Understanding the Effects of Freeriding in Team Dynamics

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ABSTRACT

Social and business researchers have long recognized freeriding as a main obstacle to team success. Previous research focuses much on the causes of freeriding and the design of reward/sanction systems to counteract freeriding. The impacts of freeriding on team progress are however less understood. A longitudinal study is designed to investigate the dynamic effects of freeriding in student work teams. The results suggest that during team progress, freeriding not only has a strong detrimental effect on the current team performance, it also affects the team's future performance by influence the development of team morale. Implications for both research and team practices are discussed.

Keywords

Freeriding, team morale, team efforts, team performance.

INTRODUCTION

Modern organizations have widely adopted the team approach as a way of accomplishing tasks which surpass the capabilities of single individuals (Glassop, 2002). In addition to issues of time and resource coordination, teams are often created with the expectation that they will enable organizations to "better utilize expertise, minimize the impact of increasing workload on one individual, and maximize the use of increasingly more sophisticated technology" (Smith-Jentsch et a., 2001; p. 179). Team members engage in collective actions and restrict individual activities for the common interests of their teams. The overall success of a team is largely determined by the coordinated group efforts (He et al., 2007), to which any deviation could lead to process loss and poor team performance (Hurley and Allen, 2007).

Of the undesirable team behaviors, freeriding has been argued as a main obstacle for teams to achieve quality performance (Olson, 1965). Freeriding, also labeled as social traps (Platt, 1973), commons problem (Edney, 1980), commons dilemma (Dawes et al., 1977), assurance problem (Runge, 1984), social loafing (Orbell and Dawes, 1981; Karau and Williams, 1993), and moral hazard in teams (Anesi, 2009), refers to an undesired behavior that a member of a group obtains benefits from group membership but does not bear a proportional share of the costs of providing the benefits (Albanese and Van Fleet, 1985). Freeriding deteriorates team productivity by tempting team members to be free-riders and shirk in collective actions (He, 2012).

Given its importance to team success, freeriding has long received attention among social and business researchers. The causes of freeriding have been comparatively well studied under the theoretical umbrella of public goods (e.g., Olson, 1965; Orbell and Dawes, 1981; Stroebe and Frey, 1982; Runge, 1984; Albanese and Van Fleet, 1985). However, the cognitive, psychological, and social influences that freeriding exerts in the process of team interactions have rarely been examined (He, 2012).

In the literature, the detrimental effects of freeriding have been oversimplified as the result of reduced group efforts caused by less-than-expected inputs from few individuals. This is most obvious in econometrics-based research that employs mathematic modeling to examine reward/sanction systems under which freeriding behaviors can be discouraged (e.g., van Dijk et al., 2001; Price, 2006; Anesi, 2009), and experimental studies that investigate conditions under which team outputs such as generated ideas can be maximized in quantity (Chidambaram and Tung, 2005; Alnuaimi et al., 2010). These studies enrich our understanding of the development of freeriding. But to fully understand the impacts of freeriding on team progress, more behavioral research needs to be conducted in the context of dynamic team process.

To serve this end, this study attempts to investigate the effects of freeriding in the dynamics of work teams. The remainder of the paper is organized as follows. First, the causes of freeriding are briefly reviewed, followed by a discussion of the impacts of freeriding on team attitudes and behaviors. Next, a longitudinal research strategy is designed with the use of student software development teams as the research subject. After empirical testing of the research model, results and implications of the study are discussed.

THEORETICAL FOUNDATIONS AND HYPOTHESES

Freeriding

The notion of freeriding can be backdated to the early seminal work of Olson (1965). Of the large literature on inefficiencies in collective actions, all studies point the free-rider problem as a main obstacle to achieving the desired outcomes (Anesi, 2009). The cause of freeriding is rather intuitive. Price (2006) summarized the cause as below:

> "If each member receives an equal share of the benefit that the group produces, no matter how much that member contributed to the production effort, then each member has a private incentive to contribute less than co-members. This incentive to freeride exists because if all members benefit equally, then the members who contributed the least to production will reap the highest net benefits (p. 20)."

There are two assumptions about human nature underlying the above analysis: (1) people are egoistic so that personal interests always surpass collective benefits of others; and (2) people are rational so that they tend to perform activities whose perceived benefits outweigh perceived costs. The assumptions are in line with the transaction cost theory, which presumes that economic actors behave with bounded rationality and self-interest (Simon, 1976; Williamson, 1981), and some are either opportunistic or untrustworthy (Williamson, 1985). A central premise of transaction cost theory is that "employees will have strong incentives to shirk (from work) and no incentive to improve performance unless task conditions allow employees to demonstrate discrete performance contributions and to obtain the rewards that accrue from increased performance" (Jones, 1984; p. 685). As such, people tend to act selfishly and shirk from assigned tasks if their behavior cannot be monitored and evaluated in a team environment.

An individual's behavior in collective actions is driven not only by rational calculation of material incentives, but also immaterial motivations such as normative conformity (socially accepted standards of conduct about principled behavior) and affective bond (emotional attachments to certain people and organizations) (Knoke, 1988; Kidwell and Bennett, 1993). Thus, the study of freeriding cannot ignore the importance of social influence on shaping one's behavior in work teams.

