SIMPLE MAIN EFFECTS ANALYSIS FOR GRADE BY GROUP SEX COMPOSITION INTERACTION

| Source | df | MF | F |
|---|---|---|---|
| Grade Within: | | | |
| Equal Sex | 1 | 7.04 | 2.26 |
| Male Majority | 1 | 8.17 | 2.63 |
| Female Majority | 1 | 15.84 | 5.09 |
| All Male | 1 | 24.00 | 7.72* |
| All Female | 1 | 66.67 | 21.44* |
| Group Sex Composition Within: | | | |
| Grade 1 | 4 | 31.57 | 10.15* |
| Grade 4 | 4 | 8.02 | 2.58 |
| Error | 30 | 3.11 | |

*$p < .05$

NOTE: The alpha value, .05, was apportioned among the five grade and two group sex composition comparisons. For the grade levels to be significant at the .05 level, the F value had to meet the table value at .05/5 = .01 level. For the group sex composition conditions to be significant at the .05 level, the F value had to meet the table value at .05/2 = .025 level.

these tests would be significant at the .05 level (Kirk, 1968). To compare the group sex composition means at the first grade level a Newman-Keuls analysis was done and is presented in Table VI. The most important implication of these results is that Hypothesis 1, that first graders will demonstrate significantly more cooperative behavior than fourth graders, is true only for homogeneous sex groups. It is not true for mixed sex groups. Apparently developmental trends are observable only within the "pure" environment of homogeneous sex groups.

The second interaction was found between group sex composition and power ($F = 1.93$, $df = 8/60$, $p < .10$). The means of this interaction are presented in Table VII and plotted in Figure 2. A simple main effects analysis of variance performed on these means and summarized in Table VIII showed that a simple main effect which reached the .10 probability level existed for group sex composition within the high power position (4). In carrying out the simple main effects analysis the alpha value, .10, was reapportioned amongst the first five tests for power position differences within group sex composition conditions (i.e., the .02 level was used for each test) so that differences resulting from any of these tests would reach the .10 level of probability. Similarly the alpha value, .10, was reapportioned amongst the three tests for group sex composition differences within power positions (i.e., the .03 level was used for each test) so that any differences resulting from these tests would

TABLE VI

NEWMAN-KEULS COMPARISON OF GROUP SEX COMPOSITION MEANS FOR FIRST GRADERS

| Group Sex Composition Conditions | | | | |
|---|---|---|---|---|
| Equal Sex | Male Majority | Female Majority | All Male | All Female |
| $5.04_{b}$ | $4.33_{bc}$ | $3.41_{c}$ | $5.50_{b}$ | $7.75_{a}$ |

NOTE: Means having different letter subscripts differ from each other at the .05 level.

TABLE VII

COLLABORATIVE NEGOTIATION MEANS FOR GROUP SEX COMPOSITION BY POWER POSITION INTERACTION

| | Group Sex Composition Conditions | | | | |
|---|---|---|---|---|---|
| | Equal Sex | Male Majority | Female Majority | All Male | All Female |
| Low Power (1) | 3.75 | 5.38 | 4.25 | 4.13 | 5.50 |
| Moderate Power (2) | 4.50 | 5.25 | 4.25 | 4.50 | 6.00 |
| High Power (4) | 5.25 | 4.13 | 4.14 | 4.75 | 6.76 |

