Competitive Aggression Without Interaction: Effects of Competitive Versus Cooperative Instructions on Aggressive Behavior in Video Games

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Two experiments extended and tested Deutsch's (1993) theory of competition effects. A knowledge structure approach predicted that people view competitive situations as inherently more aggressive than cooperative ones. Furthermore, it was predicted that leading people to think of an ambiguously aggressive situation in competitive terms would increase aggressive behavior. In Experiment 1, knowledge structures of competitive situations had more aggressive content than cooperative ones. In Experiment 2, competition-primed subjects unnecessarily killed more video game characters (Mario Brothers) than cooperation-primed subjects. The increase in kill ratio occurred in the absence of changes in hostility, friendliness, or liking for one's game partner. Implications for understanding cooperation and competition, and for further research on such "affectless aggression," were discussed.

Violence is a distinguishing characteristic of U.S. culture. Our violent crime rate is considerably higher than that of any other major Western nation, as shown by the 1990 murder and serious assault rates for the larger European and North American countries, displayed in Table 1. Furthermore, in 1990 the United States experienced 23,458 murders and nonnegligent manslaughters and an additional 1,054,863 aggravated assaults (U.S. Department of Justice, 1991).

Numerous variables influence the frequency of violent crime. The known variables differ in many ways, including level of analysis. For instance, there are many influential sociological variables such as poverty, education, age, and culture. These variables necessarily operate through the individual, though, by way of such psychological variables as trait hostility, attitudes toward violence, and feelings of frustration. Ultimately, the proximal cause of most violent encounters is anger, often in the context of an argument. In 1990, of murders for which the circumstances were known, 45% were classified as being due to arguments. Another 26% were classified as "miscellaneous non-felony types," a category that includes murders committed "during brawls while offender was under the influence of alcohol and/or narcotics" (U.S. Department of Justice, 1991, p. 14).

COOPERATION AND COMPETITION

Thus, one important aspect of violence concerns the circumstances that promote arguments, anger, and aggression and possible alternative circumstances that promote agreement, affection, and affiliation. Morton Deutsch (1993) recently summarized much research on the role of competitive circumstances as precursors to the destructive pattern of argument, anger, and aggression and on cooperative circumstances as precursors to the constructive pattern of agreement, affection, and affiliation. Deutsch (1993) cogently argues that one way of creating a more peaceful society is to build more cooperation and less competition into many of our societal structures. This position is not a new one, either.

Authors' Note: Experiment 2 was conducted as a senior honors thesis by the second author under the direction of the first author. We thank the following individuals for their helpful comments on earlier drafts of this article: Kathryn Anderson, Ann Bettencourt, William Deuser, Karen Dill. Correspondence concerning this work should be addressed to Craig A. Anderson, Department of Psychology, McAlister Hall, University of Missouri—Columbia, Columbia, MO 65211. Electronic mail should be sent via BITNET to PSC@AAMIZZOUU.

FSPB, Vol. 21 No. 10, October 1995 1020-1030  
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to Deutsch (see his dissertation research: Deutsch, 1949a, 1949b) or to social psychology in general. Investigators have empirically demonstrated a number of the aggressive negative consequences of excessive competitiveness. The classic Robber’s Cave studies by Muzafer and Carolyn Sherif (Sherif & Sherif, 1953) showed (among other things) that competitive games can break up initial friendships, create hostilities, and induce aggressive behaviors among boys at a summer camp. Nelson, Gelfand, and Hartmann (1969) found that 5-6-year-old children display more aggressive behaviors after playing in competitive contests than after noncompetitive contests, even if the prior competitions were composed mostly of wins. Aronson’s work on racial integration in classroom settings (e.g., Aronson, Stephan, Sikes, Blaney, & Snapp, 1978) illustrated the problems created by the standard competitive classroom structure as well as the utility of the cooperative “jigsaw” technique to restructuring classrooms. More recently, Tjosvold and Chia (1989) successfully demonstrated that Deutsch’s (1973) theory of cooperative and competitive goals applies to the dynamics and outcomes in work settings in a non-Western culture (Singapore).

**Dynamic Approach**

In all of this past work on competition and cooperation, an appropriately interpersonal dynamic approach has been taken. That is, competitive situations are seen as leading to interpersonal conflict and aggression by means of the cognitive, affective, and behavioral exchanges that take place between coactors. According to Berkowitz (1989), “Competitive encounters are at least partly frustrating as the contestants block each other’s attempts to reach the disputed goal” (p. 66). When people perceive that they are competing with each other over a valued commodity, they naturally behave in ways that produce ill feelings, arguments, and (occasionally) physical conflicts. Such circumstances are frequently encountered in everyone’s life, even in early childhood. Only one person can have the last cookie, choose the television show to watch, or win the spelling contest. In other words, interacting people frequently have mutually exclusive goals. By definition, only one person can attain his or her desired goal in such situations, and some sort of competition usually determines the winner, either by persuasive argument (as in “Dad, she got the last cookie last time, so it’s my turn”), by force or the threat of force (as when the stronger child takes the television remote control from the weaker), or by superior skills (as in the spelling contest). Adult examples of the same types of conflict and the same strategies can be found in any work, recreational, or family environment.