Social Influence and Team Behaviors

In cohesive social networks such as work teams, team members need to behave in a coordinated fashion so that the whole team performs as a harmonious whole toward common goals (Mathieu et al., 2000). Team members' perceptions of and attitudes about their assignments are largely determined by social influence from peers (Salancik and Pfeffer, 1978; Latane, 1981; Meyer, 1994; Meyer and Herscovitch, 2001). Thus, a team's collective attitudes about team tasks will affect individuals' attitudes of team assignments and motivate their behaviors of participating in team actions. The more positive the collective attitudes are about the tasks, more likely will team members perform cooperative behaviors and increase personal efforts on team tasks, and meanwhile, less likely will team members shirk in team activities and be free-riders.

In the literature, the concept of team morale has been used to refer to the collective attitudes and shared commitments among members with regard to their team tasks (Lindsay et al., 1991; He, 2012). Work teams with high team morale present a strong sense of shared significance of team tasks and a commitment to peak performance, and exert persistent social influence on members as their teammates commonly expect collaborative behaviors guided by team interests. In contrast, members of teams with low team morale observe weak social influence and feel limited constraints on their private behaviors. "Project team members with a weak commitment to the project scope and schedule can always find other worthwhile activities to work on" (Kappelman et al., 2006; p. 34).

In summary, team morale encourages collective efforts on team tasks and circumvents the tendency of freeriding in teams. The relationships hold throughout the lifecycle of a work team. The following hypotheses are developed:

H1: Team morale has a positive effect on the collective efforts in a team: the higher the team morale, more efforts will team members spend on team tasks.

H1a: The positive effect of team morale on team efforts holds for the early stage of team progress.

H1b: The positive effect of team morale on team efforts holds for the late stage of team progress.

H2: Team morale has a negative effect on the scale of freeriding in a team: the higher the team morale, less manifest is the freeriding behavior in the team.

H2a: the negative effect of team morale on freeriding holds for the early stage of team progress.

H2b: the negative effect of team morale on freeriding holds for the late stage of team progress.

Team members are expected to commit significant efforts on team tasks. The overall success of a team is largely determined by the coordinated efforts contributed by team members (Mathieu et al., 2000; He et al., 2007). But the quantity of team outputs alone does not necessarily indicate the quality of teamwork (Chidambaram and Tung, 2005). Freeriding as an undesirable team behavior reduces the collective efforts of team members due to less-than-expected inputs from few individuals. In addition, the presence of freeriding slows the development of team cognition (He, 2012), threatens the effectiveness of coordinated efforts in the team, and ultimately leads to process loss and poor team performance (Hurley and Allen, 2007; He, 2012). The different effects of team efforts and freeriding on team performance hold throughout the lifecycle of a team.

H3: The collective efforts of a team have a positive effect on the performance of the team.

H3a: The positive effect of team efforts on team performance holds for the early stage of team progress.

H3b: The positive effect of team efforts on team performance holds for the late stage of team progress.

H4: The scale of freeriding of a team has a negative effect on the performance of the team.

H4a: the negative effect of freeriding on team performance holds for the early stage of team progress.

H4b: the negative effect of freeriding on team performance holds for the late stage of team progress.

The Influence of Team Behaviors on Team Morale

Researchers have long recognized the reciprocal relationship between individual attitudes and behaviors shaped by time or experience. Behavioral research has concluded that experience affects strongly a person's current and future intentions and behaviors (Ajzen, 1987). Attitudes are a product of past experience and exert a causal influence on behaviors (McGuire, 1969); the resulted behavioral experiences, if they are mindful and reflect the person's willingness, define and change attitudes, and direct the performance of future behaviors (Bem, 1972). The attitude-behavior relationship can therefore be viewed as an interactive system in which the attitudes and behaviors exert a reciprocal influence on one another (Schuman and Johnson, 1976, Kleinke, 1984).

The same arguments can be extended to people's attitudes and behaviors in team experiences. In team settings, team members need to cooperate with fellow teammates to achieve overall team success (Kraut and Streeter, 1995). When carrying out team tasks, team members interact with one another, adapt their behaviors to the expectations of others, and approach work accordingly to achieve team goals. In doing so, people develop and adjust attitudes toward tasks based on past team experience (Hurley and Allen, 2007); such attitudes direct their behaviors in the execution of team tasks. As such, the observation of current team efforts and freeriding as distinct team experiences is expected to affect the development of team morale in a late stage.

H5: Team efforts in the early stage of team progress have a positive effect on team morale in the late stage of team progress.

H6: The scale of freeriding in the early stage of team progress has a negative effect on team morale in the late stage of team progress.

Inertia in Team Progress

Organizational researchers have long observed that people are reluctant to change their behaviors in organizational contexts. People's propensity of remaining with the *status quo* and resisting to changes in strategy and behavioral patterns is often referred to as inertia (Huff and Clark, 1978; Huff et al., 1992). The presence of inertia suggests that team members tend to resist changes to current team progress. Absent other forces, team behavior will remain the same pattern throughout the team lifecycle. As such, team morale, team behaviors and team performance of the current stage are likely the intimate derivatives of the previous stage. The following hypotheses are developed.