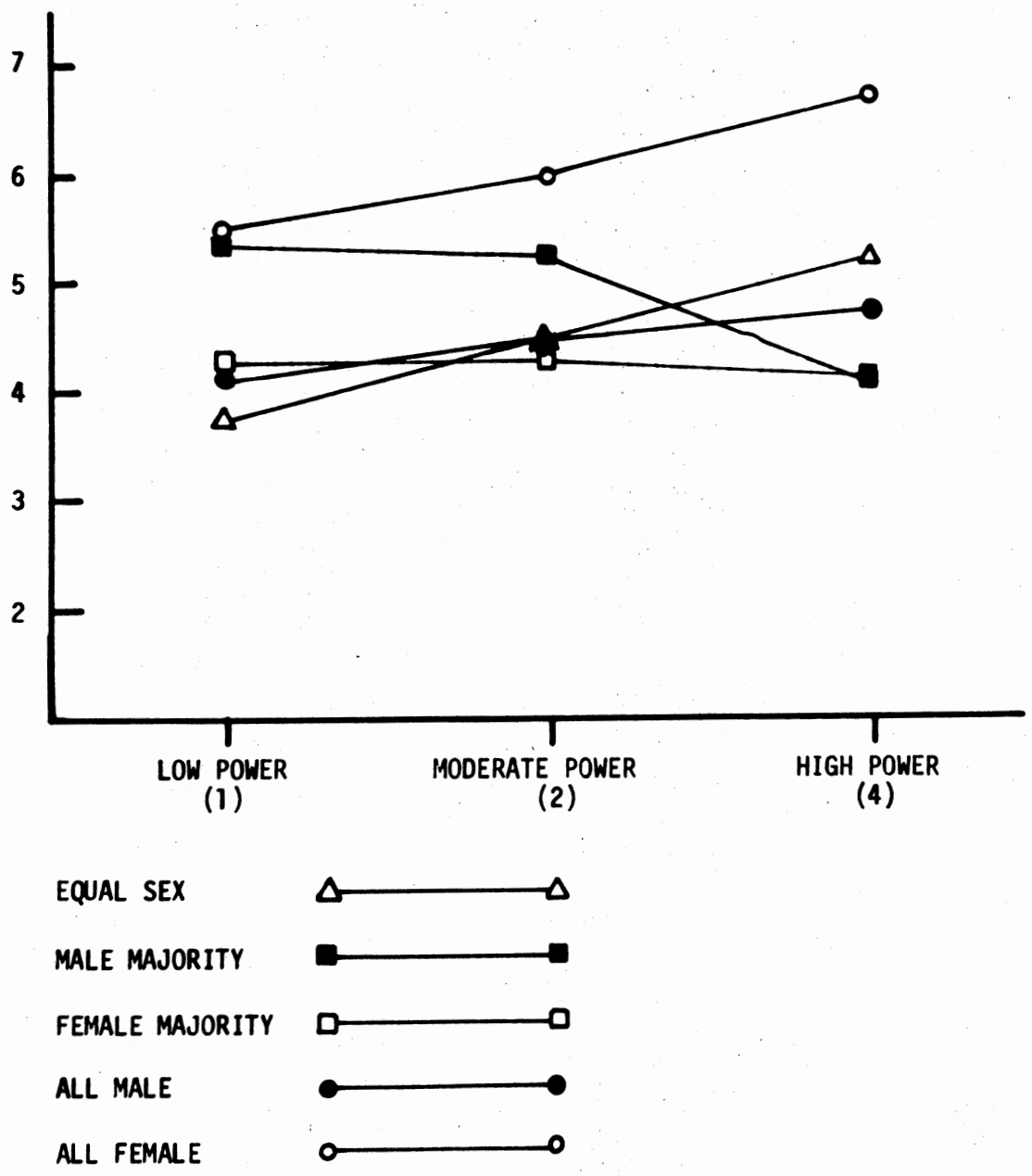


Figure 2. Mean Number of Collaborative Negotiations as a Function of Power Position and Group Sex Composition

TABLE VIII

SUMMARY OF SIMPLE MAIN EFFECTS ANALYSIS FOR POWER POSITION BY GROUP SEX COMPOSITION INTERACTION

| Source | df | MS | F |
|---|---|---|---|
| Power Within: | | | |
| Equal Sex | 2 | 4.50 | 2.88 |
| Male Majority | 2 | 3.79 | 2.43 |
| Female Majority | 22 | 0.01 | 0.01 |
| All Male | 2 | 0.79 | 0.51 |
| All Female | 2 | 3.17 | 2.03 |
| Error | 60 | 1.56 | |
| Group Sex Composition Within: | | | |
| Low Power (1) | 4 | 4.96 | 2.39 |
| Moderate Power (2) | 4 | 4.15 | 1.99 |
| High Power (4) | 4 | 10.48 | 5.05* |
| Error | 30 | 2.08 | |

*$p < .10$, non-significant by the tested .05 criterion.

NOTE: The .10 alpha level was apportioned among the five power position comparisons and the three sex composition comparisons. For the power position comparisons to be significant at the .10 level, the F value had to meet the table value at the $.10/5 = .02$ level. For the group sex composition comparisons to be significant at the .10 level, the F value had to meet the table value at the $.10/3 = .03$ level.

also reach the .10 level of probability (Kirk, 1968). A Newman-Keuls analysis of the differences between group sex composition means within the high power position, which is summarized in Table IX, showed that when holding the high power position subjects in all female groups cooperated significantly more than subjects in the male majority or female majority groups. However, subjects in the all female groups did not cooperate significantly more than subjects in the all male or equal sex groups. Since the group sex composition by power position interaction did not meet the designated .05 probability level necessary for significance, further attempts to interpret this interaction were not deemed necessary.[1]

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[1]Although data on payoff demand was collected, it was not included in this dissertation because it was believed that collaborative negotiations were a better operational measure of cooperative behavior.

TABLE IX

NEWMAN-KEULS COMPARISON OF GROUP SEX COMPOSITION MEANS FOR HIGH POWER POSITION (4)

| Group Sex Composition Conditions | | | | |
|---|---|---|---|---|
| Equal Sex | Male Majority | Female Majority | All Male | All Female |
| $5.25_{ab}$ | $4.13_{b}$ | $4.14_{b}$ | $4.75_{ab}$ | $6.75_{a}$ |

NOTE: Means having different letter subscripts differ from each other at the .05 level.

# CHAPTER V

## DISCUSSION

The primary aim of this study was to assess some of the factors which might influence the development of cooperative behavior in young children. Since no developmental theory on cooperation exists, it was necessary to extrapolate assumptions about this behavior from other developmental theories and the limited number of research studies in this area. Explanations of cognitive theorists such as Piaget (1932) and Kohlberg (1963a, 1963b) were integrated with those of social-learning theorists (Bandura and Walters, 1963) and findings of experimental game research (Kagan et al., 1971, 1972a, 1972b; Madsen et al., 1967, 1970, 1971; Shears and Behrens, 1968, 1969; Tedeschi et al., 1969a, 1969b; Vinacke and Gullickson, 1964) to predict the outcomes of this study. The following discussion of the major findings of the present investigation will begin with the first hypothesis and proceed through the remaining hypotheses in the order in which they were introduced in Chapter I and their results reported in Chapter IV.

The first hypothesis predicted that with age cooperation would decrease, more specifically, that the first graders would demonstrate significantly more cooperative

behavior than the fourth graders. This prediction was confirmed indicating that the findings of this study with regards to the effect of age on cooperative behavior was consistent with all of the previous research utilizing the negotiable, essential games (Shears and Behrens, 1968, 1969; Vinacke and Gullickson, 1964), with most of the previous research utilizing the dyadic, forced choice games (Kagan and Madsen, 1971, 1972b, and Madsen, 1971), but in conflict with most of the previous observational studies (Alvy, 1968; Azrin and Lindsley, 1956; Baldwin, 1955; Fry, 1967; Graves, 1937; Meister, 1956).

The conflict between this study's finding that cooperation decreases with age and the finding of observational studies that cooperation increases with age may be explained in terms of the demand characteristics of games. It may be that cooperation increases with age in ordinary social interactions and decreases with age only in game situations. Children learn that games are played to be won and the older the child gets the better he learns this.

An attempt was made to reduce the demand characteristics of the present game situation by making no reference to any competitive aspect of the game and playing down any motive to beat the other players. However, this may not have been enough to eliminate such demands or cues. The simple fact that a gaming device was used may have been sufficient to cause subjects to believe that they were suppose to compete to win. Vinacke (1969) has made a similar

observation with respect to experimental games:

> Many investigators seek to reduce such effects (demand characteristics) by carefully avoiding references to 'competition', 'game', etc., in their instructions. It is difficult to say, at this point, whether this device actually eliminates the implied cues (p. 310).

If it is indeed true that, in general, cooperation increases with age and that it only decreases in game situations, it may be argued that the results of this study (and all studies employing games) are trivial and that one should not be alarmed by their results (i.e., the decrease in cooperative behavior with age). However, this is not necessarily so. It appears that the game playing set is so strong in our culture that activities (e.g., Sticks and Chips) not formally introduced as competitive games, are defined as such by children. The evidence from this study that efforts to minimize competitive cues was not sufficient to alter this learned response for the fourth graders suggests that competitive motives are firmly implanted in youngsters' minds at an early age. Such a finding lends support to the notion that the socialization process in our society has "a self-aggrandizing [competitive] flavor" (Ausubel and Sullivan, 1970, p. 341). Furthermore, the popularity of Eric Berne's book, Games People Play (1964), suggests that in our culture much, if not most, social interaction is defined in terms of games that are played to be won at any cost.

