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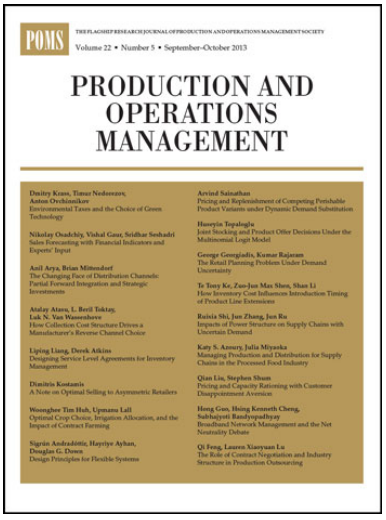

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Abstract

Task interdependence has received a great deal of attention as a critical driver of project dynamics. This study focuses on one of these key dynamics: helping among information technology (IT) implementation project team members. We uniquely distinguish between perceptions of receiving more help than one personally provides to other team members (positive inequity), versus giving more than one receives (negative inequity). We argue, using an equity theory frame, that members have a tendency to resolve perceived inequity by adjusting subsequent levels of helping, but that the extent of adjustment is moderated by task interdependence. Results from an empirical evaluation of 591 members in 107 IT implementation teams, examined at several points throughout their project cycles, provide insight into these relationships. Extending and bounding equity theory, we find that lower interdependence augments the effect of positive inequity on subsequent helping, but leaves the effect of negative inequity unaffected. Further, we find support for an inverted U-shaped relationship between the level of subsequent helping in a team and the final cost of implementation. This holds critical implications for project team design and ensuing dynamics.

Key words: positive inequity, negative inequity, task interdependence, project (team) cost performance, equity theory

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Task interdependence impacts on reciprocity in IT implementation teams: Bringing out the worst in us, or driving responsibility?

1. Introduction

Task interdependence, i.e., the extent to which an individual's successful completion of a task is dependent on the efforts of others, has received considerable attention in the operations and general management areas (e.g., Gundlach et al. 2006, Hopp et al. 2009, Ramamoorthy et al. 2014, Sosa 2014). Its importance is founded in its capacity to influence motivation and behavior in team settings (Bendoly et al. 2010, Pearce and Gregersen 1991), and its effects on helping behavior (Van der Vegt

and Van de Vliert 2005). As such, task interdependence has been recognized as an important contingency factor in behavioral research (e.g., Bachrach et al. 2006a, Bendoly et al. 2008, Peng et al. 2013, Sharma and Yetton 2003, Tenhiala 2011). In the present study we focus on task interdependence and its potential impact on affective responses of knowledge workers in information technology (IT) implementation teams.

We are specifically interested in how task interdependence impacts the relationship between an individual's perceived inequity within their team, and his or her response to such inequity, i.e. his or her exhibited reciprocity. Inequity is broadly defined as the gap between the amount of help received by an individual and the amount of help they provide. The magnitude and direction of this gap is a critical consideration in team project dynamics since, dependent on the work context, it can serve to either perpetuate team dysfunction or motivate counterbalancing helping efforts (Schultz et al. 2010). In the setting we study, helping refers to the extent to which a team member *voluntarily* performs activities that benefit the group, such as going out of his or her way to help other group members with their part of the project and remaining actively engaged in the project.

The practical importance of studying inequity rests in the notion that while teams and projects are fundamentally used as vehicles for the execution of work, the use of teams *per se* does not automatically connote "team work." While extensive research has focused on team conflict and drivers of team effectiveness (e.g., Mathieu et al. 2008, Somech et al. 2009, Tekleab et al. 2009), the notion of inequity, which is a core element of team work and can drive conflict and team performance, has not received as much attention in the extant operations management literature.

In this paper we distinguish between the team member's perceptions of positive and negative inequity in help received versus that provided by the individual. Positive inequity is present when a team member perceives that he/she is being helped more than he/she is helping others. In contrast, negative inequity is present when a team member perceives that he/she is being helped less than he/she is helping others. This dichotomy has shown to yield insightful conclusions in related research (Griffith et al. 2016, Scheer et al. 2003), though has been ignored in the operations management, project and IT implementation literatures. Given this limited research on behavioral responses and performance outcomes emanating from different positions of inequity, further work is

needed to disentangle the potentially unique impacts of positive and negative inequity on reciprocity (cf. Griffith et al. 2016).