H7: Team morale in an early stage of team progress strongly affects team morale in a late stage of team progress.

H8: Team efforts in an early stage of team progress strongly affect team efforts in a late stage of team progress.

H9: Freeriding in an early stage of team progress strongly affects freeriding in a late stage of team progress.

H10: The Performance of a team in an early stage of team progress strongly affects the team's performance in a late stage of team progress.

For a robust test of the hypothesized effects, team size and team task knowledge are added as control variables that may affect team performance. The research model is summarized in Figure 1.

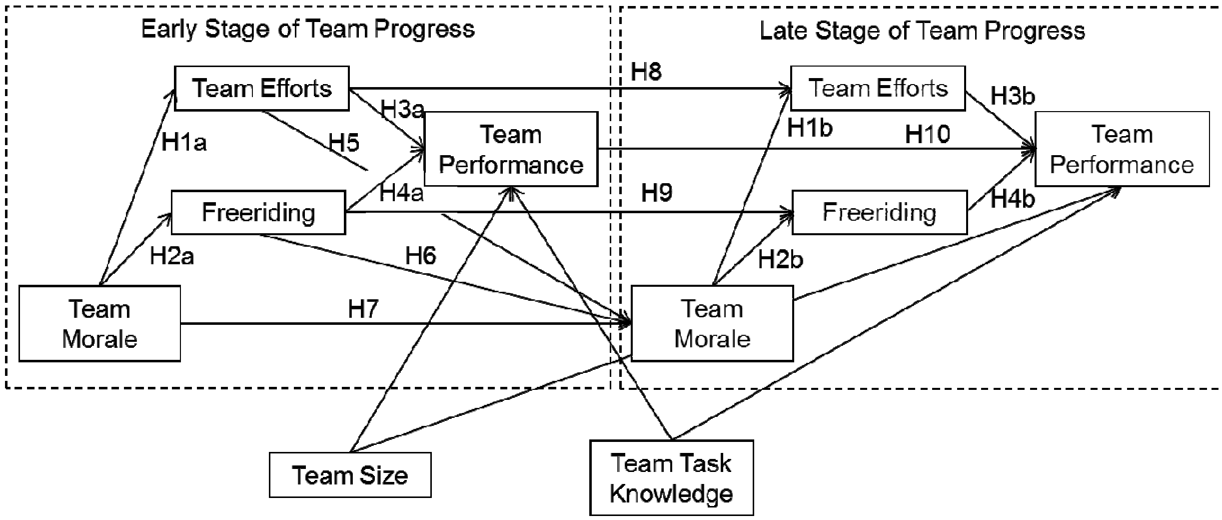


Figure 1. Research Model

RESEARCH DESIGN

To study the effects of freeriding during team progress, a longitudinal experimental study was designed, and student software development teams were selected as the research subject. The research strategy was designed for the practical advantage of sampling convenience. In addition, the expected homogeneity among student backgrounds would lower the risk of unexpected confounding effects caused by diversity among ages, experiences, organizational culture, management levels etc., and focus the test on the relationships of interest.

The team task employed in this study was the development of a relational database system using Microsoft Access. Except for team formation and task deadline, participants were free to set their own schedules and procedures to carry out their tasks, simulating a self-managed software development process in a realistic manner.

Participants

278 undergraduates enrolled in an information systems course formed teams to fulfill a course requirement of collaboratively developing a relational database system over a 5-week period. When the project was assigned, students were instructed to form three-member teams and were allowed to make their own teammate selections. Some students selected acquaintances as teammates, while others chose students who happened to be seated nearby. Eighty-four teams were formed: 10 teams with two members, 38 teams with three members, and 36 teams with four members.

Data Collection

Two surveys were distributed at the beginning and the end of the software development process. Although encouraged by the course instructor, taking the survey was voluntary, and no incentives were provided. Students were told that the survey responses would not influence their grades in any way.

Some students failed to answer one or both surveys on time, and some submitted incomplete answers. This resulted in 414 individual data, or a 74% effective response rate. Individual data were averaged to form team-level data. To assure high levels of team representation, member participation rate was calculated for each team. 20 team data were dropped from the sample because of less than 50% member participation at one of the two survey measurements. This resulted in 64 effective team-level data points for further analysis.

Measurement

In the study, team morale, team efforts, freeriding, team performance, team size, and team knowledge were measured to test the research model. Team size was assessed by the number of team members in each team as an objective measure; other constructs were measured with instruments from the literature as described below.

Freeriding: The construct of freeriding were measured with an instrument developed in He (2009). The instrument was designed with two-step questions to capture the lowest levels of participation in teams. Students were first asked to identify a teammate who had contributed the least in their teams. Then, they were asked by nine behaviorally-anchored questions to assess the participation level of the teammate on key project activities. The activities include both teamwork (e.g., participating in team meetings and communicating with other team members) and task execution (e.g., contributing ideas and working on assignments).

