

Collectivism in Teams: Goal Priority's Predictive Validity

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A U.S. Navy study examined the relationship between one facet of Collectivism and team member performance. The facet of Goal Priority was found to predict team member performance incrementally above cognitive ability. The sample consisted of 60 participants (78% uniformed Navy personnel) formed into 15 teams of four. According to the results of this study, it appears that being willing to set the team's goals above the individual's goals is indicative of someone who will perform better in a team environment.

INTRODUCTION

General mental ability (GMA) is the gold standard for predicting an individual's job success (Hunter & Hunter, 1984; Ree, Earles, & Teachout, 1994; Schmidt & Hunter, 1998). Not only is GMA related to job performance in individual jobs, but also in teams (Heslin, 1964; Hill, 1982; Stevens & Campion, 1994; Tziner & Eden, 1985; Williams & Sternberg, 1988). It stands to reason that any other variables that can come close to GMA's predictive validity for team performance are worthy of the attention of team researchers and practitioners. One of these constructs that may be of importance is referred to as *Collectivism*. The purpose of this study is to explore the relationships among cognitive ability, team member performance, and one facet of *Psychological Collectivism*, specifically, *Goal Priority*.

The definition of Psychological Collectivism adopted herein is from Jackson, Colquitt, Wesson, and Zapata-Phelan (2006); the construct is defined as a positive or negative attitude one holds towards five areas of working with others in a team. Psychological Collectivism is the product of the following five facets: preference for teamwork (Preference), reliance on others (Reliance), concern for group members (Concern), conformity to group norms (Norm Acceptance), and putting the goals of the group above personal goals (Goal Priority). Jackson et al. (2006) based their definition of Psychological Collectivism on numerous other works (see Ho & Chiu, 1994; Triandis 1989, 1995, 1996; Triandis & Bhawuk, 1997), including a meta-analysis (see Osyerman, Coon, & Kemmelmeier, 2002). Their definition is similar to Salas, Sims, and Burke's 2005 construct called *Team Orientation*. However, unlike the Salas et al. concept of Team Orientation, the Jackson et al. concept of Psychological Collectivism also includes the two additional facets of Norm Acceptance and Concern. In addition, compared to Salas et al., Jackson et al. had empirical support for their definition, whereas Salas et al. based their definition on a purely theoretical model.

Collectivism is an important dimension of teamwork (Eby & Dobbins, 1997; Kline, 1999; Salas et al., 2005; Wagner, 1995). In a recent meta-analysis of 89 studies on team performance, Bell (2007) provided evidence as to the relationship between Collectivism and team performance. Specifically, Bell found a

medium effect for Collectivism and team performance ($\rho = .25, k = 14, n = 1,299$). At the facet level, Bell found a medium effect for Preference as well ($\rho = .18, k = 10, n = 490$). Bell did not report findings on Goal Priority, probably due to a lack of research on the subject. Compared with the effect on team performance for GMA ($\rho = .27$) and *conscientiousness* ($\rho = .11$), the relative importance of Collectivism is clear. Although not examined by Bell, generally when researchers have examined both facet-level or general Collectivism and GMA together they have reported either a negative correlation, or none at all (Lin, Yang, Arya, Huang, & Li, 2005; Shaw, Duffy, & Stark, 2000, 2001; Wagner, 1995). However, prior studies examining both GMA and Collectivism together have always used Grade Point Average (GPA) as a proxy for GMA. Although the specifics of the relationship between GMA and Collectivism are still unclear, Bell's meta-analytic results across 14 studies demonstrate evidence for the relationship between Collectivism and team performance.

Bell's 2007 findings were based on her review of 14 empirical articles examining the relationship between overall Collectivism and overall team performance. However, none of these 14 articles used the Jackson et al. (2006) measure of Psychological Collectivism, given that the scale had not been published yet. The facets most often measured by the articles reviewed by Bell were Preference for teamwork and Goal Priority, meaning the meta-analytic results presented by Bell may be heavily weighted on these two facets.

