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Eric J. Sambolec

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THE EFFECTS OF COMPETITIVENESS ON TASK PERFORMANCE: AN INTERACTIONAL APPROACH

By

Eric J. Sambolec

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ABSTRACT

THE EFFECTS OF COMPETITIVENESS ON TASK PERFORMANCE: AN INTERACTIONAL APPROACH

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Eric J. Sambolec

In previous research, competitiveness has been studied as a trait, a state, or interactionally. Research has shown that competitiveness is related to performance outcomes. However, gaps remain in the literature on the effects of competitiveness on task performance across situations. This paper explores literature from sport, social, and personality psychology. Several themes are examined. Based on this review, the author hypothesized that competitiveness can be primed to influence performance at tasks. Other hypotheses involve gender differences and situational differences. Differences in interpersonal competitiveness as a trait were examined in relation to group performance. Competitiveness was manipulated through supraliminal priming. Results showed that this priming influenced performance at a group persistence task. Results also partially replicated past research on group motivation gains (Köhler, 1926; 1927; Hertel, Kerr, Messé, 1999). However, some findings were counter to previous research in this area. Explanations about gender differences are proposed. These explanations take into account the competing hypotheses of Instrumentality X Value motives versus Social Comparison / Goal Setting motives to perform well in groups. Implications for group performance in social, athletic, and work domains are discussed.

To all those who supported and all those who stood in the way of my dreams.

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My interest in group performance enhancement comes out of my love for running, particularly team cross country running. Thank you to all of those who have guided me in my running endeavors. Thank you to all who have helped me through this difficult time during which I lost my beloved ability to run and one very dear to me. Without all of you I never would have finished this thesis. Woo hoo!

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Chapter 1

INTRODUCTION

Competitiveness is a strong motivational force that can guide behavior. Competition is present in our society across a broad spectrum of domains. As a motivation that energizes and channels behavior, it can be a determining factor in people's level of achievement in life (Jackson, Ahmed, & Heapy, 1976). Historically, this concept has been studied as both a personality variable and as a temporary psychological state in persons that is triggered by the demands of certain situations. In this thesis, I examined competitiveness in both of these ways. There has been surprisingly little research on the motivational properties of competitiveness. Some of the reasons for these gaps in the literature are discussed below.

One particular area of psychology in which competitiveness is likely to exert significant effects is task performance. Research on task performance historically has looked at what aspects of the situation are related to performance on particular tasks. This tradition in social psychology dates all the way back to Triplett's research on social facilitation (Triplett, 1898). While there have been many investigations of personality factors that influence task performance, few have examined competitiveness in particular.

Before we research competitiveness, it is necessary to first define it. The first notable definition of competitiveness in the psychology literature is, "an individual's tendency to approach or avoid a competitive situation" (Martens, 1975). Martens went on further to describe competitiveness as "a social comparison process and a situation specific form of achievement motivation. Competitiveness originates in the intrinsic

motivation to be competent but competitiveness may also be extrinsically motivated" (Martens, 1976). So we see by these definitions that Martens defined competitiveness as a cognitive process that is activated in particular situations. Although achievement motivation need not be conceptualized as a personality variable, Martens described it as such. Competitiveness traverses the domains of cognitive, social, and personality psychology. Because of the broad characterization of this concept, it has been operationalized and studied in different ways.

Trait Competitiveness

Studies that treat competitiveness exclusively as a trait have been sparse in social and personality psychology. However, some work from this perspective has been done in sport psychology. For instance, Jones, Neuman, Altmann, and Dreschler (2001) developed the Sports Performance Inventory (SPI), which attempted to measure athletic potential. Based on an exploratory factor analysis of 83 self-report questionnaire items, six factors were extracted. Competitiveness was among them. This subscale exhibited acceptable reliability, Cronbach's alpha = .95. It was also able to discriminate between college varsity athletes and novice athletes. Since college athletes scored significantly higher than novice athletes did on this subscale, there is good evidence of concurrent validity.

Recent research by Hellandsig (1998) has shown that competitiveness can predict outcomes of interest in sport psychology. In this research a competitiveness subscale of a measure called the Sport Orientation Questionnaire (Gill, Dzewaltowski, & Deeter, 1988) was used to measure differences in adolescent athletes. The Sports Orientation Questionnaire (SOQ) is a self-report instrument that measures, among other things, trait

competitiveness. High levels of competitiveness, as measured by this method, predicted high levels of performance in a variety of sports. This evidence supports the predictive validity of the scale. Physical competence attributed to self and teammates also predicted high performance in all the sports measured. So while competitiveness is not the only predictor of performance at sports, it did have a significant connection to achievement in this domain. These results as a whole support the hypothesis that competitiveness can be operationalized as a trait or individual difference variable that has implications for outcomes in sports.

As shown by the studies presented above trait competitiveness, as assessed by self-report, is related to performance at team sports. However, to truly capture a personality trait, it is necessary to measure it via variety of methods. Some research has conceptualized competitiveness as a personality trait but measured it by different methods than above. For example, Higgs (1972a) measured competitiveness of participants by observer report. Observers classified participants as good or average competitors based on their behavior in three game situations. Conditions were controlled such that participants ran side-by-side with another person on a treadmill whose previous performance was approximately equal to their own. In another condition participants ran alone on a treadmill. Those judged to be high in competitiveness by observer ratings, persisted longer than those judged to be average in competitiveness. This was true across conditions. Persistence was measured in relation to the participant's own ability on an oxygen uptake trial conducted before the experimental conditions were imposed. The results of this study support the construct validity of the author's measure. That is, those who are judged to be more competitive should outperform those judged to be less so and

the evidence was consistent with this prediction. However, the author did not include a detailed description of the observer ratings used to judge competitiveness. In order to assess the validity of this measure and the other self-report measures, they should be compared in future research. Another issue with this study is that competitiveness was also treated as a psychological state induced by the demands of the situation. Competitiveness conceptualized as a state and as a person-situation interaction is discussed in subsequent sections of this paper.

Other research has not only treated competitiveness as a personality trait, but has tried to link it to other traits. For example, Higgs (1972b) measured participants' competitiveness by observer report and then subjected them to a battery of psychological and motor ability tests. However, there were no significant differences in personality, as assessed by this procedure, between those judged to be high or average in competitiveness. The only differences were in motor ability. These findings suggest that competitiveness may be linked to physiology rather than other personality traits. However, the limited sample size and methods of assessing competitiveness and personality leave the results of this study in doubt.

Frederick (2000) also tried to link competitiveness to other personality variables, as well as to performance measures. The results of this study showed that competitiveness was negatively correlated to both internal locus of control and GPA. In summary there have been some attempts to link competitiveness to personality traits. Competitiveness has predicted outcomes of interest such as performance at some athletic tasks. However there is no evidence of a distinctive personality profile that is linked to competitiveness. The use of single methods and small samples in this research also lead

me to question its results. In order to truly assess the affects of competitiveness on performance, it must be studied from not only a variety of methods but across different situations. As a reasonable next step, it appears useful to explore the effects of competitiveness on performance, not only among athletes in athletic contexts but also to other contexts as well for purposes of generalizeability.

State Competitiveness

Past research has operationalized competitiveness as temporary and changeable aspect of particular situations. These studies have manipulated the environment so that participants would behave in a more or less competitive manner. This research has used varied methods to determine how a competitive environment affects behavior. While most of this research has been performed in the area of social psychology, some also comes from sport psychology.

Some studies have measured competitiveness along with social loafing. Social loafing is a phenomenon that occurs in small performance groups. Specifically, when group size increases individuals tend to exert less effort. Stroope (1993) found that social loafing was eliminated in a group rowing task when individual performance was identifiable to the group. That is, when individual split times were publicly displayed during a rowing task, participants did not show decrements in their performance compared to when they rowed alone. Furthermore, participants felt more competitive when their split times were identifiable and they were in a group.

This effect of the competitive environment on performance is not limited to one sport or to the laboratory. A field study of swimmers obtained similar results (Williams, Nida, Baca, & Latané, 1989). This study measured swimmers at a Big Ten

Championship meet. Those athletes who competed in both individual and relay events of the same stroke and distance were examined. Once again, the results showed that social loafing was eliminated in identifiable, group situations. However, in this case, the swimmers not only failed to decrease performance when identifiable in a group, but actually increased their performance under these circumstances. These swimmers also felt significantly more competitive when in a relay situation, as rated by self-report on questionnaires. The researchers then went on to manipulate identifiability and individual or relay event. In this case, results show that swimmers were less likely to exhibit social loafing on relays when their performances were publicly identifiable. Social loafing did occur when their individual performances on a relay were not identifiable to the group.

Taken together these studies show strong support for the idea that particular situations can make individuals feel and behave more competitively. It may be the case that the factors listed above can eliminate social loafing in work groups, committees, and legislative bodies. These are only speculations though, because these experiments have not been done within those contexts.

It seems then, that the presence of others and identifiability are key components of the social environment that lead to the elimination of social loafing. These factors, in turn, are positively related to self-reported feelings of competitiveness. However, it is unclear from the results of this research whether feelings of competitiveness led to the elimination of social loafing or vice-versa. It may also be the case that other's presence, identifiability, or a combination of the two leads to both increased performance and competitiveness. Other research by Williams, Harkins, and Latané (1981) demonstrated that identifiability led to the elimination of social loafing at a group cheering task. So

while the role of identifiability in the elimination of social loafing has been demonstrated, the direct role of competitiveness has not. However it has been established that self-reported competitiveness is related to the elimination of social loafing for certain group tasks. The key concept to take from these studies for the current research is that competitive contexts such as athletic competitions lead to increased reported feelings of competitiveness.

It is reasonable to assume that working in a group at a task in an athletic environment, as mentioned above, would lead to an increase in self-reported competitiveness. In this situation, a person is presented with the opportunity to compare his or her skills to others publicly for the potential benefit of the team. The added component of identifiability makes it possible for him or her to compare his or her own skills to those of others. Identifiability should also motivate the person to avoid performing poorly and thus hurt the group's chances for success.

While such an opportunity for public social comparison should lead to increases in competitiveness, it is also logical that competitiveness should lead to better performance in a group task. First, those who come into a group task and perceive it as an opportunity to compete will be more willing and able to perform with and against others. These perceptions should motivate the person to perform better than when alone. The perceived demands of the situation should get one's competitive juices flowing in anticipation of the task at hand. Activating one's competitiveness should lead to performance enhancement at a group task. However, since people perceive situations differently, we can cannot assume that they would see a group task as an opportunity to compete. By manipulating one's perceptions of the environment, then testing their

performance at group tasks, we can explore more cleanly the extent to which competitiveness leads to performance enhancement.

Other studies from education and social psychology provide a better understanding of the nature of the environment's influence on competitiveness. For example, Aronson and Osherow (1980) created an interdependent, cooperative classroom environment in which students took turns at tasks within 5-6 person groups. The results showed that this cooperative environment had several positive outcomes for minority students but not white students when compared to a normal classroom. In addition, feelings of competitiveness decreased. However, the classroom environment differs from other environments in type of achievement, identifiability, and goals of individuals. So we cannot be sure that results obtained in the classroom will generalize to the other contexts. Secondly, this study characterizes cooperation and competition as antithetical in the classroom. This may not be the case. In other areas they may be interdependent or occur independently. For example, a leader of a group may be highly competitive with others but in order to achieve his goals, he must cooperate with his teammates in order to perform well. The two are examined separately in this paper.

Person-Situation Interaction Approaches to Competitiveness

Some researchers have attempted to integrate the trait and state approaches to competitiveness. These researchers have measured individual differences in trait competitiveness and then put participants in competitive situations to see if those who are high in competitiveness differ from those low in competitiveness in terms of certain behaviors and cognitions. Once again, some of these studies have been conducted in social and personality psychology, while others are from sport psychology.

Within the field of social psychology, there has been some interactional research on competitiveness. For example, Graziano, Hair, and Finch (1997) examined the role of competitiveness and other personality traits on performance in group task situations. Trait competitiveness was rated by both self-report and observer-report. These trait ratings of competitiveness were negatively correlated to agreeableness and positively correlated to task performance. The effect of agreeableness on task performance was partially mediated by trait competitiveness. So, this research used multiple measures of trait competitiveness to examine its role on task performance in competitive situations. While this research focused more on the trait aspects of competitiveness, it did predict performance in state competitive group tasks.

Other studies in marketing have shown that those high in trait competitiveness set higher goals when they perceive the organizational climate as competitive. However, those low in trait competitiveness set lower goals regardless of their perceptions about the level of competitiveness of the organizational climate. These goals in turn are positively related to performance (Brown, Cron, & Slocum, 1998). So the person-situation interaction approach to competitiveness has implications in the world of business as well.

Other studies have used nonconscious, subliminal priming to attempt to manipulate the salience of trait competitiveness. Subliminal priming involves pairing a target concept with an unrelated, distracter concept. The target concept is presented outside of conscious awareness but exerts effects on behavior or thoughts related to that concept (Bargh & Chartrand, 2000). Priming procedures and background will be explained in more depth later in this paper.

Priming the concept of competitiveness seems to interact with trait competitiveness in particular situations. For example, Neuberg (1988) subliminally primed participants with either competitive or neutral words. The researcher also measured level of trait competitiveness. Results showed that those high in trait competitiveness behaved more competitively in a prisoner's dilemma game when primed for competitiveness than when exposed to neutral primes. Also, among all those who were primed for competitiveness, the participants highest in trait competitiveness behaved more competitively than those low in trait competitiveness. A prisoner's dilemma game allows the participant to interact with other group members toward either a common or individual goal. Those who worked toward the individual goal and disregarded the group goal were scored as competitive. So we see that competitiveness is once again conceptualized as the polar opposite of cooperation. Be that as it may, this study shows that individual differences in competitiveness can be influenced by unconscious primes in particular situations.

These studies show that competitive behavior was changed as a function of the interaction between personality characteristics and the environment. Neuberg's study suggests that subliminal priming can change people's behavior in a mixed-motive situation in which competitiveness is one of a number of possible orientations. However, subliminal priming interacts with participants' trait competitiveness such that those who are more competitive to begin with will behave more competitively. The present research examined participants' trait competitiveness, the effectiveness of supraliminal priming, and their task performance in different group situations. As such it in part conceptually replicated Neuberg's work, and it also generalized his results to other tasks. Neuberg

found that both person factors and situational factors affected competitive behavior and its relation to priming. The interaction between these two sets of factors also exerted an influence on behavior. Therefore, I examined how participants' trait competitiveness is related to both the effectiveness of priming and their performance at different group tasks.