The theoretical development of our expectations is founded in the equity theory perspective (Adams 1965, Greenberg 1990), according to which individuals continually evaluate their relative net gains from participation in relationships; perceived inequities in these relationships are expected to be resolved by individuals adjusting their levels of helping in order to restore equity. These dynamics are critically dependent upon reciprocity, a concept from the social psychology literature capable of explaining responsive behaviors and attitudes (Settoon et al. 1996). As such, reciprocity has been described to serve as a mechanism to generate trust (Lusher et al. 2014), ensure the proper functioning of teams (Baker and Bulkley 2014) and serve as a psychological contract (Rousseau 1995). However, although equity theory anticipates increases (decreases) in helping under positive (negative) inequity, ultimately it is up to individuals to determine how much they will/are willing to adjust their helping in response to these perceptions. In fact, Scheer et al. (2003) contended that "one should not presume that firms behave in line with the predictions of classic equity theory" (p. 312). The objective of this research is thus to assess whether the predictions according to equity theory hold in our context of IT knowledge worker teams, and provide interpretations for the instances in which they do not. Accordingly, we extend equity theory to our context, while at the same time bounding its applicability. We further theorize task interdependence as one influential factor that can potentially moderate the magnitude of adjustment in the presence of inequity. We specifically contend that under both positive and negative inequity, reciprocity (behavioral adjustments) will be smaller when task interdependence is high.

In order to substantiate the practical relevance of the model, we also investigate relations between members' subsequent helping on the overall IT implementation costs of the project. Building from emerging evidence in the management literature regarding the potential consequences of helping, and the implications of the "too much of a good thing" principle in this context (Lanaj et al. 2016, Rapp et al. 2013), we offer that although helping can impact overall project costs, too much helping may ultimately be detrimental (as reflected in an inverted U-shaped relationship).

Our hypotheses are investigated with a unique dataset of 591 members in 107 IT implementation teams, examined at the several points throughout their project cycles. The comparability of projects was ensured through the teams implementing the same set of features from the same vendor on existing enterprise resource planning systems, resulting in all teams having tightly defined (i.e. comparable) project scopes and timeframes. Team sizes ranged between 3 and 8 members, with an average of 5.5 members. Hypotheses are evaluated through model estimation at the individual and project team levels.

With this focus, we aim to make three distinct contributions. First, based on tenets derived from equity theory, we develop predictions bearing on the impact of both positive and negative inequity on subsequent peer-reported helping. While the study of (in)equity has received considerable attention, little research has explicitly dichotomized this concept into positive and negative inequity (Griffith et al. 2016, Scheer et al. 2003). Second, integrating the important contingency of task interdependence, we theorize about its moderating influence on the inequity – subsequent helping relationship. Relying on the unique characteristics associated with high task interdependence, we develop and test predictions relating to its potential muting effect on behavioral responses to inequity. Third, building on recent management research, we explore the relationship between helping and overall project implementation costs in an effort to determine whether "too much" helping can have detrimental team performance consequences. Overall, recognizing task interdependence and inequity as two important drivers of project team performance, we effectively extend and bound equity theory within the context considered.

2. Theoretical Background

2.1. Inequity

Equity theory (Adams 1965) postulates that individuals favor their output-to-input ratios to be equivalent to those of their peers (or referent group). While inputs can include anything individuals contribute to a relationship and to which value is attributed, outputs can include anything of value received by the individual as a result of the relationship (Pritchard 1969).

Within teams, one form of input and output that has the potential to impact team performance in substantive ways is the members' helping behavior (Bachrach et al. 2006a, Nielsen et al. 2012). Helping behavior is commonly discussed with reference to organizational citizenship behavior, and is viewed as discretionary behavior. It has been largely affiliated with the promotion of effective organizational functioning, with teams for example benefiting from individual members occasionally covering knowledge and capability shortfalls of others (Borman and Motowidlo 1993, Organ 1988, Organ and Konovsky 1989). We focus on such voluntary helping as an archetypal form of input-output, because it is not formally required and can thus vary without formal organizational sanction.

Consistent with equity theory, we frame help provided to other members and help received from other members as inputs and outputs, respectively. If equity between inputs and outputs is not experienced, for example if I provide more/less help to my peers than I receive, inequity is present. According to equity theory, these instances will likely trigger behavioral responses in order to restore equity in the relationship. Equity can be improved by changing one's own inputs or outputs, changing a peer's inputs or outputs, misrepresenting the value of inputs or outputs, leaving the environment, or changing the referent group (Schultz et al. 2010). In industrial settings, for example, equity restoration was demonstrated by a regression to the mean effect, i.e., individuals adjusting their processing times in order to perform similarly to the average worker in their team, albeit with individual responses varying greatly (Schultz et al. 2010).