Jackson Psychological Collectivism Measure

The Jackson Psychological Collectivism Measure (JPCM), developed by Jackson et al. (2006), is a 15-item paper-and-pencil instrument; its instructions ask respondents to think about the working groups they currently belong to and have belonged to in the past and rate how much they agree or disagree with each item. Each of the five facets is measured by three items.

The Goal Priority facet is measured with the following three items: (1) "I cared more about the goals of those groups than my own goals." (2) "I emphasized the goals of those groups more than individual goals." (3) "Group goals were more important to me than my personal goals." Goal Priority means putting the needs of the group above personal goals. Salas et al. (2005) noted that engaging in this activity is a hallmark of a successful team. According to Salas et al., the willingness to sacrifice for the good of the team requires the teams to have certain foundations in place (i.e., trust). As measured in the JPCM, Goal Priority, and every other facet, is an attitude one brings with him or her to each new team setting that, when present in high levels, is correlated with successful team member performance.

The 15-item JPCM has been shown to be psychometrically sound. Jackson et al. (2006) demonstrated their scale's convergent validity by correlating it with the three most widely used measures of Collectivism, the Triandis and Gelfand (1998) measure ($r = .52, p < .05$), the Earley (1993) measure ($r = .50, p < .05$) and the Wagner and Moch (1986) measure ($r = .50, p < .05$). Jackson et al. demonstrated the scale's discriminant validity by correlating it with a measure of the Big Five personality traits. None of the personality traits correlated with Psychological Collectivism except for a low correlation with agreeableness ($r = .23, p < .05$), although facet-level analysis was not reported in regards to personality.

Evidence for the scale's criterion related validity was reported through tests of its concurrent validity in a team context. Jackson et al. (2006) reported that Psychological Collectivism was related to team member task performance ($\beta = .32, p < .05$), member citizenship behavior ($\beta = .20, p < .05$), member counterproductive behavior ($\beta = -.31, p < .05$), and member withdrawal behavior ($\beta = -.23, p < .05$). In addition, when the Big Five personality traits were included in the equation, Psychological Collectivism demonstrated incremental validity for member task performance, member citizenship behavior, member counterproductive behavior, and member withdrawal behavior. However, prior to the current study there has only been one other study examining the criterion validity of the JPCM when attempting to explain team member performance at the individual-level, and this one study only reported some of the findings at the facet-level (Jackson et al., 2006). In addition, the overall scale and its facets have only been tested for their predictive validity once before in a study that examined team performance in an academic setting (see, Dierdorff, Bell, & Belohlav, 2011). Of note, Dierdorff et al., (2011) demonstrated that of the five facets, Goal Priority was more highly, and more consistently positively correlated with team-level

performance across time than were any of the other facets. Thus, building upon previous research the current study is the first to test the predictive validity of Goal Priority utilizing a sample of employees, is the first to examine the scales utility in a military setting, and is the first to compare Goal Priority side by side with GMA.

The Current Study

This study explored the predictive validity of the facet of Psychological Collectivism termed Goal Priority for team member behavioral outcomes. The specific purpose was to employ a computer simulator in a laboratory setting and *ad hoc* groups of former and current military and civilian Navy personnel in a three-trial team exercise to examine teamwork. In this study, two dyads formed one team although all analyses were conducted at the individual-level. Together the four teammates operated helicopters in a computer simulated environment designed around U.S. Navy Anti-Submarine Warfare (ASW).

Team member performance was measured through behavioral observations, which are described in more detail below. Previous literature has demonstrated the criterion related validity of Psychological Collectivism for team member performance (Jackson et al., 2006). These outcomes were based on supervisor ratings collected at the same time as the Psychological Collectivism responses. According to Jackson et al. (2006), only Goal Priority was related to both task performance and withdrawal behavior. In the current study, the performance outcome labeled *Teamwork* (described in more detail later) measured an individual's performance coordinating with team members; therefore the following hypothesis was tested:

H1: Level of the facet Goal Priority will predict team member Teamwork performance across all missions and roles.

