Project and Organizational Antecedents of Effort Withholding in IT Project Teams

Completed Research Paper

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Abstract

When individuals assigned to Information Technology (IT) projects do not work as hard as they could, effort withholding occurs. Effort withholding is defined as the likelihood that an individual will give less than full effort on a job-related task. While an extensive body of work demonstrates that effort withholding is prevalent in all types of teamwork, little attention has been paid to an IT project context. In this study, we surveyed 473 IT project managers to address two questions: 1) what are key IT project and organizational factors that influence effort withholding, and 2) which project management approaches can suppress it? Our results indicate that the size of the team, the perceived importance of the project, the degree of uncertainty in the project requirements, and the degree of self-interest (organizational ethical climate) all contribute to effort withholding, while internal integration (project coordination) techniques suppress it.

Keywords: Effort withholding, IT project management

Introduction

Recently, an information technology (IT) project manager shared the following story with us:

> *My early experience with my current organization taught me that social loafing can be a common behavior. It can be a pervasive element of the organization's culture. In my case, I had people taking sick leave when they were not sick, arriving to work late, and leaving early without permission, which is required.*
>
> *At first, I decided that I should go with the flow because I thought it would be impossible to change the culture. Not surprisingly, the results were not satisfactory – the project work was getting delayed and team morale was low. So, I decided to change my leadership approach. I worked with each team member individually to help them understand the need for change and the undesirability of their loafing behaviors. It took me a while to do this because I had to establish rapport with each team member. I had to gain their trust first by demonstrating the importance of each role on the team, establishing clear expectations, and helping them learn about "ownership."*
>
> *Now, things are totally different. Social loafing is not a major problem any longer. My team and I worked hard to achieve these results. Things have changed and people are more involved. To me, this is very satisfying.*

As this account illustrates, team members do not always contribute fully while working on an information system (IS) implementation initiative. When such individuals do not work as hard as they could and evade responsibility, effort withholding occurs. Effort withholding is "the likelihood that an individual will give less than full effort on a job-related task" (Kidwell Jr and Bennett 1993).

Recent empirical evidence indicates that effort withholding may be a pervasive phenomenon in IT projects. In a case study of agile IS development, McAvoy and Butler (2009) observed several instances during which team members evaded project work when they thought they could get away with it. In a survey of 428 IT project managers, Mahaney and Lederer (2010) found that system developers engaged in work avoidance by playing computer games, sending jokes, socializing, web surfing, and taking excessive breaks. Similar behaviors were documented in an earlier field study of 12 project managers (Mahaney and Lederer 2003). Withholding was also found in a survey of 162 IT professionals who disclosed that they sometimes held back knowledge that could be useful to their colleagues and to the project (Lin and Huang 2010). While not the same as effort withholding, knowledge withholding is related in the sense that the individual is not fully engaging in supporting the team effort. Finally, in another field study, Hasan and Ali (2007) found that students working on IT projects sometimes exerted less than full effort. In sum, these empirical investigations provide confirmatory evidence to substantiate the presence of effort withholding in IS development environments.

As the above account from the project manager suggests, effort withholding can have significant negative consequences on project outcomes. If the human resources that are assigned to a team do not fully contribute to the project's work, the efficiency of the initiative will suffer. Furthermore, one could argue that the quality of the project deliverables may also be impacted if team members withhold valuable knowledge (Lin and Huang 2010), or elect to do less than a competent job when it comes to system development and testing (McAvoy and Butler 2009). Indeed, an association between effort withholding and the quality of project deliverables was demonstrated recently (Hasan and Ali 2007). While effort withholding behaviors may provide a positive benefit to the shirker (by allowing him/her, for example, to rest and renew his/her efforts), we suspect that such behaviors are not likely to be received positively by colleagues. Such perceptions (about others' loafing) may lead to low morale and other team issues. In all, we suspect that effort withholding will impact negatively both the efficiency and effectiveness of a project.

Given that an extensive body of research demonstrates that effort withholding is prevalent in all types of teamwork, its presence in IS development is hardly surprising. However, we believe that a systematic investigation of this phenomenon is warranted. IT projects tend to be more complex and dynamic

undertakings than many other types of organizational projects (Liu et al. 1999; Snow and Keil 2002). The heightened levels of complexity and uncertainty in IT projects are likely to create conditions that make effort withholding more difficult to detect and thus may intensify its occurrence. Given the expected amplified magnitude of the problem in IT projects (and its significant negative impacts), there is a need to understand the factors that cause it as well as managerial practices that may suppress it. Given the paucity of research on antecedents and management practices that are specific to IT projects, we believe that there is an opportunity to contribute significant new knowledge in this area.

To address the above need, our study aims to address two related research questions: (1) What are key IT project and organizational attributes that influence effort withholding and (2) which project management approaches can suppress it?

We believe that our work contributes to the recently developed literature on work avoidance in IT projects by identifying relevant antecedents that have not been studied previously. Specifically, we found that the size of the project team, the perceived importance of the project, and the degree of uncertainty in requirements are all project-related factors that significantly influence effort withholding. In addition, effort withholding was stronger for team members working in an organizational climate dominated by self-interest. Finally, we found that internal integration (a form of project coordination) reduces effort withholding, allowing us to provide useful guidance to project leaders as they attempt to detect and respond to effort withholding in their initiatives. To the best of our knowledge, no previous study has investigated the potential impact of these specific factors on effort withholding within an IT project context. Given the potential contributions to both the literature and the practice of IT project management, we believe that the focus of our investigation is warranted.