Inequity can have a significant impact on business relationships (Ring and Van de Ven 1994), and has thus received a great deal of academic attention (Colquitt et al. 2001). Focus on inequity has been seen in the areas of distributive justice and fairness, which often are discussed interchangeably with equity (e.g., Ariño and Ring 2010). However, the range of conclusions that can be drawn from these studies is limited by their almost exclusive focus on contrasts between equity and inequity, failing to differentiate the types of inequity present. This conceptual limitation was recognized by Scheer et al. (2003), who introduced the notions of positive and negative inequity. Negative inequity is present when an individual's output-to-input ratio is less than their peers' (i.e., offering more than is received), while positive inequity is present when individuals' output-to-input ratio is greater than their peers (i.e., receiving more than is offered). Using this dichotomy, Scheer et al. (2003) found differential consequences of inequity on outcomes such as hostility, trust and

relationship continuity. Such differential outcomes were also recently recorded in Griffith et al. (2016) within the context of buyer-supplier relationships, heightening the importance for dichotomizing inequity into positive and negative dimensions. We extend their research by theorizing about the behavioral responses of information technology knowledge workers to positive and negative inequity, with a specific focus on peer-reported helping.

2.2. Task Interdependence

Task interdependence generates an environment where individuals' successful completion of work-related tasks is not entirely within their control (Bamberger and Levi 2009), and thus represents a critical dimension along which to characterize teams (Hopp et al. 2009). With task interdependence rooted in the literature on team effectiveness (Gladstein 1984), it is thought to have a significant impact on team dynamics, including worker attitudes and motivation (Ramamoorthy et al. 2014). Task interdependence has been noted as specifically influencing helping behavior (Pearce and Gregersen 1991, Van der Vegt and Van de Vliert 2005). The importance attributed to helping (Bachrach et al. 2006b) thus makes the contingency role of task interdependence a critical factor to recognize in considering variations in helping under inequity.

Task interdependence has generally been associated with beneficial outcome effects in group settings (Campion et al. 1993), contributing to greater motivation (Campion and Wong 1991), increased productivity (Shea and Guzzo 1987), and the presence of cooperative norms (Wageman and Baker 1997). As such, task interdependence has been argued to enhance communication among team members (Gundlach et al. 2006, Peng et al. 2013) and facilitate the development of trust (Cheng 1983). Evidence within operations management contexts was reported by Kerr et al. (2007), who found support for the Köhler effect (i.e., poorer performers increasing their effort) in serial production lines, and Schultz et al. (2010), who reported workers adjusting to the mean in parallel tasks. Task interdependence can, however, also serve as a barrier, as shown within the IT implementation context (Purvis et al. 2001, Tenhiala 2011).

Because of the impact that task interdependence can have on the shape of institutional contexts (Sharma and Yetton 2003), it has been applied as a contingent, moderating factor in a multitude of scenarios. For example, research indicates that greater task interdependence can enhance the value of communication capabilities afforded by enterprise resource planning systems (Bachrach et al. 2006b, Bendoly et al. 2008), as well as the impact of new product development (NPD) practices on collaboration (Chen et al. 2015, Peng et al. 2013). Research also suggests that task interdependence may enhance the relationship between management support and IT implementation success (Sharma and Yetton 2003), as well as the influence of closed network structures on human resources effectiveness (Yan et al. 2013). Similarly, evidence from the literature provides that task interdependence can enhance the association between a collectivist orientation and tenure intent (Ramamoorthy et al. 2014), suggesting the positive interplay of group cohesion and interconnected tasks. Comparable patterns were identified by Taggar and Haines (2006), who reported that task interdependence can enhance team effectiveness.

However, task interdependence can also generate a constraining environment, as reported by Peng et al. (2013), who found that task interdependence negatively impacted the relationship between NPD IT tools and collaboration, or by Van der Vegt and Van de Vliert (2005), who theorized about low task interdependence making the link between skill dissimilarity and helping behavior more negative. These intriguing and substantive findings have led to calls for finer-grained investigations of the impact of task interdependence on critical organizational relationships (Somech et al. 2009), which we explore in the present study.

While task interdependence has been studied from various perspectives, we were not able to find any research focused on its interplay with positive and negative inequity in team settings. In an effort to extend this line of inquiry, we therefore theorize in this research about the moderating role of task interdependence in relationships between both positive and negative inequity, and subsequent peer-reported helping. With this investigation we are directly taking up the call issued by Bendoly et al. (2010), who encouraged research into potential contingencies that complicate the role of interdependence on desired outcomes.

3. Hypotheses

3.1. Linking Inequity to Subsequent Peer-Reported Helping

Equity theory suggests that individuals experiencing inequity will seek to rebalance their relationships in order to achieve equity (Adams 1965). While reestablishing equity can be accomplished in a number of ways (as noted above), the most functionally practical approach is through the adjustment of one's own contribution levels – helping – in response to the help received from others. When individuals sense that they are being helped more than they are helping others (positive inequity), they will adjust their helping upward and provide more help to others. In contrast, when individuals sense that they are being helped less than they are helping others (negative inequity), they will adjust their level of helping downward, and so provide less help. While we formulate the ensuing hypotheses from an equity theory perspective, we note that these predictions may not hold true, as was discovered by Scheer et al. (2003) and Griffith et al. (2016). Our objective is therefore to extend equity theory within our context, while at the same time assessing the boundaries of its applicability.