This finding lends support to the concepts and notions

put forth by both the cognitive-theorists, Piaget and Kohlberg, and the social-learning theorists as they are presented in the theoretical section of Chapter I of this dissertation. Although children become cognitively capable of cooperative interactions around the beginning of the middle childhood years, or ages 6 and 7 (Kay, 1968; Piaget, 1932), they also become vulnerable to being influenced by the peer and adult models in their environment (Bandura and Walters, 1963) since it is at this age that approval becomes especially important (Kohlberg, 1963a, 1963b). Thus, a decrease in cooperation with age, particularly in a game setting, is understandable if we accept the premise that competitiveness is modeled and rewarded more than cooperative behavior in our society (Wrightsman, 1972). Erikson (1963) would suggest that the school is the field in which children learn to compare themselves to others and to compete. It then seems reasonable to excpect that as long as we subject malleable children to competitive models and practices in our schools (such as teaching methods as old-fashioned as the "spelling bee" or as modern as the Scientific Research Associates' reading laboratories for ability grouping), we can predict that children will become less cooperative and more competitive with age and experiences. It would be interesting to carry out a study similar to the present one in a school which had systematically incorporated Havighurst's (1972) tenets emphasizing cooperative rather than competitive reactions. In such a restructured

educational milieu in which the primary objectives would center around cooperative interdependence, one might expect a continuation and perhaps an increase in cooperative behavior with age.

The second hypothesis of this study predicted a main effect for group sex composition such that the all female and female majority groups would demonstrate significantly more cooperative behavior than equal sex, all males, or male majority sex composition groups. Though differences were found, they were not in the precise order predicted in the hypothesis. Therefore, hypothesis two was not supported. As previosuly explained in Chapter I, the rationale for this hypothesis was based on the one adult study which looked at the effects of group sex composition on coalition formation strategies (Bond and Vinacke, 1961) and sex differences findings. Since the female composition of the triads in the Bond and Vinacke study increased the accommodativeness of the groups' strategies, and because a significant number of previous experimental game studies with children have found that females tend to play more cooperatively than males in these situations (Kagan and Madsen, 1972b; Maccoby and Jacklin, 1974; McKee and Leader, 1955; Sampson and Kardush, 1965; Shears and Behrens, 1969; Spiro, 1965; Tedeschi, Hiester, and Gahagan, 1969; Vinacke and Gullickson, 1964), it was predicted that those groups containing the most female children would emonstrate the greatest amount of cooperation.

Although the second hypothesis was not supported, it appears that the rationale behind it may have been. A look at the means for each group (see Table III) clearly indicates that the all female sex composition groups were the most cooperative. It seems that the presence of a male, or males, in a group greatly reduces the amount of cooperative behavior ellicited. Such a reduction in cooperativeness is dramatically observed when one compares the mean of the all female groups ($\overline{X} = 6.01$) with the means of all the other groups which range from 4.91 down to 4.22. However, this effect must be somewhat qualified by making note of the fact that the mean of the all female groups was only statistically significantly greater than the equal sex, all male, and female majority groups' means, but not the mean of the male majority groups (see Table III).

This curious finding that females are more affected by the introduction of a male in their midst than males are by the presence of a female (compare the difference of 1.79 between the all female and female majority group means and the difference of .46 between the all male and male majority group means from Table III) can possibly be explained by reference to social-learning theory and the classic modeling study by Bandura, Ross, and Ross (1963). In this study of status envy, social power, and secondary reinforcement, these researchers discovered that the sex of the model affected imitation. They found that females were much more likely to imitate an opposite-sex model than males. That is,

both boys and girls were highly responsive to male models, but males displayed marked reluctance to imitate female models. Bandura, Ross, and Ross (1963) suggested that their findings:

> . . . probably reflect both the differential cultural tolerance for cross-sex behavior displayed by males and females, and the privileged status and relatively greater positive reinforcement of masculine role in our society (p. 533).

A concrete example of this is reflected in the fact that most people find it more acceptable for a girl to be "tomboyish" and climb trees than a boy to be "sissyish" and play with dolls. Generalizing the findings of this study to the findings related to hypothesis two of the present investigation would suggest that the precipitous drop in cooperative behavior in the groups composed of one or more males is due to the more powerful modeling influence of a male peer on a group's behavior than a female peer on a group's behavior. That is, a male's presence in a female majority group dramatically surpressed their willingness to cooperate while the presence of a female in a male majority group only slightly elevated their cooperativeness. Thus, it could be argued that if we wished to foster more cooperativeness amongst our children and in our society at large, more prestige needs to be afforded the feminine role and the stereotypic behaviors and characteristics associated with it.

Another recommendation that might be made is the male socialization process become more like the female socialization process. Or as Sandra Bem and her associates (1975) at

Stanford University are currently proposing, it might be recommended that the socialization process for both males and females follow more of an "androgynous" model than the traditional adherence to rigid sex role standards. Such changes might already be underway in some segments of our culture, notably people that have allied themselves to female and male liberation views which emphasize the freedom of people to be not only strong, but also weak, and not only competitive, but also cooperative (Farrell, 1975).

A finding emerged in the present study which, though not predicted resulted in a statistically significant interaction which deserves special attention at this point in the discussion. This interaction was the grade (age) by group sex composition interaction and indicates that cooperation decreased with age only within the all female and the all male sex composition groups (see Table IV, Figure 1). Indeed female majority and male majority groups were actually more cooperative at grade four than at grade one. Three earlier studies had reported an age by sex interaction but they had only looked at differences between same-sex pairs or triads and had ignored the study of mixed-sex pairs or groups (Sampson and Kardush, 1965; Shears and Behrens, 1969; Vinacke and Gullickson, 1964). Furthermore, since no previous studies had examined this group sex composition variable within children's groups in the manner of the present study and only one adult study had (Bond and Vinacke, 1961),

there was little empirical basis for such a prediction in this study.