The rest of this article describes our study and its findings. In the next section, we provide a brief summary of the theoretical model that provides the conceptual foundation for our work. This is followed by a review of the limited literature on effort withholding in IT projects, and an explanation of the motivation for the focus of our study on project and organizational level characteristics. Next we provide a discussion of our research hypotheses. The methodology that was used to execute our study is described next. After that, the findings of our study are presented. We conclude the paper by discussing the limitations and contributions of our work.

A Synthesized Motivation Perspective of Effort Withholding in IT Projects

An extensive stream of research has been developed to understand the reasons that lead individuals to contribute less than full effort to their work assignments. Kidwell and Bennett (1993) reviewed the research work in this area and formulated an integrative conceptual model that synthesizes the various perspectives that were utilized to study effort withholding. Our work relies on this model. This section summarizes the original model and updates it by incorporating relevant findings that have been derived from recent work on effort withholding.

Based on their review, Kidwell and Bennett (1993) identified three main motivations that predict an employee's propensity to withhold effort (PWE): (1) rational, (2) normative conformity and (3) affective bonding incentives. The model brings together rational cost-benefit considerations, as well as conformity to norms and employees' desires to attach to co-workers to predict factors influencing an employee's decision to withhold effort. By combining the well-researched concepts of shirking (Alchian and Demsetz 1972), social loafing (Latane et al. 1979), and free riding (Albanese and Van Fleet 1985; Olson 1965), this model incorporates variables that have been studied as potent antecedents to an employee's PWE, both at the individual and organizational levels.

With respect to rational choice, the model presumes that an employee calculates costs and benefits of tangible incentives to maximize individual utility when considering whether to withhold effort. It hypothesizes that an employee adjusts effort levels considering contextual effects of several group and task specific attributes, including group size, task interdependence, perceived task visibility, and perceived loss of additional compensation if caught withholding effort (Kidwell Jr and Bennett 1993).

When considering normative conformity, an individual is motivated to adhere to group standards of principled behavior. A framework of norms for group conduct guide individual action to which members of a group comply (Ullman-Margalit 1977). The perceived presence of strong effort norms and equity in the work group are examples of the contextual factors impacting PWE according to this perspective (Kidwell Jr and Bennett 1993).

From an affective bonding perspective, an individual is motivated to provide effort based on emotional attachments to other individuals and groups. This motivation occurs as part of an identification process in which a member's role is internalized along with specific affective bonds (Knoke 1990). The importance of solidarity for commitment to the organization has been demonstrated in prior studies of sociological groups (Zablocki 1980). "The resulting sense of 'oneness' between person and group strengthens the member's motives for contributing personal resources to the organization" (Knoke 1990: p.42). Turnover rates, demographic homogeneity and perceived altruism in the group are factors that impact PWE according to the affective bonding perspective (Kidwell Jr and Bennett 1993).

Kidwell and Bennett's (1993) PWE model focuses on three types of effort withholding behaviors: shirking, social loafing and free riding. These terms were developed through different research streams, and contain the common element of all describing a situation where an individual withholds effort which performing a task. Kidwell Jr. and Bennett distinguish between them in this way. S*hirking* reflects a person withholding effort for various reasons such as monitoring difficulties, self-interest, and opportunism (Alchian and Demsetz 1972; Jones 1984), stemming from both organizational and group setting attributes. *Social loafing* is posited to occur more frequently as the size of the work group increases, because individuals can hide in a crowd and their performance becomes less identifiable (Williams and Karau 1991), showing a key organizational attribute that will affect effort withholding. Our study focuses on these two aspects of effort withholding, as they are most likely to be impacted by organizational climate, project characteristics and project management approaches. With *free riding*, an individual withholds effort when indivisible public goods are involved (Olson 1965), and the person believes he/she can receive the goods by letting others do the work. We exclude *free riding* from our investigation as we do not focus on projects involving indivisible public goods.

Extensive prior research has been pursued to explore the impacts of various group and organizational climate variables that influence PWE. Social loafing has been shown to increase with group size (Chidambaram and Tung 2005; Ingham et al. 1974; Liden et al. 2004; Weldon and Gargano 1985), when team member feels dispensable (Weldon and Mustari 1988), with low team member intrinsic involvement (George 1992), and if a team member believes a capable partner is loafing (Kerr 1983), although Liden et al (2004) find group member perceptions of perceived coworker loafing was associated with reduced social loafing. Social loafing has been shown to decrease with unique, attractive or difficult tasks (Harkins and Petty 1982; Zaccaro 1984), when a team member feels needed as part of the team (Weldon and Mustari 1988), when facing punishment (Miles and Greenberg 1993), and when individual effort can be identified (Williams et al. 1981). Shirking is reduced when group members are monitored (Alchian and Demsetz 1972) and greater wage premiums exist (Cappelli and Chauvin 1991). Additionally, team members work harder collectively when they expect co-workers to perform poorly on a meaningful task (Williams and Karau 1991).

As the above discussion indicates, individuals pursue work avoidance due to rational, cultural and emotional motivations. Also, it illustrates that prior work has demonstrated empirically that contextual factors (such as work characteristics, organizational features, and control approaches) are likely to influence these motivations and thus lead to a suppression or exaggeration of effort withholding behaviors (social loafing and shirking). In the next section, we provide a brief overview of studies involving effort withholding (or related behaviors) within an IT project context. Following that, we utilize the arguments of the theoretical model and related empirical findings to formulate specific hypotheses for the antecedents that were included in the scope of our study.