In the case of positive inequity, individuals may experience "…guilt for not pulling one's own weight or for receiving disproportionately great outcomes…" (Scheer et al. 2003, p. 304). Equity theory thus suggests that individuals provided with more help than they provide themselves aim to equalize the environment by helping others more. Under conditions of negative inequity, individuals are being helped less than they are helping others, and thus may feel as if they are "…being shortchanged or undercompensated…" (Scheer et al. 2003, p. 304); hostility may even develop when feelings of negative inequity reach a critical tipping point. One way to alleviate these feelings of negative inequity is for those individuals providing more help than they receive to reduce the level of helping that they provide, in an effort to re-establish balance between their levels of helping and the helping they receive. Both of these behavioral responses would have the consequence of restoring perceived equity, leading to the following baseline predictions:

H1: Positive inequity is positively associated with subsequent peer-reported helping.

H2: Negative inequity is negatively associated with subsequent peer-reported helping.

3.2. The Moderating Role of Task Interdependence

While equity theory can explain how members adjust their helping under conditions of positive and negative inequity, the context within which (positive/negative) inequity is experienced may impact *how much* members are willing to adjust their inputs. For this purpose, we consider the important contingency of task interdependence, which we theorize can impact the magnitude of individuals' adjustments in helping aimed to restore equity.

In developing our arguments for the moderating role of task interdependence, we continue with the expectations forwarded in the baseline hypotheses 1 and 2 above, in that positive (negative) inequity is positively (negatively) associated with subsequent peer-reported helping. These notions are predicated on equity theory and the desire of individuals to restore such equity with appropriate actions. We now consider augmentations of these expectations by reflecting on the contingency of task interdependence. As such, we are not theorizing for the baseline hypotheses to be fundamentally different under varying levels of task interdependence, but suggest that the strength of the relationship is either enhanced or attenuated. These expectations, which will be developed in the ensuing paragraphs, are summarized succinctly in Figure 1.

In theorizing the expectations, we rely on the notion that under greater task interdependence, more resources are necessary to coordinate members' contributions (Scott 1998), and modifications to one's regular activities are likely needed to enable integration with the efforts and contributions of others (Wageman 1995). Task interdependence requires members to work together on different (more involved) levels, relying on principles such as reciprocity (Baker and Bulkley 2014), cooperation and trust (Cheng 1983). Task interdependent environments are often also characterized by lower levels of conflict (Kumar et al. 1995) and a dominance of collective interests over individual interests (Murnigham and Conlon 1991). Members working under task interdependence may realize this, recognize the augmented importance of helping (Bachrach et al. 2006b), and as a consequence use this information as an input in their decisions on the extent to which to adjust their helping under varying conditions of inequity.

Positive Inequity – First, under conditions of positive inequity, equity theory would suggest that members could be expected to adjust their helping upward. At higher levels of task interdependence (Panel B in Figure 1), where the environment demands greater levels of coordination (Bailey et al. 2010), team members may perceive that the additional helping they are provided is due to this context. While they are still expected to increase their level of helping in an effort to restore equity, we suggest this effect to be muted due to greater task interdependence. Under this condition, members could be expected to maintain this advantageous relationship (positive inequity) to as great an extent as possible. The rationale for this expectation is that it is likely that aid given by one team member to another actually benefits the interdependent work of the individual giving the assistance. Therefore assistance under positive inequity is less likely to be viewed as altruistic and more likely to be viewed as a response to the context benefiting the source; hence it is also less likely to motivate reciprocity by the recipient. This expectation should hold true particularly in our context of IT implementation teams with tightly defined project scopes and timelines. These constraints reinforce the notion that positive inequity is due to the greater task interdependence present, as determined by the nature of the project, lessening an individual's desire to restore equity.

In contrast, under conditions of lower task interdependence (Panel A in Figure 1), which generally require less coordination (Bailey et al. 2010), individuals experiencing positive inequity may feel more obliged to enhance their level of subsequent helping in an effort to restore equity. This is due to positive inequity in lower task interdependence settings likely being perceived to not be due to the nature of the project (since tasks are not highly interrelated), but due to the altruistic stance of team members. This should motivate others more to restore equity (and to thus increase their level of helping by a larger level). In addition, lower task interdependence settings allow final poor project performance to be attributed more easily to responsible individuals, due to the tasks being more independent. As such, workers receiving more help than they provide are expected to "step up their game" even more so under lower task interdependence in an effort to reciprocate. In this setting, these workers may feel more obliged to increase their level of helping so as to ensure that others, who are offering more help than they receive, are not penalized if they fail to perform their own job tasks satisfactorily possibly due to focusing more on helping others. Since this helping is offered likely based on altruistic motives (rather than predicated on interdependent tasks), individuals

aim to return the favor and ensure the positive performance of everyone on the team. The fact that our data come from IT implementation projects employing small, manageable teams, in which individual contributions are likely to be easily determined, should contribute to this expectation holding true.