Two interpretations of this significant grade by group sex composition interaction seem worthy of discussion. The first is the more conservative of the two, the less speculative, and the less interesting interpretation, but certainly merits the following considerations. It is evident that although the majority of experimental game studies which have looked at the relationship between age and cooperation have found a negative relationship (Kagan and Madsen, 1971, 1972b; Madsen, 1971; McClintock and Nuttin, 1969; McKee and Leader, 1955; Sampson and Kardush, 1965; Shears and Behrens, 1969; Vinacke and Gullickson, 1964), this study only found a negative relationship within the all female and all male groups. No relationship was found in the mixed sex groups (see Figure 1). An explanation which might be made of these results is that since children in the middle childhood years do not normally choose to interact in mixed-sex groups, when a mixed-sex situation is imposed, experimentally, normal spontaneous interaction is suppressed. With the suppression of spontaneous behavior the age trends are eliminated. Some support for this interpretation comes from informal observation made during this experiment that seemed to indicate that subjects were more passive, defensive, and/or aggressive in mixed-sex conditions. Further support comes from the "age profiles" which David Elkind (1971) characterizes in his book, A Sympathetic Understanding of

the Child; Six to Sixteen. In his description of the average six-year-old, he states that "while boys and girls occasionally play together at this age, the movement towards liked sexed friends has already begun" (p. 67). In his characterization of the average nine-year-old, Elkind makes these comments:

> The close friendships with peers begun at age eight are continued and strengthened at age nine. Such friendships are strictly between youngsters of the same sex, and there is much overt verbal hostility between boys and girls (p. 80).

From observations like these about children's preferences for same-sexed affiliations, it is not too surprising that socialization and cultural age trends--from cooperation to competition--came out in the same-sex groups of this study while they do not appear in the mixed-sex groups.

The second interpretation which could be rendered for this grade by group sex composition interaction would explain this dramatic decrease of cooperation within the same-sex groups in quite an opposite fashion. This interpretation suggests that somewhere between the first and fourth grades children's preferences for same-sex friends and affiliations changes to heterosexual preferences. That is, in the first grade (ages 6 and 7) children prefer to associate and be grouped with members of the same sex, as in the all female and all male groups of this study and this results in the elevation in cooperative responses in such situations (see Table IV, Figure 1). However, as they grow older and become more and more socialized as to their

appropriate sex-role behavior, they learn to seek the attention and approval of members of the opposite sex. Little boys learn that they must behave "gallantly" in the presence of females while little girls learn that they must behave "passively and demurely" around males. Thus, by ages nine and ten (fourth grade) the opposite sex has started to become an object of attraction, blunting efforts to offend or compete and enhancing efforts to please and cooperate. As Elkind (1971) notes in his age profiles, by age nine there is "an increased awareness of sex and sex appropriate behaviors" (p. 78) and by age ten, "there appears a marked concern amongst children about their bodies and about sexual activity though it is much less noticeable among boys than girls" (p. 82).

Such a growing interest in heterosexual activities and relationships, plus a possible surge of rivalry among members of the same sex for the attention from members of the opposite sex could account for the opposite trends of the homogeneous and heterogeneous sex groupings between first and fourth grade which is so strikingly depicted in Figure 1. (Note also the major drops in amount of cooperativeness in the all female ($\overline{X} = 3.33$) and the all male ($\overline{X} = 2.04$) groups shown in Table IV.) As can be seen in Figure 1, by fourth grade cooperation is greater within the female majority, male majority groups. Furthermore, this same graphic representation of the grade by group sex composition trend suggests that the other mixed-sex grouping, the equal

sex treatment, seems to have operated much like two separate, same-sex groups, and hence, the amount of their cooperativeness decreased somewhat, but much less dramatically than the all female and all male treatment groups. Again, Elkind's age profiles lend support to the same-sex rivalry interpretation when he explains that sex differences in friendship patterns begin to emerge around age ten. He describes boys at this age as "beginning to move in loosely organized groups with a lot of switching around" and girls as forming more intense friendships in smaller groups, but at the same time, having more "serious 'falling outs', being mad, not playing, or speaking to one another" (p. 83).

Though such a psychodynamic interpretation is highly speculative and certainly requires further empirical verification, the sex-typing trend which is implied in this finding warrants a bit more conjecture. It might be hypothesized that if this group sex composition variable were examined at older ages (junior and senior high grade groups), this age by sex affiliation preference would become stronger. That is, the range between the heterogeneous sex groups (female majority and male majority) and the homogeneous sex groups (all female, all male, and equal sex) as is illustrated in Figure 1 would become wider and in the opposite, but just as strong a direction as that of the first graders. Thus, it may be that the ninth and tenth years are the critical years for the crossing over of certain sex-role identification behaviors in this culture.

The third hypothesis of this study predicted a main effect for power; that is, that players holding the high power position would demonstrate fewer cooperative behaviors than players holding either the moderate or low power positions. This hypothesis was not confirmed. Contrary to the findings of the few previous studies which utilized a similar version of the negotiable, essential game, Sticks and Chips (Shears and Behrens, 1968, 1969), high power was not found to decrease cooperative behavior. If anything, the significant power by group sex composition interaction suggests that cooperation increases with power. (See Figure 2 and Tables VII, VIII, and IX). This second unpredicted interaction demonstrated that high power players were more cooperative than moderate power players and that moderate power players were more cooperative than low power players in the same-sex groups, but not the mixed-sex groups. If it is assumed that trends are obliterated in mixed-sex groups due to the suppression of spontaneous behavior in such groupings, then it can be concluded that high power increases cooperation. The contradiction in the conclusions of the Shears and Behrens' study and the present study is probably due to the fact that the operational definitions of the two studies were different. Shears and Behrens operationally defined cooperation in terms of equal (most cooperative), equitable, or exploitative (least cooperative) payoff demands while this study defined cooperation in terms of initiated and accepted offers to join together.

Depending on how one defines cooperative behavior it can be concluded that cooperation either increases or decreases with power. A similar state of affairs appears to exist in the real world. For example, the United States, a powerful country, has initiated and belongs to more alliances than Norway, a weak country, thus it could be concluded that the United States is more cooperative than Norway. On the other hand if the United States and Norway teamed up to conquer the U.S.S.R., the United States would demand and probably receive more of the spoils of war than Norway. It could then be concluded that the United States is less cooperative than Norway. Which operational definition of cooperation is most appropriate is debatable. It seems questionable, however, whether an equitable division of winnings should be defined as noncooperative behavior.

