Interdependence and Preference for Group Work: Main and Congruence Effects on the Satisfaction and Performance of Group Members

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This study examined the direct and interactive relationships of interdependence (task and reward) and preference for group work on the satisfaction and performance of group members. Hypotheses were tested among a sample of task-performing group members over a four-month period (N's = 328–432). Consistent with a "community of fate" perspective, hierarchical regressions revealed that interdependence (task and reward) and preference for group work were positively related to group-member satisfaction. Consistent with "supplies-values fit" framework, the interaction of task interdependence and preference for group work was significantly related to group-member performance. Implications for the design of group tasks, the effects of group-member preferences, and the prediction of individual satisfaction and performance in group contexts are discussed. © 2000 Elsevier Science Inc. All rights reserved.

The use of work groups and teams in organizations has dramatically increased in the past several years, as has interest in understanding the dynamics of work groups (e.g., Campion, Medsker, & Higgs, 1993; Campion, Papper, & Medsker, 1996; Cohen & Bailey, 1997; DeMatteo, Eby, & Sundstrom, 1998; Hackman, 1987; Liden, Wayne, & Bradway, 1997; Sundstrom, De Meuse, & Futrell, 1990; Tannenbaum, Beard, & Salas, 1992; Zander, 1994). This rekindled interest focuses mainly on the prediction of group performance (Guzzo & Dickson, 1996) with far less attention paid to the prediction of individual-level performance outcomes in the group context. This state of affairs leaves a critical gap, the identification of the factors that relate to individual satisfaction and

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performance levels in group contexts. In a recent review of team-related studies conducted in organizational settings, only 16 percent included individual-level analyses (Cohen & Bailey, 1997). The assessment of group effectiveness should not be de-emphasized, but the use of groups also has important implications for individual group-member attitudes and behavior, themes that are underdeveloped in the literature. We contribute to this line of research by investigating the predictors of group-member satisfaction and performance in the group context.

Drawing on recent theory and research, we identified three critical areas which should be considered when assessing the satisfaction and performance of group members. The first is task interdependence, the way in which work is organized in groups or the perceived interrelatedness of group tasks (Salas, Dickinson, Converse, & Tannenbaum, 1992; Tannenbaum et al., 1992; Wageman & Baker, 1997). Another important issue is how individuals are rewarded in groups or the level of reward interdependence in the group (Campion et al., 1993; DeMatteo et al., 1998). Finally, more attention has recently been devoted to the attitudes or preferences of individuals toward group work (Marwell & Ames, 1979; Wagner, 1995). Several researchers suggest that group design elements (task and/or reward interdependence) are critical for success; others maintain that individual differences are central; still others champion a complementarity or congruence approach. Until recently, most previous research favored the work design approach with little attention paid to interactions of design aspects and group-member attitudes. In this paper, we extend this research by developing interactive predictions and testing interactions among task interdependence, reward interdependence, and preference for group work in determining the satisfaction and performance of group members. In developing these predictions we draw on the supplies-values (S-V) fit perspective (Edwards, 1996), an aspect of person-environment fit, which suggests that an alignment between an individual's preferences (values) and what the job or environment supplies will result in optimal outcomes.

Several researchers note that the use of groups may be a key to solving the satisfaction-productivity dilemma often apparent in organizations (Campion et al., 1993). Implementing group-based work holds the potential for reducing competition and fostering cooperation among coworkers; individuals may be more satisfied under these conditions and produce more and higher-quality work as a result (Campion et al., 1993; Fisher, 1981). Much conceptual work has been devoted to the idea that the use of groups can influence the satisfaction levels of group members (Campion et al., 1993; Campion et al., 1996; Gladstein, 1984; Keyton, 1991) and that satisfaction of individual groups members is an important measure of success (Hackman, 1987). We also focus on individual performance in groups, operationalized as peer ratings of group-member performance. Performance evaluations from group members are a decidedly important measure of individual performance in groups (Borman, 1974; Kane & Lawler, 1978; Lewin & Zwany, 1976; Mello, 1993). Moreover, as the use of groups becomes more prevalent, peers, rather than supervisors, often become the primary evaluators of individual performance (Bassin, 1996; Gomez-Mejia, Balkin, & Cardy, 1998).

Background and Theory

Task Interdependence

The study of task interdependence has a long history in several fields of social science (e.g., see Thompson, 1967 and McGrath, 1964). Task interdependence involves the design of work in the group or the degree to which group members "interact and depend on one another to accomplish work " (Campion et al., 1993: 827). Defined at the individual level, task interdependence is viewed as perceptions about the structural relationships among group members (van der Vegt, Emans, & van de Vliert, 1998). Conceptualized in this way, task interdependence is sometimes referred to as experienced or perceived task interdependence (Wageman, 1995). That is, group members in work or field situations often have considerable discretion about how much or how little they work together on tasks. Task interdependence in these instances varies from group to group and can only be measured through observation or individual perceptions of interdependence. The relationship between task interdependence and individual outcomes in the group context is often explained by the social facilitation effect, or the motivation of individuals to maintain a positive image in the presence of potential evaluators (e.g., Erez & Somech, 1996; Guerin, 1986). In support of these arguments, Pearce and Gregerson (1991) found that reciprocal task interdependence related positively to individual's felt responsibility for work (Pearce & Gregerson, 1991), while Anderson and Williams (1996) found a positive relationship between task interdependence and how often workers sought help for performance-related problems. Both types of behavior are likely to increase individual's performance in groups, although empirical results are not entirely consistent (e.g., Brass, 1985). At the group level, task interdependence (aggregated individual-level perceptions) has been found to relate to group performance (e.g., Campion et al., 1993) and group satisfaction (aggregated perceptions of satisfaction; e.g., Campion et al., 1996). It follows from the results of these studies that high levels of task interdependence will be positively associated with the satisfaction and performance of group members. Thus, the following predictions are made:

> **H1a:** *Task interdependence will be positively related to group-member satisfaction.*

> **H1b:** *Task interdependence will be positively related to group-member performance.*

Reward Interdependence

Reward interdependence is the extent to which the rewards that an individual receives depends on the performance of coworkers (Wageman & Baker, 1997). As with task interdependence, reward structures can range from completely independent—individual rewards, such as commissioned sales—to completely interdependent, where tasks result in consequences that are important and shared completely by group members (Shea & Guzzo, 1987).

Researchers generally suggest that the higher the shared rewards, the more satisfied and better performing group members will be. For example, Campion et al. (1993) state that rewards *should* be linked to the group's performance in order to motivate group-oriented behavior. This argument is described as a "more is better" (Wageman, 1995) or a "community of fate" (Besser, 1995) perspective of reward structures. The reasoning suggests rewards based on group performance foster the feeling among group members that they will succeed or fail together. The chief theoretical issue is that group-based reward structures foster cooperation and diminish competitiveness, behaviors that facilitate the "smooth functioning" of the group (DeMatteo et al., 1998: 144). Hom, Berger, Duncan, Miller, and Blevin (1994) found that reward interdependence related positively to intrinsic motivation and performance of dyads (groups of two), while Campion et al. (1993) found that outcome interdependence (aggregated perceptions of outcome interdependence) related positively to satisfaction. Thus:

> *H2a:* *Reward interdependence will be positively related to group-member satisfaction.*

> *H2b:* *Reward interdependence will be positively related to group-member performance.*

Preference for Group Work

Preference for group work is a dimension of the broader individualism-collectivism (I/C) construct (Wagner, 1995; Wagner & Moch, 1986) and refers to the degree to which individuals have strong preferences for group, rather than autonomous, work. More generally, I/C relates to the relative importance individuals place on personal interests versus shared interests, like group work, family, and circles of friends (Wagner, 1995). The preference for group work sub-dimension is more specific to work group situations. The constitutive definition of preference for group work suggests that those holding these values will find group work satisfactory, while those who prefer autonomous work will be dissatisfied in groups (Wagner & Moch, 1986).

> *H3a:* *Preference for group work will be positively related to group-member satisfaction.*

With respect to performance, some have proposed that a strong preference for group work may result in better individual performance in groups (e.g., Cummings, 1981; Hackman & Oldham, 1980), but the theoretical issue (e.g., DeMatteo et al., 1998) and empirical evidence (e.g., Campion et al., 1993) are not clear. One the one hand, it is possible that those who prefer to work in groups are less motivated or able and prefer group work, in part, to benefit from the effort of better or higher-ability group members. Indeed, Wagner (1995) found a strong *negative* relationship between preference for group work and both college GPA and importance of winning. On the other, those who prefer autonomous work may react negatively to group- or equality-based systems and may have little concern

for the group (Triandis, Bontempo, Villareal, Asai, & Lucca, 1988). Moreover, those preferring group work are characterized by an attachment to the group and an orientation toward group goals (DeMatteo et al., 1988), attributes which are likely to result in better individual performance in the group. Although the current empirical evidence does not strongly support either argument, we tend to agree with the latter view and make the following tentative prediction:

> **H3b:** *Preference for group work will be positively related to group-member performance.*

Higher-Order Effects

While current theory suggests that task interdependence, reward interdependence, and preference for group work will be related to group-member satisfaction and performance directly, we extend this line of research and suggest that combinations of these variables may provide more explanatory power than main effects alone (Wageman, 1995; Wageman & Baker, 1997; Wagner, 1995). Indeed, the notion of congruence among different aspects of design and/or individual attitudes to produce synergistic effects is taking hold (e.g., Wageman & Baker, 1997; Wagner, 1995). For example, some empirical findings indicate that the benefits of task interdependence "do not come automatically" (Wageman & Baker, 1997: 141), instead other factors may be needed to elicit satisfaction and performance from group members when task interdependence is high. Other findings indicate that effects on cooperation in groups may be moderated by collectivist beliefs, including preference for group work (Wagner, 1995). In the proceeding sections, we extend this line of inquiry by developing interactive hypotheses among task interdependence, reward interdependence, and preference for group work.