Gender Differences

The results of much of the previous research show that there are gender differences in competitiveness. Most show that men are more competitive than women are in general. Most of these gender differences have been tested using self-report measures of trait competitiveness. Several studies have shown that men score higher on the competitiveness subscale of the SOQ (Gill, Kelley, Martin, & Caruso, 1991; Ruan, 1993).

Other self-report measures show mixed results. For example, a study using the SPI found that while males were more competitive that females in a novice athlete group, the reverse was true of college athletes (Jones, et al., 2001). Another study found that among 155 professional tennis players, females were significantly more competitive on a trait measure (Houston, Carter, Smither, 1997). A study of Taiwanese swimmers after participation in a tournament found that females were more competitive than males on the SOQ (Lee, 1997). Of course after a competition we might expect that people will report feeling competitive but it is not clear why women would feel more competitive than men. This reversal may only be the case for these small, restricted samples of professional tennis players and Taiwanese swimmers, but not for athletes in general. So as a whole, trait competitiveness measures have shown that males tend to be more

competitive than females in general. Results that show females as more competitive had small samples of high level athletes which are not typical of females in general while the males samples were larger and more representative. Although the results have not been unanimous, there seems to be reasonable support for this gender difference.

The potential causes for this gender difference are varied and interesting. They could arise from differences in socialization, biology, a combination of both, cognitive strategies, and/or a host of other reasons. Previous research has suggested that gender differences in competitiveness are not due to biological sex, but rather to differences in social roles (Olds & Shaver, 1980). This research has shown that the more masculine a person is, as measured by the Personal Attributes Questionnaire (Spence & Helmreich, 1979), the more competitive he or she is regardless of his or her biological sex. Other research has shown that the gender difference may exist because females have a stronger desire to maintain equitable outcomes based on socialized differences in submissiveness and dominance between the genders (Wyer & Malinowski, 1972). So it seems that this gender difference may be learned rather than biologically based. While I acknowledge that this gender difference likely exists, the causes will not be discussed at length here. Future research needs to investigate this issue.

Evidence of this gender difference in competitiveness is also found in state competitiveness and the interaction between trait and state competitiveness. For example, Kline and Sell (1996) looked at trait competitiveness across group tasks of varying degrees of competitiveness. Groups were composed of all highly competitive individuals, all highly cooperative individuals, and mixed groups. These groups were then put into competitive or cooperative situations. There was no gender difference in

performance at these tasks. So females performed just as well as males at competitive tasks regardless of level of trait competitiveness. Unfortunately, once again competitiveness and cooperation are separated and operationalized as opposites in this experiment. As a result we do not see how they can jointly affect performance such as in team sports where one must cooperate with one's team and compete against other teams and individuals in order to achieve success. There was support for the idea that women will perform just as well as men in competitive tasks even if there is a gender difference in trait competitiveness. Unfortunately, the authors do not mention whether there were gender differences in trait competitiveness in this sample.

Previous research has shown that trait competitiveness is activated only in particular situations and that this trait-situation link varies across genders. Results of a previous study show that when participants work at a group task and they believe their input is less than their partner's input they will allocate the same amount of reward to each member of the group. There is not a gender difference in this condition. However, when participants believe their input to the group is greater than the input of their partner, males tend to give more reward to themselves and females still give the same amount of reward to their partner as to themselves (Carles & Carver, 1979). This change in strategy can be interpreted as an increase in competitiveness in males when they believe they are helping the group more than other members are. It could also be the case that females are more likely to adhere to fairness norms. Either way this brings up an interesting point. That is that competitiveness can be conceptualized and measured in an interpersonal context not just in sports. So in this case competitiveness is not defined as desire to compare one's skills to those of an opponent but rather to defeat an opponent by

allocating more resources to oneself than to others. This desire to gain an advantage over one's opponent is part and parcel of the essence of competitiveness. By seeking an advantage over an opponent or using social comparison to evaluate one's performance, a person still seeks to fulfill the same goal of performing one's best in relation to others and to one's own standards of excellence. For measurement purposes competitiveness can be measured as one's motivation to succeed and one's willingness to gain advantage relative to others because this behavior serves the goal of performing one's best.

Another study that examined gender differences in competitiveness across situations was conducted with children. By using observer report, researchers assessed children's competitiveness when working at a task with same sex partners or opposite sex partners. This study found that children in preschool only behaved competitively when they worked with a member of the opposite sex. This was true of both boys and girls. However, when children were a little older (7-9), girls only behaved competitively when performing a task with the opposite sex while boys were competitive when working with the same or opposite sex (Moely, Skarin, & Weil, 1979). The authors believe that males develop a more general tendency to compete across situations, while females compete only in particular situations. In certain situations women may be just as competitive as men, but men appear to be more competitive in general across situations. So how this gender difference in trait competitiveness manifests in behavior and under what circumstances is still largely an open question. Past research has looked at these differences from a variety of perspectives and measures. This research suggests that while gender differences in competitiveness exist, they do not exist in all situations.

Tasks

I measured the effects of competitiveness on performance at a persistence task. I collaborated on prior research on the Köhler motivation gain effect which has used persistence tasks to explore performance (Hertel, Kerr, & Messé, 2000; Kerr, Messé, Park, & Sambolec, in preparation). Using a persistence task as opposed to other types of cognitive or physical tasks has several advantages. First of all, few participants have experience with persistence tasks, such as holding up one's arm as long as possible. So it is unlikely that certain individuals will come into the laboratory with known advantages over others at these tasks. Second they are relatively non-evaluative. Failure or success at the task says little about a participant's intrinsic qualities such as personality or intelligence. Performance at cognitive or physical tasks often causes participants to make attributions about their abilities and worth.

Previous research has shown that performance at persistence tasks can be influenced by factors such as the presence of others (Triplett, 1898), relative ability difference between self and co-worker (Messé, Hertel, Kerr, Lount, & Park, 2002), and group efficiency (Köhler, 1926, 1927). These studies have focused on the factors that facilitate performance enhancement in small groups. This concept of individual performance improvement in a team setting is referred to as a group motivation gain. That is, a motivation gain occurs when an individual's performance in a group is greater than his/her performance when working at the same task alone. So the individual exceeds expectations that would be predicted by his or her solitary performance when taking into account any losses in performance due to physical demands of the group task, i.e., loss of time at a team rowing task when one member's oar hits another's (Steiner,

1972). Previous research in motivation gains has placed participants in contexts in which they worked with and/or competed against other individuals or teams (e.g., Hertel, Kerr, & Messé, 1999; Williams & Karau, 1991). However, very little research in this area has looked at individual differences that may moderate performance. It seems that competitiveness is a likely candidate for a personality moderator in this type of research.

Competitiveness may be of particular importance within certain group performance contexts. The first is at a conjunctive task. In such a task, each member of a group performs the same function and the group's success is determined by the weakest member (Steiner, 1972). Some past work investigating conjunctive tasks manipulated co-workers' supposed ability so that participants were always the least capable members of the group (Hertel, et al., 1999, Study 2; Messé, et al., 2002, Study 2). The participant's performance is also essential to the group's performance because his or her score is the one that all members of the groups will receive. Research has shown that when a person is placed in such a situation, he or she often shows motivation gains (Köhler, 1926, 1927; Hertel, et al., 1999; Messé et al., 2002). A highly competitive person or one placed in a highly competitive context may be more motivated to beat the more capable member(s) of the groups and refuse to quit first. In the process the competitive person maximizes benefit for the group unintentionally. Therefore, competitiveness brought into the situation by priming or initial predisposition may increase performance under conjunctive conditions. However, because the assumed goal of conjunctive tasks is to help the team's performance, it could also be that the desire to beat one's opponent may not be as salient in this performance context and heightened competitiveness may not increase performance.

In contrast, it is more likely the case that the task demands of a coactive group situation might well be affected by competitiveness. In such a situation participants are able to simply monitor one another's performance. There is no group goal or outcome. They are given no specific instructions on how they should behave toward this other person but are told that their own score is simply the outcome of their own performance. Under these circumstances a highly competitive person, as a function of either personality or environment, will be more likely to see this interpersonal configuration as an opportunity to compete, by gauging his or her own performance against that of other group member(s). In this situation, it is the presence of another which allows the opportunity to evaluate one's own performance relative to this person and one's own standards that will motivate the participant to enhance his/her performance. Additionally those participants who are high in trait competitiveness would interpret this situation as a chance to beat an opponent thereby pushing their own performance. Once again, competitiveness, either brought in to the lab as a predisposition or induced by priming will lead to motivation gains under coactive task conditions.

There has been little research on the relationships between competitiveness, task performance, and mood. However, it seems plausible that those whose personality complements their situation should experience a better mood than those whose personality and situation are incompatible. Since, this is a person-situation analysis of behavior, mood was measured to examine this relationship. Positive and negative affect are of primary interest so the PANAS (Watson, Clark, & Tellegen, 1988) was included as a mood measure.

Hypotheses

In Study 1, I tested the effectiveness of a priming manipulation, as well as examined gender differences in competitiveness. Based on previous research, I expected that scores on trait competitiveness, measured by a variety of measures including the SOQ competitiveness subscale (Gill, Dzewaltowski, & Deeter, 1988), the Competitiveness Index (CI; Smither & Houston, 1992), and a Measure of Social Values (Van Lange, Otten, De Bruin, & Joireman, 1997) would be higher for those who are primed for competitiveness in comparison to those who are not (Neuberg, 1988). The SOQ and the CI both purport to measure competitiveness as a motivation to perform well in athletic contexts in order to beat one's opponents and/or to live up to one's own standards of excellence. The Measure of Social Values operationalizes competitiveness as a gaining advantage over others by allocating the greatest possible resources to oneself. Each measures a different competitive behavior but both are motivated by the same underlying concept so their ratings should be highly consistent with one another.

Also as shown by previous research, there are gender differences in trait competitiveness (e.g., Gill, et al., 1991). However, previous research has found no gender difference in effectiveness of priming competitiveness (Neuberg, 1988). So, I predicted that males would score higher than females on initial trait competitiveness. All participants were measured on trait competitiveness before and after the priming procedure to test the effects of the priming. Although I expected males to be higher on the pretest measure of trait competitiveness, I had no apriori hypothesis on gender differences on the posttest measure. However, there was no reason to believe there should have been any post-test gender differences beyond that found on the pretest. It

was unclear as to whether the prime would be equally effective for both sexes. So results explored possible gender differences in priming effects, but no specific apriori hypotheses about gender as a moderator of priming were formulated.

In Study 2, I tested the effects of priming on task performance. Based on previous research on the link between trait competitiveness and performance, I expected that those who were higher on trait competitiveness would outperform those lower in trait competitiveness (Higgs, 1972a). I also expected that this difference would occur in both group and individual conditions. However, I also proposed that these individual variations in trait competitiveness could be overshadowed by nonconscious priming. So, I predicted that priming would increase performance at tasks, particularly in interpersonal conditions, regardless of initial level of trait competitiveness. To test this hypothesis, half of the participants were primed for competitiveness after they had been pretested for trait competitiveness, the other half were not. I expected that trait competitiveness scores, as measured by the SOQ competitiveness subscale, would predict performance in the control group but not in the primed group. As noted above, I also hypothesized that males, in general, would score higher in trait competitiveness than would females. Once again, I proposed no hypotheses with regard to gender differences on the effectiveness of priming. I did hypothesize gender differences across situations. In general males' performance should have been enhanced by level of competitiveness across situations, while females' competitiveness should have only enhanced performance in competitive situations. That is, males should have enhanced performance in all group conditions when primed while females should have only exhibited performance enhancement in the coactor condition when primed. Previous research has shown that males behave more

competitively in general while females behave competitively in competitive situations (Jones, et al., 2001).

I predicted that task setting and demands would exert a significant influence on performance. I expected to replicate the Köhler effect (Köhler, 1926; 1927). That is, I expected people working under conjunctive task demands would outperform those in the individual control condition. I also expected that those who were primed for competitiveness would exhibit enhanced performance in the coactive and conjunctive task demands conditions. Those in the coactive conditions who were primed should have particularly outperformed those in the individual condition because they had been primed and were in a situation that could be interpreted as competitive. Those in the conjunctive condition should have outperformed those in the individual condition. However, priming might not have greatly enhanced performance for those in the conjunctive condition because they were not instructed to defeat their partner but rather work with him. So I expected that priming effects would overshadow task demands in the conjunctive condition and thereby moderate performance but not as much as in the coactive condition.

The Positive and Negative Affect Schedule (PANAS, Watson, Clark, & Tellegen, 1988) was included in Study 2 as a measure of mood. I expected that those whose priming and task demands conditions most closely matched their pretest level of competitiveness would have exhibited the highest positive and the lowest negative affect. So I expected those who were highly competitive, primed for competitiveness, and who were allowed to compete, i.e., those in the coactive (and perhaps, conjunctive) condition, would have left the study with a more positive mood than those who were low in

competitiveness. Participants low in trait competitiveness would have exhibited less positive affect if primed and forced to compete (group conditions).

Chapter 2

STUDY 1

Method

Participants

One hundred seventy-four undergraduate psychology students from Michigan State University participated in exchange for partial fulfillment of course requirements. Participants were recruited into the study using the university's subject pool website. Forty-eight were male and one hundred twenty-six were female.

Measures

Participants completed the Measure of Social Values as a pre- and posttest measure of competition and cooperation (Van Lange, Otten, De Bruin, & Joireman, 1997). This measure consists of nine items. Participants are presented with a hypothetical situation in which they are asked to divide points among themselves and another person. Respondents have three forced choice options of how to divide these points. One option divides the points evenly and is scored as a prosocial choice. The two other options provide a discrepancy between the participant's and the other's points such that the participant gets more points. The option that provides for a moderate discrepancy is scored as an individualistic choice and the large discrepancy is scored as a competitive choice. There was no option which allowed participants to receive less than the other. So a participant receives three scores for this measure. If a participant makes six of these nine choices in one particular category then he or she is classified as a

member of this category (prosocial, individualistic, or competitive). To see the full measure, refer to Appendix A.

Participants also completed two measures of competitiveness that were administered as posttests only. The first was the Competitiveness Index (CI; Smither & Houston, 1992). It consists of 20 statements to which a participant can choose to either agree or disagree. Items include statements such as "I am a competitive person" and "I hate to lose." For the full measure, refer to Appendix B.