H3: Task interdependence negatively moderates the positive relationship between positive inequity and subsequent peer-reported helping.

Negative Inequity – Under conditions of negative inequity, equity theory suggests that individuals are expected to adjust their inputs – helping in our context – downward, because they are providing more help than they are receiving. Evaluating this scenario through a lens informed by the contingencies implied by the presence of task interdependence, we theorize that behavioral reactions to negative inequity will not be as strong under higher levels of task interdependence (Panel D in Figure 1). While negative inequity is still expected to lead to a decrease in helping, the requirement for coordination and cooperation engendered in high task interdependence contexts (Bailey et al. 2010) may temper this response due to the likely presence of cooperative norms (Wageman and Baker 1997) and perceptions of the importance of helping (Bachrach et al. 2006b).

As such, because of the high degree of task interdependence, coupled with a negative inequity setting, members are likely seeking to demonstrate their commitment as team players to maintain a good team environment (cf. Scheer et al. 2015). Specifically, while the negative inequity setting suggests that members should reduce their helping, the condition of high task interdependence is expected to limit the magnitude to which helping is reduced (i.e. mute the impact of negative inequity on helping). This expectation rests in part on the assumption that individuals are motivated by common (team) goals (Stark et al. 2014) and the desire to not impede goals by limiting the help provided to others; after all, helping more in a context of highly interdependent tasks, where helping can have a substantive impact on team performance outcomes (Bachrach et al. 2006a, Nielsen et al. 2012), may be viewed as a necessity due to the context. The specific setting in which our data were collected (small teams working on projects with tightly defined project scopes and timelines) can again offer further substantiation for this expectation. In addition, the trusting, normatively cooperative environment present under conditions of high task interdependence may contribute to members' willingness to carry the weight of their peers. Parallel arguments regarding continued

involvement can be seen in the literature linking cooperation to trust (Bierly et al. 2009), and trust to information sharing (Staples and Webster 2008). Limiting help provided, in response to the negative inequity situation, may thus be more warranted than a larger withdrawal of their help.

In contrast, under conditions of low task interdependence (Panel C in Figure 1), members experiencing negative inequity may feel more comfortable withdrawing more of their help to restore equity, due to the lower levels of coordination and cooperation implied, as well as the lower likelihood of them feeling compelled to contribute to the team, which may stem from the more independent nature of tasks under conditions of low task interdependence (Van der Vegt and Van de Vlier 2005). Further, the causal nexus of poor project performance is unlikely to be shared across all members equally, as levels of performance on independent tasks will be more identifiable and can be associated with individual members (since the tasks are rather independent, in addition to the small team sizes in our setting); the potential for "group blame" is thus less likely and the desire to restore equity with one's actions should be enhanced. Limiting the amount of helping to restore equity is thus done in an effort to ensure that one's own work is performed satisfactorily first (since an inequitable amount of help is received and since poor performance is likely able to be traced back to the individual). As a result, low task interdependence settings are expected to permit negative inequity effects more so than high task interdependence settings. Accordingly we pose the following:

> *H4: Task interdependence negatively moderates the negative relationship between negative inequity and subsequent peer-reported helping.*

3.3. Impacts on Project Cost Performance

While the benefits of helping in project teams have been largely touted (Cohen and Bailey 1997, Smith et al. 2010, Triana et al. 2013), recent work has emphasized helping's diminishing returns to performance and the costs associated with the process of helping. For example, Rapp et al. (2013) point out that helping others fundamentally creates a drag on the ability of helpers to complete their own work, citing Drago and Garvey (1998). They further suggest that the switching between roles of worker and helper can serve to distract helpers in their own work along the lines that cognitive switching cost arguments would entail. At high levels of helping, role overload also can set in, further detracting from the functional capacity of helpers.

From the perspective of those receiving excessive assistance, it also is not clear whether the benefits outweigh potentially more systematic costs, such as reductions in psychological ownership (Avey 2009, Sonenshein 2014), losses in feelings of work responsibility and losses in conscientiousness. Beliefs in autonomy and locus of control may be degraded when excess help is received, bordering on perceptions of being micro-managed. In combination, these dynamics have deleterious effects on work continuation once helpers leave – the Tristen IT implementation case being a relevant example of discontinuation effects (Bendoly and Cotteleer 2008).