A criticism which can be made of both the Shears and Behrens' studies and the present study is the within subjects nature of their experimental designs with respect to power. Since this design had subjects rotate power positions it seems likely that this design increased the cooperative behavior, especially when cooperation was defined in terms of payoff demand. The fact that power rotated from round to round may have induced an attitude of "I'll scratch your back (when I'm high power) if you'll scratch mine (when you're high power)." If subjects had kept their power positions through the eight rounds of the game, the high power individuals might have been much less ready to cooperate.

The fourth and final hypothesis tested in this study had again to do with the power variable. This hypothesis predicted that the high power position would decrease cooperative behavior amongst fourth graders to a greater degree than it would amongst first graders, thus predicting an interaction effect for high power by grade (age). As stated previously, the rationale for such a hypothesis was based on Piaget's notions (Kay, 1968, Piaget, 1932) of changes in cognitive abilities, as well as changes in concerns about fairness and equity, with age, and the findings of the few previous children's studies dealing with these two variables (Shears and Behrens, 1969; Vinacke and Gullickson, 1964). Contrary to these findings, a power by grade interaction was not found and the fourth hypothesis had to be rejected. Fourth graders (nine- and ten-year-olds) were no more effected by power variations, in particular the high power position, than first graders (six- and seven-year-olds). The subjects in this study did not appear to become more cognizant or sophisticated in the use of their high power position to demand more equitable payoff settlements as a means of increasing their own gains like the subjects in a previous study did. As a matter of fact, as the discussion of the findings for hypothesis three implied, if anything the high power status increased their cooperativeness and willingness to negotiate for equal payoffs regardless of age.

Once more this contradictory finding is probably best

accounted for by the fact that a different measuring criterion was employed in this study than that of previous studies--collaborative negotiations versus payoff demand (Shears and Behrens, 1969). Since the Shears and Behrens' definition of cooperation defines equitable behavior on the part of the high power individual as noncooperative behavior, an understanding of equity would seem to decrease the cooperative behavior of the high power individual. Since an understanding of equity increases with age and cognitive development, high power players should become increasingly more equitable and less cooperative with age. This probably explains the age by power interaction found by Shears and Behrens (1969). Since an understanding of equity has nothing to do with cooperative behavior as operationally defined in this study, an interaction between age and sex should not have been found and was not.

## Summary and Implications

The present study attempted to assess some of the developmental antecedents and conditions influencing cooperative behavior. Cooperative behavior was defined as a group-oriented activity in which the individual collaborates with another or others to attain some common goal (Ausubel and Sullivan, 1970). More specifically, cooperation was defined as the number of collaborative negotiations initiated and accepted by a player in a mixed-motive game situation. Unlike most of the previous studies in this area of

developmental psychology, cooperation was measured independent of competition since both kinds of behavior could have been exhibited by the same individual in the experimental situation. Such an independent measure of cooperation added strength to the design of this experiment and allowed for the collection of valuable information unobtainable through other measurements and procedures such as the more popular game techniques which included the Prisoner's Dilemma, Cooperation Board, and Circle Matrix technique.

Forty boys and girls, twenty first graders and twenty fourth graders, were systematically grouped into five different same and mixed-sex groups to engage in a negotiable, essential, mixed-motive game. This game, Sticks and Chips, involved four children (a tetrad) who engaged in eight rounds of play in which their power for each round was systematically varied by rotating sticks of different lengths which they were instructed to "join together" to make the longest stick possible. For each round, the players who combined their stick to make the longest stick were awarded twenty chips which they then divided amongst themselves.

It was found that the first graders (six- and seven-year-olds) demonstrated significantly more cooperative behavior than the fourth graders (nine- and ten-year-olds) in this experimental game. This finding supports the age trends for cooperative behavior found in a number of previous studies, particularly those employing game techniques. Such a finding suggests that cooperation decreases with age.

The implications of this finding may be of great social importance. The wider implications suggest that our society and culture deemphasize the significance of cooperative attitudes, endeavors, and values and in so doing do not provide the conditions and atmospheres necessary to foster a cooperative spirit in our young. It might indicate that we need to revise the objectives and practices, particularly in our schools where most of this kind of social learning takes place, to ones which enhance and facilitate such learning. It should be kept in mind, however, that these results may be specific to game situations. It could be argued that most findings using contrived laboratory games are not generalizable to the real world, and in this case, ordinary social behavior.

Another major finding of the present investigation of cooperative behavior in young children was that the sex composition of children's groups affected their degree of cooperativeness. Though the results did not conform exactly to the hypothesis, the underlying rationale for the hypothesis was supported. It was found that children's willingness to cooperate is dependent upon the sexual makeup of the group they are a member of. Subjects in the first grade all female group were significantly more cooperative than subjects in any of the other groups. In addition, a significant grade (age) by group sex composition interaction was found in this study. Since it was the first time any investigation of the group sex composition variable was made

with children, this finding was considered the most interesting one of the study and the most relevant to this area of developmental research.

This grade by group sex composition interaction showed that children in the first grade are much more cooperative in same-sex, or homogeneous sex groupings than they are in mixed or heterogeneous sex groups, and that of the various sex groupings, the all female group was significantly more cooperative than any of the other first grade sex groups. This interaction also illustrated that the group sex composition variable affected the fourth graders in an altogether different manner. Though the degree of variability in response to this treatment was much smaller for the fourth graders than it was for the first graders, the opposite effect was indicated. That is, the fourth graders responded more cooperatively in the mixed or heterogeneous sex groupings than the same-sex groups, which demonstrated the least amount of cooperativeness. The implications of such a finding are indeed interesting and certainly warrant further scientific exploration. With no previous empirical data on the subject of children's behavior and reactions to different sex composed social groups, any interpretation of this finding is speculative at best. However, it might be inferred from such an age trend that children's preferences for affiliation with same and opposite sex peers changes during the middle childhood years from that of a preference for like-sex to opposite-sex associates. Some support for

such an empirical finding has come from informal observations and writings by developmental psychologists (Cohen, 1976; Elkind, 1971; Havighurst, 1972; Minuchin, 1965; Mussen, Conger, and Kagan, 1974). The psychodynamic interpretation of such a finding would suggest that as children become socialized in this, and perhaps other societies, boys and girls learn that they are supposed to be "nice" to and seek the approval and attention of members of the opposite sex; thus, as they grow older, they may behave more pleasantly, politely, and cooperatively towards members of the opposite gender. It may even be speculated that this kind of sex appropriate learning and socialization becomes stronger and would be more prevalent among older populations than what was sampled in this study. However, such an interpretation and hypothesis should not be assumed without equal consideration of an alternative interpretation of these results. That is, that heterogeneous or mixed-sex groupings of any type during the middle childhood years may suppress or inhibit ordinary and spontaneous behavior, and in so doing, alter otherwise natural developmental trends.