Prior Research on Effort Withholding in IT Projects

The research on work avoidance in IT projects is quite limited. In total, we located five studies that have investigated effort withholding or related behaviors empirically. One of these studies focused on the impact of effort withholding on project outcomes (Hasan and Ali 2007); another documented specific effort withholding behaviors in IS development (Mahaney and Lederer 2003); the other three studies focused on antecedents that influence effort withholding or related behaviors (such as knowledge withholding). The findings of these three studies are summarized in Table 1. As Table 1 indicates, our review identified four categories of effort withholding antecedents: (1) attitudes of individual team members, (2) attributes of the project team, (3) characteristics of the project work, and (4) elements of the project management approach that is used to lead the initiative.

Table 1: Antecedents of Effort Withholding or Related Factors in IT Projects

Category	Antecedent	Source
Personal Attitudes	Personal outcome expectations (-)	Lin and Huang (2010)
	Team outcome expectations (-)	Lin and Huang (2010)
	Contribution self-efficacy (ns)	Lin and Huang (2010)
Team Attributes	Team cohesion/trust (-*)	McAvoy and Butler (2009); Lin and Huang (2010)
	Team's distributive justice (-)	Lin and Huang (2010)
	Team's procedural justice (ns)	Lin and Huang (2010)
	Team size (ns)	Lin and Huang (2010)
Project Work	Task visibility (ns)	Lin and Huang (2010)
Project Management	Formal planning (-)	Mahaney and Lederer (2010)
	Team meetings (-)	Mahaney and Lederer (2010)
	Individual performance evaluations (+*)	McAvoy and Butler (2009)
	Structured signoffs (ns)	Mahaney and Lederer (2010)
	Periodic progress reviews (ns)	Mahaney and Lederer (2010)

Note: a positive sign (+) indicates a positive direct impact from the identified factor on effort withholding; a negative sign (-) indicates a negative direct impact; an asterisk (*) indicates an association that was identified based on qualitative data; a "ns" indicates a non-significant direct relationship between the factor and effort withholding.

To keep the scope of our project to a manageable size, we decided to focus our investigation on two categories of antecedents: organizational factors (specifically organizational ethical climate) and project characteristics. We elected to include organizational ethical climate in the scope of our study because it has not been addressed in the prior IT effort withholding studies. The organizational behavior literature suggests that a firm's culture is likely to be a salient antecedent (Kidwell and Valentine 2008), and the IT project management literature suggests that a self-interest climate fosters selective (biased) project reporting (Smith et al., 2009). Given this evidence, we decided to include this organizational factor (ethical climate) in our scope of our study as an attempt to expand the existing knowledge on antecedents of effort withholding in IT projects. Specifically, the organizational climate factor we investigate is the level of "self-interest" in the organization's ethical environment. This factor has been identified in prior research as an influential antecedent in IS project management success (Iacovou et al. 2009).

We included two types of project characteristics in the scope of our study: features of the project itself and specific strategies that are typically employed in order to coordinate and manage an IT project. In all, we included five project characteristics in our study. In terms of project features, we included project importance, requirements uncertainty and team size. With the exception of team size (which is often included as a project characteristic in IT project management research), they were not incorporated in previous effort withholding studies in the IT project context. We note that task visibility (shown in Table 1 as an attribute of project work) is typically not included as a project characteristic within IT research. We included these three factors because work avoidance research indicates that conditions related to team environment dynamism, task significance and team size are likely to impact effort withholding (Kidwell Jr and Bennett 1993). In terms of project coordination/management approaches, we included formal

planning and internal integration (Barki et al. 2001) in our model. These two factors were integrated in our study as earlier work has demonstrated their potential importance in suppressing detrimental team member behaviors (albeit with mixed results) (Mahaney and Lederer 2010).

Given the prevalence and significance of effort withholding in IT projects and the limited research that examines its antecedents, our investigation attempts to identify types of organizational climates and projects that are prone to this behavior. At the same time, we aim to identify project coordination approaches that may remedy the presence of effort withholding. By incorporating both contextual (project and organizational) factors and project coordination approaches in a single investigation, we hope to achieve a holistic treatment of the phenomenon that will reveal the relative importance of each antecedent. To the best of our knowledge, our study represents the first systematic attempt to simultaneously examine contextual factors and managerial approaches in a study of effort withholding in IT projects.

The next section describes our hypotheses and research model.

Antecedents of Effort Withholding in IT Projects

Our research model (see Figure 1) incorporates six antecedents in three domains of project member effort withholding that are potentially relevant to IS team projects specifically. The linkage between each of the six antecedents and effort withholding is discussed next.

Team Size

Team size has been identified as a significant antecedent of PWE (Suleiman and Watson 2008). A rational choice variable in Kidwell and Bennett's (1993) model, team size presumes each project worker adjusts his or her activity to maximize individual utility. Small groups produce higher average effort because in a small group, it is easier to encourage effort and to police individual behavior (Hechter 1987). Thus, as team size increases, each project member perceives that his or her individual efforts are less visible and is more likely to put forth less effort, knowing that penalty is unlikely. Studies have shown that increased group size increases effort withholding (Liden et al. 2004; Valacich et al. 1995), and that small groups have increased individual contributions to a team project (Chidambaram and Tung 2005). We note that Lin and Huang (2010), did not find an influence of team size (in their context of knowledge withholding). In our context, we anticipate this effect will hold true in an IS project setting. Consistent with the above evidence regarding the linkage between *team size* and effort withholding, we propose that

- H_1: Effort withholding will be more pronounced in projects with a larger number of team members.