Adopting these viewpoints, we suggest that too much helping can lead to the domination of certain knowledge workers and the non-involvement of others, leading to losses in coordination and efficiency, and subsequently extended costs for the project (Drago and Garvey 1998, Rapp et al. 2013). This expectation recognizes the potential for diminishing returns coupled with increased costs, and as a result we anticipate a curvilinear relationship between the total amount of helping experienced in subsequent stages of projects and the overall level of project cost performance.

H5: Subsequent peer-reported helping is positively associated with project cost performance (a), with however too much helping being detrimental (inverted U-shaped relationship) (b).

Figure 2 provides an overview of these collective hypotheses and a preview of the computational approach for dichotomizing positive and negative inequity.

4. Methods

4.1. Sample and Data Collection

Since the phenomena we are interested in are prevalent in team project settings, we purposefully collected data from the members of IT implementation project teams involved in developing a new set of features for pre-existing enterprise resource planning systems. The new set of software features (referred to as a "bolt-on") focused on integrating new product life-cycle management (PLM) functionality with the enterprise resource planning product produced by a leading vendor. As is typical of this type of bolt-on, the vendor outsourced the development to teams of information technology professionals affiliated with the vendor. These teams comprise our sample. This specific

context allowed us to control for a great deal of variance in project structure and complexity by virtue of having largely consistent technological platforms onto which a common technology was to be added. This comparability of projects contributes to the robustness of our results. Most employed in these project teams had significant prior experience working with the enterprise system architecture and related bolt-on projects prior to the current PLM installations. All implementation work was conducted by these fully co-located teams.

Through the Project Management Institute (PMI), one of the coauthors identified 43 project leaders responsible for supervising 121 teams engaged by the vendor to develop the PLM bolt-on. These leaders were identified based on professional consulting relationships developed over a six year period of involvement with the PMI. It was through these leaders that access to project team members was obtained. Prior to each implementation (t=0), project leaders assisted in the data collection effort by requesting their team members fill out a pre-project questionnaire and by providing the investigators with an estimated project schedule. These schedules were used in the timing of the distribution of mid-project surveys, which were distributed and completed by team members at the half-way mark estimated on these preliminary schedules (t=1). At the conclusion of the project a follow-up questionnaire was distributed (t=*2*), and the project's cost performance was assessed by project managers subsequent to final team survey collection (t=3). This data collection in separate time frames was critical to guarding against reverse causality in our inferences, and to account for inter-temporal effects. As such, it can for example be expected that task conflict is lower in the beginning stages of a project, increases as the project goes on, and then diminishes again toward the end of the project. To take these dynamics into consideration, as well as to enhance the robustness of our results in terms of causality, variables measured in their most appropriate time periods were included in our models.

In rare cases where project team members were unwilling or unable (due to them leaving the team) to complete a portion of this battery, data collection ceased. This resulted in 14 of the original 121 projects being dropped from the investigation, yielding the 107 project team sample. In total, 591 individual technology workers (88% of the original set) were involved in the data collection effort (representing a total of 2,848 dyads). As a check against potential sampling bias introduced by this criterion, the demographic data of the final sample, as well as firm-level descriptive data, were

compared to that of the omitted 14 projects and 78 team members. No statistically significant differences were observed. The average age of the knowledge workers was 43 years, with an average of 11 years of work experience at the present company. Most workers had a bachelor's degree as their highest education level (47.7%), followed by master (30.5%), doctoral (9.1%) and vocational (8.6%) degrees. About three quarters of the workers were male. In addition, most were Caucasian (64.6%), followed by Asian (17.1%), African-American (9.0%) and Hispanic (8.3%) workers. Earlier research had used this dataset to investigate different aspects relating to the mediating effects of psychological safety in the relationship between team affectivity and transactive memory systems (Hood et al. 2016).

4.2. Measures

4.2.1. Main Variables

Inequity refers to an imbalance between inputs and outputs of an individual and focal referents (Scheer et al. 2003), which are composed of team members in our study. We compute a measure of inequity by subtracting the amount of help an individual perceives to provide to each of his/her team members (helping *by* the individual *i* towards co-worker *j*, $\Sigma_j HB_{ij}$) from the amount of help an individual perceives he/she receives from each of his/her team members (helping *towards* the individual *i* from co-worker *j*, $\Sigma_j HT_{ij}$). In our survey process we define "helping" as the extent to which a team member voluntarily performs activities that benefit another member, specifically in regard to the successful completion of project work that other member is tasked with completing. Using this definition, for all other team members (G-1, where G is the group size), respondents were asked to rate the extent to which they were either helped by or gave help to another member on a five-point scale (1 = not at all, 2 = very little, 3 = neutral, 4 = somewhat, and 5 = to a great extent) (see online Appendix). Hence for a group of size 6, each individual would provide 5 responses to both of these inquiries, or a total of 60 ratings across the team. These items are collected both at the mid- ($t=1$) and end periods ($t=2$). Individual ratings tend to be relatively consistent across members evaluated (e.g., a member that was evaluated as helping very little by one member was likely evaluated similarly by the other members) (HB α_{t1}=0.847; HT α_{t1}=0.858).