The last major finding of the present study was that power did not appear to affect the degree of cooperativeness on the part of the subjects under investigation. It was anticipated that possession of the most powerful status, the longest of four segments of sticks, would decrease the cooperativeness of the players whenever they held that position, and that this effect would be greater for fourth

graders than for first graders. Thus, a grade by high power interaction was predicted. However, this interaction was also not found, though another minimally significant, unpredicted interaction was found for group sex composition and power. This interaction suggested that the all female sex composition group was the most cooperative of all the groups and remained so when invested with high power. The implications of such a contradictory and illogical finding is not so profound or upsetting when a closer examination of the dependent variable and measuring criterion is made. That is, when it is considered that cooperative behavior was defined as number of collaboration negotiations and that the power was rotated an equal number of times amongst all the players in the game, it is not so surprising to find that an altruistic and cooperative atmosphere was created which resulted in no power or age differences. An important implication of this finding is that the definitions of a cooperative response and the measuring techniques from all previous research and any future research should be carefully scrutinized before any meaning is attached to or generalized from their findings. Unfortunately, this has not always been done in the past, thus it remains a serious problem in the study of this kind of human behavior (Cook and Stingle, 1974; Vinacke, 1969). However, it is the belief of this author that definitions and measuring instruments of cooperative behavior such as those which were employed in the present investigation are more useful and

meaningful than others which pervade this area of research. Therefore, further employment of such small group coalition game techniques can only result in relevant contributions to the understanding of cooperative behavior.

Once a better understanding of the development of cooperative behavior is acquired, then conditions which promote this behavior amongst people can and should be adopted. Such conditions might include a new emphasis on cooperation in our schools via revised curricula, teaching methods, and grading practices, and in our homes through cooperative models on television, in magazines and books, and around the dinner table. Only then will the cultural differences in cooperativeness (Madsen, Kagan, Shapira et al., 1967-1972) begin to disappear; only then will the "cooperation deficiency" label (Cook and Stingle, 1974) of our country be dropped, and only then will our species be freed from the threat of destruction (Salk, 1975).

## Need for Future Research

The findings of this study and their implications suggest the need for further research to answer a number of questions which have been raised. The first set of questions left open for examination center around the grade, or age, variable. Further research is needed to establish what is the "natural" developmental trend for most children with regards to cooperation. Does it generally decrease with age as the present findings suggest, or is that merely

a function of the demand characteristics of game techniques frequently used to measure it? If a decrease in cooperation with age is supported by future research, what kinds of conditions should be provided by our socializing agencies and processes to promote more cooperation?

The second set of questions this research raises has to do with the group sex composition variable and its effect on children's cooperative behavior which was under study for the first time in the present research. Before anything conclusive can be stated about the influence of such a factor on cooperation as was found in this study, much more research is needed to try and replicate these relationships. The question of whether or not children's preferences for same-sex friends and affiliations changes during the middle-childhood years warrants further documentation. Furthermore, questions pertaining to whether or not homogeneous and heterogeneous sex groupings effect other behaviors during these years are now also open to speculation. Is this a factor which mainly influences younger children (six and seven year olds) more than older children (nine and ten year olds) as was indicated by this study's findings? Or is this finding suggestive of further changes in sex affiliation preferences during adolescence? The implication that fourth grade (ages nine and ten) may be the critical, crossing-over age for such preferences needs further validation.

The final questions which have been raised by this research and remain unresolved may be the most important

ones when it comes to future research in this area of developmental psychology. These are the questions of methodology--laboratory games versus observational procedures--and operational definitions of cooperation--equitable payoff demands versus collaborative negotiations. This study found that variations in power did not effect the degree of cooperation elicited and this finding was explained in terms of the operational definition and instrument employed to measure cooperation. Since this variable and its effect on the development of cooperation has received only minimal scientific attention and the few previous studies all employed different measuring criteria which resulted in contradictory findings, further investigation with regards to its actual effect is strongly recommended. A major study which involved the comparison of the various popular measuring devices and procedures would make an invaluable contribution to this area of research and our understanding of the development of cooperative behavior.

REFERENCES


Alvy, K. T. Relation of age to children's egocentric and cooperative communication. Journal of Genetic Psychology, 1968, CXII, 275-286.

Ausubel, D. P., and Sullivan, E. V. Theory and Problems of Child Development. New York: Gruen and Stratton, 1970.

Azrin, N. H., and Lindsley, O. R. The reinforcement of cooperation between children. Journal of Abnormal and Social Psychology, 1956, 52, 100-102.

Baldwin, A. L. Behavior and Development in Childhood. New York: Dryden, 1955.

Bandura, A. Principles of Behavior Modification. New York: Holt, Rinehart, and Winston, 1969(a).

Bandura, A. Social learning theory of identificatory processes. In D. A. Goslin (Ed) Handbook of Socialization Theory and Research. Chicago: Rand McNally, 1969(b), 213-262.

Bandura, A., Ross, D., and Ross, S. A. A comparative test of the status envy, social power, and secondary reinforcement theories of identificatory learning. Journal of Personality and Social Psychology, 1963(a), 67, 527-534.

Bandura, A., and Walters, R. H. Social Learning and Personality Development. New York: Holt, Rinehart, and Winston, 1963(b).

Barnes, K. E. Preschool play norms: A replication. Developmental Psychology, 1971, 5, 99-103.

Bem, S. The measurement of psychological androgyny. Journal of Consulting and Clinical Psychology, 1975, 42, 155-162.

Bem, S., and Bem, D. Case study of nonconscious ideology: Training the woman to know her place. In D. J. Bem, Beliefs, Attitudes, and Human Affairs. California: Brooks/Cole, 1970.