Task Interdependence × Reward Interdependence.   This predicted interaction can be traced to the work of Miller and Hamblin (1963) who reported higher levels of group-level performance when levels of task and reward interdependence were about the same or "matched." The theory suggests that optimal outcomes can be achieved through the right design combination, but mismatches result in deleterious outcomes. Several laboratory studies since have confirmed this general hypothesis (see DeMatteo et al., 1998 and Mitchell & Silver, 1990 for reviews). When task interdependence is low, high levels of reward interdependence may foster a free-riding effect, reducing individual effort and performance in the group (Wageman & Baker, 1997; see also Kidwell & Bennett, 1993). Conversely, high task interdependence and individualized rewards reduce facilitative behaviors and increase competition within the group, factors, which are likely to reduce the satisfaction of group members. Thus,

> **H4a:** *The interaction of task interdependence and reward interdependence will be significantly related to group-member satisfaction.*

> **H4b:** *The interaction of task interdependence and reward interdependence will be significantly related to group-member performance.*

Interdependence × Preference for Group Work.   Supplies-values fit, an aspect of the person-environment fit approach (Edwards, 1996), suggests that congruence between the characteristics of groups and group-member attitudes is important in predicting the satisfaction and performance of group members. S-V fit concerns the congruence between what the job or environment supplies (work design variables (task and reward structure) in this case) and what the individual values in terms of preferences, interests, and goals (e.g., Cummings & Cooper, 1979; Edwards, 1992). Usually applied to the study of stress, incongruence has also been linked to satisfaction (e.g., Furnham & Schaeffer, 1984) and aspects of performance, such as absenteeism (e.g., Furnham & Walsh, 1991). S-V fit can actually be traced to the work of Lecky (1945) who proposed that individuals seek out situations that conform to their preferences, attempt to avoid discrepant situations, and generally prefer congruence. Vroom (1962, 1964) expanded these ideas and suggested that work performance is a function of an individual's "conception of himself (*sic*) and his (*sic*) conception of the attributes required by the task or job" (Vroom, 1964: 247).

With respect to this study, some research evidence sheds light on the implications of S-V, or more specifically in this case, matching the structure of group work with preference for group work. Several studies show that the motivation and performance of those who prefer individual work suffer when they function in interdependent task situations (e.g., Birch & Veroff, 1966; Vroom, 1959). For example, Wageman suggested that highly interdependent tasks for individualists, "may be constraining and frustrating and may undermine satisfaction with their work" (Wageman, 1995: 153). It logically follows that those who prefer group work would be more satisfied and perform more effectively in a setting where tasks are highly interdependent, while those with a preference for individual work or autonomy would be more satisfied and perform more effectively when tasks are more individualized.

Similar congruence or S-V fit arguments can also be applied to reward interdependence. The "community of fate" perspective suggests that high levels of reward interdependence result in positive outcomes, but those who prefer individual work find group rewards less efficacious motivators than rewards for individual performance (Hayes, 1976). The consequence of a mismatch between what the group supplies (i.e., the structure of rewards) and what the individual values (i.e., a preference for group work) may be "negative synergy" (Wageman, 1995: 152). Consistent with the S-V perspective, the form of these interactions is predicted to be such that the highest levels of satisfaction and performance are apparent when the structure of the group (task or reward interdependence) is consistent with one's preference for group work. For example, satisfaction and performance are predicted to be high when high task interdependence and high preference for group work are combined and when low task interdependence and low preference for group are combined.

> ***H5a:*** *The interaction of task interdependence and preference for group work will be significantly related to group-member satisfaction.*

H5b: *The interaction of task interdependence and preference for group work will be significantly related to group-member performance.*

H6a: *The interaction of reward interdependence and preference for group work will be significantly related to group-member satisfaction.*

H6b: *The interaction of reward interdependence and preference for group work will be significantly related to group-member performance.*

The preceding derivations also suggest a potential three-way interaction among task and reward interdependence and preference for group work, an interaction that has rarely been explored. While theory suggests that congruence between the way work is performed and how rewards are distributed within the group may facilitate higher satisfaction and performance levels of group members, these benefits may only be realized when they coincide with individual preferences for group work. Drawing again on S-V fit, the combination of high task interdependence and high reward interdependence may facilitate satisfaction and performance for those who prefer group work, but not for others whose personal preference does not coincide with the nature of the work (Vroom, 1964). Thus:

H7a: *The three-way interaction among task interdependence, reward interdependence, and preference for group work will be significantly related to group-member satisfaction.*

H7b: *The three-way interaction among task interdependence, reward interdependence, and preference for group work will be significantly related to group-member performance.*

Method

Participants

The participants in the study were 566 upper-division undergraduate students enrolled in business administration courses at a large university in the Southern U.S. Eleven instructors (a total of 17 classes) employing a group-based classroom style were contacted prior to the term by the research team. Each granted the research team permission to solicit participation from students in their class(es). Participants were guaranteed confidentiality, were assured that participation was voluntary, and signed waivers allowing supplemental information to be collected from the instructor of the course as needed. It should be expressly noted that this was a correlational study. Neither the structure nor the content of the participating courses were manipulated by the research team.

Data were collected at three time periods during the term. During the first week of class and *before* groups began to interact and complete projects, participants completed an initial questionnaire (Time 1) consisting of background and demographic information, course expectations, and attitudes (including prefer-

ence for group work). The second data collection (Time 2) transpired the week following mid-term exams (approximately eight weeks following the Time 1 data collection). The second questionnaire contained several measures relating to perceptions of group functioning and processes, including task interdependence. The final wave of data (Time 3) was collected just prior to final examinations (8 weeks after Time 2; 16 weeks after Time 1). Group-member satisfaction was among the measures collected at Time 3. Following the term, performance information was collected from the course instructors for those individuals who had signed waivers. The final sample was 39 percent female with an average age of 22 years. The modal class standing was junior level.