Participants also filled out the Sports Orientation Questionnaire (SOQ; Gill, Dzewaltowski, & Deeter, 1988). This 25-item measure allows participants to rate their agreement on a 5-point scale from "strongly agree" to "strongly disagree." The SOQ includes three subscales for competitiveness, goal orientation, and win orientation. Competitiveness items included: "I perform my best when I am competing against an opponent." Goal orientation items included: "I try my hardest to win when I have a specific goal." Win orientation items included: "I hate to lose." For a full version of the SOQ refer to Appendix C.

Two different types of supraliminal priming manipulations were examined, a word search task and a story. These were further divided into competitive, neutral, and cooperative conditions to create a 2 X 3 between subjects factorial design. The word task priming manipulation was based on techniques shown to be effective in past research (Bargh & Chartrand, 2000). This manipulation was a list of 25 words, 15 of them are descriptors of competition or cooperation (target words). The other 10 were neutral distracter words (see Appendices D & E). In the neutral or no prime condition, participants were given a list of 25 neutral words (see Appendix F). The target and

distracter words were selected by research assistants within the Small Groups Lab at Michigan State University. Final selections for inclusions of these words were made by the author and one of his advisors (Messé). Examples of competitive words are: competition, victorious, rivalry, and achievement. Examples of cooperative words are: connection, partnership, and support. Examples of neutral words are: glassware, edifice, stowaway, and circumlocution. According to the directions, the participants, in 15 minutes, had to find as many words as they could that are three letters or longer hidden within these given words. They were instructed not to unscramble words, but only to find smaller words that existed within the given order of letters of the stimulus word. That is all the three letter or longer words had to be contiguous letters already contained in the stimulus words.

The story priming manipulation consisted of three different stories that were as similar as possible to one another in context, while still representing different ideas. All three described a running race. The competitive story told of a solitary runner who endured years of hard work and maintained an extremely competitive outlook to beat his competition and qualify for the Olympics. The cooperative story described a team of athletes running a relay at the World Track and Field Championships who valued their common bond above all and succeeding because of it. The neutral story described a day in the life of a marathon race official. It told of his duties to prepare for and clean up the course. It made no mention of competition or cooperation. The stories were developed by members of the small groups lab and then edited by the researcher and one of his advisors (Messé). For full versions of these stories refer to Appendices (G-I).

Procedure

In order to participate in Study 1, participants had to complete the Social Values Measure (SVM) as a pretest questionnaire. This measure was posted on the university's psychology subject pool website as a "global questionnaire." These questionnaires allow researchers to collect data on students without linking themselves to any particular study. These questionnaires are listed on the website when students logon to it. They were told that by filling out these questionnaires they could gain opportunities to participate in studies that would allow them additional chances at course credit. Approximately 500 students filled out the SVM on the web.

The experimenter then contacted all of the students who had filled out the SVM correctly by e-mail and invited them participate in the "Puzzling Words Study." Experimental sessions consisted of six to thirty students in a large lecture hall. When participants arrived at a session, an experimenter welcomed them in the hallway outside the classroom and asked them to sign their names on a log sheet. Another experimenter brought participants into the classroom and sat them with at least one space between each other. The experimenter then described the basic purpose and procedure of the study. He told the participants that the study was intended to measure their performance on a variety of tasks. He went on further to say that not all participants would have the same tasks but they would all take approximately the same amount of time. They could leave after 30 minutes if they had finished and were allowed as much as one hour. The lower time limit allowed most people to finish and prevented them from distracting those who had not. It also compelled them to spend a reasonable amount of time on the tasks.

The experimenter then passed out packets containing a consent form, the priming manipulation, and the measures. The priming manipulation was titled a measure of verbal and creative abilities. Participants first filled out the neutral version of the opposite condition prime. That is, if someone was in the competitive word task prime condition, he or she would first fill out the neutral story prime. If one was in the cooperative story prime condition, he or she would first fill out the neutral word task prime. This procedure is presented in Figure 2.1. So in the event a participant looked over at the neighboring participant he or she would see an identical task. This was implemented to reduce potential suspicion that some participants had different tasks. Also there was no reason to believe that the neutral prime would affect scores on the dependent variables so its inclusion before the target prime should not have influenced the other prime types effects.

Word Prime

Neutral Prime (Control)	Competitive Prime
Neutral Story	Neutral Story
↓	↓
Neutral Words	Competitive Words

Story Prime

Neutral Prime (Control)	Competitive Prime
Neutral Words	Neutral Words
↓	↓
Neutral Story	Competitive Story

Figure 2.1. Presentation of Priming Stimuli in Study 1

Results

Malleability of Social Values.

In order to assess the effectiveness of priming competitiveness a pilot test was conducted measuring participants' base rate of competitiveness on the Social Values Measure (SVM; Van Lange, et al., 1997). After participants completed the priming

procedure, I measured their responses on this scale once more. In order to be classified on this scale participants must make six of nine consistent choices. Results on the pretest showed that of the 124 participants who filled out the Social Value Measure in the sample, 16 (12.9%) were classified as competitive, 29 (23.4%) as individualistic and 59 (47.6%) as prosocial. This left 20 participants (16.1%) who could not be classified into any of the three categories. Twenty-seven of the participants who filled out the SVM were male. Four (14.8%) were prosocial, five (18.5%) individualistic, and twelve (44.4%) prosocial. The rest (6) could not be classified. Ninety-seven females filled out this measure. Of these 12 (12.4%) were competitive, 24 (24.7%) individualistic, and 47 (48.5%) prosocial. This left 14 females who could not be classified. For the full distributions of competitiveness scores on this measure by gender, refer to Figures 2.2 and 2.3.

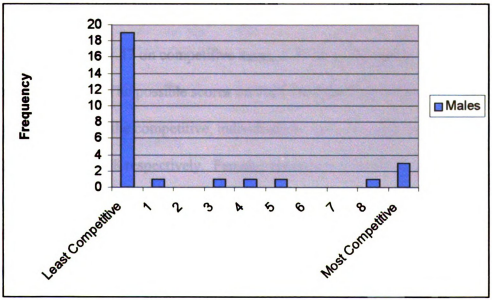

Figure 2.2. Pretest Competitiveness Scores on Social Values Measures for Males in Study 1

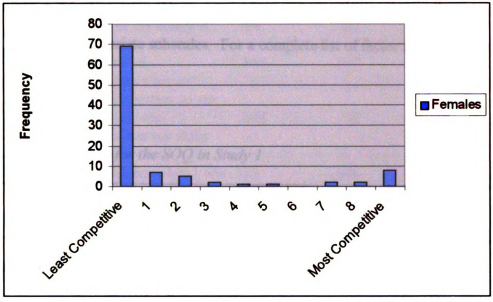

Figure 2.3 Pretest Competitiveness Scores on Social Values Measure for Females in Study 1

Results showed that the mean pretest scores on the SVM for all those who participated was 1.47 on competitive items, 2.77 on individualist items, and 4.76 on prosocial items. The possible scores on each subscale range from 0-9. Males mean pretest scores on the competitive, individualistic, and prosocial items were $M = 1.78$, $M = 2.74$, and $M = 4.48$ respectively. Females mean scores on the same items were $M = 1.38$, $M = 2.78$, and $M = 4.84$ respectively. These gender differences were nonsignificant (all F's < 1).

Posttest Measures of Competitiveness.

Participants also completed the SOQ (Gill, Dzewaltowski, & Deeter, 1988) and CI (Smither & Houston, 1992) as posttest measures. The SOQ achieved acceptable level

of reliability, Cronbach's alpha = .95. The competitiveness subscale of the SOQ also achieved a high level of reliability, Cronbach's alpha = .94. as did the CI, Cronbach's alpha = .84. The original factor structure of the SOQ was also replicated such that items loaded on appropriate subscales. For a complete list of factor loadings refer to Table 2.1.

Table 2.1

Factor Loadings for the SOQ in Study 1

	Factor			
Item	Competitiveness	Win	Goal	Unpredicted
1. I am a determined competitor	**.579**	.134	.251	**.602**
2. Winning is important	.376	**.479**	.006	**.563**
3. I am a competitive person	**.512**	.241	.230	**.612**
4. I set goals for myself when I compete	.330	.222	**.535**	**.512**
5. I try my hardest to win	**.292**	.292	.454	**.604**
6. Scoring more points than my my opponent is very important to me	.417	**.532**	.000	**.443**
7. I look forward to competing	**.773**	.007	.180	**.465**
8. I am most competitive when I try to achieve personal goals	.197	.009	**.745**	.192
9. I enjoy competing against others	**.772**	.009	.222	.394
10. I hate to lose	.177	**.770**	.004	.279
11. I thrive on competition	**.747**	.240	.189	.303
12. I try my hardest to win when I have a specific goal	.254	.166	**.684**	.279
13. My goal is to be the best athlete possible	**.558**	.387	.288	.219
14. The only time I am satisfied is when I win	.180	**.754**	.009	-.007
15. I want to be successful in sports	**.594**	.448	.174	.206

16. Performing to the best of my ability is very important to me	.009	.167	**.468**	**.605**
17. I work hard to be successful in sports	**.646**	.350	.276	.168
18. Losing upsets me	.109	**.783**	.124	.251
19. The best test of my ability is competing against others	**.766**	.282	.158	-.003
20. Reaching personal performance goals is very goals is very important to me	.164	.137	**.780**	.179
21. I look forward to the opportunity to test my skills in competition	**.695**	.138	.443	.209
22. I have the most fun when I win	.322	**.666**	.284	.005
23. I perform my best when I am competing against an opponent	**.758**	.293	.176	.117
24. The best way to determine my ability is to set a goal and try to reach it	.207	.009	**.786**	-.001
25. I want to be the best every time I compete	**.312**	.548	.304	.290

Note. The above table presents factor loadings based on a Principal Components Factor Analysis with Varimax Rotation and Kaiser Normalization. The above is a Rotated Component Matrix.

3 X 2 X 2 ANOVAs analyzing Prime (competitive, cooperative, or neutral), Prime type (words or story), and Gender were performed on the posttest measures of competitiveness: the CI, SOQ and SOQ competitiveness subscale. Results revealed a nonsignificant Priming effect on the SOQ and it's competitiveness subscale, F's < 1. Although this relationship was stronger when using the CI as the dependent variable, it was still nonsignificant, $F(2, 160) = 1.91, p < .16$. The effect of prime type (word or story) was marginally significant on the SOQ, $F(1, 160) = 3.48, p < .07$ such that those in the word condition scored higher than those in the story condition. This effect was also marginally significant for the competitiveness subscale, $F(1, 160) = 3.10, p < .09$, but nonsignificant for the CI, $F < 1$. The effect of Gender was significant on both the

competitiveness subscale, $F(1, 160) = 4.46, p < .04$ and the CI, $F(1, 160) = 8.82, p < .005$ such that males scored higher than females on these measures. This effect was nonsignificant for the total SOQ, $F(1, 160) = 1.52, p < .22$.

Interactions terms were computed among the independent variables. Results revealed no significant interactions. There was a marginally significant prime X prime type interaction on the SOQ , $F(2, 160) = 2.60, p < .08$ as well as a marginally significant prime X gender interaction, $F(1, 160) = 3.42, p < .07$. However these interactions did not even reach marginally significance on the other measures of competitiveness. A marginally significant prime X prime type X gender interaction was detected by both the competitiveness subscale of the SOQ, $F(2, 160) = 2.62, p < .08$ and the CI, $F(2,160) = 2.84, p < .07$. This effect was not significant for the overall SOQ.

To examine the nature of the 3-way interaction contrasts were performed which revealed that males primed for competitiveness by words scored marginally higher than males primed by the neutral words on SOQ competitiveness subscale, $t(160) = 1.64, p = .10$. This effect did not reach significance on the other measures of competitiveness (t's < 1.6). However when comparing the competitive prime versus the neutral prime for males primed by the story method and for female primed by either method, we see that competitiveness scores are opposite of the predicted direction. That is under these conditions, competitiveness priming made participants score lower on measures of competitiveness. For all means refer to Table 2.2. This suggests that competitiveness priming may only have worked for males in the word task condition but not males on the story condition or for females using either priming stimulus. These results also suggest that the SOQ, its competitiveness subscale and the CI are measuring similar but not

identical concepts. They also suggest that priming was only selectively successful in creating differences on trait measures of competitiveness.

Table 2.2

Scores on Competitiveness Measures After Priming by Condition

	Prime					
	Competitive		Neutral		Cooperative	
	Prime Type					
Measure	Word Task	Story	Word Task	Story	Word Task	Story
	Males					
SOQ	104	90.33	88.7	92.2	108.67	81
SOQ: Competitiveness Subscale	55.5	46.67	45.3	48.2	57.11	42.11
CI	15.5	11.83	12.8	14.2	15.83	15
	Females					
SOQ	82.2	93.05	91.38	86.68	96.3	90.05
SOQ: Competitiveness Subscale	39.56	46.47	46.48	42.26	48.75	44.85
CI	10.56	12	13.1	10.61	12.71	12.9

Note. Scores on the SOQ are totaled from all 25 items on the measure. Items are on a 5-point scale. Higher scores indicate a higher sports orientation. Scores on the SOQ: Competitiveness Subscale are totaled from 13 items on the SOQ. Items are on a 5-point scale. Higher scores indicate higher competitiveness. Scores on the CI are totaled from all 20 items on the measure. Scores are dichotomous. Items are scored as 1-point for agreement or 0-points for disagree. Higher scores indicate higher competitiveness.

ANOVA's on the SVM revealed no significant effects (all F's < 1.2) for any of the three types of choices (competitive, individualist, or prosocial). Based of these results, I decided to use the SOQ and its competitiveness subscale as pre and posttest measures of competitiveness in the main experiment (Study 2). Since the word task seemed to be a better method for priming competitiveness than the story task, I decided to use the word task as the priming manipulation in the Study 2. Also since only males responded to the competitive prime, Study 2 only examined males.

Discussion

The results showed that scores on the SVM were not affected by the priming procedures. Of the 174 participants in the study only 124 completed the SVM as a pretest measure. So we can only use these participants to measure differences caused by the priming procedures. Results show that only 15 of these participants changed their classification on this measure (competitive, individualistic, or prosocial) after the prime was administered. Only six of these were in the predicted direction. That is only six participants were measured as more competitive after the competitive prime or more prosocial after the cooperative prime. Four were in the opposite direction indicating possible reactance or ineffectiveness of the prime. The remaining five consisted of changes in classification after the neutral prime. Three participants were measured as more prosocial and two were more competitive. So it appears that social values as

measured by this instrument are either very difficult to change or are relatively unaffected by cooperative and competitive priming procedures. Perhaps this is because the instrument really measures allocation of resources which is not related to one's motivation to beat others at a task.