Team Morale: the instrument of team morale was adopted from He (2009). It includes six questions about team members' attitudes (or the perceived importance) of their team assignments.

Team Efforts: The collective efforts of team members, or team efforts, were assessed with the instrument of self-perceived influence in teamwork developed by Robey et al. (1989). The instrument of influence was widely used in IS research for studying members' participative efforts in IS project teams (e.g., Robey et al., 1989; 1993).

Team Performance: Team performance was measured by a five-item instrument adapted from Robey et al. (1993). One question item that asks for a team's adherence to budgets was dropped from the survey questionnaire due to its irrelevance to the research context.

Team Knowledge: The participating teams were asked to develop relational database management systems. Thus, computer knowledge was judged as the relevant knowledge for the task. Thompson and colleagues' (2006) four-item instrument computer self-efficacy was adopted to assess the computing knowledge possessed in each team. The construct of computer self-efficacy has been widely used in IS for assessing one's perceived confidence on computing tasks (Compeau and Higgins, 1995; Compeau et al., 1999; He and Freeman, 2010).

RESULTS

Construct Validity

The test of construct validity was conducted with Partial Least Squares (PLS) – a structural equation modeling (SEM) technique that has been commonly used in IS research. Similar to other SEM techniques (e.g., LISREL), PLS tests the validity of constructs and the structural model at the same time, and is therefore considered methodologically rigorous when compared with regression-based techniques who separate the test of construct validity (e.g., factor analysis) from the test of the research model (Gefen et al., 2000). Two other distinctive features of PLS made the technique a particularly suitable testing tool for this study:

1. The algorism of PLS, which is component-based rather than covariance-based, can easily model formative indicators in a research model (Chin 1998). In this study, the construct of freeriding was modeled as formative indicators based on its conceptulizations and operationalizations (questions asking the performance of a certain set of activities).
2. PLS allows comparatively small sample sizes for robust tests. The sample size of 64 of the current study is acceptable for PLS, but would be insufficient for a reliable test with LISREL.

The design of the instrument of freeriding suggests the measure be modeled as a formative indicator in hypothesis testing. Conventional procedures used to assess the validity of reflective constructs (e.g., factor analysis) may not be appropriate for assessing the validity of formative constructs (Diamantopoulos and Winklhofer, 2001). In this study, a multitrait-multimethod (MTMM) method with special modification for assessing formative constructs (Loch et al., 2003) was used to examine the convergent and discriminant validity of a new measure of freeriding. This method is also practiced in Marakas et al. (2007) for the development of different types of computer self-efficacy.

In this method, a composite score of each formative indicator was calculated based on the sum of products between its formative items and their associated weights. The weight represents the extent to which an item contributes to the overall value of a latent variable. A correlation matrix is then calculated between items of formative constructs and all constructs under study. To establish convergent validity, items should correlate high with items measuring the same construct, and low with items measuring other constructs. To establish discriminant validity, items should correlate high with the assigned constructs and low with unassigned ones. Following the guideline, the resulted correlation matrix was examined and all the aforementioned rules were satisfied. Thus, the validity of the formative construct of freeriding was concluded.

Assessing the validity of reflective items follows the conventional practice based on the examination of construct reliability, convergent validity, and discriminant validity. Construct validity can be assessed by composite reliability calculated in PLS (should be larger than 0.70). Convergent validity can be assessed by the average variance extracted (AVE) among measures (should be larger than 0.50). Discriminant validity can be assessed by comparing the square root of AVEs and inter-construct correlations – the former should be larger than the latter to support disciminant validity. Close examination of Table 1 suggested that all the conditions were satisfied. Thus, validity of the reflective indicators under study was concluded.

	Variables	Reliability	1	2	3	4	5	6	7	8	9	10
	1. Team Size	-	**-**									
	2. Team Knowledge	0.87	-0.13	**0.80**								
Time 1	3. Team Morale	0.96	0.11	-0.17	**0.91**							
	4. Freeriding†	-	-0.02	0.15	-0.69	**-**						
	5. Team Efforts	0.94	0.10	-0.09	0.07	0.01	**0.89**					
	6. Team Performance	0.95	0.36	-0.20	0.51	-0.41	0.32	**0.89**				
Time 2	7. Team Morale	0.97	0.23	-0.21	0.69	-0.65	0.12	0.47	**0.92**			
	8. Freeriding†	-	-0.04	0.19	-0.60	0.74	0.09	-0.33	-0.78	**-**		
	9. Team Efforts	0.96	0.34	-0.12	-0.02	0.02	0.37	0.38	0.14	-0.10	**0.93**	
	10. Team Performance	0.96	0.44	-0.14	0.35	-0.25	0.41	0.53	0.52	-0.31	0.76	**0.90**