**Cognitive Contribution**

What do people learn from this lifetime of competitive goal conflicts? Certainly, one general lesson most people learn is that competition is necessarily aggressive. We learn this both in the relatively positive sense of being assertive and in the more negative sense of inflicting harm. One need only attend a football game or a debate and listen to the contestants, coaches, and spectators to get a feel for how all view the contest as the proper scene for inflicting physical or psychological harm on the opponents. Participants are expected to try to trounce, demolish, destroy, or blow away their opponents, figuratively if not literally.

People also experience many cooperative episodes in normal daily life. As parents, educators, and concerned citizens, we certainly hope that children (and adults) learn the benefits of cooperation to reach a shared goal. Indeed, many of the useful suggestions arising from the dynamic literature on cooperation and competition revolve around changing apparently competitive situations into cooperative ones, either by restructuring the task (as in classroom activities) or by restructuring the participants’ perceptions of the task (as in labor/management negotiations).

At a fairly early age, then, most people learn to think of competitive situations in hostile, aggressive terms and to think of cooperative situations in friendly, nonaggressive terms. We develop rich knowledge structures about competitive and cooperative situations. These knowledge structures guide our perceptions and behavior as we enter new situations. Such a knowledge structure approach has proved useful in understanding a variety of phenomena across domains of psychology ranging from story comprehension (e.g., Bower, 1976) to perception of political defectors (e.g., Sedikides & Anderson, 1992). In addition, this knowledge structure approach to understanding cognitive effects of competitive versus cooperative situations is wholly compatible with a major

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**TABLE 1: Murder and Serious Assault Rates (per 100,000 population) for Large European and North American Countries (population more than 25,000,000), 1990**

<table>
<thead>
<tr>
<th>Country</th>
<th>Murder Rate</th>
<th>Serious Assault Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>8.4</td>
<td>370.2</td>
</tr>
<tr>
<td>Canada</td>
<td>5.5</td>
<td>150.5</td>
</tr>
<tr>
<td>France</td>
<td>4.6</td>
<td>76.3</td>
</tr>
<tr>
<td>West Germany</td>
<td>4.2</td>
<td>102.7</td>
</tr>
<tr>
<td>Italy</td>
<td>2.3</td>
<td>33.0</td>
</tr>
<tr>
<td>Spain</td>
<td>2.3</td>
<td>25.2</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2.0</td>
<td>305.4</td>
</tr>
<tr>
<td>Turkey</td>
<td>1.5</td>
<td>19.0</td>
</tr>
</tbody>
</table>


a. Historically, Turkey is not included in European comparisons, though in recent years political events have led some social scientists to include it occasionally as a European country.

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theoretical perspective on aggression—namely, Berkowitz’s (1990) cognitive neoassociation model. What we are calling knowledge structures are essentially sets of associatively linked elements in a semantic network. Once these knowledge structures or associative links exist, they may lead us to behave more (or less) aggressively in a given situation merely because we view the situation as competitive or cooperative.

This purely cognitive effect of competition and cooperation presumably plays a role in the dynamics of interpersonal interactions. Once one participant defines a situation as competitive, he or she will likely behave competitively (aggressively). This behavior is perceived by the coactor in the situation, is interpreted as competitive (aggressive), and is instrumental in inducing a similar aggressive response (cf. Kelley & Stahelski, 1970).

However, this knowledge structure approach to competitive aggression does not require true interpersonal interaction in order to produce aggressive behavior. The main thesis of this article is that simply defining a situation as competitive (vs. cooperative) is sufficient in many circumstances to produce significant increases in aggressive behavior. The main circumstance in which this is likely to occur is when the situation is ambiguous along two dimensions. First, the situation must be ambiguous with regard to how much aggression is called for. If someone punches you in the nose, being told that this is actually a cooperative situation is unlikely to be convincing. Second, the situation must be relatively novel. If one has been in the same situation repeatedly, one is likely to have already formed a standard way of behaving in it; such behavioral scripts are likely to be used regardless of some instruction to view the situation differently.