There was a lack of significant results on this measure for prime, prime type, and gender, indicating that it is not a useful procedure for purposes of exploring the target concepts. However, results from the posttest competitiveness measures were more promising. Males primed for competitiveness by the word task scored somewhat higher on every posttest measure of competitiveness when compared to the neutral prime condition. However this effect was only marginally significant on one measure (SOQ competitiveness subscale) and did not reach statistical significance on the other two measures.

Unexpectedly, the cooperative word prime made males just as competitive or more so than the competitive prime, although not significantly more than the neutral condition (see Table 2.2). The reasons for these trends are unclear. The cooperative word prime (Appendix E) contains words such as "teamwork," "camaraderie," and "squadron" which may bring to mind image of competitive sports for males. Other words contained within the instrument which seem much more related to cooperation such as "interconnected", "collective", and "support" may actually bring to mind cooperation but cause reactance in males who are inclined to be more competitive. This reactance may lead males to think or behave more competitively when primed for cooperation by these words.

For males primed by the story method, the results show a different pattern. The highest posttest competitiveness scores were obtained from the neutral priming condition, then competitive, and finally cooperative on the SOQ and its competitiveness subscale. For the CI, participants scored highest when primed for cooperation, then neutral, and finally competitive. So most of the SOQ results were at least in the right direction for the cooperative prime, although not significant but in the wrong direction on the CI. These conflicting results may be due to the content of the story primes (Appendices G, H, and I). All three describe a running race. The competitive story describes a man who runs his best due to his competitive spirit. The cooperative story describes a group of teammates who do their best and enjoy themselves because of their cooperation. The neutral story just describes the days events of a road race official but does not mention any competitive or cooperative content. To males, who are more competitive than females, the mention of a sporting context may trigger competitive juices, generally, regardless of the context in which it is phrased. This may be why scores in the cooperative prime condition were higher than expected.

For females, the competitive word task prime did not work at all. Females scored lowest on all posttest measures of competitiveness in the competitive word task prime condition when compared to both the neutral and cooperative prime condition, although this effect was not significant. Females primed for competitiveness by the story prime did score higher than those in the neutral condition on all three measures but not significantly so. So the competitive story did not make females significantly more competitive and the competitive word task prime actually makes them less competitive. It appears then, that competitiveness priming is ineffective for females, at least when

measured by these instruments. When we look at the content of the competitive word task prime, we see words such as "victorious," "vanquishing," and "superiority" which may not activate accessible concepts to most females. These words are related to defeating others and hierarchies which may not be as salient to women as they are to men.

Males were overall more competitive than females on the SOQ competitiveness subscale and the CI, but contrary to expectations females did score higher than males in the neutral word task condition on many of the measures, although none of these differences even approached significance. It appears that the competitive word task prime made males somewhat more competitive. This priming procedure did not work for females. The competitive story prime worked for neither. As a result I decided to eliminate the story prime in the subsequent study. I also decided to focus specifically on males in Study 2 because overall the priming was ineffective for females. Since the cooperative prime tended to yield higher competitiveness scores than the neutral condition, it too was eliminated from Study 2. Competitiveness seemed more likely a moderator of performance in group tasks because a desire to outperform one's partner should increase motivation while cooperation should not. This would be especially true in the coactor condition in which a participant is not told to work with another person but simply that he can monitor the other's performance. Here one has the opportunity to compete against another and competition has been made salient by the prime so priming should moderate performance it the coactive condition.

It is less clear what competitiveness priming should do in the conjunctive condition because beating one's partner will not necessarily help the group which should

be the goal in a conjunctive task. Cooperation may improve the group's performance under these circumstances but since priming cooperation did not make people more cooperative on the SVM and they actually appeared more competitive on the other measures, cooperative priming was dropped. If the competitive prime is enough to make males perceive a group situation as competitive, then the prime's effects should override those of task demands and priming will moderate performance in the conjunctive condition. If however, the cooperative nature of conjunctive task demands override the salience of competitiveness, then priming will not moderate performance in the conjunctive condition. However, priming was expected to increase performance in the co-actor condition, in which concerns with relative performance could not possibly be tempered by cooperative focus (e.g., a focus on team success, group cohesion, and so forth).

Chapter 3

STUDY 2

Method

Participants

One hundred twenty male undergraduate psychology students from Michigan State University participated in exchange for partial fulfillment of course requirements. I recruited only males for this study because the Study 1 showed that priming competitiveness was more effective for males than females. Participants were recruited into the study using the university's subject pool website. This sample originally included 132 students. However, 12 were excluded for explicit verbal suspicion expressed to the experimenter after the study that there was no partner, computer/equipment failure, misunderstanding of directions/language which prevented completion of the priming procedure, and sleeping during the task.

Six of the aforementioned participants failed to complete at least 50% of the word priming task and were excluded from analyses. Of these, two were in the neutral prime individual condition, one in the neutral prime conjunctive condition, as well as one each from the competitive prime individual, conjunctive, and coactor conditions. Two participants told the experimenter they did not believe there was another participant in their group and were therefore excluded from analyses. These were both given the competitive prime treatment, one each in the coactor and conjunctive conditions. Two participants in the competitive prime coactor condition were issued the wrong hand weight by the experimenter and their data was excluded. One participant in the neutral

prime condition fell asleep during the session. Finally one participant in the neutral prime individual condition experienced computer failure.

Apparatus and Measures

In order to measure participants' trait competitiveness, I used the competitiveness subscale of the Sports Orientation Questionnaire (Gill, Dzewaltowski, & Deeter, 1988). The SOQ is self-report questionnaire in which participants rate their agreement with items on a 5-point scale from strongly agree to strongly disagree. The SOQ contains 25 items divided into 3 subscales. To see the full SOQ, refer to Appendix C. The competitiveness subscale consists of all the odd-numbered items. This subscale contains 13 items. It has demonstrated acceptable levels of internal consistency, reliability, and validity (Gill, Dzewaltowski, & Deeter, 1988; Gill & Dzewaltowski, 1988) both in the US and in Taiwan (Kang, Gill, Acevado, & Deeter, 1990).

As in Study 1, the priming manipulation was based on techniques shown to be effective in past research (Bargh & Chartrand, 2000). Again, this manipulation was a list of 25 words, 15 of which connote competition (target words). The other 10 are neutral masking words (see Appendix D). In the neutral or no prime condition, participants were given a list of 25 neutral words (see Appendix F). Examples of competitive words were: competition, victorious, rivalry, and achievement. Examples of neutral words were: glassware, edifice, stowaway, and circumlocution. As in Study 1, the participants had to find as many words as they can that are three contiguous letters or longer hidden within these given words in 15 minutes. They were instructed not to unscramble words, but only to find smaller words that exist within the given ordering of letters. They were

given the word glassware as an example and told from this word they could extract words such as glass, war, lass, ass, etc.

The performance task used was a persistence task based on previous research in motivation gains (Köhler, 1926, 1927; Hertel, Kerr, & Messé, 1999). Participants were instructed to hold their arms above a tripwire for as long as possible. Participants held a 4 lb. hand-weight so that the trials would tend to last only for a short period. Previous research has shown that participants using comparable weights can hold their arms above the tripwire for about 2.5 minutes on average (Hertel, Kerr, & Messé, 1999). Also based on previous research, participants used a 4lb. weight (Hertel, Kerr, & Messé, 1999). The tripwire was extended between two pulleys and above a keyboard such that once the participant's arm fell on the tripwire, a spring-loaded lever attached to the pulley system depresses the spacebar on the keyboard. This device is heretofore referred to as the Weston machine, named after its designer, Eric Weston. During this task, the participants were seated in front of a computer that recorded the time for each trial of the persistence task. As soon as the spacebar was depressed from the dropping of the participant's arm, the clock stopped for the trial.

I administered the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) as a measure of participants' mood. The PANAS has exhibited acceptable levels of reliability (Cronbach's Alpha's: .84 - .90; Watson, Clark, & Tellegen, 1988). As stated earlier, I included this measure for exploratory reasons. I suspected that participants whose initial state of competitiveness more closely matched the state they were placed in the experiment would experience more positive affect.

Procedure

In order to participate in the study, participants had to fill out the SOQ as a pretest measure of trait competitiveness. All students in introductory psychology are required to participate in a certain number of studies or to complete an alternative service in order to fulfill requirements for course credit. To participate, students registered on the university subject pool website. The SOQ was posted on the university subject pool website as a "global questionnaire." All students who sign-on to the website are notified that they can fill out these global questionnaires to qualify for additional studies. These global questionnaires are not explicitly associated with any particular study on the website. The SOQ was titled a measure of "sports and competition." I also included a gender question and a question assessing level of athletic involvement on a 5-point scale from "no participation in sports" to "participation in college athletics." Students were required to enter their e-mail addresses when filling out these measures. Eight hundred forty eight students filled out the pretest measure. About 30% were male. The experimenter then contacted all male students who completed the questionnaire and invited them to participate in the study via e-mail. In this e-mail the experimenter notified the students that they had been selected to participate in a study that would assess their performance at a variety of tasks. They were also told that there was a chance they could earn money for their participation. Finally, the e-mail instructed the students how to sign-up for sessions of the experiment.

Once a participants had signed up, an experimenter sent him an e-mail reminder the night before his session to increase the show-up rate. Participants signed up for sessions that could accommodate one to four students. These sessions were randomly

assigned to conditions. When the participant(s) arrived, an experimenter welcomed the participant(s) into the laboratory and asked them if they had any arm, shoulder, or back injuries that would disqualify them from performing the persistence task. Any students who had such injuries would be given credit and dismissed.

The experimenter seated participants around a large table where they completed informed consent forms. As the participants did this, the experimenter stated that he or she was going to call another laboratory where a similar study was being conducted. The experimenter informed the participants that depending on what condition they were in, the participants might be paired via a computer link with a participant from this other lab during the study. This procedure was actually an experimental deception used to accomplish two goals. First, for many of the experimental sessions only one student signed up. This meant that without such deception, it would not be possible to complete all of the dyad conditions. With other supposed participants in another lab, students were led to believe that they would not be completing the experimental tasks alone. Second, when participants in the dyad conditions complete the tasks on the computer, the program tells them that the name of their partner is "Robert Jackson." So if students knew all the other participants in their session, they could see through this deception. By telling them that another group of students in a different lab is participating in this study, they would be more likely to believe that their experimental partner existed. The script for the bogus fake phone call read by the experimenter was as follows: "Hi John. I have (number of participants present) students. How many do you have? Oh you have (same number) also. Okay, well we're ready to start. All right goodbye."

After the phone call, the experimenter described and demonstrated portions of the experimental task for the participants. First the experimenter informed participants that they would be performing the study in small booths adjacent to the lab. The remainder of the study would run by computer and the experimenter would be in the main lab room. The experimenter then demonstrated the persistence task to the participants stressing that they should grasp the hand weight firmly, sit up straight, keep elbow locked, and place their free hand on the control key on the computer keyboard during the task trials. The experimenter reiterated that the computer would present participants with all necessary information throughout the study.

At this time the experimenter took each participant to his respective booth individually. To do this, the experimenter printed out the list of all participants signed up for the session prior to this time. The experiment needed to enter each participant's name into the computer program before each session for two important reasons. The first was in order to identify and retrieve data by condition and session. Second, after each task trial, the computer gave participants feedback information on how well they and, if applicable, their partner had done. The participant's first name was used in this feedback screen. Booths were labeled A-D. The experimenter entered names in the order they appeared on the computer print out. To match this predetermined order to the proper participant, the experimenter collected consent forms from the participants, looked at their signatures and sent them to the appropriate booth. The experimenter was careful not to use the participants' names so that when the feedback screen came up with the name "Robert Jackson" in the dyad conditions, participants would not know who precisely his partner was. Finally the experimenter told participants that if they had any questions

while in the booth, or if they had completed the study that they should slip a red sheet provided to them under the door. At that point the experimenter would come to get them from the booth. The experimenter asked if participants had any questions, answered them, and then put each participant in the proper booth, instructed him to follow the directions on the computer, and closed the door to the booth.

All booths were approximately equal in size (10ft. x 10ft.) and contained the same materials and equipment arranged in the same manner. There was a small desk centrally located. On this desk was a computer with a keyboard and Weston machine in front of it. A small web-cam was mounted next the keyboard to encourage participants to complete the task trials properly. In addition, experimenters placed a clipboard containing the priming task and the red sheet that would be used to summon the experimenter on top of the computer tower. Experimenters also provided a hand weight on the desk and a paper bag where participants were instructed to place any watches of bracelets during the study to ensure they could not time themselves or wear something that would interfere with the hand weight.

Participants were randomly assigned to conditions within a 2 (competitive prime vs. neutral prime) X 3 (individual, coactor, or conjunctive) design. The priming condition differed according to which priming stimulus the participant was given. The task context condition (individual, coactor, or conjunctive) differed by what instructions and feedback the computer program gave to participants. Participants in all conditions received the same instruction screens before the first task trial. These initial instructions described how participants should perform the task trials. These were very similar to the instructions the experimenter gave to participants before entering the booths.

After the computer program instructed participants on how to perform the persistence task, it described how they could receive money for their participation. The instructions stated that two people would be randomly selected at the end of the study to win money. Further everyone had an equal chance to win money regardless of their performance on the trials. However, the money awarded would be based on how long a participant lasted such that for each second one held his arm above the tripwire, he would gain five cents. So winning the prize was not contingent upon performance, however the amount of that prize was. I included this external motivation so that participants would be more likely to exert reasonable effort at the task.

Then, the computer program instructed the participants to grasp the hand weight in their dominant hands and get ready for the first of several trials. There was then a countdown on the screen to signal the start of the first trial. As soon as a participant could no longer hold up his arm, it would drop and depress the tripwire on the Weston machine pushing the spacebar and ending the trial. The computer program recorded the trial length and a screen appeared telling the participant that the first trial was now over. The program further instructed the participant to switch the hand weight to his other arm and await the start of the next trial that would be indicated by the computer countdown. The procedure for the second trial was identical to the first in all conditions except for the switching of arms as indicated above.

At this point, participants completed the priming task. The computer program instructed participants to open the envelope next to the computer and follow the instruction on the form contained within. This form was the priming task. It was labeled a "Word Finding Task" at the top of the page. Instructions stated that the task was

designed to measure the participants' verbal and creative abilities. In order to complete the task participants had to find words of three letters or longer hidden within the given words. For complete copies of the priming tasks refer to Appendices D and F.