Requirements Uncertainty

Requirements uncertainty, referring to the uncertainty in eliciting user requirements, is the key type of project uncertainty investigated in this study. Three key dimensions of uncertainty are: *requirements instability,* the extent of changes in user requirements over the course of a project; *requirements diversity,* the extent to which users differ among themselves in their requirements; and *requirements analyzability,* the extent to which the process for converting user needs to a set of requirements specifications can be reduced to mechanical steps or objective procedures (Nidumolu 1996; 1995). IS research has focused on requirements uncertainly as a key research domain focus, reflecting the difficulty in eliciting requirements from users (Browne and Ramesh 2002; Browne and Rogich 2001). Many projects have unclear requirements at the beginning stages, with project team members not having a clear vision of the system that needs to be built. The requirements can also be fluid throughout a project's span, thereby increasing project uncertainty (Zmud 1980).

Jones (1984) argues that the more unstructured or ambiguous the task, the greater the difficulty in assessing individual performance. From a rational choice perspective, more difficulty in monitoring

individual project member performance leads to the likelihood of greater PWE when there is greater task interdependence. Additionally, lack of information about requirements makes it difficult to predict the time and effort that the project will consume and bring about uncertainty about eventual project success (Nidumolu 1995). Therefore, project teams are likely to withhold effort, dispersing responsibility should the project fail and attribute blame for failure elsewhere (Alnuaimi et al. 2010). Although this has not been previously studied in an IS project context, we anticipate that this will hold true. Consistent with the above evidence regarding the linkage between *project uncertainty* and effort withholding, we propose that

- H_2: Effort withholding will be more pronounced in high-uncertainty projects.

Project Importance

Project importance refers to the significance that an organization places on the particular project being undertaken (Iacovou 1999). Because the project is highlighted in the minds of senior management and the organization as a whole, there is greater commitment to the project, with more resources devoted to it. With the project member's decisions based on rational choice, the greater the motivation for the manager to evaluate individual performance, as the project is more important, the lower project member PWE (Kidwell and Robie 2003). The more important the project, the more likely the project manager will engage in active monitoring, making it more difficult for individual project team members to withhold effort undetected. Consistent with the above evidence regarding the linkage between *project importance* and effort withholding, we propose that

- H_3: Work withholding will be less pronounced in important projects.

"Self-interest" Organizational Climates

Victor and Cullen (1988) characterize an organization's ethical climate by its orientation on two different axes: ethical criterion and locus of analysis, or referent. The ethical criterion that is used in organizational decision making can be grouped into three categories: egoism (maximizing self-interest); benevolence (maximizing joint interests); and principle (adherence to principle). The referent is the group viewed as the source for ethical reasoning: individual, local, and cosmopolitan. From this framework, the dimensions of self-interest, company profit, team spirit, rules and code, personal morality, social responsibility and efficiency are those most investigated (Vaicys et al. 1996). In this study, we use self-interest to represent the organizational ethical climate.

To a varying extent, project members make decisions based on selfish interests, attenuated by altruism or fairness expectations (Alfano and Marwell 1980; Marwell and Ames 1981; 1979; 1980). These normative conformity variables, as outlined in Kidwell and Bennett's model (1993), are hypothesized to have a negative effect on PWE.

Strong perceived peer compliance norms reflected in a low "self-interest" organizational climate are likely to decrease PWE in individual project members. Kidwell and Robie (2003) found that low levels of perceived altruism, or organizational citizenship, increased effort withholding among project team members. In a study that focused on military reserve members, Kidwell and Valentine (2008) provide evidence that individual perceptions of positive group context play a key role in the existence of effort withholding, indicating that positive group context might be an important element of ethical climate for mitigating effort withholding. Consistent with the above evidence regarding the linkage between *"self-interest" organizational climates* and effort withholding, we propose that

- H_4: Effort withholding will be more pronounced in projects that exist in "self-interest" organizational ethical climates.