Computationally, *positive inequity* then exists when an individual, *i*, perceives that he/she is being helped *more* than he/she is helping others ($\Sigma_j HT_{ij} - \Sigma_j HB_{ij} > 0$), and *negative inequity* exists when an individual perceives that he/she is being helped *less* than he/she is helping others ($\Sigma_j HT_{ij} - \Sigma_j HB_{ij} < 0$). To delineate potentially distinct impacts of positive and negative inequity, as hypothesized, we created spline variables for these dimensions. As such, in cases of positive inequity, the value of the positive inequity spline variable is greater than zero, with the value of the negative inequity spline variable set to zero. Similarly, in cases of negative inequity, the value of the negative inequity spline variable is greater than zero, with the value of the positive inequity spline variable set to zero. If both spline variables are zero, equity is present (cf. Scheer et al. 2003).

Task interdependence was introduced to our respondents as "the extent to which successful completion of your team's task work is dependent upon the exchange of information and advice, regular communication, coordination and cooperation between you and another team member." Using this definition, respondents were asked to rate the extent to which the interactions they had with each of their team members (while working on their team's assignments) can be characterized by task interdependence (the same five-point scale as above was used). At t=1 and t=2, each individual was asked to provide as many task interdependence scores as she had team mates. Averages were constructed to represent that individual's overall assessment (α_{t1}=0.815; α_{t2}=0.901). In addition to including task interdependence measured at t=1 as the moderator in the regression on helping, it was also included as a control variable measured at t=2 in the regression on project cost performance, since task interdependence may change over the course of the project.

Subsequent peer-reported helping assesses how helpful an individual is viewed by his team members (the same five-point scale as above was used), and was measured at t=2. Unlike inequity and task interdependence, this variable represents the perception of the team members regarding the focal individual. This rating thus offers a more objective assessment of an individual's level of help provided (as perceived by others, rather than a self-reported measure), and alleviates concerns relating to common source/method variance in the estimation of effects at the individual level. To compute an individual's score on this dimension, the evaluations by the individual's team members of the individual's amount of helping were averaged at t=2, $\Sigma_j HT_{ji}$ (providing a group consensus on

an individual in contrast to an individual's average self-report). Fleiss's kappa calculations demonstrate moderate agreement across team members with regard to ratings of assistance provided by respective members ($\kappa_{avg} = 0.426$).

Project (team) cost performance was an objective, archival metric collected from corporate records several weeks following project completion (t=3). The consideration of project implementation cost is important, as highlighted by various studies (Ngai et al. 2007, Whitaker et al. 2007). Our measure is also comparable to the primary performance dimension considered in the seminal work by Mabert et al. (2003). The determination of this performance measure involved a series of calculations. First, in pre-project meetings with clients and supervisors, project coordinators agreed on forecasts of each projects' total costs. These projected costs included staffing and hardware (e.g., servers, lines, and routers), as well as software expenditures. Not included in these project costs were any multi-year maintenance warranties purchased in accompaniment with the software. At the close of the project, the projected costs were subtracted from the actual total project costs; this difference was then divided by the projected costs resulting in a value indicating the percentage over or under each team came to their respective projected cost targets. These values ranged from 17% under budget to 64% over budget with a mean of 27%, a median value of 27% and a standard deviation of 0.17.

For ease of interpretation, we conducted a linear transformation in which we subtracted each teams' percent over/under budget value from the maximum value in the sample (64% over budget). We then divided this value by the range of values in the sample (81%=64%+17%). As a result of this transformation, the performance data range from 0 to 1.00, where 1.00 indicates the team that was originally the most *under* budget (-0.17) while 0 indicates the team that was most *over* budget (0.64). This transformation allows low values of the performance measure to reflect poor performance and high values to reflect strong performance.