Although Goal Priority has been shown to predict team member performance, so has GMA. However, the predictive validity of these two variables for team member performance has never been compared in a single study, and whenever GMA and some form of Collectivism have been examined together, GMA was operationally defined as college GPA. GPA is related, but not the same construct as GMA and is therefore not always an adequate proxy for GMA. Therefore, in this study, participants completed a six-item cognitive ability measure. Thus, to test the predictive validity of Goal Priority in relation to cognitive ability, and because it was believed that Goal Priority would predict team member Teamwork performance, the following hypothesis was tested:

H2: Team member Goal Priority will demonstrate incremental validity over cognitive ability for predicting team member Teamwork performance.

METHOD

Participants and Setting

The current study was part of an Office of Naval Research (ONR) funded project being conducted by the U.S. Navy. The purpose of the larger project was to explore aspects of teamwork, team composition, team member performance predictors, team roles, team adaptation, and the usefulness of a U.S. Navy computer simulator. The portion of the larger study that is the focus of the current paper addressed only the specific hypotheses listed above and consisted of teams of four operating a computer simulator that models a U.S. Navy ASW task. As mentioned above, each dyad controlled one helicopter and worked with one other dyad controlling a second helicopter with the goal of seeking and destroying an enemy submarine. Participants operated the simulators on a U.S. Navy base, using laptop computers set aside in rooms designated for this study. The participants worked together to accomplish three separate 25-minute missions. In addition each participant completed several questionnaires, a mental ability test, and was observed and rated by researchers over the course of the study.

The sample consisted of 60 participants formed into 15 teams of four. Analysis was conducted at the individual-level. Participants included both military and civilian Navy personnel. Two cases were removed from the data because they were found to be univariate outliers using the criterion of z-scores greater than 2.5 or less than -2.5 (Meyers, Gamst, & Guarino, 2006). Although age and race were not recorded, the participants varied in both. Table 1 lists the demographic information for the sample. Participants' prior ASW experience was statistically tested as a control variable.

TABLE 1
SAMPLE DEMOGRAPHICS

Categories	Percent of Sample
Gender	
Male	78
Female	22
Military Service	
Uniformed ^a	78
Civilian	22
Pay Grade	
Officer	32
Enlisted	68

Note. Sample size for this table was 60; mean ASW Experience was 1.5 years.

^a Mean Navy tenure of 14 years.

Measures

The relevant variables of interest were measured using the JPCM, a mental ability test, and through behavioral observation.

Collectivism. All participants rated themselves once using the JPCM prior to participating as team members in this study (see Jackson et al., 2006).

Cognitive Ability. Cognitive ability was measured using six items taken from the Raven's Progressive Matrices Scale (items are not attached to protect the secrecy of the scale). These six items were selected based on their range of difficulty. Although these six items alone did not allow for an accurate assessment of general intelligence, they did enable the differentiation of cognitive ability among the participants for the purposes of hypothesis testing.

Team Member Performance. Team member performance was assessed through researcher ratings of behavioral observations. Researchers consisted of trained psychology graduate students and a supervising Navy Research Psychologist. Team members were observed during the three 25-minute ASW missions. Each member was scored separately on three items at the conclusion of each of the three missions. The six items (three for each role) are listed in Table 2. The first item was designed to capture role-specific teamwork performance (i.e., how well the team members worked with each other). The second and third items were designed to measure how well each person operated his or her role-specific equipment. Combinations of these items produced team member performance outcome scores. Specifically, Item 1 averaged across all three missions equated to each participant's *Teamwork* performance score. Teamwork performance was the only outcome analyzed during the current study.

Scores on these behavioral observations ranged from 1 to 5, with higher scores indicating better performance. There were a total of three 25-minute missions allowing for three separate assessments of team member Teamwork performance. Observers consisted of U.S. Navy personnel and contractors all trained in psychological research. A total of five researchers made behavioral ratings of team members. On average, scores between raters for each item differed by 7%, or 0.35 points on a 5- point scale, representing a 93% consensus between raters.

TABLE 2
TEAM MEMBER PERFORMANCE MEASURE

Measure Item	Role
1. Coordinating with ATO	SO
2. Effective use of buoys	SO
3. Effective use of other equipment	SO
4. Coordinating with SO and other ATO	ATO
5. Piloting	ATO
6. Deploying sensors and weapons	ATO

Note. Each helicopter was operated by two team members each fulfilling separate, interdependent roles: one Airborne Tactical Officer (ATO) and one Sensor Operator (SO).