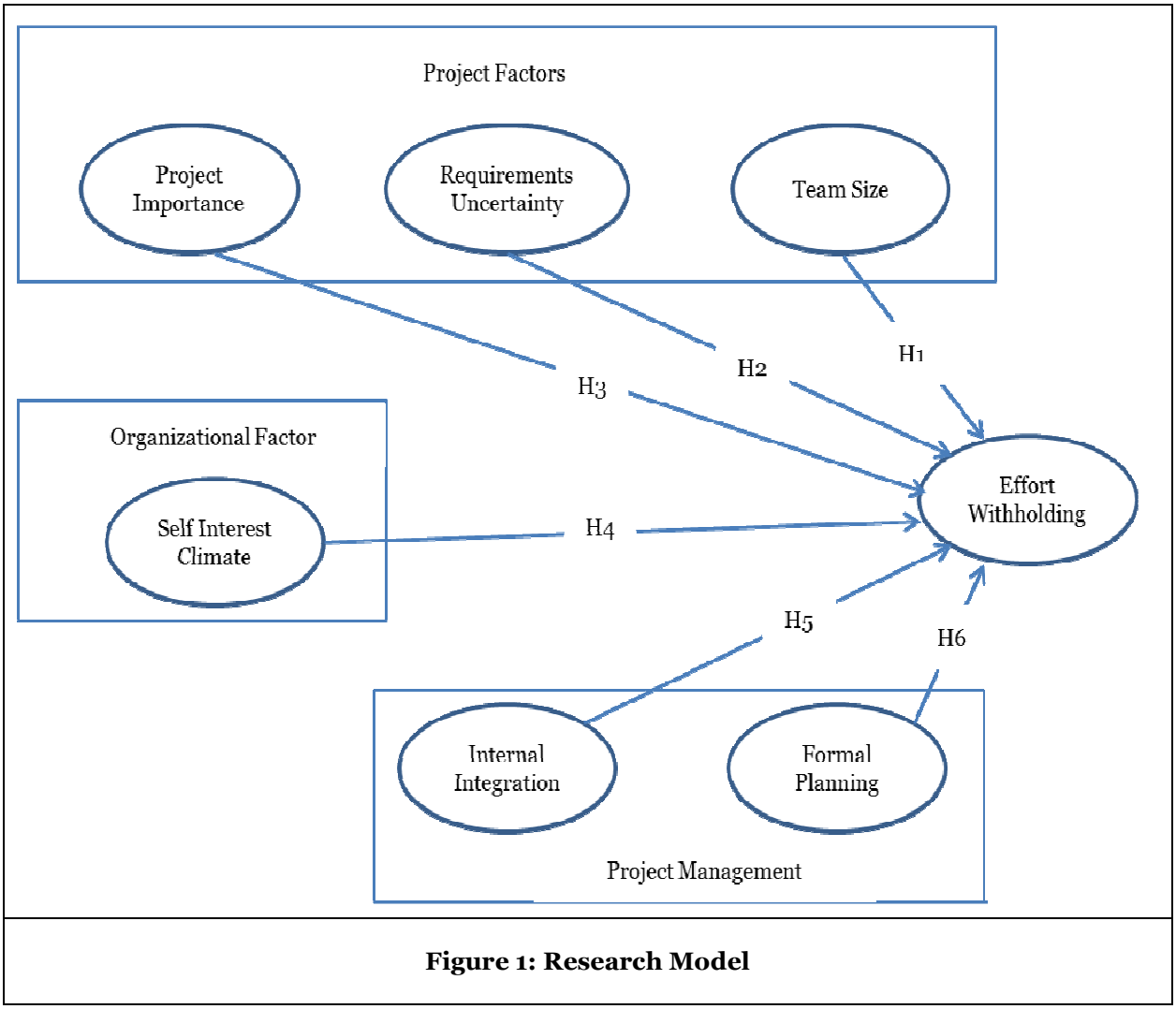

Figure 1: Research Model

Internal Integration

Internal integration is defined as management practices that increase communication and cohesion among team members (MacFarlan 1981), a high information processing capacity approach to IS project management. From the affective bonding perspective of the PWE model, the individual is more motivated to provide effort based on attachments to team members beyond formal task duties (Kidwell Jr and Bennett 1993). Increased group cohesiveness (Karau and Williams 1997; Kidwell and Robie 2003) and perceptions of positive group context (Kidwell and Valentine 2008) have been shown to decrease effort withholding, while Liden et al (2004) show that decreased cohesiveness increases effort withholding in group settings. Weldon and Mustari (1988) show that PWE decreases when a team member feels needed as part of the team. By strengthening internal integration among project members, the group will work together and develop working relationships that will decrease PWE. Consistent with the above evidence regarding the linkage between *internal integration* and effort withholding, we propose that

- H_5: Work withholding will be less pronounced in projects with high internal integration.

Formal Planning

Formal planning is defined as the reliance on plans, schedules, and budgets to ensure the efficient and timely execution of a project, a low information processing capacity approach to IS project management (Alter and Ginzberg 1978; MacFarlan 1981). When a project is more formally structured with a project

plan that is clearly observable and consists of meetings where project member accomplishments are discussed, PWE is likely to be reduced (Mahaney and Lederer 2010). Sonnentag (2001) found no difference among individual team member performance in highly structured project processes.

Consistent with the above arguments regarding the linkage between *formal planning* and effort withholding, we propose that

- H_6: Work withholding will be less pronounced in projects with high formal planning

Research Methods

To assess the validity of the above six hypotheses, we conducted a survey. The sample for the survey was members of the Project Management Institute (PMI) who were located in 10 Eastern states in the USA, and who indicated that they managed IT projects. We believe that IT project managers have the best view of project team dynamics (including effort withholding) and our antecedents. Invitations to participate were sent to 3,000 PMI members, and 52 were returned as undeliverable. A reminder was sent after 10 days, and 599 responses were received (for a gross response rate of 20%). Of these, 126 were removed because of missing or incomplete data, leaving 473 usable responses. Table 2 provides a profile of the respondents.

Table 2: Profile of Respondents

	N	%
Gender		
Male	329	69.6
Female	141	29.8
Not specified	3	0.6
Organizational Affiliation		
Employee of organization completing the project	331	70.0
Employee of a third party (e.g., vendor, consulting firm)	134	28.3
Not specified	8	1.7
Years of Project Management Experience		
< 6	92	19.5
7-9	79	16.7
10-12	107	22.6
13-18	99	20.9
> 18	93	19.7
Not specified	3	0.6

The respondents were asked to consider their most recently completed project when responding to the questionnaire. Table 3 provides an overview of the projects as reported by the respondents.