Berne, E. Games People Play. New York: Grove Press, Inc. 1964.

Bond, J. R., and Vinacke, E. W. Coalitions in mixed-sex triads. Sociometry, 1961, 24, 61-75.

Brotsky, S. J., and Thomas, K. Cooperative behavior in pre-school children. Psychonomic Science, 1967, 9, 337-338.

Caplow, T. A theory of coalitions in the triad. American Sociological Review, 1956, 21, 489-493.

Cohen, S. Social and Personality Development in Childhood. New York: Macmillan Publishing Co., 1967.

Cook, H., and Stingle, S. Cooperative behavior in children. Psychological Bulletin, 1974, 81, 918-933.

Deutsch, M. A theory of cooperation and competition. Human Relations, 1949, 2, 129-152.

Elkind, D. A Sympathetic Understanding of the Child: Six to Sixteen. Boston: Allyn and Bacon Publishers, 1971.

Erikson, E. Childhood and Society. New York: W. W. Norton and Company, 1963.

Farrell, W. The Liberated Man. New York: Bantum Books, 1974.

Flanders, N. A. Interaction Analysis in the Classroom: A Manual for Observers. Ann Arbor: University of Michigan, 1966.

Fry, C. L. A developmental examination of performance in a tacit coordination game situation. Journal of Personal Social Psychology, 1967, 5, 277-281.

Galls, P. S., and McClintock, C. G. Cooperative and competitive behavior in mixed-motive games. Journal of Conflict Resolutions, 1965, 9, 68-78.

Gottschaldt, K., and Fruharif-Ziegler, C. On the development of cooperative behavior in young children. Zeitschrift fur Psychologie, 1958, 162, 254-278.

Graves, E. A. A study of competitive and cooperative behavior by the short sample technique. Journal of Abnormal and Social Psychology, 1937, 32, 343-351.

Greenberg, P. J. Competition in children: An experimental study. American Journal of Psychology, 1932, 44, 221-221-248.

Harford, P., and Cutter, H. Cooperation among negro and white boys and girls. Psychological Reports, 1966, 18, 818.

Hartup, W. W. Friendship status and the effectiveness of peers as reinforcing agents. Journal of Experimental Child Psychology, 1964(a), 1, 154-162.

Hartup, W. W. Patterns of imitation behavior in young children. Child Development, 1964(b), 35, 183-191.

Hartup, W. W., and Coates, B. Imitation of a peer as a function of reinforcement from the peer group and rewardingness of the model. Child Development, 1967, 38, 1003-1016.

Havighurst, R. J. Development Tasks and Education. New York: David McKay Company, 1972.

Hirota, K. Experimental studies of competition. Japanese Journal of Psycholgy, 1951, 21, 70-81.

Hoffman, L. W., and Hoffman, M. L. Review of Child Development Research: Volume One. New York: Russell Sage Foundation, 1964.

Inhelder, B., and Piaget, J. The Growth of Logical Thinking from Children to Adolescence: An Essay on the Construction of Formal Operational Structures. New York: Basic Books, 1958.

Kagan, S., and Madsen, M. C. Cooperation and competition of Mexican, Mexican-American, and Anglo-American children of two ages under four instructional sets. Developmental Psychology, 1971, 5, 32-39.

Kagan, S., and Madsen, M. C. Experimental analyses of cooperation and competition of Anglo-American and Mexican Children. Developmental Psychology, 1972(a), 6, 49-59.

Kagan, S., and Madsen, M. C. Rivalry in Anglo-American and Mexican children of two ages. Journal of Personality and Social Psychology, 1972(b), 24, 214-220.

Kay, W. Moral Development. London: George Allen and Union, 1968.

Kirk, R. E. Experimental Design: Procedures for the Behavioral Sciences. California: Wadsworth Publishing Co., 1968.

Kogan, N., and Wallach, M. A. Risk Taking: A Study in Cognition and Personality. New York: Holt, Rinehart, and Winston, 1964.

Kohlberg, L. The concepts of developmental psychology as the central guide to education. In M. Reynolds (Ed.), Psychology and the Process of Schooling in the Next Decade. Minneapolis: University of Minnesota Press, 1971.

Kohlberg, L. The development of childrn's orientations toward a moral order: I. Sequence in the Development of Moral Thought. Vita Humana, 1963(a), 6, 11-33.

Kohlberg, L. Moral development and identification. In H. Stevenson (Ed.), Child Psychology. Chicago: University of Chicago Press, 1963(b), 383-431.

Laurendeau, M., and Pinard, A. Causal Thinking in the Child: A Genetic and Experimental Approach. New York: International Universities Press, 1962.

Leuba, C. An experimental study of rivalry in children. Journal of Comparative Psychology, 1933, 16, 367-378.

Lindskold, S., Cullen, P., Gahagan, J., and Tedeschi, J. T. Developmental aspects of reaction to positive inducements. Developmental Psychology, 1970, 3, 277-284.

Maccoby, E. The Development of Sex Differences. California: Stanford University Press, 1966.

Maccoby, E., and Jacklin, C. The Psychology of Sex Differences. California: Stanford University Press, 1974.

Madsen, M. C. Cooperative and competitive motivation of children in three Mexican subcultures. Psychological Reports, 1967, 20, 1307-1320.

Madsen, M. C. Developmental and cross-cultural differences in the cooperative and competitive behavior of young children. Journal of Cross Cultural Psychology, 1971, 2, 3.

Madsen, M., and Shapira, A. Cooperative and competitive behavior of urban Afro-American and Mexican village children. Developmental Psychology, 1970, 3, 16-20.

Maudry, M., and Nekula, M. Social relations between children of the same age during the first two years of life. Journal of Genetic Psychology, 1939, 54, 193-215.

McClintock, C., and Nuttin, J. Development of competitive game behavior in children across two cultures. Journal of Experimental Social Psychology, 1969, 5, 203-218.

McKee, J. P., and Leader, F. The relationship of socio-economic status and aggression to the competitive behavior of pre-school children. Child Development, 1955, 26, 135-142.

Meister, A. Perception and acceptance of power relations in children. Group Psychotherapy, 1956, 9, 153-163.

Mills, T. M. The coalition pattern in three-person groups. American Sociological Review, 1954, IXX, 657-667.