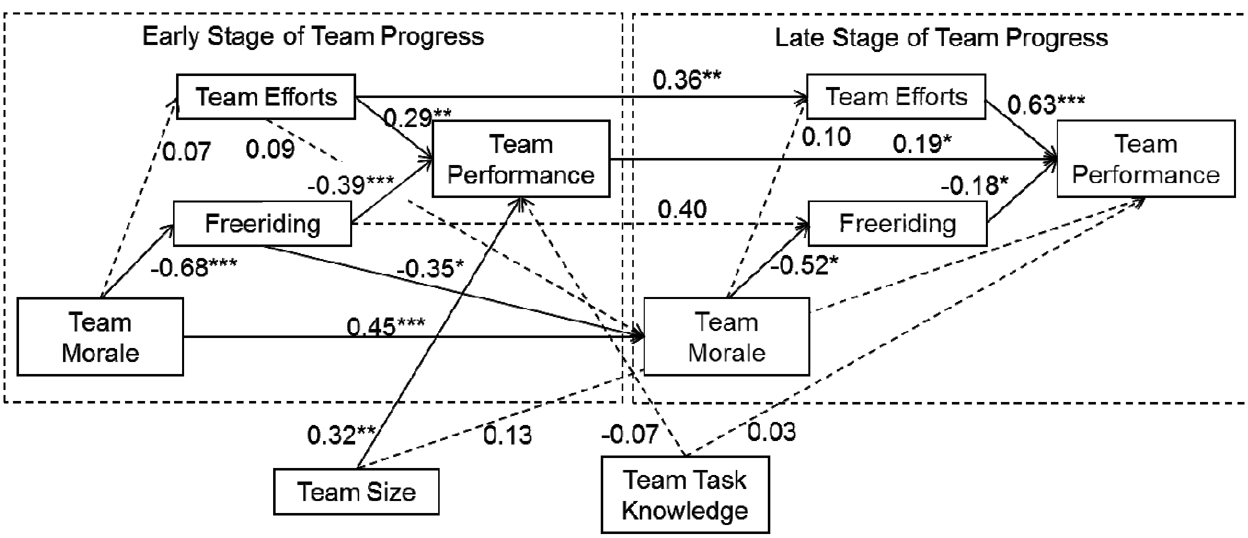
Notes:

1. Time 1: one week after the start of the team project; Time 2: at the end of the team project.
2. Reliability: composite reliability calculated in PLS
3. Numbers in bold on the leading diagonal are the square root of the average variance extracted (AVE) among reflective measures. For discriminant validity of constructs, diagonal elements should be larger than off-diagonal elements.
4. Off diagonal elements are correlations among constructs.
5. † Freeriding is modeled as formative indicators in the study. Calculations of construct reliability and shared variance are not relevant for the construct.

Table 1: Inter-Construct Correlations

Hypothesis Testing

The research model was tested with PLS-Graph 3.0. The resulted path coefficients of hypothesized relationships are reported in Figure 2, in which dashed lines indicate insignificant paths at α=0.05 level.



Note:

1. Dashed lines indicate insignificance with p>0.05 (2-sided).
2. * p<0.05; ** p<0.01; *** p<0.001 (2-sided)

Figure 2. Testing Results

Overall, testing results lent strong support to the proposed research model. Most relationships were concluded with hypothesized directions and statistical significance. In addition, endogenous variables other than Team Efforts were well explained by the model. The explained variances range from 38% for Team Performance of early stage to 69% for Freeriding of late stage. These statistics demonstrate good model fit (Gefen et al 2000). Table 2 summarizes the proposed hypotheses and the test results.

Hypothesized Effect	Testing Results
H1a: Team Morale → Team Efforts (early stage)	Not Supported
H1b: Team Morale → Team Efforts (late stage)	Not Supported
H2a: Team Morale → Freeriding (early stage)	Supported
H2b: Team Morale → Freeriding (late stage)	Supported
H3a: Team Efforts → Team Performance (early stage)	Supported
H3b: Team Efforts → Team Performance (late stage)	Supported
H4a: Freeriding → Team Performance (early stage)	Supported
H4b: Freeriding → Team Performance (late stage)	Supported
H5: Team Efforts (early stage) → Team Morale (late stage)	Not Supported
H6: Freeriding (early stage) → Team Morale (late stage)	Supported
H7: Team Morale (early stage) → Team Morale (late stage)	Supported
H8: Team Efforts (early stage) → Team Efforts (late stage)	Supported
H9: Freeriding (early stage) → Freeriding (late stage)	Not Supported
H10: Team Performance (early stage) → Team Performance (late stage)	Supported

Table 2: Summary of Hypothesis Testing Results

SUMMARY AND DISCUSSION

There is little doubt that freeriding exerts deteriorating effects on collective actions. But the mechanisms through which freeriding affect team behaviors and team performance are not well understood. The current research attempts to investigate the dynamic effects of freeriding on team progress. Dinosaur

The Findings

A longitudinal study was designed, and two surveys were distributed in sampled teams at the beginning and the ending of a complete team process. Testing results demonstrate that in the sampled teams:

(1) Freeriding presents a negative effect on team performance. In addition, freeriding of the early stage strongly affect team morale of the late stage. The findings suggest that during team progress, freeriding not only has a strong detrimental effect on team performance in the current stage, it also affects the team's future performance by influence the development of team morale in the next stage.