Context

The inclusion of a particular class in the study was guided by two primary criteria: (1) the instructor required groups to complete several projects/assignments throughout the term; and (2) assigned groups remained intact throughout the term. These criteria for inclusion were established to more closely simulate actual work groups and to preclude the possibility that some groups would wait until the end of the term before "throwing together" a final project. A member of the research team discussed the course format with each instructor prior to the term to determine its eligibility. Instructors generally tried to maximize group heterogeneity when assigning students to groups. In each of the 17 classes involved in the project, the course instructor required groups to work on projects during *and* outside of class time throughout the 16-week term. These assignments included textbook cases and exercises, group quizzes and homework (mostly case analysis), and, in most classes, a semester written project with group presentation. As a check, in the Time 3 data collection we assessed the amount of time that group members reported working on group projects outside of class. These results showed that participants reported interacting with their team members for an average of 2.27 hours outside of class each week during the term or roughly 36 hours outside of class *in addition to* in-class projects. On average, the amount of reward interdependence, the amount of an individual's grade that was dependent upon group performance, was 38 percent (range 38–100%). Groups ranged in size from 3 to 7 members with a mean size of 4.77 members (sd. 1.07). These simulated work group conditions are more realistic than short-term groups created for specific laboratory tasks, and likely provide a more consistent pattern of group-member interaction than student-based field studies in which a single group project is completed (e.g., Colquitt & Simmering, 1998; Wagner, 1995).

Measures

Task Interdependence.   Following Campion et al. (1993), Campion et al. (1996), Kiggundu (1983), and Liden et al. (1997), we measured task interdependence as group-member perceptions about the structure of tasks. A 4-item scale with 7 response options adapted from Campion et al. (1993) was collected at Time 2. A sample item is: "I can't accomplish my tasks without information from other team members."

Reward Interdependence.   The variable was operationalized as the percentage of an individual's course grade that was based on group performance. Course instructors supplied this variable for each individual involved in the project.

Preference for Group Work.   Preference for group work is a dimension of individualism-collectivism and as such, it was important to demonstrate that it could be empirically distinguished from other dimensions. Following Wagner (1995), we subjected preference for group work items and items from other dimensions of collectivism from the Time 1 questionnaire to a factor analysis with varimax rotation (see Appendix). These items were adapted from several sources (Barber, Rau, & Simmering, 1988; Erez & Earley, 1987; Franken, Hill, & Kierstead, 1994; Wagner & Moch, 1986; Wagner, 1995). The preference for group work dimension emerged as a very strong factor (eigenvalue = 5.94, explained variance = 27%). The resulting scale had 7 items, each with 7 response options. High values indicate a stronger preference for group work.

Group-Member Satisfaction.   This variable was measured with a 3-item scale adapted from the global job satisfaction scale (Cammann, Fichman, Jenkins, & Klesh, 1983) at Time 3. A sample item is: "All in all, I am satisfied with my team."

Group-Member Performance.   This study was conducted at the individual level and thus a measure of an individual's performance *in the group context* was needed. We used peer ratings of performance for this measure. Participants in 12 of the 17 classes were required to evaluate the performance of each of their group members during the final week of the term. Each group member was asked to allocate points to all other group members based on their performance during the term. The number of points to be allocated differed across classes (e.g., high performance would be allocated 100 points in one class and 50 in another). To make performance comparable across classes, the average evaluation for each individual (total peer evaluation points received divided by the number of evaluating group members) was divided by the maximum number of points possible for that particular class. The resulting variable for each individual is the percent of the total possible peer evaluation points that an individual received. Since the variable was negatively skewed, we transformed performance using the arcsine transformation for proportions suggested by Tukey (1977), Winer (1971), and Cohen and Cohen (1983); specifically, A = 2*arcsine*{sqrt(p)}. Higher values indicate better individual performance in the group context.[1]

Control Variables

Several control variables collected at Time 1 were included in the analyses. Age and gender (women = 0, men = 1) were included since they may be related to reward allocation preferences, collectivism, and satisfaction (e.g., Chen & Church, 1993; Mason, 1995; Schneer & Reitman, 1994; Wagner, 1995). Class standing (1 = sophomore, 2 = junior, 3 = senior) was controlled to account for potential rater biases in the group-member performance measure (Wagner, 1995). We also included cumulative university grade point average (GPA: a proxy for

ability) and grade expectations as they may be indicative of effort level and performance (Wagner, 1995) and may influence peer evaluations (Saavedra & Kwun, 1993). Grade expectation (4 = A, 3 = B, 2 = C, 1 = D) was measured by asking participants at Time 1, "What grade are you going to shoot for in this class?" Group size affects work coordination and distribution (Gladstein, 1984; McGrath, 1984) and may be related to satisfaction (Campion et al., 1993), and therefore was controlled. Group size was collected from course instructors.

Analytic Approach

Following Wagner (1995), this study was conceptualized and conducted at the level of the individual, although the context of the theoretical predictions is the work group. Research on teams and groups has been hampered by ambiguities regarding levels of analysis (Gully, Devine, & Whitney, 1995) and several researchers note the importance of explicitly stating the level of analysis for each construct of interest in the study (Ostroff, 1993; Roberts, Hulin, & Rousseau, 1978). Generalizing from the level of the individual to the group level is not always appropriate (James, 1982; Roberts et al., 1978; Yammarino & Markham, 1992) and it is not our purpose to do so in this study. All variables are conceptualized and operationalized at the level of the individual. Reward interdependence, although a characteristic of the group, is also a characteristic of the performance portfolio of each individual in this context (the weight of team performance in the calculation of the individual's total grade), and can be considered an individual level variable.