Half the participants were placed in the neutral prime condition, the other half in the competitive prime condition. As mentioned before the neutral prime contained 25 unrelated neutral words while the competitive prime contained 15 competitive words and 10 neutral words. The participants were given 15 minutes to complete this task. The computer screen displayed the number of seconds remaining to complete the task. If participants finished before this time, they could click on a button that would take them to the next screen in the computer program. However, if this elapsed time was less than 10 minutes the computer would continue the countdown until at least 10 minutes had elapsed before advancing to the next screen. If participants took longer than 15 minutes, the computer program automatically advanced to the next screen instructing participants to move on. This limited the time to complete the task between 10 and 15 minutes.

Subsequent instruction screens after the participants finished the word task priming procedure differed depending on condition. For those in the individual condition, the computer program provided instructions identical to those of the first and second trial for the next two trials. However, in all conditions, participants received comparable rest between trials to ensure that there was not differential fatigue between conditions. So, participants in the individual condition completed four trials with identical instructions except for which arm to use (alternated by trial) interrupted only by the priming procedure after the second trial.

Instructions for the conjunctive condition told participants that for the next few trials they would be following a somewhat different procedure than before. During these trials they would be paired with another student at the task to create a two-man team. Each participant would receive the same score. That score would be the trial score of the person whose arm dropped first. They were told that during the trials two boxes would appear on the screen. Each box would have one of the participant's names in it. The box would remain green as long as that person's arm remained above the tripwire. As soon as one person's arm touched the tripwire, their corresponding box would turn red. This would signal the end of the trial and the other person could lower his arm. The partner's name was always given as "Robert Jackson." As described earlier the participants believed this partner was in a booth either next to them or in the other lab. In actuality the partner's box would never turn red. The real participant would necessarily always quit first. Finally the instructions informed participants that they could still win money as previously mentioned but that it would be awarded to one of the two-man teams. This was done to motivate the participants to try their best. The computer program followed this procedure for two trials, one with participant's dominant arm and one with the non-dominant arm.

In the coactor condition, computer instructions also mentioned to participants that they would be following a somewhat different procedure than before. On the next few trials they would be able to monitor another participant in the study. As in the conjunctive condition, this was always a fake participant named "Robert Jackson" who would always outlast the real participant. Also like the conjunctive condition, both participants' names would be in boxes lit green if their arms were still above the tripwire

and red when their arms hit the tripwire. However, unlike the conjunctive condition, the two participants' performances were independent of one another. That is, the performance of one did not affect the score the other received. So participants were instructed that they were simply able to monitor the performance of another student, but not that they were teammates. In the conjunctive condition, the participant's box on the computer screen would turn red as soon as his arm hit the tripwire and the trial would end meaning "Robert's" box would never turn red. In the co-active condition, "Robert's" box would stay lit green for 1.42 times as long as the participant. This ratio is based on Köhler's original studies (Köhler, 1926; 1927) and more recent work (Messé, et al., 2002) which has found that this discrepancy between partner's leads to a maximal motivation gain under conjunctive task demand conditions. The computer followed this procedure for the third and fourth trials. The third trial instructed participants to use their dominant arms, and then prior to the fourth trial, their non-dominant arms. Finally the program informed participants that they could still win money according to the same procedure mentioned at the beginning of the program. That is, two participants from the study would be randomly selected to win money. How much money they would earn would be contingent on their performance.

After the fourth trial of the persistence task in all conditions, the computer program informed participants that they had just completed the last trial. Now they would be required to answer some questions on the computer. These questions consisted of a manipulation check that asked participants if they worked with another person at the task over computer, how hard they worked, the PANAS, and the SOQ. After completing these questions, participants were given the option of reading a short lecture about the

purpose of the study or being dismissed. If they choose to be dismissed, the program instructed them to place their red sheet under the door and wait for the experimenter to get them. Those who read the lecture were given the same instructions after reading it. The lecture informed participants of some major findings in group research and also gave them some information about the present study. Once participants placed their red sheets under the door, the experimenter opened the door to the booth, asked them if they were done and took them back into the main room. At this point the experimenter debriefed, thanked, and dismissed the participants.

Results

Characteristics of Pretest and Experimental Samples.

As in the pilot study (Study 1), in order to recruit participants for the main study (Study 2), the experimenter posted the SOQ on the university's subject pool website as a global questionnaire. In addition, there were questions about the students' level of athletic involvement on a 5-point scale from 1 (none) to 5 (college athlete) and gender. Eight hundred forty eight students filled out this pretest measure. Two hundred eighty-eight were male and 560 were female.

Mean scores on the SOQ were as follows. Males scored an average of 100.05 on the overall SOQ, including means of 51.82 on the competitiveness subscale, 22.22 on the win orientation subscale, and 26.01 on the goal orientation subscale. Females' overall mean SOQ score was 90.06 with means of 44.75, 19.79,and 25.52 for the competitiveness, win orientation, and goal orientation subscales respectively. ANOVAs revealed that males scored significantly higher on all these measures (all F's > 40, $p <$ .0001) with the exception of the goal orientation subscale, $F(1, 846) = 3.51, p < .07$.

(refer to Table 3.1). However, only the overall SOQ and the competitiveness subscale were examined in this study.

Table 3.1

Scores on SOQ and Subscales by Gender on Pretest Sample

	Gender					
	Male		Female			
Measure	*M*	*S*	*M*	*S*	*F*	*df*
SOQ	100.05	15.59	90.06	16.59	71.89**	1, 846
Competitiveness Subscale	51.82	9.58	44.75	10.88	86.94**	1, 846
Win Orientation Subscale	22.22	4.84	19.79	4.81	48.21**	1, 846
Goal Orientation Subscale	26.01	3.53	25.52	3.71	3.51*	1, 846

Note. All items are on 5-point scale. Higher scores indicate more endorsement of items. SOQ contains all 25 items on measure. Competitiveness subscale contains items 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, and 25; Win Orientation contains items 2, 6, 10, 14, 18, and 22; Goal Orientation contains items 4, 8, 12, 16, and 20. *F*'s with *p* values < .05 are marked with **. Those that are marginally significant ($p < .10$) are marked with *.

A factor analysis was performed in order to assess reliability of the SOQ. The overall SOQ achieved acceptable levels of internal consistency, Cronbach's alpha = .94. The factor analysis using a varimax rotation extracted four factors. The first factor contained almost all of the items from the competitiveness subscale with the exceptions

of items 3,5, and 25. That is all these items had a factor loading of .4 or above on a Principal Components factor analysis with a Varimax rotation and Kaiser Normalization. Only one item not on the competitiveness subscale loaded on this factor (item 14) with a .407 factor loading. Factors 3 and 4 loaded almost perfectly with the win orientation and goal orientation subscales using a factor loading of .4 as the criterion. Factor 2 contained items 1-7, 10, and 11 which are not predicted by Gill, Dzewaltowski, and Deeter to combine as a subscale. However, since I was only using the competitiveness subscale and the overall SOQ as dependent measures, these issues do not concern the current results. For a detailed presentation of the factor loadings for this scale, please refer to Table 3.2.

Table 3.2

SOQ Pretest Factor Loadings

	Factor			
Item:	Competitiveness	Unpredicted	Win	Goal
1. I am a determined competitor	**.405**	**.678**	.158	.268
2. Winning is important	.184	**.561**	**.521**	.009
3. I am a competitive person	**.266**	**.743**	.242	.201
4. I set goals for myself when I compete	.204	**.412**	.110	**.608**
5. I try my hardest to win	**.219**	**.567**	.207	.390
6. Scoring more points than my my opponent is very important to me	.198	**.537**	**.515**	.131
7. I look forward to competing	**.614**	**.562**	.007	.180
8. I am most competitive when I try to achieve personal goals	-.005	.148	-.003	**.703**
9. I enjoy competing against others	**.555**	**.616**	.103	.142

10. I hate to lose	-.003	.235	**.789**	.119
11. I thrive on competition	**.508**	**.484**	.320	.152
12. I try my hardest to win when I have a specific goal	.144	.258	.151	**.636**
13. My goal is to be the best athlete possible	**.745**	.149	.239	.212
14. The only time I am satisfied is when I win	.407	.008	**.668**	-.002
15. I want to be successful in sports	**.734**	.217	.175	.104
16. Performing to the best of my ability is very important to me	.309	.175	.006	**.592**
17. I work hard to be successful in sports	**.785**	.190	.131	.213
18. Losing upsets me	.162	.114	**.752**	.101
19. The best test of my ability is competing against others	**.523**	.194	.394	.102
20. Reaching personal performance goals is very goals is very important to me	.203	.009	.005	**.723**
21. I look forward to the opportunity to test my skills in competition	**.639**	.355	.123	.323
22. I have the most fun when I win	.190	.109	**.672**	-.004
23. I perform my best when I am competing against an opponent	**.528**	.303	.300	.165
24. The best way to determine my ability is to set a goal and try to reach it	.160	-.004	-.008	**.747**
25. I want to be the best every time I compete	**.388**	.112	.464	.348

The final sample of participants in the study included 80 male students who had filled out the pretest measures. Unfortunately not everyone in the study filled out the pretest measure. It was necessary to include other students because the signup rate for the study was relatively low. Means for those who filled out the pretest measure and participated in the study were as follows. The overall mean SOQ score was 99.68 including means of 51.34, 22.10, and 25.74 on the competitiveness, win orientation, and

goal orientation subscales respectively. Scores on the athletic involvement item revealed that two men did not participate in any sports, 16 sometimes played recreational sports, 14 played intramural or club sports, 39 had played for a high school team, and 9 played for a university team.

Task Performance and Priming Effects.

As previously mentioned, participants performed a persistence task by holding up their arms as long as possible for four trials alternating dominant and non-dominant arms. To test if participants fatigued and at what rate with each arm across the four trials a 2 (Trial Block) X 2 (Trial within Block) repeated-measures ANOVA was conducted on those in the control condition (individual). The first factor simply contrasts the first two trials with the last two [(Trial 1 + Trial 2) / 2 vs. (Trial 3 + Trial 4) / 2] while the second factor tests participants' dominant versus non-dominant arm. A significant Trial Block main effect emerged ($F(1, 39) = 34.79, p < .0001$) indicating that those in the control condition persisted longer in the first trial with each arm (Block 1 mean = 103.65, s = 45.77) than on their second trial with each arm (Block 2 mean = 79.89, s = 38.24). There was also a significant arm main effect ($F(1, 39) = 23.84, p < .0001$) indicating that these participants persisted longer with their dominant arms (98.26s, s = 41.53, n = 40) than with their nondominant arms (85.28s, s = 40.61). Finally, a significant Block X Arm interaction emerged ($F(1, 39) = 4.51, p < .05$) indicating that participants fatigued at different rates with each arm. On average, control participants decreased performance by 28.53s from the first to the second trial with their dominant arms and 19.0s with their nondominant arms. Examined multiplicatively, participants last 1.485 times longer on the first compared to the second trial with their dominant arms and 1.3956 times longer

with their nondominant arms. So any participants in the conjunctive and coactive conditions whose performance declines less than these figures from Block 1 to Block 2 would manifest a motivation gain.

In order to analyze the performance of the participants in the experimental conditions (conjunctive and coactive), scores on the experimental trial (3 & 4) were corrected for fatigue. This was done by multiplying scores for the experimental trials by the rate of fatigue shown in the control condition by each arm (1.485 for dominant and 1.3856 for nondominant). These fatigue corrections replicate the methods of previous research in motivation gains (Hertel, et al., 1999).[1] I then subtracted the scores from the first trial of each arm from these fatigue corrected scores to eliminate variability from these control trials. The result was fatigue corrected difference scores. So any score above zero on this metric represents a motivation gain since the result of the equation eliminates fatigue and arm differences.

Fatigue corrected scores were analyzed separately for Trials 3 and 4. This was done because feedback that participants received after each trial differs qualitatively. Before Trial 3 the only difference between the conjunctive and coactive conditions was the instructions that participants received was a task demands manipulation. After Trial 3, those in both the conjunctive and coactive conditions were both given feedback that they had stopped before the other participant had. In the conjunctive condition, the trial ended as soon as the participant's arm hit the tripwire. Since this was a conjunctive team task, the other participant did not continue and there was no information how much better the other participant was, but simply that the other participant lasted longer. In the

[1] A number of different fatigue corrections could be used for the motivation scores. This was chosen amongst alternatives because others yielded similar or attenuated results but were more complicated.

coactive condition, the other participant outlasted the real participant as well, but since their performances were independent, the other participants always persisted at the same ratio beyond the real participant (1.42 times longer). So information about ability discrepancy, task demands, and performance feedback are confounded on the fourth trial.[2]

In order to test for motivation gains and priming effects in Trial 3, a 3 (Group Condition: individual control, conjunctive, and coactive) X 2 (Prime) ANOVA was performed on the fatigue corrected Trial 3 – Trial 1 difference scores. Results revealed a significant effect of Group, $F(2, 114) = 16.95, p < .0001$. Planned contrasts reveal that those in the conjunctive condition ($M = 72.7$s, $s = 65.6$) significantly outlasted those in the individual condition ($M = 12.2$s, $s = 34.6$, $F(1, 114) = 23.40, p < .0001$) indicating a significant motivation gain for those in the conjunctive condition. Those in the coactive condition ($M = 74.7$s, $s = 63.5$) also manifested a significant motivation gain over those in the individual condition ($F(1, 114) = 27.31, p < .0001$). The conjunctive and coactive conditions did not significantly differ from one another ($F(1, 114) = .17$, *ns*). So it appears that in the third trial, conjunctive and coactive task demands are equally effective in producing motivation gains. In past research, coactive conditions have led to increases in performance over individual conditions but significantly lower than conjunctive conditions (Kerr, Messé, Park, Seok, & Lount, in preparation). To test the Köhler effect, that is that conjunctive task demands lead to the greatest motivation gains, a planned contrast was performed comparing only unprimed conjunctive and coactive conditions. This comparison most closely mimicked conditions in previous research. The contrast

[2] Those who would like to see an examination of fatigue corrected experimental trial scores on the conjunctive and coactive conditions compared by priming condition and arm can refer to Appendix J.

revealed that task demand condition still did not differ (F(1, 114) .28, *ns*). Means for all conditions on Trial 3 are presented in Figure 3.1.

The overall effect of priming was not significant (F(1, 114) = 2.38, *ns*). However this analysis included individual controls whom it was hypothesized, would not be affected by the prime. Therefore, further contrasts were performed to test the effectiveness of the priming manipulation. Contrasts reveal that those who were primed lasted significantly longer on Trial 3 under coactive conditions (97.9s versus 57.5, F(1, 114) = 5.13, $p < .03$) but not under conjunctive conditions (78.2s versus 66.8, F(1, 114) = .4, *ns*). This priming effect makes sense in light of the differential task demands of the situations. Those who are in the presence of another who is not a teammate should be more motivated to outlast the other participant when primed for competitiveness rather than those who are supposed to be working collectively with that person. Unsurprisingly, priming had no effect in the individual condition when there was no one present with which to compete ($F < .5$).