Mills, T. M. Power relations in three-person groups. American Sociological Review, 1953, XVIII, 351-357.

Minuchin, P. P. Sex-role concepts and sex typing in childhood as a function of school and home environments. Child Development, 1965, 36, 1033-1048.

Mussen, P. M., Conger, J. J., Kagan, J. (Ed.) Child Development and Personality, Fourth Edition. New York: Harper and Row, Publishers, 1974.

Nelson, L., and Kagan, S. Competition: The Star-Spangled Scramble. Psychology Today, 1972, 6, 53-56.

Nelson, L., and Madsen, M. Cooperation and competition in four year olds as a function of reward contingency and subcultures. Developmental Psychology, 1969, 1, 340-344.

Parten, M. B. Social participation among pre-school children. Journal of Abnormal and Social Psychology, 1932, 27, 243-269.

Phillips, B. N., and DeValult, M. V. Evaluation of research on cooperation and competition. Psychological Reports, 1957, 3, 289-292.

Phillips, J. L. The Origins of Intellect: Piaget's Theory. San Francisco: W. H. Frieman and Company, 1975.

Piaget, J. Judgement and Reasoning in the Child. New York: Harcourt, Brace, Jovanovich, 1928.

Piaget, J. The Moral Judgement of the Child. French, Trubaer and Company, 1932.

Piaget, J. Play, Dreams and Interpretations. New York: Norton, 1951.

Piaget, J., and Inhelder, B. The Psychology of the Child. Boston: Routledge and Kegan Paul, 1969.

Piaget, J. The Science of Education and the Psychology of the Child. New York: Viking Press, 1972.

Porteus, B. D., and Johnson, R. C. Children's responses to two measures of conscience development and the relations of sociometric nomination. Child Development, 1965, 36, 703-711.

Salk, J. The survival of the wisest. Phi Delta Kappan, 1975, LVI, 667-669.

Saltz, E. The Cognitive Bases of Human Learning. Illinois: Dorsey Press, 1971.

Sampson, E. E., and Kardush, M. Age, sex, class, and race differences in response to a two-person non-zero sum game. Journal of Conflict Resolution, 1965, 9, 212-220.

Shapira, A., and Madsen, M. C. Between and within group cooperation and competition among kibbutz and non-kibbutz children. Developmental Psychology, 1974, 10, 140-145.

Shapira, A., and Madsen, M. C. Cooperative and competitive behavior of kibbutz and urban children in Israel. Child Development, 1969, 40, 609-617.

Shears, L. M. Negotiation: A coalition game. (Speech presented at NIMH worshop, Bethesda, MD.), 1967.

Shears, L. M. Patterns of coalition formation in two games played by male tetrads. Sociometry, 1966, 29, 130-137.

Shears, L. M., and Behrens, M. G. Age and sex differences in payoff demands during tetrad game negotiations. Child Development, 1969, XL, 559-568.

Shears, L. M., and Behrens, M. G. Effect of IQ on demand payoff in a competitive negotiable tetrad group. Child Development, 1968, XL, 515-519.

Smedslund, J. The acquisition of conservation of substance and weight in children: Practice in conflict situations without external reinforcement. Scandinavian Journal of Psychology, 1961, 2, 156-160.

Snedecor, G. W., and Cochran, W. G. Statistical Methods (Sixth Edition). Ames: Iowa State University Press, 1967.

Spiro, M. E. Children and the Kibbutz. New York: Schocken Books, 1965.

Tedeschi, J., Hiester, D., and Gahagan, J. Matrix values and the behavior of children in the Prisoner's Dilemma game. Child Development, 1969, 40, 517-527.

Tedeschi, J., Lindskold, S., Horai, J., and Gahagan, J. Social power and the credibility of promise. Journal of Personality and Social Psychology, 1969, 13, 253-261.

Toffler, A. Future Shock. New York: Random House, 1970.

Vinacke, W. E. Sex roles in a three-person game. Sociometry, 1959, 22, 343-360.

Vinacke, W. E. Variables in experimental games: Toward a field theory. Psychological Bulletin, 1969, 71, 293-318.

Vinacke, W. E., and Arkoff, A. An experimental study of coalitions in the triad. American Sociological Review, 1957, 22, 406-414.

Vinacke, W. E., and Gullickson, G. R. Age and sex differences in the formation of coalitions. Child Development, 1964, 35, 1211-1231.

Vinacke, W. E., Lichtman, C. M., and Cherulnick, P. D. Coalition formation under different conditions of play in a three person competitive game. Journal of General Psychology, 1968, 69, 117-127.

Wasik, B. H., Senn, S. F., and Epanchin, A. Cooperation and sharing behavior among culturally deprived preschool children. Psychonomic Science, 1969, 17, 371-372.

Wolfe, D. L., and Wolfe, H. M. The development of cooperative behavior in monkeys and young children. Journal of Genetic Psychology, 1939, LX, 137-175.

Wrightsman, L. S. Social Psychology in the Seventies. California: Wadsworth Publishing Company, 1973.

Wrightsman, L. S., O'Connor, J., and Baker, N. Cooperative and Competition: Readings on Mixed-Motive Games. California: Brooks/Cole Publishing Company, 1972.

Zak, J. Studies of the development of interaction among preschool children. Psychologie Wychowa Woza, 1968, 11, 75-85.

# APPENDIXES

APPENDIX B

COLLABORATIVE NEGOTIATIONS RECORDING SHEET

Grade _____

Group Sex Composition _____

Subject's Sex _____

Subject's Seating Position _____

| Power Position | Round Number | Cooperative Interactions | | | Payoff Distribution (Number of Chips Obtained) |
|---|---|---|---|---|---|
| | | Initiates | Accepts | Rejects | |
| | 1 | | | | |
| | 2 | | | | |
| | 3 | | | | |
| | 4 | | | | |
| | 5 | | | | |
| | 6 | | | | |
| | 7 | | | | |
| | 8 | | | | |

VITA 2

Janis J. Jaworski

Candidate for the Degree of

Doctor of Education

Thesis: THE EFFECTS OF GRADE, POWER, AND SEX COMPOSITION OF TETRAD GROUPS ON THE DEGREE OF COOPERATION AMONG YOUNG CHILDREN ENGAGED IN A MIXED-MOTIVE GAME

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