Hypotheses were tested using hierarchical multiple regressions (Cohen & Cohen, 1983). Control variables were entered the first step, the independent variables of interest (task interdependence, reward interdependence, and preference for group work) in step 2, the set of two-way interactions in step 3, and the three-way interaction in the final step. Changes in explained variance and standardized regression coefficients (β's) were examined at each step.

Results

The means, standard deviations, and correlations among variables are presented in Table 1. Internal consistency reliabilities are reported in the main diagonal where appropriate. Tables 2 (group-member satisfaction) and 3 (group-member performance) report the regression results. Analysis sample sizes for the regressions were 432 (group-member satisfaction) and 328 (group-member performance).

The main effect hypotheses for group-member satisfaction (Table 2) were supported (*Hypotheses 1a, 2a,* and *3a*), but the predicted interactions were not significant. Thus, the column labeled Model 2 is the appropriate column for interpretation. Task interdependence significantly predicted satisfaction (β = .128, $p < .01$), as did reward interdependence (β = .118, $p < .05$), and preference for group work (β = .151, $p < .01$). Contrary to expectations, no support was found for congruence predictions with respect to group-member satisfaction (*Hypotheses 4a, 5a*, and *6a*).

The results were quite different in the group-member performance equations (Table 3).[2] Since the block of two-way interactions, but not the three-way interaction, contributed significant incremental variance to R-square, the column labeled Model 3 is appropriate for interpretation. Reward interdependence was a strong predictor of group-member performance ($\beta = .302$, $p < .01$) supporting *Hypothesis 2b*, but *Hypothesis 1b* (task interdependence; $\beta = -.026$, n.s.) and *Hypothesis 3b* (preference for group work; $\beta = .023$, n.s.) were not supported. As a block, the two-way interactions explained an additional 3.2 percent of the variance in group-member performance. The task interdependence $\times$ preference for group work interaction (*Hypothesis 5b*) was a strong predictor ($\beta = .142$, $p < .01$). No support was found for the other two-way interactions (*Hypotheses 4b* and *6b*) or the three-way interaction (*Hypothesis 7b*) in predicting performance.

The significant task interdependence by preference for group work interaction was plotted using standardized regression coefficients and values of plus and minus one standard deviation (-1 and $+1$) (Cohen & Cohen, 1983). The interaction is depicted in Figure 1. The depiction shows that the form of the interaction conforms to the form predicted by supplies-values fit. The highest levels of group-member performance were found at the high task interdependence—high preference for group work point, and the low task interdependence—low preference for group work point. Lower performance levels correspond to the incongruence plot points, with the lowest performance corresponding to high task interdependence—low preference for group work.

Discussion

This study explored direct relationships between task structure, reward structure, and preference for group work, and interactions among these variables, and the satisfaction of performance of group members. This study (1) contributes and extends the literature which identifies correlates of group-member satisfaction and performance; (2) extends research on structural characteristics of work in groups and individual attitudes, and alignment issues among them, in group settings; and (3) tests these ideas in a simulated work group environment over a four-month period, overcoming some of the limitations associated with many short-term group studies. Each of these potential contributions is discussed briefly below.

The results with respect to group-member satisfaction look much like a "textbook on team building" (Gladstein, 1984: 511). Task interdependence, reward interdependence, and preference for group work were strong independent predictors of individual's satisfaction with the group. These findings lend credence to the ideas that working on tasks closely with others may be a more enjoyable, pleasant, and satisfying experience than working alone; that intertwined rewards may diminish intra-group competition and foster more positive attitudes among group members; and that individual preferences or values are critical determinants of group-related attitudes.

All in all, the results support a universalistic approach to the design of groups for group-member satisfaction, but, interestingly, a hybrid model for the predic-

Table 1. Descriptive statistics and zero-order correlations among study variables[a,b]

	Mean	Std Dev	1	2	3	4	5	6	7	8	9	10	11
Control Variables													
Age	21.90	4.21	n/a										
Gender	.39	.49	.037	n/a									
Class Standing	2.21	.80	.209**	-.127**	n/a								
GPA	2.91	.53	.014	.259**	-.176**	n/a							
Grade Expectation	3.66	.55	.089	.108*	.005	.303**	n/a						
Group Size	4.77	1.07	.049	.033	.145**	-.062	.055	n/a					
Independent Variables													
Task Interdependence	4.40	1.00	.053	.005	.039	-.009	.053	.057	(.70)				
Reward Interdependence	38.21	22.71	.023	-.038	.250**	-.118*	-.052	.407**	.145**	n/a			
Preference for Group Work	4.49	1.17	-.141**	-.120**	-.038	-.263**	-.156**	-.026	.058	.016	(.88)		
Dependent Variables													
Group Satisfaction	5.45	1.54	-.032	-.011	.025	-.109*	-.051	.110*	.154**	.163**	.194**	(.78)	
Group-member Performance	2.57	.51	.078	.111*	.106*	.260**	.089	.090*	.013	.187**	-.062	.130**	n/a

[a]Coefficient α's are reported in the parenthesis in the diagonal where appropriate. Pairwise deletion procedure used to generate the table (N's = 328–432).
[b]Gender (men scored higher), Class Standing (senior scored highest), Grade Expectation ("A" scored highest) Task and Reward Interdependence (high scores reflect high interdependence), Preference for Group Work (high scores indicate high preference for group work).
  *$P < .05$.
  **$P < .01$.