The research reported in this article was designed to answer two related questions. First, do people view competitive situations in general as more aggressive than cooperative ones? This is the knowledge structure question. Second, does priming a competitive versus a cooperative structure for a novel task significantly influence the aggressiveness of the behavior in that task, even when interpersonal interaction is kept to a minimum? This is the competitive aggressiveness question.

Our literature search turned up no directly relevant studies of either of these two questions. Perhaps the closest study was a hostility priming experiment by Wann and Branscombe (1990). These researchers primed hostility by having subjects think about aggressive sports (e.g., boxing) or nonaggressive sports (e.g., golf). When later asked to rate an ambiguous description of a target person, subjects who had been primed with aggressive sports rated the person as more hostile and as more likely to prefer hostile activities than subjects primed with nonaggressive sports. This study provides a beautiful demonstration that subtle manipulations designed to influence how people think about ambiguous descriptions can indeed influence important person perception processes. However, we cannot claim this study as support for our contentions concerning competitive and cooperative knowledge structures. The Wann and Branscombe priming manipulation varied the hostility of the primes (as they intended), not the competitive/cooperative nature of them. Golf and boxing are both competitive sports. What we needed was a manipulation that held constant the content (and thus the inherent aggressiveness) of the activity while systematically varying subjects’ competitive versus cooperative perspective on the task.

Our two main questions concerning competitive versus cooperative knowledge structures were addressed in two studies. The first assessed people’s beliefs about competitive and cooperative situations in general, with a focus on their beliefs concerning aggression. The second assessed the effects of competitive versus cooperative instructions on the aggressiveness of behavior in a novel video game task. The video game task was chosen for both methodological and ecological reasons. Methodologically, the task was useful because it allowed a standardized presentation of a novel task in which aggressive behavior was possible but not necessary. In addition, each subject’s style of play could be videotaped and coded for aggressiveness.

The video game task was useful ecologically in that the growing use of such games in U.S. society has been a source of concern to many. By examining the effects of cooperative versus competitive instructions on the aggressiveness of style of play, this research contributes to the general literature on potential positive and negative effects of video games.

EFFECTS OF VIOLENT VIDEO GAMES

In recent years, several investigators have demonstrated that playing aggressive video games can produce some unwanted consequences in the game player. For instance, playing a violent video game can increase subsequent aggressive behavior (Schutte, Malouff, & Post-Gordon, 1988; Silvren & Williamson, 1987). Feelings of hostility and anxiety have been linked to video game violence (Anderson & Ford, 1986). Cooper and Mackie (1986) showed that even passive observation of violent video game play produces increases in aggression. As might be expected, playing violent video games also decreases prosocial behaviors (Chambers & Ascione, 1987).

The results of the relatively few violent video game studies are very similar to those reported in the massive literature on media violence, in that both clearly show that under many circumstances violent material can produce increases in aggression (see Geen, 1990, for an
Important as these results are, they do not directly address the competitive aggression hypothesis outlined earlier. No studies have explicitly manipulated competitive versus cooperative instructions for the same task and then followed up by assessing purely cognitive-based (i.e., in the absence of dynamic interaction) aggressive behavior in that task context. This gap exists not only in the video game literature but also, as noted earlier, in the competition/cooperation literature. If knowledge structures about competition and cooperation do exist, and if they operate as hypothesized, then we should be able to detect these knowledge structures (Experiment 1) and should be able to influence aggressive behavior by simple manipulations of competitive versus cooperative instructional sets (Experiment 2).

EXPERIMENT 1

Overview

This experiment was designed to assess differences in beliefs about competitive versus cooperative situations. The main focus was on beliefs concerning aggressive behavior. Subjects generated common characteristics of competitive and cooperative situations. They then rated competitive and cooperative situations on several aggression, excitement, and pleasantness dimensions. Finally, they completed a cognitive similarity task in which aggressive and ambiguous words were paired with each other and with the words compete and cooperate. Each word pair was rated for similarity/relatedness. If people do indeed have knowledge structures about competitive and cooperative situations, and if they differ in aggression content, then competitive situations should lead to the generation of more aggression-related features, to higher aggression ratings, and to higher similarity/relatedness ratings when paired with aggressive words.

Method

SUBJECTS

Ten female and seven male introductory psychology students participated in the experiment for course credit. Preliminary analyses yielded no consistent effects of sex of subject, and so it was dropped from all final analyses.

MATERIALS

Common features questionnaires. Instructions for the generation of competitive features began as follows:

People are often involved in competitive situations. In this part of the study, we are interested in finding out how you think about competitive situations. Please take a few moments to think about several different competitive situations that are familiar to you.