Materials

Software. Teams operated a commercially available ASW computer simulator called Sonalysts Combat Simulations: Dangerous Waters©, which is owned by Sonalysts, Inc. and published by Strategy First software publishers. The Dangerous Waters simulator was developed by content experts to provide a high fidelity computer-based Navy task environment. Participants in this study operated the simulator using missions constructed by this author in conjunction with U.S. Navy ASW experts. In these missions, teams of two dyads operated a single helicopter per dyad with the goal of finding and sinking an enemy submarine. Although teams were only measured in multiplayer mode, teams were trained on both single and multiplayer missions developed by the author.

Each mission was designed to take teams 20 to 25 minutes to complete. From the perspective of the participants, missions were considered successful if the enemy submarine was destroyed within the 25-minute time limit and without violating the mission parameters outlined during the mission briefings. For the purposes of this study, only individual performance was analyzed because this study focused on understanding an individual-level predictor.

Successful completion of the three missions, not only required both helicopters to work together, but also required that each dyad member work with the other member. This is because each dyad was composed of two distinct interdependent roles with separate tools and information. Thus, within both helicopters each dyad member shared the overall team goal of sinking the submarine, but performed different tasks depending on which role they chose. The two roles were the Airborne Tactical Officer (ATO) and the Sensor Operator (SENSO or SO). The main duties of the ATO were to decide where the helicopter should go, program the autopilot, deploy the sensors, launch the weapons, and coordinate with allies. The main duties of the SO were to monitor the sensors, locate the submarine, plot manual solutions when the target was believed to have been located, and to communicate relevant information to the ATO verbally and via the ATO's display.

The helicopter that was modeled in the simulation and was operated by the teams is the U.S. Navy's MH-60R Seahawk "Romeo." Each helicopter was loaded with a realistic collection of equipment, but only that which was used by the teams to accomplish their missions are listed here. Part of the training of participants included explaining how all the equipment listed below works, and what their role was in operating it for the purpose of achieving team goals. To enable teams to destroy the submarine, the helicopters were loaded with two MK50 torpedoes. In addition, each helicopter was loaded with 25 sonobuoys consisting of 10 shallow Direction Command Activated Sonobuoys (DICASS - capable of providing both active and passive sonar data) and 15 shallow Directional Frequency Analysis and Recording sonobuoys (DIFAR- capable of providing passive sonar data). Finally, each helicopter was equipped with radar, an Electronic Support Measures sensor (ESM), a Magnetic Anomaly Detector (MAD), a Submarine Anomaly Detector (SAD), and a hydrophone (also known as the "dipping sonar").

Procedure

Participants were recruited using e-mails, posters, and word of mouth. They were offered the chance to compete for trophies in a base-wide competition as part of an ONR funded research project examining teams. Participation was completed over the course of two sessions in the laboratory (see Table 3). Session 1 consisted mainly of training; Session 2 consisted mainly of flying three missions. Once participants signed up they were scheduled for training. At the conclusion of mission three, participants completed the cognitive ability measure.