Table 2. Regression Results with Group Satisfaction as the Dependent Variable[a,b]

Block	Model 1 β	(SE)	Model 2 β	(SE)	Model 3 β	(SE)	Model 4 β	(SE)
Control Variables								
Age	−.022	(.077)	−.007	(.076)	−.007	(.076)	−.002	(.076)
Gender	.007	(.078)	.023	(.077)	.014	(.077)	.017	(.077)
Standing	−.014	(.079)	−.031	(.079)	−.032	(.079)	−.031	(.079)
Grade Point Average	−.102*	(.082)	−.060	(.082)	−.059	(.083)	−.057	(.083)
Grade Expectation	−.024	(.079)	−.014	(.077)	−.013	(.078)	−.006	(.078)
Grade Size	.104*	(.076)	.051	(.080)	.049	(.081)	.057	(.081)
Independent Variables								
Task Interdependence			.128**	(.074)	.142**	(.076)	.145**	(.076)
Reward Interdependence			.118*	(.083)	.118*	(.087)	.108*	(.083)
Preference for Group Work			.151**	(.077)	.136**	(.078)	.153**	(.080)
Two-way Interactions								
Task Interdependence × Reward Interdependence					−.084	(.069)	−.100*	(.070)
Task Interdependence × Preference for Group Work					−.022	(.081)	−.020	(.081)
Reward Interdependence × Preference for Group Work					.017	(.077)	.032	(.078)
Three-way Interaction								
Task Interdependence × Reward Interdependence × Preference for Group Work							−.085	(.080)
Total R^2	.024		.079**		.086**		.092**	
ΔR^2 Block	.024		.055**		.007		.006	

[a] $N = 432$. β represents the standardized regression coefficient for each variable in each model. Standard errors are reported in parentheses.
[b] Gender (men scored higher), Class Standing (senior scored highest), Grade Expectation ("A" scored highest), Task and Reward Interdependence (high scores reflect high interdependence), Preference for Group Work (high scores indicate high preference for group work).
*$P < .05$.
**$P < .01$.

tion of individual performance in groups. Consistent with the satisfaction equations, reward interdependence was also strongly related to group-member performance. In fact, when view as a whole, the results of this study reflect a quite positive light on the popular argument that team-based rewards are associated with higher satisfaction levels of group members *and* group-member performance (e.g., Besser, 1995). But among the more interesting contributions of this study was the significant interaction of task interdependence and preference for group work in predicting performance. The alignment of task structure and individual preference for group work has received relatively little attention from researchers, perhaps because it seems self-evident and perhaps because most research in group contexts is aimed at *designing* ways to enhance group effectiveness (Campion et al., 1996). Nevertheless, these results are consistent with the S-V fit framework, which highlights the potential for deleterious outcomes when preferences and work situations are incongruous. Moreover, this finding does not diminish the practical value of design approaches to effectiveness, since preference for group work is a somewhat malleable characteristic which may evolve or be influenced by appropriate designs for specific situations (DeMatteo & Eby, 1997; Eby & Dobbins, 1997; Wageman, 1995; Wagner, 1995).

Moreover, the significant interaction sheds some light on the complex role that preference for group work and gross ability levels play in the context of groups. Although preference for group work was negatively related to GPA ($r = -.263, p < .01$) and grade expectation ($r = -.156, p < .05$), i.e., poorer students may prefer to work in groups, this variable was *not* directly related to performance ($\beta = .023$, n.s., $r = -.062$, n.s.), a measure operationalized as performance evaluations from group members. Moreover, individuals who preferred group work performed as well as their preference for autonomy counterparts when the design of tasks (i.e., low task interdependence) was more consistent with their preference. On the other hand, GPA was strongly and positively related to group-member performance ($\beta = .272, p < .01$), i.e., higher ability level was associated with better performance evaluations from group member. These intriguing findings begged the question of whether or not the significant interaction between preference for group work and task interdependence would appear only if GPA was held constant, i.e., for a given level for ability. As a check, we dropped GPA from the control variable block and reran the group-member performance equations. The interaction results for preference for group work and task interdependence were substantively identical to those reported. The effects, then, appear to be additive. Higher ability individuals (i.e., those with high GPAs) performed better in their groups than their low-GPA counterparts, but at a given level of ability, a fit between preference for group work and task design yields additional individual performance increments. These results have important implications for managers and organizations. Specifically, organizations often gear their search activities to finding the most qualified and talented individual (e.g., those with high college GPAs, but, according to these data, those who are more likely to prefer autonomous work), but these individuals may often be less attracted to and satisfied in team- or group-based organizations (DeMatteo et al., 1998), and their performance in groups-based

Table 3. Regression Results with Group-member Performance as the Dependent Variable[a,b]