Subjects then rated how easy or difficult it was to think about these situations. This rating was included only to ensure that subjects did take some time to think about the task before generating features. Following this rating scale were these additional instructions:

What are the common features or characteristics of most competitive situations? Please list the most common or most characteristic features of competitive situations that you have experienced or that you know about. List one feature/characteristic per line. Try to list at least three, but do not list more than 10.

These instructions were followed by 10 blank lines. Instructions for the generation of cooperative features were the same, except that the word cooperative replaced competitive.

Dimensional ratings. The words competitive and cooperate were each rated on six unipolar scales. Four of the scales asked the extent to which each type of situation called for aggression-relevant behaviors (forceful, aggressive, hurtful, and destructive). These scales were anchored at not at all (1), moderately (3), and extremely (5). One scale asked the extent to which each type of situation was very dull (1) versus very exciting (5). The final scale asked the extent to which each type of situation was very unpleasant (1) versus very pleasant (5).

Similarity/relatedness task. This task was borrowed from Bushman's (1991) work on the cognitive networks of hostile and nonhostile people. In that line of research, subjects are presented with all possible pairs of words from a list of 10 aggressive and 10 ambiguous words. For each word pair, the subject rates how similar, associated, or related the words are to each other. The aggressive words are blood, butcher, choke, fight, gun, hatchet, hurt, kill, knife, wound. The ambiguous words are alley, animal, bottle, drugs, movie, night, police, red, rock, stick. Subjects in the present study performed this same word-pair rating task, with the words compete and cooperate added.

PROCEDURE

After completing consent forms, subjects were given booklets containing all experimental materials. The booklets were constructed so that half the subjects were randomly assigned to generate competitive features first; the other half generated cooperative features first. Crossing this manipulation was another counterbalancing factor. Half the subjects did the dimensional ratings for competitive situations first; the other half did these ratings for cooperative situations first. Because these counterbalancing factors yielded no consistent effects, they were dropped from all final analyses.

After completing all experimental materials, subjects received a written debriefing. Additional questions were answered by the experimenter.
Results

Features of cooperative and competitive situations. The features listed by subjects were classified into one of three categories. Aggressive features were those that described explicitly aggressive behavior (e.g., fighting), aggression-related emotions (e.g., animosity), or behavior that typically leads to anger or aggression (e.g., back-stabbing). Nonaggressive features were those that described lack-of-aggression behaviors (e.g., agree), aggression-reducing behaviors (e.g., compromise), or aggression-incompatible feelings (e.g., belonging). The third category was for all remaining features, which were essentially aggression irrelevant. For each subject, total features, aggressive features, and nonaggressive features were counted. Both the number of aggressive and nonaggressive features generated for cooperative and competition situations and the proportion of total features that were aggressive and nonaggressive were analyzed in 2 (Situation: cooperative vs. competitive) \times 2 (Feature: aggressive vs. nonaggressive) within-subjects analyses of variance (ANOVAs). The results were essentially the same, and so only the proportion results are reported in this article.

As expected, there was a strong interaction between type of situation and type of feature, $F(1, 16) = 32.26$, $p < .0001$. As can be seen in Figure 1, subjects generated more aggressive features for competitive than for cooperative situations ($p < .002$), whereas they generated more nonaggressive features for cooperative than for competitive situations ($p < .0001$).

Dimensional ratings. Results of the six dimensional ratings of cooperative and competitive situations are presented in Figure 2. As predicted, subjects rated competitive situations as calling for more forceful, $F(1, 16) = 20.11$, $p < .001$, more aggressive, $F(1, 16) = 64.54$, $p < .0001$, more hurtful, $F(1, 16) = 6.94$, $p < .02$, and more destructive, $F(1, 16) = 9.26$, $p < .008$, behavior than cooperative situations. In addition, competitive situations were rated as more exciting, $F(1, 16) = 6.35$, $p < .03$, but less pleasant, $F(1, 16) = 4.80$, $p < .05$, than cooperative situations.

Similarity/relatedness ratings. Four scores were derived from subjects' similarity/relatedness rating task: (a) the average similarity of cooperate to the 10 aggressive words, (b) the average similarity of cooperate to the 10 ambiguous words, (c) the average similarity of compete to the 10 aggressive words, (d) the average similarity of compete to the 10 ambiguous words. These were analyzed in a 2 (Situation Word: cooperate vs. compete) \times 2 (Comparison Word Type: aggressive vs. ambiguous) within-subjects ANOVA. As predicted, both the situation main effect and the situation by comparison word type interaction were highly significant, respective $F(1, 15) = 24.25$ and $32.68$, $p < .002$. The means, displayed in Figure 3, reveal that compete is more closely linked to clearly aggressive words ($p < .0001$) and to ambiguously aggressive words ($p < .03$) than is cooperate. The interaction merely reveals that this effect is stronger for clearly aggressive words.