TABLE 3
TIMELINE OF STUDY BY SESSION

Session 1 (lasted approximately 1.5 hours)
<ol style="list-style-type: none">1. Four participants were introduced to the nature of the team task and roles.2. Participants discussed among themselves which role to take.3. Participants were divided by role and trained for 45 minutes in separate rooms: Both ATOs in Room 1 and both SOs in Room 2. All ATO training was conducted by the same researcher. All SO training was conducted by the same researcher.4. All four team members came back together and attempted the Session 1 Training Mission in Room 1. This was a 15-minute training mission where the ATO and SO worked together for the first time. The participants chose which person they would work with. This is when the dyad was formed. This mission was operated in dyads and unlike the competition; the dyads did not work together during the Session 1 Training Mission. This mission was a two-player mission, not a four-player mission.5. Participants completed the JPCM.
Session 2 (lasted approximately 2 hours) – occurred on average 21 days after Session 1
<ol style="list-style-type: none">1. Participants gathered in Room 1 and were told about the events of the day.2. Dyads were assigned to Helicopter 1 (Room 1) and Helicopter 2 (Room 2). The Helicopter 2 dyad was sent to Room 2.3. Both dyads were trained while they operated the Session 2 Training Mission. This was a 15-minute mission designed to give the dyad the chance to practice the basic components of their roles.4. All four participants gathered in Room 1 and were briefed on details of the tasks that remained static across all three missions. In addition they were then briefed on the details of Mission 1. Next, the participants were given time to discuss their plan for Mission 1.5. Helicopter 2 dyad moved to Room 2. All participants assumed their stations. The ATOs practiced using the radio communicator for the first time.6. Mission 1 was completed.7. All four participants gathered in Room 1 for the briefing of Mission 2. The team was given time to form a plan for Mission 2. Helicopter 2 dyad moved to Room 2. All participants assumed their stations.8. Mission 2 was completed.9. All four participants gathered in Room 1 for the briefing of Mission 3. The team was given time to form a plan for Mission 3. Helicopter 2 dyad moved to Room 2. All participants assumed their stations.10. Mission 3 was completed.11. All participants completed the six-item cognitive ability measure.12. Participants were thanked and dismissed.

During each mission, researchers scored the individual performance of each participant using the performance measures discussed in the Measures section. These performance scores did not impact the competition but were used only for research purposes. Competition-related results were not finalized until all teams had competed; thus, teams did not know exactly where they stood relative to other teams until the conclusion of the study when the trophies were awarded.

RESULTS

Means, standard deviations, internal consistency reliabilities, and correlations for primary study variables are presented in Table 4. Hypotheses 1 and 2 were tested using hierarchical linear regression. The following control variables were also examined: current military status, latency between being trained on the task and completing the task (which varied by individual), and years of ASW experience. Support was found for Hypothesis 1 in that Goal Priority was positively linearly associated with member Teamwork performance ($\beta = .309, p = .018$) and accounted for 9.5% of its variance, $F(1, 56) = 5.89, p = .018$.

TABLE 4
DESCRIPTIVE STATISTICS, INTERNAL CONSISTENCIES, AND CORRELATIONS
OF STUDY VARIABLES

Variable	<i>M</i>	<i>SD</i>	1	2	4	5	6	7
1 Teamwork	3.29	0.64	(.84)					
2 Goal Priority	4.08	0.74	0.29*	(.82)				
3 Cognitive	2.39	1.94	0.27*	-0.21	(.32)			
4 Role	1.51	0.50	0.18	0.26*	0.15	—		
5 Military	0.75	0.43	0.23	0.01	-0.18	-0.14	—	
6 ASW Years	1.56	2.90	0.13	0.11	0.02	0.16	0.05	—
7 Latency	21.0	13.58	-0.21	0.07	-0.13	0.04	-0.10	.19

Note. Composite reliabilities of multi-item measures are reported within parentheses along the diagonal. Individual-level correlations are presented below the diagonal. Role was coded 1 for ATO and 2 for SO. Military status was coded as 1 for current uniformed Navy personnel and 0 for civilians. Latency is in days. Higher scores indicate greater levels of each continuous variable.

n = 58.

* $p < .05$. ** $p < .001$, two-tailed.

Support was found for Hypothesis 2 in that when controlling for current military status, Goal Priority together with cognitive ability were positively linearly associated with member Teamwork performance, and the three variables together accounted for 29.6% of the variance, $F(3, 54) = 7.55, p < .001$. After testing the model with the three control variables, only participants' current military status was a statistically significant predictor and therefore remained in the final model. Hierarchical linear multiple regression was used to test the change in R^2 for each of the three control variables. In the final analysis, Model 1 included just the one control variable of military status. Model 2 included the addition of cognitive ability. Model 3 included the addition of Goal Priority. Although Model 1 was not statistically significant, $F(1, 56) = 3.97, p = .051, R^2 = .066$, military status was a statistically significant control variable in the final model ($\beta = .268, p = .023$) and was also statistically significant ($\beta = .286, p = .025$) in Model 2, which itself was statistically significant, $F(2, 55) = 5.21, p = .008, R^2 = .159$. Finally, as noted above, Model 3's change in R^2 when moving from Model 2 to Model 3 was also statistically significant (R^2 change = .136, $p = .002$). Thus, taken together, support was found demonstrating that in this sample, Goal Priority demonstrated incremental validity above and beyond cognitive ability when controlling for current military status.