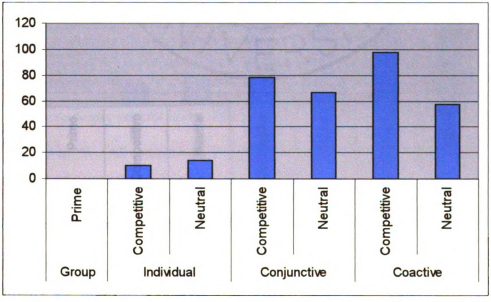

Figure 3.1 Motivation Gain for Trial 3 by Condition

As stated previously, the fourth trial is qualitatively different from the third because performance feedback and information about partner's ability are confounded. So Trial 4 data were examined separately. To examine the effects of task demands and priming a 3 (Group) X 2 (Prime) ANOVA was performed on fatigue corrected Trial 4 scores. Analyses revealed a significant main effect of Group ($F(2, 114) = 6.82, p < .01$). Further analyses revealed that those in the conjunctive condition ($M = 41.9$s, $s = 64.9$) outlasted individual controls ($M = 10.2$s, $s = 33.4$, $F(1, 114) = 8.44, p < .01$). Coactors ($M = 45.7$s, $s = 40.2$) also outlasted individual controls ($F(1, 114) = 11.75, p < .01$). As in Trial 3, those in the conjunctive and coactive conditions did not differ from one another ($F < .3$). For all means by condition in Trial 4 refer to Figure 3.2. To test the Köhler effect in Trial 4, unprimed scores were compared in the conjunctive and coactive conditions revealing no significant difference ($F < .2$)

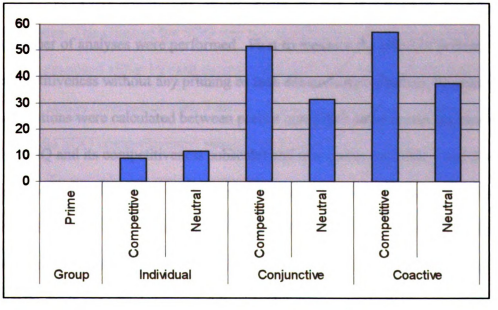

Figure 3.2 Motivation Gain for Trial 4 by Condition

The overall priming effect in Trial 4 did not reach statistical significance ($F(1, 114) = 1.92$, *ns*). Once again though since individual controls were included in this analyses, further planed contrasts were warranted. However, in Trial 4 the prime did not reach statistical significance for either the conjunctive ($F(1, 114) = 1.75$, *ns*) or the coactive conditions ($F(1, 114) = 1.6$, *ns*), although means were in the predicted direction. This may mean that the prime wears off by Trial 4 or that the confound between performance feedback and partner's discrepancy decreases motivation. In Trial 4, participants already know they have been beaten. This may decrease their motivation on the fourth trial. Before Trial 3 they have no such information and have just been primed for competitiveness. So since participants had been primed just before the start of the third trial and have no information about the ability of their partner, they will have higher motivation in the third trial.

In order to examine the effects of participants' pretest trait competitiveness scores a number of analyses were performed. First to measure the effect of pretest competitiveness without any priming or task demands manipulation, bivariate correlations were calculated between pretest competitiveness scores (as measured by both the SOQ and its competitiveness subscale) and raw scores on Trials 1 and 2 which as you recall were simply control trials. Results revealed low to moderate correlations ranging from .13 to .27. All correlations are presented in Table 3.3. The only significant correlation was between the SOQ pretest scores and Trial 2 performance ($r(120) = .27, p < .03$). So it appears that competitiveness did exert a small effect on performance at a persistence task.

Table 3.3

Correlations Between Pretest Competitiveness and Control Trials

	Pretest SOQ	Pretest SOQ competitive	Trial 1	Trial 2
Pretest SOQ	-			
Pretest SOQ competitiveness	.92***	-		
Trial 1	.21*	.13	-	
Trial 2	.27**	.16	.86***	-

Note. This sample contained the 80 participants who completed the pretest questionnaire and participated in the main study. * $p < .10$, ** $p < .05$, *** $p < .0001$

To test whether pretest competitiveness predicted affected performance after the priming and task demands manipulations a 2 (group condition) X 2 (prime) ANCOVA was conducted using pretest SOQ and pretest SOQ competitiveness subscale scores as covariates. The effect of the SOQ was non significant on the fatigue corrected difference scores examined either by each experimental trial (Trial 3 and 4 individually) or as overall scores (average of trials 3 and 4, (F's < .5). Similar results were obtained when using the SOQ competitiveness subscale as a covariate (F's < 1).

To test whether pretest competitiveness predicted performance in each group condition, regressions were conducted using fatigue corrected difference scores examined by each arm and as overall scores. Prime was entered as a dummy variable as were pretest SOQ scores. For those in the conjunctive condition, SOQ scores did not exert a significant effect. Bivariate correlations were all low, ranging from .05 to .19, *ns* (n = 31). None of the coefficients reached statistical significance including the interaction between priming and SOQ scores. This was true for all fatigue corrected scores. The

same regression was performed in the coactive condition revealing similar results. All bivariate correlations were low, ranging from .05 to .29 with the exception of the Prime X SOQ interaction in the third trial ($r(25) = .31, p < .08$). However, none of the coefficients reached statistical significance indicating that trait competitiveness did not significantly moderate task performance by itself or in conjunction with the prime.

Posttest Measures of Trait Competitiveness

In order to test the hypothesis that scores of posttest competitiveness would be changed by priming manipulation and task demands, a 2 (prime) X 3 (dyad condition) ANOVA was conducted on posttest scores of the SOQ and its competitiveness subscale. These analyses included all participants, even those who did not fill out the pretest SOQ. Since participants were randomly assigned to conditions, any pretest differences should be evenly distributed across conditions. Results reveal a marginally significant effect for prime on both the overall SOQ and the competitiveness subscale respectively, $F(1, 114) = 3.88, p < .06$; $F(1, 114) = 3.13, p < .08$. The effect of dyad condition was not significant for either measure, F's < 2. The prime by group interaction was also nonsignificant, F's < 1.

Since priming was somewhat effective in boosting motivation gain scores in the coactive conditions, it may also be the case that competitiveness will increase in these instances as well. For exploratory reasons, I performed contrasts which revealed a significant effect of priming in the dyad conditions on both the SOQ and the competitiveness subscale respectively, $t(114) = 2.24, p < .03$ and $t(114) = 2.02, p < .05$. The priming effect did not appear in the individual condition, $t < 1$. So it appears that priming can effect scores on a trait measure of competitiveness especially when one

competes (i.e., a group condition). The effect of task setting (group: coactive and conjunctive vs. individual) was marginally significant for both measures, $t(114) = 1.97$, $p < .06$; $t(114) = 1.97$, $p < .06$. Counter to the predictions, those in the competitive condition scored higher ($M = 102.3$, $s = 11.5$) than the conjunctive ($M = 96.8$, $s = 20.8$) or the coactive conditions ($M = 94.6$, $s = 18.0$) on the SOQ. A similar pattern emerged on the competitiveness subscale in which individuals ($M = 53.1$, $s = 7.1$) scored higher than those in conjunctive ($M = 49.7$, $s = 12.2$) and coactive ($M = 48.4$, $s = 11.2$) conditions. Those in the conjunctive condition did not differ from those in the individual condition on either measure, $t(114) = 1.53$, *ns*; $t(114) = 1.51$, *ns*.

Mood Effects

Analyses on PANAS scores revealed that those above the median on the SOQ competitiveness subscale pretest measure scored significantly higher on positive affect than those below the median, $F(1,76) = 6.56$, $p < .02$. However there was no significant difference between these two groups on negative affect, $F(1,76) = 1.03$, *ns*. There were also no significant interactions between pretest competitiveness, as measured by a median split, and priming or task demands conditions. There were no significant effects for priming or task demands conditions (F's < 1.3).

Discussion

Priming and Task Demands in Trial 3

Only Trial 3 data were be examined here because participant feedback in this trial is qualitatively different from that in Trial 4. In Trial 3, participants have just been primed and, in the group conditions, perform in the presence of another for the first time without knowing the ability of this other person. In Trial 4, those in the group conditions

receive differing levels of information about the other person. In the coactive condition, participants know the other is not only better than they are but by what amount. In the conjunctive condition, participants know the other is better but not by what amount. So the Trial 3 comparison between the two task demand conditions is a more viable one where the Trial 4 data are confounded by feedback about one's partner.

Results showed that priming effectively increased performance for those in the first experimental trial (Trial 3) for the coactive condition but not the individual or conjunctive condition. This makes sense in light of the task demand situations. When competitiveness is made salient by priming, those who work alone still have no one with whom to compete. If we take competition to mean doing one's best in relation to others, it is clear why priming would not moderate performance in the individual condition. If one desires to compete (or competitiveness is made salient to him), competition is not possible and so priming should not moderate this performance. We can use the lock and key analogy to understand this situation. In this case, the key is the concept made salient by priming. The lock represents the demands of the situation. In order to overcome the challenges of the situation and succeed, one must use the key to open the lock. In the individual condition, priming provides a key for the wrong lock. That is competitiveness is not applicable in this situation.

In the coactive condition, competition becomes an appropriate behavior because another person is present (a potential competitor). When one is primed for competitiveness, beating this other person who is not framed as a teammate or ally becomes salient. So in this situation priming provides the appropriate key for the lock. In the coactive condition participants were told that they could simply monitor another's

performance. However, if participants were specifically instructed to beat this other person or this coactor were framed as a participant, competitiveness priming would likely moderate performance to an even greater degree.

In the conjunctive condition, priming did increase performance but not significantly so. Again this makes sense in light of task demands. In a conjunctive situation, the team score is equal to that of the member who quits first. So performing one's best in relation to others is important but not as important as giving one's all for the group which has more to do with cooperation. So in this case priming competitiveness provides a key that doesn't quite open the lock. Cooperative or group loyalty priming might well have moderated task performance in this condition. This issue harkens back to the idea that competitiveness and cooperation are not antithetical. Some in the conjunctive condition may have enhanced performance through priming because they saw beating their teammate as a way to increase the team's score. We can also think of a situation such as a team sports game where teammates must cooperate with one another to compete against other teams.

Finally, examination of these data helps us to refine our definition of competition. I previously defined competitiveness as one's desire to perform at one's best in relation to others or one's own standards. The data show that priming participants for competitiveness motivated them to perform their best in relation to others but not against their own standards or previous performance. So competition here is interpersonal rather than intrapersonal.

Priming and Task Demands in Trial 4

The comparison between the two group task demands conditions for the Trial 4 data is more complicated than for Trial 3. As mentioned previously, those in the coactive condition have more information about their partner's ability than those in the conjunctive condition. This should help us to understand the nonsignificant priming effect in Trial 4.

As shown in Figure 3.2, those in the primed for competitiveness outlasted controls in the same task demand conditions in Trial 4 by 20.1 and 19.4 seconds for conjunctive and coactive conditions respectively. This gain is nonsignificant. However this same comparison in Trial 3 yielded performance increases of 11.5 and 40.4 seconds for the conjunctive and coactive primed versus nonprimed groups, respectively. This comparison was significant for the coactive but not the conjunctive condition. We can speculate that the effect of the prime wears off or decreases by the second experimental trial (Trial 4). It is also possible that upon receiving feedback that they have quit the task first, participants are less motivated to try quite so hard again. However, for those in the conjunctive condition, performance increases from Trial 3 to 4 although not to significant levels over the unprimed condition. Those in the conjunctive condition received information that they quit the task first but their partner's ability was unknown. Those primed for competitiveness may then believe that increased effort may allow them to beat this partner. Those in the conjunctive condition also received feedback that they had quit the task first but also know their partner lasted 1.42 times longer than they had.

Priming competitiveness before the third trial may lead to a performance or ego orientation on this trial. Those performing under this orientation see competition as an

opportunity to showcase their abilities. However, when they lose and find out their ability is inferior to their partner's, they lose motivation. Future studies should explore this possibility by manipulating failure with success feedback after trials and also manipulating ego versus mastery orientation. Mastery orientation has been shown to increase performance at a task when one is unskilled at the task (Elliot & Dweck, 1988). So while the effect of priming was only significant for coactors in the third trial, it led to increases in performance in every group condition and trial.

Trait Competitiveness

Results show that in general, trait competitiveness as measured by the SOQ at pretest, had little effect on performance. The only significant effect of pretest SOQ scores was on Trial 2 scores. The modest positive correlation (r = .27) showed that more competitive people performed better on the second trial before any priming or task demand manipulation had taken place. This effect was only marginally significant in Trial 1 (r = .21). The relationship to experimental trials was lower. Correlations between the SOQ measures and raw Trial 3 and 4 scores ranged from .09 to .18 and all were non significant. While correlations between fatigue corrected trial scores, which eliminated performance differences that might have been due to trait competitiveness, were near zero (r's < .02, *ns*). So trait competitiveness was not related to performance on experimental trials whether corrected for fatigue or not.

On the experimental trials, pretest SOQ scores affected nothing significantly. Those primed in Trial 3 showed a marginally significant trend toward better performance. However, trait competitiveness did not predict performance in prime or task demand conditions. This pattern goes against the hypotheses. The results were limited by a small

number of participants (n = 80) who filled out the pretest SOQ. However, the lack of significant results on the performance measures lends credence to the idea that the power of the situation (task demands condition) and state competitiveness (induced by priming) are more predictive of performance at some group tasks than trait competitiveness.

Malleability of Trait Competitiveness

Results on posttest measure of trait competitiveness (SOQ & SOQ competitiveness subscale) were similar to those obtained on the performance measures. That is, those who worked in either of the two dyad conditions were marginally more competitive on these measures than those who worked alone. Although priming did not make all those primed more competitive, it did make those in the two dyad condition appear significantly more competitive when compared to those in their conditions who were not primed. All these analyses were done on posttest SOQ scores. When looking at SOQ difference scores from pretest to posttest, there were no significant effects. However since only 80 participants yielded this data, power is decreased when compared to data from the whole sample (n = 120).

It appears that competitiveness as measured by the SOQ was very difficult to change. Correlations from pretest to posttest scores on the SOQ and the competitiveness subscale were .72 and .76 respectively. This makes it all the more impressive that in particular situations such when working in dyads or when primed for competitiveness in dyads, one can actually become more competitive when measured by these self-report instruments. So while competitiveness measured by the SOQ appears to be very stable and trait like, it is not unchangeable.