(2) Team morale was found to be negatively associated with the scale of freeriding. This result confirms that enhancing team morale can effectively counteract the tendency of freeriding in teams.

(3) The data does not support the hypothesized relationships between team morale and team efforts. Team morale presents little impact on current team efforts, which shows little influence on the development of future team morale. Combining with the strong effects of team morale on freeriding, one can conclude that in the sampled teams, team morale affects team behavior by reducing the tendency of freeriding in the team, not by encouraging more participative efforts from all team members.

(4) Interestingly, freeriding behavior does not present strong inertia as do other team factors. This finding implies that freeriding as an undesirable team behavior is developed rather ad hoc. One may fail to contribute to team actions at a particular time. But the chance for the person to continue shirking in team activities is not necessarily high. In team settings, the social influence from peers may prevent one from adopting freeriding as a regular behavior. This is evidenced by the strong effect of team morale on freeriding concluded from the empirical test.

Although the results are interesting, additional research is needed to test the robustness of the findings in various contexts. In addition, future research of freeriding will benefit from incorporating other social and behavioral factors that are important to team success.

Suggestions to Future Research

Due to the scope of the research, other social and behavioral factors that are relevant to freeriding are not investigated. One of such factors may be an individual's identification with his/her working team. Individuals can identify with multiple actors (organizations, unions, supervisors, committees, siblings), and their behavioral choices are dependent upon the strength of their identification with each of these actors (Brickson, 2000). Stronger one's identification with a team, more committed will the person be towards the team's objectives (Pelled et al., 1999), therefore less likely will the person shirk from collective actions. This will be a promising area for future research on freeriding.

The study does not investigate team leadership, another important factor that may affect freeriding behaviors in project teams. Empirical evidence has repeatedly demonstrated that leadership plays a key role in regulating team behavior and directing task execution toward satisfactory outcomes (Carte et al., 2006; Morgeson et al., 2010). However, little attention of leadership research has been placed on freeriding. A common view of team leadership is that of "… leader as completer … the best a leader can do is to observe which functions are not being performed by a segment of the group and enable this part to accomplish them" (Schutz, 1961; p. 61). The theory of transformational leadership also emphasizes the role of team leaders in shaping members' collective behavior by inspiring commitment and sacrifice for the group (Burns, 1978). Thus, effective team leaders are expected to restrain and eliminate freeriding behaviors among team members, but practical guidelines that managers can follow are rare in the literature (Albanese and Van Fleet, 1985). It must be desirable for future research to investigate the role of team leadership in counteracting freeriding. Such research will enrich our understanding of team leadership and provide strong implications for the practice of project management.

Another interesting area for future research could be the effects of demographics on freeriding. The literature of team diversity suggests that the distribution of demographics such as ethnicity, age, and gender may influence one's behavior in work teams. In a study of team cognition in software development teams, mixed-gender teams were found to develop higher levels of team cognition than that of single-gender teams (He et al., 2007). Distinct behavioral patterns induced by team diversity may exist in the phenomenon of freeriding. However, due to the scope of study, team diversity effects were not investigated. Future research needs to clarify the issue.

Limitations of the Study

Although the results are encouraging, the study has several limitations. One is about the low variance among the sizes of teams being investigated in the study. The sampled teams had two, three, or four members in each team, while in actual projects the use of large teams with dozens members is not rare. It must be desirable to study freeriding in large teams in real business settings.

All the constructs except team size were self-reported by participating students. Thus, common-method bias could be another concern for the study. By aggregating individual responses to form team level measures, this concern may be alleviated in that multiple responses could cancel out each other's errors. To assess the extent of common source variance, the Harman's single factor test was performed by loading all the self-reported items (team size) into an exploratory factor analysis (Podsakoff et. al., 2003). The maximum variance accounted for by one single factor is 17%. Although the method does not explain the exact source of the extracted variance, which may be caused by the use of a common method, the lack of discriminant validity, and/or the existence of causal relationships among the investigated constructs, the limited amount of variance suggests that there is no strong common-source bias present.

As an experimental study, student teams were selected as the research subject. Thus, special caution is needed when applying the findings to teams of other settings. Student teams differ from other teams in many ways. For example, the incentive systems are weak in student teams because of the lack of severe consequence of poor performance; but in real business settings, failing to meet co-workers' expectations is likely to affect the prosperity of one's career. Also, the sampled student teams involve no geographically distributed participants, and team communication relies mainly on face-to-face meetings and emails; while companies are increasingly adopting virtual teams enabled by the development of group communication technologies (Bjørn and Ngwenyama, 2009). Future research is desired to test the generalizability of the findings in various contexts.

REFERENCES

Ajzen, I. (1987) Attitudes, traits, and actions dispositional predictions of behavior in personality and social psychology, in Berkowitz, L. (Ed.), *Advances in Experimental Social Psychology* (Vol. 20), Academic Press, San Diego, CA, 1-64.

Albanese, R., Van Fleet, D.D. (1985) Rational behavior in groups: The freeriding tendency, *The Academy of Management Review*, 10, 2, 244-255.