Table 3: Profile of Projects

	N	%
Project Cost ($)		
Less than 500K	159	33.6
500K - 3M	185	39.1
3M - 8M	53	11.2
More than 8M	56	11.8
Not specified	20	4.2
Maximum Project Team Size (Members)		
Less than 10	151	31.9
10 – 50	252	53.3
50 - 100	39	8.2
More than 100	31	6.6

We employed measures that had been used previously to operationalize the constructs (see the Appendix). The three measures of effort withholding were taken from Oetzel (2001). The measures for requirements uncertainty (three for instability, three for diversity, and four for unanalyzability) were adopted from Nidumolu (1995); note that one item from the original requirements instability scale was removed, as it was not applicable ("requirements will fluctuate quite a bit in the future"). Three measures of project importance were adapted from Iacovou (1999). The measures for internal integration (four) and formal planning (three) were taken from Barki et al. (2001). Team size was measured by the maximum number of project team members, using the categories shown in Table 3. Finally, the two self-interest climate measures were adopted from Cullen et al. (1993).

To test for the possibility of non-response bias, we compared the responses obtained from the first 20% of respondents to those obtained from the last 20% that we received. In doing so, we observed statistically significant differences for only one of the 26 items, which is what we would expect from chance alone. In addition, we observed no discernable differences in terms of the demographic measures for the respondents or the projects. As a result, we conclude that the risk from non-response bias is very small. We also used Harmon's one-factor test for common method bias (CMB), and found no evidence to suggest that CMB should be a problem.

To perform the statistical analysis, we used PLS-Graph (version 3.0, build 1130; Chin 2001). First, we tested the measurement model by examining the reliability and validity of the measurement items. In doing so, we identified one measure of internal integration (II3) that displayed a low item loading (0.48). Although an examination of the measure from a face validity perspective did not reveal any obvious reason for this low loading, we decided to remove it from further analysis. The remaining items displayed adequate loadings (greater than 0.70), with two exceptions. One of the remaining measures of internal integration (II4) and one measure of formal planning (FP2) displayed loadings that were slightly below the common 0.70 cut-off. Given that they were still above 0.60 and the remaining items for each construct were above 0.70, we decided it would be advisable to retain them (Chin 1998).

In addition to examining the loadings of individual items on their respective constructs, we conducted several other tests of the measures. First, we checked the loadings and cross-loading of all measures on all constructs (see Table 4) as one test of discriminant validity. All items exhibited higher loadings on the construct they were intended to measure than on any other constructs, and all of the cross-loadings were lower than item loadings (and lower than 0.60). This provides evidence of adequate discriminant validity.

We tested scale reliability by computing Composite Reliability (CR) scores for all of the measurement scales (Fornell and Larcker 1981). For adequate scale reliability, the composite reliability scores should be greater than 0.70, and ideally greater than 0.80. The composite reliability scores in this study ranged from 0.80 to 0.90 (see Table 5). We also computed Average Variance Extracted (AVE) scores to test for

scale reliability. For adequate reliability, the AVE scores should be greater than 0.50 (indicating that, on average, the indicators share more variance with the construct than with measurement error). As shown in Table 5, the AVE values for this study range from 0.58 to 0.82, providing further evidence of scale reliability.

Table 4: Loadings and Cross-loadings of Measurement Items

Item	EW	SI	II	FP	RI	RD	RU	PI
EW1	.85	.25	-.21	-.06	.25	.26	.20	-.09
EW2	.86	.27	-.21	-.08	.23	.24	.21	-.13
EW3	.89	.26	-.23	-.05	.22	.27	.19	-.10
SI1	.26	.90	-.13	-.05	.08	.11	.09	-.07
SI2	.28	.91	-.14	-.05	.08	.10	.09	-.12
II3	-.23	-.10	.85	.37	-.14	-.15	-.28	.11
II2	-.20	-.13	.80	.30	-.14	-.16	-.20	.12
II4	-.13	-.11	.61	.51	-.12	-.08	-.21	.11
FP1	-.08	-.03	.50	.92	-.11	-.04	-.30	.12
FP2	-.01	-.02	.31	.68	-.01	.12	-.23	.04
FP3	-.05	-.08	.28	.76	-.01	.07	-.22	.08
RI1	.19	.09	-.06	.00	.73	.47	.12	.06
RI2	.19	.02	-.12	-.09	.80	.42	.21	.07
RI3	.27	.10	-.21	-.10	.89	.57	.30	.05
RD1	.20	.06	-.17	-.01	.58	.85	.20	.04
RD2	.27	.10	-.09	.05	.52	.86	.14	.02
RD3	.28	.13	-.17	.00	.38	.76	.13	.04
RU1	.16	.03	-.16	-.22	.21	.15	.75	-.15
RU2	.20	.08	-.36	-.27	.22	.18	.73	-.11
RU3	.19	.10	-.17	-.18	.18	.13	.77	-.12
RU4	.15	.08	-.23	-.29	.20	.13	.83	-.08
PI1	-.12	-.10	.15	.11	.05	.03	-.15	.91
PI2	-.12	-.11	.11	.09	.06	.04	-.15	.92
PI3	-.08	-.05	.13	.11	.08	.04	-.06	.73

Note: EW – Effort Withholding; SI – Self Interest; II – Internal Integration; FP – Formal Planning; SZ – Size; RI – Requirements Instability; RD – Requirements Diversity; RU – Requirements Unanalyzability; PI – Project Importance

As a second test of discriminant validity, we compared the square-root of the AVE for each construct to the correlations between that construct and all others. In Table 5, the values on the diagonal (shaded cells) represent the square-root of the average variance extracted (AVE). The off-diagonal values display the correlations among constructs. For adequate discriminant validity, the values in the shaded cells should be greater than those in the corresponding row and column. All construct values passed this test, providing further evidence in support of discriminant validity.