DISCUSSION

Support was found for both hypotheses. Specifically, Goal Priority was related to a participant's degree of successful teamwork behavior, even incrementally above cognitive ability.

Hypotheses

Previous research has demonstrated Goal Priority's criterion validity for team member performance (Jackson et al., 2006) and for team-level performance (Dierdorff et al., 2011). Unlike Jackson et al. (2006) the controlled environment of this laboratory study allowed for the use of the study's design (rather than statistical procedures) to control for possible confounds such as task related knowledge, team tenure, and previous experience with the rater (or supervisor). Unlike Dierdorff et al. (2011), the current study utilized employees rather than students as participants. Therefore, the findings in this study extended the previous research by Jackson et al. (2006) in that Goal Priority was related to team member performance, while the impact of rater bias, previous within team experience, and previous task experience were all minimized. In addition, the design of this study extended the previous research by Jackson et al. by including a measure of behavior that occurred on average 21 days after the Goal Priority scale was administered. Thus, the results of Hypothesis 1 demonstrated the predictive validity of Goal Priority, which previously had been evaluated only in terms of concurrent validity in the Jackson et al. study and only applied to a student sample in the Dierdorff et al. study.

Support was also found for Hypothesis 2, indicating that Goal Priority demonstrated incremental validity over cognitive ability in predicting successful teamwork behavior. Previous research has shown that each of these variables is related to successful team members, but prior to the current study these variables had not been tested together. Although the measure of cognitive ability used in this study is somewhat limited, it is a significant step forward in testing this tri-part relationship. Furthermore, although no facet-level studies had been done before the current study, previous researchers have examined the relationship between overall Collectivism and cognitive ability (Lin et al., 2005; Shaw et al., 2000, 2001; Wagner, 1995). However, when examining these two variables together, previous studies always relied upon GPA as their measure of cognitive ability. Nonetheless, the relationship observed herein is inline with previous findings using GPA in that Psychological Collectivism was negatively correlated with cognitive ability ($r = -.269, p = .021$, one-tailed) and so was Goal Priority, although this relationship did not reach the .05 level of significance ($r = -.210, p = .057$, one-tailed). Taken together, Goal Priority and cognitive ability appear to be unique predictors of successful team member teamwork behavior. It is recommended that future researchers continue to explore these relationships.

Limitations and Future Research

The major limitation of this study was the small sample size ($n = 58$ after two outliers were removed) thereby truncating the generalizeability of the findings and also perhaps limiting the statistical power. Another limitation of this study impacts the interpretation of the results of Hypotheses 1, and 2. Specifically, the dependent variable in each of these hypotheses was measured using researcher evaluations of behavioral observations. Although precautions were taken to ensure the reliability of raters such as extensive training and the assessment of inter-rater agreement, which was satisfactory in all cases, researcher evaluations are ultimately subjective in nature. It is therefore recommended that future researchers attempt to devise objective measures of teamwork behavior, and subsequently test Psychological Collectivism's predictive validity with those measures. In addition, although the method for measuring cognitive ability in this study was an improvement over past research, the six items taken from the Raven's scale for this study cannot be used to determine actual cognitive ability. Rather, the scores on the adapted version of the Raven's scale used herein allow only for differentiation among the participants, not among the general population; and therefore the generalizeability of the cognitive ability findings to outside the lab are to be made with caution.

Conclusion

The current study supports the notion that at least one of Psychological Collectivism's facets is related to team member performance. In this study, Goal Priority was demonstrated to be a statistically significant predictor of successful teamwork behavior of employees, even over and above cognitive ability. Taken together, the current study along with Jackson et al. (2006) have demonstrated the criterion related validity of Goal Priority for predicting team member performance.

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