Alnuaimi, O.A., Robert, L.P., and Maruping, L.M. (2010) Team Size, Dispersion, and Social Loafing in Technology-Supported Teams: A Perspective on the Theory of Moral Disengagement, *Journal of Management Information Systems*, 27, 1, 203-230.

Anesi, V. (2009) Moral hazard and free riding in collective action, *Social Choice and Welfare*, 32, 2, 197-219.

Bandow, D. (2001) Time to create sound teamwork, *The Journal for Quality and Participation*, 24, 2, 41-47.

Bem, D.J. (1972) Self-perception theory, in Berkowitz, L. (Ed.) *Advances in Experimental Social Psychology* (Vol. 6), Academic Press, New York, NY, 1-63.

Bjørn, P., and Ngwenyama, O. Virtual team collaboration: building shared meaning, resolving breakdowns and creating translucence, *Information Systems Journal*, 19, 3, 227-253.

Brickson, S. (2000) The impact of identity orientation individual and organizational outcomes in demographically diverse settings, *The Academy of Management Review*, 25, 1, 82-101.

Burns, J.M. (1978) *Leadership*, Harper and Row, New York: NY.

Carte, T.A., Chidambaram, L., and Becker, A. (2006) Emergent leadership in self-managed virtual teams: A longitudinal study of concentrated and shared leadership behaviors, *Group Decision and Negotiation*, 15, 323–343.

Chidambaram, L., and Tung, L. L. (2005) Is out of sight, out of mind? An empirical study of social loafing in technology-supported groups, *Information Systems Research*, 16, 2 pp. 149-168.

Chin, W.W. (1998) Issues and opinion on structural equation modeling, *MIS Quarterly*, 22, 1, vii-xvi.

Compeau, D.R., and Higgins, C.A. (1995) Computer self-efficacy: Development of a measure and initial test, *MIS Quarterly*, 19, 2, 189–211.

Compeau, D.R., Higgins, C.A. and Huff S. (1999) Social cognitive theory and Individual reactions to computing technology: A longitudinal study, *MIS Quarterly*, 23, 2, 145-158.

Dawes, R.M., McTavish, J., and Shaklee, H. (1977) Behavior, communication, and assumptions about other people's behavior in a commons dilemma situation, *Journal of Personality and Social Psychology*, 5, 1, 1-11.

Diamantopoulos, A., and Winklhofer, H.M. (2001) Index construction with formative indicators: An alternative to scale development, *Journal of Marketing Research*, 38, 2, 269-277.

Edney, J.J. (1980) The commons problem: Alternative perspectives, *American Psychologist*, 35, 2, 131-150.

Gefen, D., Straub, D.W., and Boudreau, M. (2000) Structural equation modeling techniques and regression: Guidelines for research practice, *Communications of the Association for Information Systems*, 4, 7, 1-78.

Glassop, L.I. (2002) The organizational benefits of teams, *Human Relations*, 55, 2, 225-249.

He, J., (2012) Counteracting free-riding with team morale: An experimental study, *Project Management Journal*, forthcoming.

He, J., and Freeman, L. (2010) Understanding the Formation of General Computer Self-Efficacy, *Communications of the Association for Information Systems*, 26, 12, 225-244.

He, J., Butter, B.S., and King, W.R. (2007) Team cognition: Development and evolution in software project teams, *Journal of Management Information Systems*, 24, 2, 6261-292.

Huff, J.O., and Clark, W.A.V. (1978) Cumulative stress and cumulative inertia: A behavioral model of the decision to move, *Environment & Planning,* 10, 1101-1119.

Huff, J.O., Huff, A.S., and Thomas, H. (1992) Strategic renewal and the interaction of cumulative stress and inertia, *Strategic Management Journal*, 13, 55-75.

Hurley, E.A., and Allen, B.A. (2007) Asking the how questions: Quantifying group processes behaviors, *The Journal of General Psychology*, 134, 1, 5-21.

Jones, G.R. (1984) Task visibility, free riding, and shirking: Explaining the effect of structure and technology on employee behavior, *Academy of Management*, 9, 4, 684-695.

Kappelman, L.A., McKeeman. R., and Zhang, L. (2006) Early warning signs of it project failure: The dominant dozen, *Information Systems Management*, 23, 4, 31-36.

Karau, S.J., and Williams, K.D. (1993) Social loafing: A meta-analytic review and theoretical integration, *Journal of Personality and Social Psychology*, 65, 4, 681-706.

Kidwell, R.E. Jr, and Bennett, N. (1993) Employee propensity to withhold effort: A conceptual model to intersect three avenues research, *The Academy of Management Review*, 18, 3, 429-456.

Kleinke, C.L. (1984) Two models for conceptualizing the attitude-behavior relationship, *Human Relations*, 37, 4, 333-350.

Knoke, D. (1988) Incentives in Collective Action Organizations, *American Sociological Review*, 53, 3, 311-329.

Kraut, R.E., and Streeter L.A. (1995) Coordination in software development, *Communications of the ACM*, 38, 3, 69-81.

Latane, B. (1981) The psychology of social impact, *American Psychologist*, 36, 4, 343-356.