Block	Model 1 β	(SE)	Model 2 β	(SE)	Model 3 β	(SE)	Model 4 β	(SE)
Control Variables								
Age	.045	(.054)	.047	(.054)	.047	(.053)	.049	(.053)
Gender	.090	(.056)	.089	(.055)	.099	(.055)	.101	(.055)
Standing	.194**	(.055)	.117*	(.058)	.114*	(.057)	.115*	(.057)
Grade Point Average	.255**	(.059)	.280**	(.059)	.272**	(.059)	.273**	(.059)
Grade Expectation	-.042	(.056)	-.020	(.056)	-.031	(.055)	-.027	(.055)
Group Size	.018	(.054)	-.086	(.060)	-.115	(.060)	-.112	(.060)
Independent Variables								
Task Interdependence			-.021	(.054)	-.026	(.054)	-.025	(.054)
Reward Interdependence			.246**	(.065)	.302**	(.067)	.298**	(.067)
Preference for Group Work			.023	(.054)	.023	(.055)	.030	(.056)
Two-way interactions								
Task Interdependence × Reward Interdependence					.042	(.053)	.049	(.054)
Task Interdependence × Preference for Group Work					.142**	(.053)	.142**	(.053)
Reward Interdependence × Preference for Group Work					-.104	(.055)	-.105	(.055)
Three-way Interaction								
Task Interdependence × Reward Interdependence × Preference for Group Work							-.039	(.054)
Total R^2	.106**		.145**		.177**		.179**	
ΔR^2 Block	.106**		.039**		.032**		.001	

[a] $N = 328$. β represents the standardized regression coefficient for each variable in each model. Standard errors are reported in parentheses.

[b] Gender (men scored higher), Class Standing (senior scored highest), Grade Expectation ("A" scored highest), Task and Reward Interdependence (high scores reflect high interdependence), Preference for Group Work (high scores indicate high preference for group work).
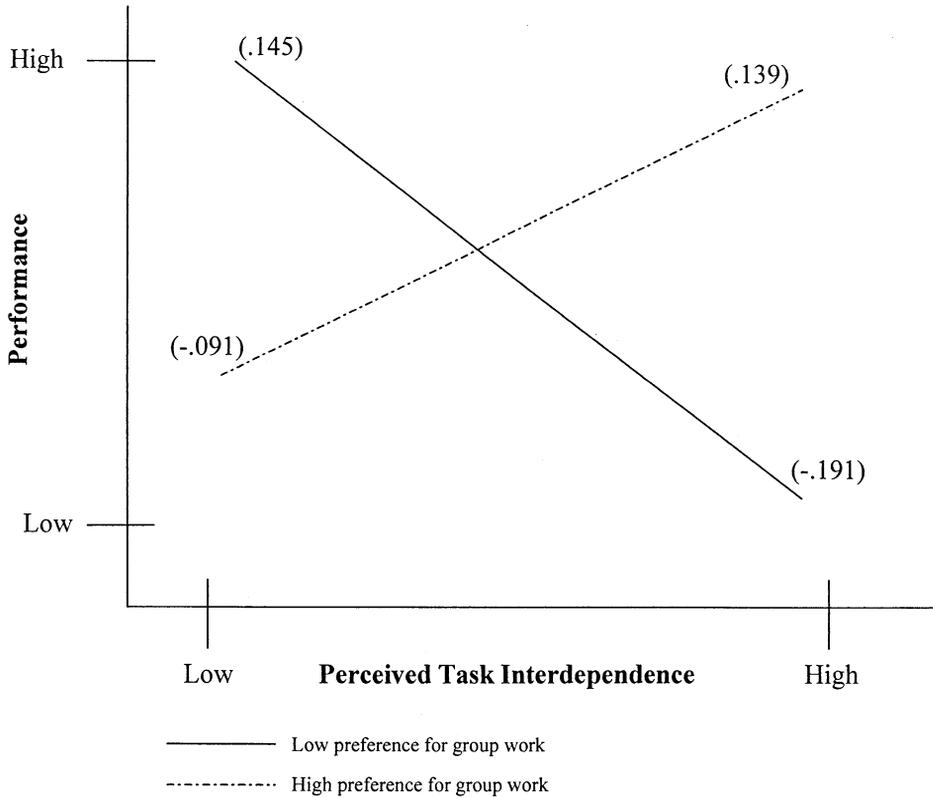
Figure 1.   Interaction of Perceived Task Interdependence and Preference for Group
Work Predicting Performance

organizations may not be superior in all instances to less or equally talented
and qualified counterparts who prefer group-style work. These findings not
only correspond to S-V fit, but all lend credence to recently developed
perspectives regarding job search behavior and organizational attraction like
attraction-selection-attrition framework developed by Schneider (1987). More
important, they highlight the importance of using multiple criteria for match-
ing individuals and jobs.

   In the general organizational literature, satisfaction and performance are
often unrelated or, at best, weakly correlated constructs. These findings are often
explained by efficiency or trade-off arguments (e.g., satisfying work is less
efficient or productive). But writings in the team and group literature often assume
that the satisfaction and performance of group members have parallel determi-
nants in group settings and that they may be positively related. In this study,
group-member satisfaction and performance were weakly correlated ($r = .13, p <$
.05). Moreover, the pattern of results was divergent for the two outcomes, main

effects of interdependence and preference for group work predicted satisfaction, but a hybrid approach predicted performance. When taken in the light of other recent empirical work, these findings point to a complex picture of group dynamics and a tentative direction for future theory on the functioning of groups. That is, all else equal, the satisfaction of group members may be facilitated by designing tasks and rewards that are interdependent and by selecting individuals who prefer group work. Conversely, a more complex fit model may be needed to facilitate individual performance in groups. Although some researchers have noted that making a direct theoretical connection between reward interdependence and group-member performance requires an "inferential leap" (Milkovich & Wigdor, 1991: 86) this study does contribute to a growing body of literature which demonstrates a positive relationship between reward interdependence and performance. But an alignment of task interdependence with group-member preferences for interdependent work may also be a key to promoting individual performance in groups.