Mood Measures

Scores on the PANAS revealed only one significant effect. Those who were above the median in pretest competitiveness exhibited more positive affect than those below the median. However, counter to the hypotheses, those who were more competitive, when primed and placed in dyad conditions, did not exhibit any more positive affect than other groups. In fact there were no significant effects on the PANAS for prime or task demands conditions. This is counterintuitive. The hypotheses assumed that those who are chronically more competitive and get to compete and/or are primed for competition should be in a better mood. Since, participants filled out the PANAS at the end of the study, losing on the experimental trials may have affected their mood. However, it is unclear why mood was unaffected for the various conditions.

One possible explanation is that the wording of the PANAS makes it unlikely that those who just completed a physical persistence task would highly endorse the items. Examples of some adjectives that participants have to endorse to score high on positive affect are "interested", "excited", and "proud". Even though participants might feel more competitive after being primed or have performed better, performance at this type of task is unlikely to elicit such emotion. This task was chosen specifically because it is uninteresting to most people and performance at it should have little effect on self-esteem because it is not a task most people have performed before or consider important.

The effect that competitive people have higher positive affect is most surprising. It is possible that most competitive people see the task as a competitive one and then enjoy themselves more as a result. This explanation appears unlikely though because PANAS scores did were not moderated by prime or condition. Since some conditions are

more competitive than others, we would expect competitiveness to interact with condition or prime but it does not. It could be that competitive people are generally in a better mood, but there is no previous research to support that idea.

Chapter 4

GENERAL DISCUSSION

Measures

Based on the results from Study 1 and Study 2, the SOQ appeared to be the best way to measure competitiveness among these samples, while the SVM seemed to be the worst measure of competitiveness. As mentioned previously, this may be because the SVM measures allocation of resources while the SOQ measures motivation to perform well in relation to others and one's own goals. One criterion for establishing the validity of these competitiveness measures is to test their relation to competitive behavior. Athletes, for example are chronically exposed to competitive situations and one could argue that they are more competitive because of the effects of these situation or that their competitiveness leads them into these situations. There was a measure of athletic involvement included in both studies. This measure was then correlated with all of the competitiveness measures. Athletic involvement was most highly correlated with the SOQ competitiveness subscale ($r = .53, p < .0001$, Study 1; $r = 64, p < .0001$, Study 2 pretest; $r = .61$, $p < .0001$, Study 2 posttest). The overall SOQ was also highly correlated to athletic involvement with correlations ranging from .49 to .59 (p's < .0001). The other subscales of the SOQ (win orientation and goal orientation) were also significantly correlated to athletic involvement but not as highly as the previously mentioned scales with r's ranging from .26 to .41,(p's < .01).

The CI, which was used only in Study 1, also exhibited a significant relationship to athletic involvement, $r = .32, p < .0001$. Correlations between athletic involvement

and SVM scales were low. Pretest SVM competitiveness scores were not significantly related to athletic involvement ($r = .08$, *ns*) while posttest scores on this measure yielded a low but significant correlation ($r = .17, p < .05$). SVM individualism scores were not significantly related to athletic involvement and ranged from .06 to .17. SVM prosocial exhibited a small but significant negative relationship to athletic involvement scores with correlations ranging from -.18 to -.21. This makes sense within the structure of the SVM since participants cannot simultaneously make prosocial and competitive choices.

So it seems that the overall SOQ and its competitiveness subscale are the best measures of competitiveness among these samples. The original factor structure was very closely replicated with the exception of an additional nonpredicted factor. The overall SOQ is highly correlated to the competitiveness subscale ($r = .97, p < .0001$). So the competitiveness subscale can be thought of as a shorter version of the overall scale although both seem to be very effective at measuring competitiveness.

Implications for Motivation Gains and the Köhler Effect

In Study 2, participants in the coactive condition did not perform significantly differently from those in the conjunctive condition. This is true even when examining those who were not primed which most closely replicates past studies. This result is not consistent with some previous research (Kerr, Messé, Park, Seok, & Lount, in preparation). However in Kerr et al. (in preparation), only females participants were examined. In a partial replication of Hertel, Kerr, and Messé, Experiment 2 (2000), Hertel (personal communication, November, 2002) found that male participants showed equal motivation gains in conjunctive and coactive task demands conditions. These male participants were recruited from a gym and as a result may have been especially

competitive. The experimenters in this study were attractive females whom Hertel hypothesizes may have triggered participants' impression management concerns. This overshadowed motivation for group success which should be salient in conjunctive conditions. As a result, this impression management increased motivation for both conjunctive and coactive conditions.

It has been hypothesized that the high instrumentality that a weaker member feels in contributing to the group's success motivates him or her to perform especially well in conjunctive conditions. However, since this concern for the group's success and indispensability of the weaker person's input is absent in coactive or additive conditions, there is little instrumentality to motivate people in this condition (Kerr, 1990; Hertel, Kerr, & Messé, 2000). A competing explanation for motivation gains in certain tasks is that social comparison and goal setting lead performers to do as well as stronger members when performances can be compared (Stroebe, Diehl, Abakoumkin, & Arnscheid, 1990). This model predicts motivation gains for conjunctive, coactive, and additive conditions but without differences between them.

It would appear that based on the results in the current studies, that the social comparison/goal setting model has been supported. However, as mentioned previously, the gender differences between these studies may be the real explanation for the disparate results. Since males are more competitive than females, it likely that they engage in social comparison during these tasks to a larger extent. Their goal is more likely to be to beat their partner with little concern for the success of the group in the conjunctive condition and therefore conjunctive and coactive conditions do not differ for males. However, for the less competitive females, group success and instrumentality of the

weakest member leads to motivation gains in the conjunctive condition (over and above the coactive condition) where instrumentality to group success is salient but competition is not. More research is necessary to tease apart these competing motivations for each gender.

Limitations

The priming effects and motivation gains in general are limited to particular circumstances. For example a significant effect was limited to only the third trial in the coactive condition in Study 2. Also many researchers have focused on the negative motivational aspects of groups such as social loafing (Latané, Williams, & Harkins, 1979). So while motivation gains that were moderated by priming were demonstrated, these results would likely not generalize to some other situations. Below are presented several factors that would limit or bring into question the generalizeability of the results.

First of all, the physical persistence task used shared several aspects of everyday tasks such as physical labor and exercise. However, it is unclear as to whether motivation gains would occur using a similar paradigm but substituting cognitive tasks for physical ones. Recent research however has replicated motivation gains effects on a computer sales task (Hertel, Deter, & Konradt, 2001). However, it is unclear as to whether priming effects would be replicated by such tasks. It is unlikely that priming competitiveness would increase performance at complex, unfamiliar tasks. These types of tasks require skill and practice so performance at them is not monotonically related to effort as it is at a simple physical persistence task.

Another limitation of these effects is gender. While past research in motivation gains has exhibited robust effect for females (Hertel, Kerr, & Messé, 2000),

competitiveness priming was ineffective for females in the present Study 1. This may be to the content of priming procedures. For example, both of the competitive and cooperative story prime in Study 1 referred to sports situations with males athletes which could be more likely to make competition salient to men but may be irrelevant to women. Perhaps a competitive story prime referring to females athletes or competition between groups rather than between individuals would make competition more salient females. Competitive words referring to exceptional performance in traditionally females domains might also make competition more salient. Females have been characterized as more connected to groups than males and as a result might perform better under conjunctive conditions than males although this was not the case in previous research (Hertel et al., 2000, Exp.1). Perhaps, however, cooperation is more chronically salient to females and priming this concept effectively would enhance performance at a conjunctive task. Future research in this area should resolve these gender differences.

As with most psychological research, these studies were conducted on mostly white, college undergraduates in introductory psychology classes. This sample was also from a large Midwestern university with an athletically oriented student body. Attendance at athletic events is often at capacity and the performance of school sports teams is often a hot topic on and around campus. Many students also participate in varsity or intramural sports. The heavy sports interest at this school may make competition particularly salient to this sample, especially males and as a result make them easily primeable to competitiveness. This may not be the case for less sports oriented communities. The age range may make these participants especially suggestible. The first few years of college involve identity exploration and experimentation (Erikson,

1980). This may well make certain personality traits like competitiveness more malleable during this time and make people more open to suggestions and priming. Later in the life span when personality is more set, this priming may be less likely to work. Males at this point in the lifespan are often engaged in aggressive and competitive behavior. They are competing for mates, grades, and jobs. This may be caused by societal as well as physiological factors (increased testosterone). When these demands decrease, competitiveness should decrease making it less salient. So the priming and motivation gain effects may be particularly strong for this sample. Future research should examine other age ranges.

Culture may also play a role. More individualistic societies like our own approve of the pursuit of personal glory and individual gain more than more collectivistic cultures. In these cultures, priming interpersonal competition may cause reactance and actually lead to decreases in performance. Perhaps priming intergroup competition or international competition and national pride rather than interpersonal competition might lead to motivation gains in a collective context such as a conjunctive task.

Directions for Future Research

In an effort to generalize these results, future research should focus on different situations which could be moderated by competitive and cooperative priming. For example, athletic contexts are clearly associated with competition and cooperation. Perhaps exposure to competitive slogans or words just before game time could boost performance. This should be especially true for individual sports. For team sports, cooperative priming could help teammates work with one another. Competitiveness priming could potentially increase team performance if intergroup rather than

interpersonal competition were primed. Other contexts that should be explored are work and legislative groups in which individuals or teams need to increase motivation to increase productivity or efficiency.

As already mentioned, one area of interest would be the role of cooperative priming in performance enhancement. Increased cooperation might make group goals more salient and enhance performance at conjunctive or additive tasks especially for females. Also competition can be interpersonal or intergroup. As mentioned earlier competition and cooperation do not need to be thought of as antithetical concepts. In the context of intergroup competition, one must cooperate within the group while competing against other groups in order to attain maximal performance. Priming intergroup competition or intragroup cooperation should both be effective means of enhancing performance in these situations. An effective cooperative prime would need to be developed first.

The present studies examined two person groups as performance settings. However, it is plausible that this paradigm could be extended to include larger groups. The procedure is much simpler with only two people but conjunctive or coactive task could be simulated with more than two people. However, additional issues would arise, such as ability discrepancies between all partners and feedback information. This information would be much more complicated but if participants understood they were the least capable member of the group and their performance was most vital, we could likely replicate conjunctive task conditions. Köhler (1926, 1927) was able to demonstrate these effects with three person groups, so perhaps they could be replicated with even larger groups. So while studying two person groups is simpler and more cost efficient,

most of the groups to which people belong or interact with consist of more than two people. Expanding this research to larger groups would make it more generalizeable to the types of groups people interact with every day. There is no reason to believe these results would not generalize to somewhat larger groups.

In many previous motivation gains studies including the ones examined here, participants are given feedback that they have performed worse at the task than their partner or coworker. This is done so that participants will push performance to the maximum. This is necessary in conjunctive tasks which by definition are dependent on the weakest member. However, as mentioned earlier some people might be especially likely to push performance on subsequent trials upon learning that they were the most capable member of a group. Namely those with a performance or ego orientation would be motivated to perform well at a task when they know they are better in order to display their skill. Future studies could manipulate failure or success feedback from previous trials and see how it relates to motivational orientation and performance.

Chapter 5

CONCLUSIONS AND IMPLICATIONS

The results of these studies show that not only do those working at coactive and conjunctive tasks increase performance over those working alone, but priming in the coactive condition can even further enhance this performance. So factors that enhance performance in these groups tasks include group task demands and state competitiveness. Also these effects were independent of one's trait competitiveness. So people can temporarily become more competitive in the laboratory and when another is present will increase performance regardless of how competitive they were to begin with.

These results are promising for anyone wishing to get an edge at a task which involves physical persistence such as sports or many types of manual work. It also could help those who wish to enhance a group's or team's performance such as a business manager or team sport coach. One does not have to be born competitive to gain this edge but rather must attain a competitive state of mind. It seems there are rituals and preparations which have adhered to this principle for some time. For example, many athletes decorate their bedrooms and exercise areas with motivational slogans. Members of the University of Notre Dame Football team must touch a sign before the start of every home game hanging just above the entrance to the field which reads "Play Like a Champion Today." These types of competitive slogans serve to prime athletes for the type of interpersonal competition necessary to perform well against others.

However, attempts at priming are not necessarily limited to athletics. Boardrooms and offices are often decorated with pictures framed by slogans stressing the

value of achievement or effort. Managers and supervisors likely believe this type of stimuli gets their workers in the right mindset to work productively. Results from this study show that these people may have been right all along. We often do better when working in the presence of others but may be motivated to do so outside our conscious awareness.

APPENDIX A

APPENDIX A

Measure of Social Values

In this task we ask you to imagine that you have been randomly paired with another person, whom we will refer to simply as the "Other". This other person is someone you do not know and that you will not knowingly meet in the future. Both you and the "Other" person will be making choices by circling either the letter A, B, or C. Your own choices will produce points for both yourself and the "Other" person. Likewise, the "Other's" choice will produce points for him/her and for you. Every point has value: the more points you receive, the better for you, and the more points the "Other" receives, the better for him/her. Here is an example of how this task works:

	A	B	C
You get	500	500	550
Other gets	100	500	300

In this example, if you chose A you would receive 500 points and the other would receive 100 points; if you chose B, you would receive 500 points and the other 500; and if you chose C, you would receive 550 points and the other 300. So, you see that your choice influences both the number of points you receive and the number of points the other receives.

Before you begin making choices, please keep in mind that there are no right or wrong answers: choose the option that you prefer most, for whatever reason. Also, remember that the points have value. That is the more of them you accumulate, the better for you. Likewise, from the "other's" point of view, the more points he/she accumulates, the better for him/her.

For each of the nine choice situations, circle A, B, or C, depending on which column you prefer most:

	A	B	C
(1) You get	480	540	480
Other gets	80	280	480

	A	B	C
(2) You get	560	500	500
Other gets	300	500	100

	A	B	C
(5) You get	560	500	490
Other gets	300	500	90

	A	B	C
(6) You get	500	500	570
Other gets	500	100	300

(Measure of Social Values continued)

	A	B	C
(3) You get	520	520	580
Other gets	520	120	320

	A	B	C
(4) You get	500	460	490
Other gets	100	300	490

	A	B	C
(7) You get	510	560	510
Other gets	510	300	110

	A	B	C
(8) You get	550	500	500
Other gets	300	100	500

	A	B	C
(9) You get	480	490	540
Other gets	100	490	300

APPENDIX B

APPENDIX B

Competitiveness Index

For the following twenty questions, rate your attitude.