Lindsay, W.M., Manning, G.E., and Petrick, J.A. (1991) Mapping work group morale, *The Journal for Quality and Participation*, 14, 2, 100-106.

Loch, K.D., Straub, D.W., and Sherif, K. (2003) Diffusing the internet in the Arab world: The role of social norms and technological culturation, *IEEE Transactions on Engineering Management*, 50, 1, 45-63.

Marakas, G.M., Johnson, R.D., and Clay, P.F. (2007) The evolving nature of the computer self-efficacy construct: An empirical investigation of measurement construction, validity, reliability and stability over time, *Journal of the Association for Information Systems*, 8, 1, 15-46.

Mathieu, J.E., Goodwin, G.F., Heffner, T.S., Salas, E., and Cannon-Bowers, J.A. (2000) The influence of shared mental models on team process and performance, *Journal of Applied Psychology*, 85, 2, 273-283.

McGuire, W.J. (1969) The Nature of Attitudes and Attitude Change, in Lindzey, G., and Aronson, E. (Eds.) *The Handbook of Social Psychology* (2^{nd} ed., Vol. 3), Addison-Wesley, Reading, MA, 134-314.

Meyer, G.W. (1994) Social information processing and social networks: A test of social influence mechanisms, *Human Relations*, 47, 9, 1013-1047.

Meyer, J.P., and Herscovitch, L. (2001) Commitment in the workplace: Toward a general model, *Human Resource Management Review*, 11, 299–326.

Morgeson, F.P., DeRue, D.S., and Karam, E.P. (2011) Leadership in teams: A functional approach to understanding leadership structures and processes, *Journal of Management*, 36, 1, 5-39.

Olson, M. (1965) *The Logic of Collective Action*, Harvard University Press, Cambridge.

Orbell, J., and Dawes, R. Social dilemmas, In Stephenson, G., and Davis, J.H. (Eds.), *Progress In Applied Social Psychology* (Vol. 1). Chichester, England: Wiley, 1981.

Pelled, L.H., Eisenhardt, K.M., and Xin, K.R. (1999) Exploring the black box: An analysis of work group diversity, conflict, and performance, *Administrative Science Quarterly*, 44, 1, 1-28.

Platt, J. (1973) Social traps, *American Psychologist*, 28, 8, 641-651.

Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y., and Podsakoff, N.P. (2003) Common method biases in behavioral research: A critical review of the literature and recommended remedies, *Journal of Applied Psychology*, 88, 5, 879-903.

Price, M.E. (2006) Judgments about cooperators and freeriders on a Shuar work team: An evolutionary psychological perspective, *Organizational Behavior and Human Decision Processes*, 101, 1, 20-35.

Robey, D., Farrow, D.L., and Franz, C.R. (1989) Group process and conflict in systems development, *Management Science*, 35, 10, 1172-1191.

Robey, D., Smith, L.A., and Vijayasarathy, L.R. (1993) Perceptions of conflict and success in information systems development projects, *Journal of Management Information Systems*, 10, 1, 123-139.

Runge, C.F. (1984) Institutions and the free rider: The assurance problem in collective action, *The Journal of Politics*, 46, 1, 154-181.

Salancik, G., and Pfeffer, J. (1978) A social information processing approach to job attitudes and task design, *Administrative Science Quarterly*, 2, 224-253.

Schuman, H., and Johnson, M.P. (1976) Attitudes and behavior, in Inkeles, A., Coleman, J., and Smelser, N. (Eds.), *Annual Review of Sociology* (Vol. 2), Annual Reviews, Palo Alto, CA, 161-207.

Schutz, W.C. (1961) The ego, FIRO theory and the leader as completer, in Petrullo, L. and Bass, B.M. (eds.), *Leadership and Interpersonal Behavior*, Rinehart & Winston, Holt: NY, 48-65.

Simon, H. (1976) *Administrative behavior* (3rd ed.), Free Press, New York: NY.

Smith-Jentsch, K.A., Campbell, G.E., Milanovich, D.M., and Reynolds, A.M. (2001) Measuring Teamwork Mental Models to Support Training Needs Assessment, Development, and Evaluation: Two Empirical Studies, *Journal of Organizational Behavior*, 22, 2, 179-194.

Stroebe, W., and Frey, B.S. (1982) Self-interest and collective action: The economics and psychology of public goods, *British journal of Social Psychology*, 21, 121-137.

Thompson, R., Compeau, D.R., and Higgins, C.A. (2006) Intentions to use information technologies: An integrative model, *Journal of Organizational and End User Computing*, 18, 3, 25-46.

van Dijk, F., Sonnemans, J. van Winden, F. (2001) Incentive systems in a real effort experiment, *European Economic Review*, 45, 187-214.

Williamson, O.E. (1981) The economics of organization: The transaction cost approach*, The American Journal of Sociology*, 87, 3, 548-577.

Williamson, O.E. (1985) *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*, Free Press, New York: NY.

Yamagishi, T. (1986) The provision of a sanctioning system as a public good, *Journal of Personality and Social Psychology*, 51, 110–116.