This study has several limitations. College students served as the participants in the study, a subject of much debate. The participants did operate in intact groups, in a simulated work environment, over a four-month period, and on multiple tasks and assignments. But the groups were simulated works groups and the nature of, and reactions to, the tasks (group projects and cases) and rewards (grades) may be somewhat different in real work contexts. The use of three separate self-report evaluations and separate sources for reward interdependence, group size, and group-member performance contributes to our confidence in the results. These factors not only reduce common method variance, but may also reduce fatigue and improve self-report data quality by reducing the length of single-administration questionnaires (Ganster, Fusilier, & Mayes, 1986). DeMatteo et al. (1998), pointing to a need for longitudinal research in this area, noted that much of our knowledge of the dynamics of interdependence (task and reward) in groups is limited by a heavy reliance on laboratory studies which employ short-term, single-assignment designs. The design of this study overcomes many of these weaknesses and provides a more realistic view of groups in the workplace. These factors would seem to support a cautious generalization of the results of this study to other settings, but clearly replications and extensions are needed. Finally, although the study was longitudinal, the design did not allow for the examination of causal relationships and should be interpreted accordingly. Thus, although our theoretical reasoning may imply specific causal directions, we are precluded from ruling out alternative causal mechanisms among the variables.

To summarize, this study investigated the main and multiplicative relationships between task interdependence, reward interdependence, and preference for group work, on the one hand, and the satisfaction and performance of group members on the other. The results help balance the group literature by simultaneously examining different dimensions of group effectiveness and by examining the relative effects of design characteristics and individual preferences in a group context.

Appendix
Factor Analysis of Preference for Group Work and other Individualism-Collectivism Items[1]

Items	Factors				
	1	*2*	*3*	*4*	*5*
1. When I have a choice, I try to work in a group instead of by myself	**.832**	−.077	.127	−.024	−.089
2. I prefer to work on a team rather than individual tasks	**.817**	−.054	.297	.072	−.051
3. Working in a group is better than working alone	**.787**	.139	.150	.064	−.081
4. Given the choice, I would rather do a job where I can work alone rather than do a job where I have to work with others in a group (R)	**.735**	−.049	.201	.097	.103
5. I prefer to do my own work and let others do theirs (R)	**.706**	.038	−.048	.025	.257
6. I like to interact with others when working on projects	**.621**	.056	.337	.385	−.025
7. I personally enjoy working with others	**.599**	.021	.392	.391	.038
8. I like situations in which there is a winner (R)	.124	**.767**	−.065	.163	.035
9. The most important thing is to win (R)	.070	**.758**	.025	−.122	−.183
10. I like competitive situations (R)	.088	**.737**	.059	.317	.085
11. I get upset when other people win (R)	.015	**.665**	−.037	−.095	−.019
12. I tend to work harder when I am competing against other people (R)	.034	**.634**	.058	.202	−.018
13. In order to get ahead, it is important to be viewed as a winner (R)	−.078	**.592**	.377	−.214	−.124
14. Teams can more thoroughly evaluate options than any one individual can	.179	.014	**.752**	.054	.099
15. Working in teams stimulates innovation	.253	.038	**.691**	.246	−.018
16. I believe teamwork can produce better results than individual efforts	.435	.073	**.679**	.059	−.062
17. I always voice my opinions when working on a team	.080	−.087	.074	**.775**	−.031
18. I always encourage my team members to give me feedback on my ideas	.156	−.023	.453	**.506**	−.126
19. I tend to be more creative when there are people around to stimulate my thoughts	.293	.170	.310	**.376**	−.121
20. Only those who depend on themselves get ahead in life (R)	.140	−.060	.011	−.017	**.789**
21. One should live one's life independent of others as much as possible (R)	−.011	.049	.037	.060	**.763**
22. Individuals are responsible for the successes and failures of work groups (R)	.026	−.114	−.065	−.198	**.376**
Eigenvalue	**5.94**	2.63	1.72	1.33	1.08
Percent Variance Explained	**27.0**	11.9	7.80	6.00	4.90

[1] Principal components analysis with varimax rotation. Items denoted by (R) were reverse coded to preserve consistent directionality, with high values indicating high preference for group work and collectivism.

Notes

1. The results were nearly identical in pattern when the untransformed performance variable was used. The total R-square for the model was .159 using untransformed performance, versus .179 for the model using the arcsine transformation of performance.
2. It was necessary to assess the validity of the peer ratings of performance measure. In the Time 2 (mid-term) data collection, several self-report measures of individual effort and performance were included. We correlated the group-member performance measure used in this study with the Time 2 self-report measures to assess convergent validity with self-report performance. Peer ratings of group-member performance correlated .26 ($p < .01$) with "I make a unique contribution to how successful my team is," $-.22$ ($p < .01$) with "I sometimes slack off on projects because my team members will cover for me," .22 ($p < .01$) with "How I perform is important to my team," .25 ($p < .01$) with "I am the best performer on my team," and .29 ($p < .01$) with "I consider myself to be the top performer in this team." Moreover, the group-member performance variable was positively associated with grade point average (.26, $p < .01$). These findings provide consistent evidence of the validity of the operationalization of individual performance in the group.

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