In addition to the hypothesized relationships, we included a "team size to project importance" path in our analysis to account for a relationship between those two constructs that has been identified in prior literature (Iacovou et al., 2009) to "control" for this effect. This path was not found to be statistically significant.

Table 5: Discriminant Validity among Latent Constructs

	Items	CR	AVE	EW	SI	II	FP	SZ	RI	RD	RU	PI
EW	3	.90	.75	.87								
SI	2	.90	.82	.30	.91							
II	3	.80	.58	-.25	-.15	.76						
FP	3	.83	.63	-.08	-.06	.49	.79					
SZ	1	N/A	N/A	.20	.01	-.06	.14	1.0				
RI	3	.85	.66	.27	.09	-.17	-.09	.18	.81			
RD	3	.86	.68	.30	.12	-.17	.02	.18	.61	.82		
RU	4	.85	.59	.23	.10	-.30	-.32	-.04	.27	.19	.77	
PI	3	.89	.73	-.13	-.10	.15	.12	.05	.07	.04	-.15	.85

Notes:

1. Items – number of items used to measure the construct; CR – composite reliability; AVE – average variance extracted

2. EW – Effort Withholding; SI – Self Interest; II – Internal Integration; FP – Formal Planning; SZ – Size; RI – Requirements Instability; RD – Requirements Diversity; RU – Requirements Unanalyzability; PI – Project Importance.

Findings

Table 6 displays the results obtained from our tests of the hypothesized relationships. All but one of the paths from antecedent factors that we predicted would influence effort withholding exhibited a statistically significant path coefficient. The amount of variance explained in effort withholding was 0.24, suggesting that the selected antecedent factors are important determinants of PWE.

Table 6: Results of Hypothesis Tests (Structural Model Results)

Hypothesis	Antecedent Factor	Path Coefficient	t-statistic	Hypothesis Supported?
H1	Size of team	**.15**	**3.82**	Yes
H2	Requirements Uncertainty	**.27**	**5.91**	Yes
H3	Project Importance	**-.09**	**2.02**	Yes
H4	Self Interest (Ethical Climate)	**.23**	**6.03**	Yes
H5	Internal Integration	**-.14**	**2.68**	Yes
H6	Formal Planning	.03	0.71	No

Note: Bolded values are statistically significant at $p < .05$ (two-tailed test)

Our findings confirm that effort withholding occurs in IT projects, and five of the hypothesized factors significantly impact such behaviors. Specifically, our results indicate that effort withholding is more likely to be present when an IT initiative employs a large project team, suffers from low requirements structure and aims to achieve what may be perceived as unimportant (non-strategic) goals of the organization. As discussed earlier, individuals are more likely to withhold effort when they belong to a large group as that

reduces individual accountability and makes social identification with the group more challenging. Team members are more likely to engage in effort withholding when requirements uncertainty is high as that reduces the visibility of the task and minimizes the detection risk. With respect to project importance, the evidence we found is consistent with the notion that increased project significance is likely to enhance the meaning of project work and attract intense scrutiny and resource availability, which will reduce the probability of effort withholding (due to the increased detection risk and the increased social cohesiveness that comes with increased responsibility and resource-rich environments).

Our findings also confirmed that individuals who work in organizational settings that are dominated by self-interest cultural environments are more likely to engage in effort withholding. This is consistent with arguments that suggest that collaborative environments lead to reduced PWE. In terms of project management techniques, our work confirms that methodologies that increase team integration will yield lower PWE. The cohesion and other bonding effects that are likely to result from the application of such techniques appear to have a suppressing effect on PWE.

Our findings did not support the idea that increased project planning will suppress PWE. We suspect that this is because the use of planning techniques (scheduling, budgeting, etc.) does not create strong enough deterrents for individuals to avoid effort withholding and does not impact normative or affective bonding significantly.

Limitations and Implications

While our work has important implications both for research and practice, before we highlight its contributions, we must recognize some of its limitations. First, our survey instruments gauged self-reported assessments. While such self-reports tend to be subjective, evidence suggests that insiders' evaluations of projects are consistent with assessments by outsiders (Hoegl and Gemuenden 2001; Sicotte et al. 2004). Second, our study was cross-sectional in nature. The lack of longitudinal data does not enable us to assess causality in an unequivocal fashion. However, the consistency between our findings and prior work in the area of effort withholding provides some support regarding the directionality of our results. Third, the applicability of our findings may be somewhat limited because of the use of a single source (the project manager) to collect the data. We embraced this approach in order to protect the anonymity of the respondents and to minimize their personal risk in participating in the study. Future work would need to consider the perspectives and input of other informants to achieve a more holistic view of effort withholding in IT projects.

In terms of implications for research, our work has demonstrated empirically that project factors (such as team size, requirements uncertainty, and project importance) along with organizational factors (ethical climate) and management approaches (internal integration) do impact the likelihood of effort withholding in IT development environments. To shed further light on this phenomenon, IS researchers are advised to conduct additional field investigations that incorporate additional antecedents in them. Moreover, it will be useful to survey other organizational actors (besides project managers) in such studies to identify similarities and differences across responsibility levels (team members, project managers, auditors, PMOs/CIOs, etc.). Finally, it may be useful to establish competing hypotheses in future explorations to enable us to determine the exact contributions of each theoretical perspective (rational, normative and affective bonding) in receiving a fuller understanding of effort withholding behaviors.