1. I like competition.
   Agree__ Disagree__
2. I find competitive situations unpleasant.
   Agree__ Disagree__
3. I don't like competing against other people.
   Agree__ Disagree__
4. I enjoy competing against an opponent.
   Agree__ Disagree__
5. I try to avoid competing with others.
   Agree__ Disagree__
6. I get satisfaction from competing with others.
   Agree__ Disagree__
7. I dread competing against other people.
   Agree__ Disagree__
8. I am a competitive individual.
   Agree__ Disagree__
9. Competition destroys friendships.
   Agree__ Disagree__
10. I will do almost anything to avoid an argument.
    Agree__ Disagree__
11. I try to avoid arguments.
    Agree__ Disagree__
12. I often remain quiet rather than risk hurting another person's feelings.
    Agree__ Disagree__
13. In general, I will go along with the group rather than create a conflict.
    Agree__ Disagree__
14. I don't enjoy challenging others even when I think they are wrong.
    Agree__ Disagree__
15. I would like to be on a debating team.
    Agree__ Disagree__
16. Games that have no clear-cut winner are boring.
    Agree__ Disagree__
17. It's usually not important to me to be the best.
    Agree__ Disagree__
18. I often try to outperform others.
    Agree__ Disagree__
19. When I play a game I like to keep score.
    Agree__ Disagree__
20. I don't like games that are winner-take-all.
    Agree__ Disagree__

APPENDIX C

APPENDIX C

Sports Orientation Questionnaire

The following statements describe reactions to sport situations. We want to know how you usually feel about sports and competition. Read each statement and circle the letter that indicates how much you agree or disagree with each statement on the scale: A, B, C, D, or E. There are no right or wrong answers; simply answer as you honestly feel. Do not spend too much time on any one statement. Remember, choose the letter which describes how you usually feel about sports and competition.

	Strongly Agree	Slightly Agree	Neither Agree Nor Disagree	Slightly Disagree	Strongly Disagree
1. I am a determined competitor.	A	B	C	D	E
2. Winning is important.	A	B	C	D	E
3. I am a competitive person.	A	B	C	D	E
4. I set goals for myself when I compete.	A	B	C	D	E
5. I try my hardest to win.	A	B	C	D	E
6. Scoring more points than my opponent is very important to me.	A	B	C	D	E
7. I look forward to competing.	A	B	C	D	E
8. I am most competitive when I try to achieve personal goals.	A	B	C	D	E
9. I enjoy competing against others.	A	B	C	D	E
10. I hate to lose.	A	B	C	D	E
11. I thrive on competition.	A	B	C	D	E
12. I try my hardest to win when I have a specific goal.	A	B	C	D	E
13. My goal is to be the best athlete possible.	A	B	C	D	E

Turn to the next page please.

(Sports Orientation Questionnaire continued)

	Strongly Agree	Slightly Agree	Neither Agree Nor Disagree	Slightly Disagree	Strongly Disagree
14. The only time I am satisfied is when I win.	A	B	C	D	E
15. I want to be successful in sports.	A	B	C	D	E
16. Performing to the best of my ability is very important to me.	A	B	C	D	E
17. I work hard to be successful in sports.	A	B	C	D	E
18. Losing upsets me.	A	B	C	D	E
19. The best test of my ability is competing against others.	A	B	C	D	E
20. Reaching personal performance goals is very important to me.	A	B	C	D	E
21. I look forward to the opportunity to test my skills in competition.	A	B	C	D	E
22. I have the most fun when I win.	A	B	C	D	E
23. I perform my best when I am competing against an opponent.	A	B	C	D	E
24. The best way to determine my ability is to set a goal and try to reach it.	A	B	C	D	E
25. I want to be the best every time I compete.	A	B	C	D	E

APPENDIX D

APPENDIX D

Competitive Work Task Prime

Word Puzzle Task

For each of the words listed below, find any smaller words of 3 or more letters hidden within them. Then write the words you have discovered to the right of the words below. So for example if you were given the word "glassware" you could list words such as "glass", "are", "lass", "ass", and "war". However, you may not change the ordering of the letters. Do your best, you may be asked questions about this task later. Please take your time to complete the task thoughtfully. However, try to spend no more than 15 minutes on this task. When you are done with this task, redirect you attention to the computer screen. Good Luck! You may begin.

1. Stadium

2. Dormitory

3. Tournament

4. Rivalry

5. Thoroughly

6. Achievement

7. Bracelet

8. Competition

9. Vanquishing

10. Predicate

Turn to the next page please.

(Competitive Word Task Prime continued)

11. Opposition

12. Victorious

13. Indeterminate

14. Superiority

15. Medal

16. Ranking

17. Challenging

18. Contemplation

19. Indefinite

20. Winning

21. Championship

22. Edifice

23. Conquering

24. Trophy

25. Comparison

APPENDIX E

APPENDIX E

Cooperative Word Task Prime

Word Puzzle Task

This is a task designed to measure your verbal and creative abilities. For each of the words listed below, find any smaller words of 3 or more letters hidden within them. Then write the words you have discovered to the right of the words. So for example if you were given the word "glassware" you could list words such as "glass", "are", "lass", "ass", and "war". However, you may not change the ordering of the letters. List as many words as you can. Please take your time to complete the task thoughtfully. However, try not to spend more than ten minutes on this task. When you are done with this task, turn the page. Good Luck! You may begin.

1. Collaboration

2. Dormitory

3. Interconnected

4. Teamwork

5. Thoroughly

6. Together

7. Camaraderie

8. Bracelet

9. Communal

10. Unification

Turn to the next page please.

(Cooperative Word Task Prime continued)

11. Collective

12. Predicate

13. Cooperation

14. Partnership

15. Indeterminate

16. Contemplation

17. Tandem

18. Cohesive

19. Indefinite

20. Networked

21. Squadron

22. Edifice

23. Reciprocity

24. Teammates

25. Support

APPENDIX F

APPENDIX F

Neutral Word Task Prime

Word Puzzle Task

For each of the words listed below, find any smaller words of 3 or more letters hidden within them. Then write the words you have discovered to the right of the words below. So for example if you were given the word "glassware" you could list words such as "glass", "are", "lass", "ass", and "war". However, you may not change the ordering of the letters. Do your best, you may be asked questions about this task later. Please take your time to complete the task thoughtfully. However, try to spend no more than 15 minutes on this task. When you are done with this task, redirect you attention to the computer screen. Good Luck! You may begin.

1. Thoroughly

2. Dormitory

3. Transfer

4. Mountain

5. Edifice

6. Cabinet

7. Circumlocution

8. Alleviate

9. Pavement

10. Contemplation

Turn to the next page please.

(Neutral Word Task Prime continued)

11. Orange

12. Indeterminate

13. Tornado

14. Predicate

15. Formica

16. Indefinite

17. Beanbag

18. Interstellar

19. Meantime

20. Distraction

21. Bracelet

22. Stowaway

23. Intricacy

24. Equipment

25. Menagerie

APPENDIX G

APPENDIX G

Competitive Story Prime

Word Finding Task

This is a task designed to measure your verbal and creative abilities. Read the passage below. As you do so, circle any grammatical or spelling errors. Please take your time to complete the task thoughtfully, however try to spend no more than ten minutes on this task. Good luck! You may begin.

Michael worked hard to be the best compared to those around him. Everything he achieved in life was due to his hard work and competitive spirit. Since he was a teenager Michael enjoyed running. He became very good in it in college. He was always able to push a little hardest than anyone he ran against in practice, He would give all he had to finish a step ahead of any other runner he ran against and he knew this was the key to his success. At the age of 27 Michael finally got his bigbreak. He qualified for the Marathon World Championships. He started off well on the rural course, running with the lead pack. Slightly past the halfway point of the race Michael make his decision. He took the lead at a pace he wasn't sure he could hold the rest of the way. However, he knew this was the only way he could win the race because some of the other runners in the leed pack possessed superioir speed at the end of the race. Only four runners chosen to go with him. Now this pack of five had broke away form the rest of the field. With three miles to go Michael had fallen into forth place just two steps behind the leader. He felt terrible, as is each step would be his last. However, he noticed that the men in front of him were also laboring and looked very fatiging. He thought back to his arduous training where his pushed his body and mind to its limits to finish ahead of the others he trained with. He knew he had trained hardest of all these men. At that moment Michael found an extra reserve of energy. He surged to the front of the pack running like a man possessed. The others could not respond. He held a five step lead until the finnish line were he collapsed. Michael had gave everything he had and was now the world champion. He had beaten all the best runers in the world. Exhausted, Micheal pulled himself to his feet to congratulate all of his competitors finishing the race. The media quickly broadcasted this story. The public embraced Michael as a hero for being a fine role model as a competitive athlete.

APPENDIX H

APPENDIX H

Cooperative Story Prime

Word Finding Task

This is a task designed to measure your verbal and creative abilities. Read the passage below. As you do so, circle any grammatical or spelling errors. Please take your time to complete the task thoughtfully, however try to spend no more than ten minutes on this task. Good luck! You may begin.

Michael, Carl, Paul, and Ben worked hard to be the best. They were all members of the same track club and had trained together since they were children. Everything they achieved in life was due to there hard work. Last year they finally got their big break. The team qualified for the Track and Field World Championships. They started off well at the championships, winning their first two qualifing rounds. Although they had some sloppy batton passes, the members did not panic because they knew each other's strengths and weakness so well that they did easily overcome these errors. The day of the final had arrived. That morning the team members got together. They did not meet to practice baton passes or sprints as they had so many times in the pass. Rather they met to pledge their support to one another. No matter what happens in the race they would always be the team that stuck together, the team that always had. The dream they had worked so hard together for was finaly here and they would enjoy it together as a team. Race time had finally arrived. Michael was the first runner. He got off to a fairly good start, As the other runners cheered him on he seemed to accelerate catching other team and moving into third place. He had an excellant baton exchange with Carl the second runner. Carl fed off Michael's success to hand off the baton to Paul neck and neck for first place. Now the three who run their legs chanted in unity to Ben the anchor runners. The louder they chanted the more Ben increased his lead on the field. They had won. The four ran to embrace one another. Because of the combined efforts of the team the had done it. No one team member ran his best time but together they worked as a unit to accomplish there goal and acheived it as a team. The media quickly took notice of their story. At the awards ceremony, the crowd cheered and cheered. Although the team members received medals and fame for their acomplishment they all agreed that being with there team members made it all worthwhile. Being a part of a cohesive, successfull group was its own reward.

APPENDIX I

APPENDIX I

Neutral Story Prime

Word Finding Task

This is a task designed to measure your verbal and creative abilities. Read the passage below. As you do so, circle any grammatical or spelling errors. Please take your time to complete the task thoughtfully, however try to spend no more than ten minutes on this task. Good luck! You may begin.

Michael woke up early on Sunday, he had to go to work. He is a timer and offical for a marathon races. This particular Sunday was a very big race. Over 3,000 people were entered so Michael knew that he would be having his hands full. The first difficult task was getting to the race itself. Many of the city's streets were blocked since they were in the race course. In order to get to the start line, Michael had to drive through the east side of town, past the river, and through 3 aditional tolls. This alternate route was about 15 miles longer than the usual root. When he finally got there Michael had to make sure to park further away from the start then he would've liked because he had to make sure he could get his car out. Upon arrival at the start line, Michael greeted the usual crew of race officials, Cindy Maher, his best friend Bill Coats, and the veteran official Fred Houston who had been an official for 32 years. They all set out on their taks of setting up cones to block traffic, greeting volunteers and participants, and setting up the clocks. As race time drew near, Fred and his crew herded the runners in to the start area which was not an easy task When all the runners were finally herded in, the officials turned the crowds attention to Enrico Palatzo, the Italian opera singer who woul sing the national anthem. Then Michael made sure all the timers were ready and the gun was fired. Once the start area was cleaned up after about a half hour, Michael and his crew would set off to the finnish line to record times and finishing place of all the runners. This would be the longest task of all with this many runeers involved. The last runner usually di not finish until about 4 hours after the first one so Michael new he had a long day ahead of him. However, he enjoy getting out in the breezy spring morning. The finish line work went very smoothly amd all times and place were recorded accurately, a rarity in Michael's exerience. When the last runner finally did come, the remaining crew applaude and cleaned up the finish area. It was almost 5PM by now and Micheal was ready to go home satisfied after a job well done.

APPENDIX J

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Supplemental Analyses

(Repeated Measures ANOVA for Experimental Trials Examined by Priming Condition and Arm)

A 2 (Group condition: Conjunctive vs. Coactive) X 2 (Priming condition) X 2 (Arm: dominant vs. nondominant) ANOVA with repeated measures on the latter factor was performed on the fatigue corrected difference scores for the experimental trials. Analyses revealed no significant main effect of group ($F(1, 76) = .315$, *ns*) indicating that motivation gain did not differ by conjunctive and coactive groups. The Priming main effect reached statistical significance ($F(1, 76) = 5.391$, $p < .03$) indicating that those primed for competitiveness ($M = 70.45$, $s = 47.31$, $n = 38$) outlasted those not primed ($M = 48.19$, $= 39.5$, $n = 42$). The Arm main effect was also significant ($F(1, 76) = 12.02$, $p < .001$) indicating that as with controls, those in the experimental conditions fatigued at different rates with each arm. However, the arm factor did not interact significantly with Group or Priming conditions (F's < 1). The Group X Prime main effect was also nonsignificant ($F(1, 76) = .515$, *ns*).

To further examine these effects by group condition, 2 (Prime) X 2 (Arm) ANOVA's with repeated measures on the latter factor were performed on the fatigue corrected difference scores. In the conjunctive condition, the effect of Priming was non significant ($F(1, 38) = 1.31$, *ns*). The effect of Arm was marginally significant ($F(1, 38) = 4.02$, $p < .06$). The Prime X Arm interaction was non significant ($F(1, 38) = .08$, *ns*). The mean motivation gain scores plotted by Group and Priming condition are presented in Figures 3.1 and 3.2. In the coactive condition, the Priming effect was significant

($F(1, 38) = 4.54, p < .05$). The Arm effect was also significant ($F(1, 38) = 12.74, p < .001$). However the Prime X Arm interaction was non significant ($F(1, 38) = 1.51$, ns). These results indicate that while the conjunctive and coactive groups did not differ overall in magnitude of motivation gains, the effectiveness of priming was limited to the coactive condition but did not interact with the arm factor.

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