Discussion

That people have consistent knowledge structures about cooperative and competitive situations is now well established. The results of Experiment 1 also confirmed the prediction that people think about competitive situations in much more aggressive terms than cooperative situations. Such an understanding of the social world presumably arises from years of experience with competitive goal conflict situations and cooperative goal interdependence situations. This knowledge structure
EXPERIMENT 2

Overview

Experiment 2 was conducted to test the hypothesis that giving people a competitive perspective on a task would increase the aggressiveness of their behavioral approach to the task, relative to a cooperative perspective. Pairs of male and female subjects played the Nintendo video game Super Mario Brothers under either a competitive or a cooperative set of instructions. One third of the pairs consisted of two males, one third had two females, and the remaining third had one male and one female participant. Participants took turns operating the characters of the video game. Video game performance was videotaped and coded for aggressiveness of play. In addition, several questionnaire measures were taken to assess the possibility that the experimental manipulation of competitive versus cooperative set might influence feelings of hostility or agreeableness, liking for the paired subject, or perceptions about the video game. No strong hypotheses were advanced for these secondary dependent variables.

Method

SUBJECTS

Thirty male and 30 female university undergraduates participated in the experiment in exchange for extra credit in an introductory psychology course. The subjects participated in pairs. Subjects who knew each other were not allowed to participate in the same pair. Because these data were collected during the 1990-91 academic year, most participants were unfamiliar with the Super Mario Brothers video game.

MATERIALS

A Nintendo video game system was connected to a 19-in. color television monitor. The video signal from the game system was run through a videotape recorder so that game play could be recorded. In Super Mario Brothers, Mario and Luigi are the main characters. They are controlled by the subject, who must maneuver them through various scenes while avoiding cute but deadly creatures.

Two subjects participated in the experiment together. They were seated approximately 5 ft in front of the video monitor. A partition separated the subjects so that they could not see each other during the game or while completing questionnaires. In addition, subjects were not allowed to communicate with each other until the experiment was complete.

DEPENDENT VARIABLES

Aggression. A behavioral index of aggressive style of play was based on four separate measures coded from the videotapes of actual game play. To ensure that each subject was familiar with the game and the controls at the time aggressive style of play was assessed, only a portion of each subject's game play was coded. Specifically, the aggression measures were based on the last time a subject played through the first scene of the game. The aggression measures were all derived from how the subject had the main character deal with the deadly creatures. Two ways of handling the creatures involve killing them. First, the main character can kill the creatures by jumping directly on top of them. Second, under some circumstances the main character can obtain the ability (for a period of time) to throw fireballs. Hitting a creature with a fireball kills it. Two additional ways of dealing with the creatures involve avoiding them. First, the main character can avoid the creatures by jumping over them. Second, there are some (though fewer) circumstances in which the main character can avoid the creatures by jumping on top of a block or taking a slightly different path.

A coder blind to subjects' experimental conditions examined all the videotapes and simply counted the creatures (a) jumped on, (b) fireballed, (c) jumped over, and (d) avoided in other ways. In a related study, two coders used this same procedure. They produced perfect correspondence on each of these counts, and one coder was deemed sufficient in this experiment.
The main dependent measure of aggressive style of play was the proportion of creatures encountered during the scenario that were killed by the Mario or Luigi character, assessed during the last run through Scenario 1 of the video game. That is:

\[ \text{kill ratio} = \frac{\# \text{jumped on} + \# \text{fireballed}}{\# \text{jumped on} + \# \text{fireballed} + \# \text{jumped over} + \# \text{avoided in other ways}} \]

**Video game perceptions.** One questionnaire administered after the game was over consisted of a set of questions used by Anderson and Ford (1986). Each question was rated on a 7-point bipolar scale. The questions were designed to assess subjects' perceptions of the video game: “How easy was the video game you played?” (1 = very easy, 7 = very difficult); “How enjoyable was the video game you played?” (1 = not enjoyable, 7 = very enjoyable); “How frustrating was the video game you played?” (1 = not frustrating, 7 = very frustrating); “How violent was the content of the video game you played?” (1 = no violent content, 7 = very violent content); “How violent were the graphics of the video game you played?” (1 = no violent graphics, 7 = very violent graphics); “How fast paced was the action of the video game you played?” (1 = slow action, 7 = hectic action); “How many pauses in action were there in the video game you played?” (1 = many, long pauses, 7 = no pauses).