Finally, with respect to practical implications, our work suggests that a risk management strategy may be advisable in pursuing actions to prevent effort withholding. Our findings clearly indicate that not all projects are equally prone to effort withholding. Specifically, our results show that projects are likely to suffer from high PWE when they employ large teams, focus on non-strategic goals and suffer from low requirements clarity/stability. Thus, executives are advised to scan their project portfolios to identify projects that have these characteristics. For such projects, in order to reduce the PWE, the executives should take actions to increase the perceived importance of project (by identifying such projects as "strategic", for example) and enhance team cohesiveness through internal integration efforts. This will enable the team to see its work as being more important and will enable the team members to bond with each other more effectively, creating a collaborative environments that reduces the risk of effort

withholding. As PWE is higher in organizations with self-interest climates, the use of climate surveys is also advised as a risk detection strategy; executives who find themselves managing IS initiatives in less altruistic climates would be wise to increase the monitoring of individual work contributions in teams and intensify internal integration efforts. The need for such tactics will be of course lower in more collaborative organizational environs.

In summary, we believe that effort withholding represents a risk that can be mitigated with proper prevention and detection. We hope that our findings and recommendations will provide a good starting point for interested researchers and executives who wish to learn more about this phenomenon.

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APPENDIX A: MEASUREMENT ITEMS

Item	Mean	Standard Deviation	Weight	Loading	Item Wording
Please indicate your level of agreement with the following statements about user requirements in this project. 1=strongly disagree, 4=neither disagree or agree, 7=strongly agree					
Requirements Instability (RI)					
RI1	5.0	1.7	.36	.73	Requirements fluctuated quite a bit in earlier phases of the project.
RI2	4.2	1.8	.39	.80	Requirements fluctuated quite a bit in later phases of the project.
RI3	3.8	1.9	.48	.89	Requirements identified at the beginning of the project were quite different from those existing today.
Requirements Diversity (RD)					
RD1	4.1	1.7	.44	.84	Users differ a great deal among themselves in the requirements to be met by the system.
RD2	4.5	1.7	.42	.86	A lot of effort has to be spent in reconciling the requirements of various users of this system.
RD3	3.7	1.7	.35	.76	It is difficult to customize the system to one set of users without reducing support to other users.
Requirements Unanalyzability (RU) (Reverse-scored)					
RU1	3.4	1.6	.32	.75	There is a clearly known way to convert user needs to requirement specifications.
RU2	2.9	1.5	.33	.73	Available knowledge is of great help in converting user needs to requirements specifications.
RU3	3.7	1.8	.31	.77	Established procedures and practices can be relied upon to generate requirements specifications.
RU4	3.3	1.6	.33	.83	An understandable sequence of steps can be followed for converting user needs to requirements specifications.
Internal Integration (II)					
Please rate your level of agreement with the following statements: 1=strongly disagree, 4=neutral, 7=strongly agree					
II1	5.3	1.4	.53	.85	Project team members actively participate in the definition of project goals and schedules.
II2	5.6	1.4	.47	.80	Every effort is made to keep project team turnover at a minimum.
II3	5.8	1.3	removed		The project team meets frequently.
II4	5.9	1.4	.29	.61	Project team members are kept informed about major decisions concerning the project.
Formal Planning (FP)					
FP1	5.5	1.4	.69	.92	Special attention is being paid to project planning.
FP2	5.1	1.7	.12	.68	Planning tools (such as PERT, CPM, GANTT, etc.) and/or project management software are used to closely follow the project's status.
FP3	4.3	1.7	.38	.76	Significant resources were allocated to estimate project times and budgets.

Item	Mean	Standard Deviation	Weight	Loading	Item Wording
Project Importance (PI)					
The following questions refer to the system that has been produced by the project. Please indicate your level of agreement with each of the following statements: 1=Strongly disagree, 4=neutral, 7=Strongly agree					
PI1	5.8	1.5	.46	.90	The system is of strategic importance to the organization.
PI2	5.5	1.5	.43	.92	The system will significantly improve the operations of the organization.
PI3	5.0	1.6	.25	.73	The image of the organization will be significantly enhanced by the system.
Self Interest (SI)					
In this section, we would like to ask you some questions about the general climate in your organization. Please answer the questions in terms of how it really is in your organization, not how you would prefer it to be. Please be as candid as possible; remember that all of your responses will be anonymous. To what extent are the following statements true about your organization? 1=Completely false, 2=Mostly false, 3=Somewhat false, 4=Neutral, 5=Somewhat true, 6=Mostly true, 7=Completely true					
SI1	4.1	1.6	.54	.90	In this organization, people are mostly out for themselves.
SI2	4.1	1.7	.57	.91	In this organization, people protect their own interest above other considerations.
Effort Withholding (EW)					
Please rate your level of agreement with the following statements: 1=Strongly disagree, 4=neutral, 7=Strongly agree					
EW1	3.8	2.0	.38	.85	One or two project team members pretend to be prepared when they really are not.
EW2	3.3	1.9	.38	.86	Some of the members of the project team take the work too lightly.
EW3	3.6	2.0	.39	.89	One or more of the project team members do not do their fair share.

Note: The three measures of effort withholding were taken from Oetzel (2001). The Project Uncertainty measures were adopted from Nidumolu (1995, pg. 215), and the Project Coordination items were adopted from Barki et al. (2001, pg. 62). Three measures of Project Importance were adapted from Iacovou (1999). Team Size was measured by the maximum number of project team members, using the categories shown in Table 3. Finally, the two Self-Interest climate measures were adopted from Cullen et al. (1993).