**Interpersonal liking.** A five-item interpersonal liking scale was administered to assess how much each subject liked his or her game partner. The items were “How much did you enjoy participating with the other subject?,” “How much would you like to play the video game with the other subject again?,” “How much did you like the other subject?,” “How much would you like to see the other subject again?,” and “How much did you get along with the other subject while playing the video game?” Each item was answered on a 5-point rating scale anchored at very much (1), uncertain (5), and not very much (5). Thus, low scores indicate liking for the partner. These items were internally consistent; Cronbach’s alpha was .90.

**Affective state.** We used the State Hostility Scale devised by Anderson, Deuser, and DeNeve (1995) to assess two current mood states, hostility and agreeableness. The scale consists of 55 statements such as “I feel furious” and “I feel friendly.” Subjects respond on 5-point Likert-type scales anchored at strongly disagree (1), disagree (2), neither agree nor disagree (3), agree (4), and strongly agree (5). Hostility is assessed by 24 items, agreeableness by 11. One item of each type was dropped because of low intercorrelations with the remaining items. “I feel willful” was dropped from the Hostility scale; “I feel tender” was dropped from the Agreeableness scale. The remaining items produced internally consistent scales. Cronbach’s alphas were .96 and .88 for Hostility and Agreeableness, respectively.

**Procedure.** On arrival, the two subjects were led into the laboratory, seated in front of the video game equipment, and asked to read and sign a standard consent form. They could not see each other from the time they were seated until after the experiment was over, because of the partition between their chairs. The experimenter delivered the manipulation at this point. Subject pairs were randomly assigned to the conditions.

**Cooperation/competition manipulation.** Subjects in both conditions were told that their task was to get as far as possible in each scenario. That is, their goal was to avoid losing the life of the main character. In the cooperative condition, subjects were told that their overall performance would be combined and assessed together, as a pair. They were informed that their video game performance was being taped and that the researchers would record for each pair how well they did. They were then shown how to play the singles version of Super Mario Brothers. In this version, whenever Mario lost a life, the other player would take over and operate Mario until he lost another life. They would keep trading back and forth, resetting the game when all Mario’s lives were gone, until the experimenter returned after 30 min of game play.

The competitive condition differed in two ways. First, subjects were told that their performances (how far they got in the scenario) would be compared against each other. Second, they were shown how to play the doubles version of Super Mario Brothers. In this version, each player operates one of two characters, either Mario or Luigi (randomly assigned). Mario and Luigi have exactly the same characteristics (e.g., speed, jumping ability) and go through the same scenarios as Mario in the singles version. Subjects were to take turns operating their character in the same way as in the cooperative condition, after the other subject’s character lost a life. Because each subject operated only one character (either Mario or Luigi), this doubles version of the game makes direct comparisons possible and thus highlights the competitive nature of the task. Once again, subjects traded turns until the experimenter returned after 30 min.

**Questionnaires.** After the 30-min game period had elapsed, the experimenter returned and escorted the subjects to separate rooms so that each could fill out the questionnaires in complete privacy. The first questionnaire assessed perceptions of the video game. The second was the interpersonal liking scale. The third and final one contained the hostility and the agreeableness items and was labeled Current Mood. On completion of these questionnaires, each subject was separately de-
briefed, thanked, and excused. The debriefing included a careful assessment of subject suspicion. No subjects correctly guessed the true purpose of the study.

**PREDICTIONS**

The main theoretical a priori prediction was that people induced to view the video game task as a competitive one would kill a higher proportion of the creatures they encountered than people induced to view the task as a cooperative one. There were no strong predictions for the other dependent variables, though several possibilities seemed particularly interesting. For instance, the competitive instructions might increase the perceived frustration, violence, or pace of the game and might decrease its enjoyability, relative to cooperative instructions. Similarly, the competitive instructions might make partners like each other somewhat less, or increase their hostility, or decrease their agreeableness. Finally, the game manipulation might interact with sex of subject, such that females would feel more agreeable after playing the cooperative game than the competitive one, whereas males would feel more agreeable after the competitive encounter.

**Results**

Because two subjects participated simultaneously in each experimental session, the design can be conceptualized in two ways. The simpler way is as a 2 (Game: cooperative vs. competitive) x 2 (Sex: male vs. female) factorial. But paired subjects could observe each other’s game play, and consequently they might have influenced each other. The second way of conceptualizing this study uses the dyad as the unit of analysis in a 2 (Game: cooperative vs. competitive) x 3 (Dyad: female vs. mixed vs. male) design. Preliminary analyses of the four variables coded from the video tapes revealed that observing the partner’s game had little impact on style of play, as all four correlations between the two performances (correlated across the 15 pairs in each experimental condition) were nonsignificant ($p > .17$). Nonetheless, data analyses were performed in two ways. Whenever the statistically more liberal analyses (those treating the subject as the unit of analysis) produced reliable effects, the more conservative dyad analyses were also conducted and are reported. In the latter case, the two subjects’ data in each dyad were simply averaged before analysis.

**Aggression.** As predicted, people playing in the competitive conditions killed a significantly higher proportion of creatures encountered than people playing in the cooperative conditions, $F(1, 56) = 35.68, p < .0001$. On average, competitive subjects had a 66% kill ratio, whereas cooperative subjects killed only 41%. Interestingly, there was no hint of a sex main effect or of a game by sex interaction, $F s < 1$. That is, female and male participants had essentially the same kill ratios. Figure 4 graphically displays these results.

The more conservative dyad analysis yielded essentially the same results. The main effect of game was highly significant, $F(1, 24) = 21.61, p < .0001$. Type of dyad (female vs. mixed vs. male) had no impact either as a main effect or in interaction with game, $F s < 1$.

In brief, the main hypothesis was strongly confirmed. Presenting the task in competitive terms significantly increased (relative to the cooperative condition) the tendency to play in an aggressive style. Both men and women in the competitive condition were more likely to kill the creatures they encountered than those in the cooperative condition.

**Video game perceptions.** What effect did the cooperative/competitive task manipulation have on subjects’ perceptions of the video game? Recall that subjects answered seven questions about the game. The questions concerned how difficult, enjoyable, frustrating, violent (content and graphics), and action packed (hectic and lack of pauses) subjects perceived the game to be.

The main effect of game approached significance on only one question. People in the competitive condition rated Super Mario Brothers as slightly less enjoyable ($M = 4.83$) than those in the cooperative condition ($M = 5.53$), $F(1, 25) = 3.43, p < .07$. The dyad analysis produced the same pattern of results, though it was weaker, $F(1, 24) = 2.88, p < .14$.

The only reliable effect in all the video game perception analyses was a significant sex effect on rated difficulty of the game. As is frequently found in studies of video games, females perceived the game as more difficult ($M = 3.97$) than males ($M = 3.07$), $F(1, 56) = 8.91, p < .005$. The dyad analysis reproduced this effect. Type of dyad was reliably related to rated difficulty of the game, $F(2, 24) = 4.89, p < .02$. Male dyads rated the game as least difficult ($M = 2.95$), female dyads gave the most difficult ratings ($M = 4.05$), and mixed dyads were intermediate ($M = 3.55$).

No other effects were statistically reliable (all $p s > .10$). Overall, a competitive versus a cooperative orientation to the game had relatively little impact on perceptions about the game, in contrast to the huge effects the orientation had on aggressive behavior.

**Interpersonal liking.** Perceptions of one’s playing partner were also unaffected by the game manipulation or by sex of subject. Specifically, there were no significant effects on the interpersonal liking scale, all $p s > .20$.

**Affective state.** The two affective state measures were hostility and agreeableness. As is common in studies of self-reported hostility, males in this experiment reported feeling slightly more hostile ($M = 2.07$) than females ($M = 1.78$). However, this effect was only marginally signifi-
Type of Situation
- Competitive
- Cooperative

Sex of Subject

- Males
- Females

Figure 4 Percentage of creatures killed by the main character as a function of sex of subject and competitive versus cooperative perspective.

If we assume the popular gender stereotype of females preferring cooperative situations and males preferring competitive ones, then the obtained interaction on the agreeableness measure makes sense. Both males and females felt best after a task that fit their preferred interaction style. This explanation is speculative and unrelated to the main point of the article, and so it will not be discussed further.

Discussion

Experiment 2 is the first to empirically assess the theoretical proposition that putting people in a competitive frame of mind increases their aggressive tendencies even though the aggression is not directed at the competitor. The kill ratios of both male and female subjects were about 60% higher in the competitive condition than in the cooperative condition.

An alternative way of framing this finding is to note that the cooperative frame of mind reduced aggressive tendencies, relative to the competitive condition. One obvious question is whether the cooperative frame of mind decreases aggressive tendencies or the competitive frame of mind increases them, or whether both these effects occur. This question assumes, however, that there is some natural "control" condition with which the cooperative and the competitive condition might be compared. In the context of dyadic game playing, such a control condition is difficult to envision. Players typically see themselves as either competing or cooperating with the other player. An instruction set to "ignore" the other player could be used, but that solution merely masks the experimenter's ignorance of how the subject is actually viewing the task with an untenable assumption that the subject is not paying attention to his or her partner's performance. Thus, we believe that a truly dyadic interaction involves either cooperative or competitive motives (or some mix of the two), thereby precluding an optimally similar control condition. However, there are options that might still allow a rough assessment of whether the cooperative instructions decrease aggression, the competitive ones increase aggression, or both effects occur. In the video game paradigm, for instance, one could have a control condition in which two subjects take turns but play totally different games. If one of the control subjects is playing the same game as is used in the competitive and cooperative instruction conditions, then the relative magnitudes of the cooperative and competitive instruction effects can be meaningfully assessed. We leave the task of teasing apart the relative effects of competitive and cooperative instructions to future research. For present purposes, it seems sufficient to have discovered that cooperative and competitive frames of mind can produce such vastly different rates of aggressive gameplay, as displayed in Figure 4.

The lack of similar cooperative/competitive effects on the perceptual, liking, and affect measures is intriguing. Subjects apparently differed in their level of aggressive behavior without concomitant differences in how they felt about the game, how they felt about their partner, or their own current mood state. If this pattern holds up in subsequent research, it suggests one answer to the puzzlement children and adults frequently experience when some interacting person expresses anger at them. Specifically, people often appear to get angry at another for no apparent reason. The angry person blames the target of his or her anger for some aggressive act; that instigating act is the source of the person's anger. The instigator is fully unaware that he or she has done anything to annoy the now-angry person and is truly puzzled by the uncomfortable situation in which he or she finds himself or herself. The current theoretical analysis of competition and aggression suggests that the instigators in such situations may very well have been
behaving aggressively as a result of their current competitive frame of mind. However, there is no aggressive affect in their behavior; it is a purely cognitive phenomenon based on competitive behavioral scripts that they have learned and automatized over a lifetime of practice. In essence, it is affectless aggression. The lack of affect in their own instigating aggressive behavior makes it difficult for them to interpret it as aggressive. Consequently, it is impossible for them to predict or to understand the angry reactions of the "victims" of their aggression. Their reactions to being "falsely" accused of inappropriately aggressive behavior are likely to exacerbate the conflict cycle that began so innocuously.

CONCLUSIONS

Past work on the effects of cooperation and competition has focused on dynamic interactions of people. We now know from this work, as elegantly presented by Deutsch (1993), that competitive goal conflict situations create dynamic interpersonal processes that not only allow the argument, anger, and aggression sequence but, in addition, significantly promote it. Similarly, we know that restructuring situations along more cooperative lines can reduce the argument-anger-aggression sequence.

The present experiments extend this work by showing that people's real-world understanding of cooperative and competitive situations includes major differences along an aggression promotion/aggression reduction dimension. That is, when we think about competition, we spontaneously think about aggressive behaviors, negative emotions, and conflict, whereas when we think about cooperation, we think about friendly behaviors, pleasant emotions, and working together. These differences in perspective are themselves sufficient to produce significant differences in aggressive behavior, even in the absence of the dynamic interpersonal processes normally studied in this domain. Viewing a particular situation as a competitive one can increase aggressive behavior, and apparently can do so without concomitant increases in hostility or decreases in friendliness. Thus, in addition to adding to our understanding of the normal dynamics of competitive aggression, this research suggests a potentially fruitful new line of work on situations that promote affectless aggression. Of particular interest are questions concerning the situational (and perhaps individual difference) variables that contribute to affectless aggression, as well as how affectless aggressive behavior may lead to serious anger-based aggression in fully dynamic interpersonal interactions. The knowledge structure approach to cognition and behavior is likely to be instrumental in identifying factors that promote affectless aggression, whereas interactive behavioral process approaches (e.g., Kelley & Stahelski, 1970) are sure to be most useful in delineating subsequent instigation of anger and anger-based aggression.

A better understanding of the competitive frame of mind and its relation to (initially) affectless aggression may well lead to intervention strategies designed to reduce unnecessary aggression and violence. If certain subgroups of people spontaneously define many ambiguous situations as competitive ones, they may produce a fairly competitive and aggressive environment for themselves. An intervention that teaches these people to apply the cooperative knowledge structure more often, and the competitive one less often, may substantially reduce the frequency of aggressive conflicts in their lives and in the lives of those around them.

A second approach to reducing aggression using the knowledge structure approach may be to change the competitive knowledge structure itself so that it contains fewer aggression elements. We are less optimistic about the efficacy of this approach, however. If competition is inherently frustrating, as Berkowitz and others have suggested, then attempts to change the competition knowledge structure are likely to fail. We all participate in so many competitive situations that the environmental reality of the competition/aggression link must necessarily become a part of the competition knowledge structure. In our view, the most fruitful interventions are likely to involve increasing the use of cooperative situations and decreasing the frequency with which people apply a competitive perspective to ambiguous situations in their daily lives.

REFERENCES


Received October 22, 1993
Revision received March 22, 1994
Accepted March 29, 1994