4.2.2. Control Variables

Since leadership can play a crucial role in the translation of effort into effective and efficient results (Grant 2012, Hill et al. 2012), we included both *inspirational* and *intellectual leadership*, as exhibited by the project team leader, as controls. Inspirational leadership was defined as the extent to which the project leader expressed confidence that goals would be achieved, talked enthusiastically about what needed to be accomplished, acted in ways that built respect, and displayed a sense of power and confidence. This type of leadership can enhance members' self-esteem and motivation, shift the focus "from self-interest to collective interests", and generate social capital (Sha and Chang 2012, p. 313), and thus influence helping behavior. Intellectual leadership was defined as the extent to which the project team leader sought out different perspectives, reexamined critical assumptions, suggested new ways of looking at how to solve the problem, and got individuals to look at the problem from many different angles. Such behavior would make the leader appear open to different viewpoints, also fostering respect and confidence (Balthazard et al. 2009). This may make members more likely to engage in the team and thus adjust their level of helping. Using the same five-point scale as above, each team member evaluated the project team leader on these dimensions, with the members' scores then being averaged. To account for the temporal component in our model, leadership variables measured at t=1 were included as controls in the regression on subsequent peer-reported helping, and leadership variables measured at t=2 were included as controls in the regression on project cost performance.

Task conflict refers to individuals' perception of disagreements and conflicting opinions being present in the team. Such conflict may result in individuals questioning their expertise and competence (De Wit et al., 2012, Swann et al. 2004), and can even lead to feelings of disrespect or offense (Pelled 1996, Simons and Peterson 2000). The degree of task conflict may thus negatively impact the amount of helping an individual is willing to offer. However, task conflict may have a positive influence on performance, since divergent opinions (which is inherent to task conflict) may lead the team to question assumptions, to be more creative, and to thus pursue the best way forward with the implementation (Bradley et al. 2012, Hinds and Bailey 2004). Task conflict was measured with three items derived from Simons and Peterson (2000) (there is conflict of ideas in your team; there are disagreements within your team about the project you are working on; people in your team have conflicting opinions about the project you are working on), to which respondents were asked to

indicate their degree of agreement on a scale anchored at "strongly disagree" (value=1) and "strongly agree" (value=5). The scales possessed good reliability (α_{t1}=0.714).

Group size was calculated as the number of members on a team, and was included as a control variable since reciprocity may be harder to achieve in larger groups, due to individuals potentially feeling that their actions in terms of helping are less visible, and, in addition, a poor project performance is less likely to be attributable directly to them. Group size should thus negatively influence team performance. Frequencies regarding groups of each size in our sample are presented in Table 1.

5. Analysis and Results

5.1. Analytical Approach

Two regression analyses were conducted, one to test H1 through H4, and one to test H5. This approach was taken to account for the different levels at which the variables were collected (individual- vs. group-level), and to incorporate a temporal dimension into our analysis.

The first set (testing H1-H4) utilized the sample of 591 individual technology workers (measured at the individual level), with the independent variables measured at *t*=1 and the dependent variable measured at *t*=2. Due to the nature of our primary independent (spline) variables, positive and negative inequity, as computed above, we applied spline regression analysis (Johnston 1984). This approach enables the consideration of potentially different effects by positive and negative inequity.

In addition, due to individuals being nested in teams, random effects are likely correlated. Specifically, the team-level attributes evaluated (inspirational and transformational leadership) can be considered to be exogenous, since these leadership attributes are not likely influenced by individual-level behaviors, but that individual-level behaviors are likely influenced by the leadership styles of the respective team leaders. Different leadership styles are further expected to be distributed randomly, i.e. not determined by the individuals included in the respective teams. To accommodate this characteristic of our data, a multi-level fixed-effects model was estimated. This type of model

was deemed to be most appropriate based on comparisons to simple random effects and fixed effects models. Akaike's Information Criterion (AIC) for the mixed-effects model was smaller than the AIC's for both the simple random-effects model and the fixed-effects model, suggesting our model to be the best fit to the data. Opting for a multi-level approach was also suggested to be a more conservative method (Tokar et al. 2015), since accounting for group-level effects in their absence has little harm, while erroneously not including them can have significant impact on the results (Moerbeek 2004, Van Landeghem et al. 2005).

The level-1 model included positive and negative inequity, as well as task interdependence, as the independent and moderator variables. To assess the moderation effect, two interaction terms between task interdependence and both inequity dimensions were included. In addition, task conflict was entered as a control variable. In a level-2 model, the team an individual belonged to was included as a fixed effect (captured by the intercept), in addition to the control variables accounting for the inspirational and intellectual leadership of the team leader. Due to our multi-level approach, the control variable of group size is redundant and was thus not included in the model.

A two-stage least squares (2SLS) model was employed to test H5, utilizing the aggregated sample of 107 project teams, due to the dependent variable in this model (project cost performance) being a group-level variable. For this purpose, individual-level variables (which are used as independent variables) were averaged per team. The model included inspirational and intellectual leadership of the team leader, task conflict, group size, task interdependence and peer-reported helping as controls. Peer-reported helping, measured at t=1, was included in order to complement subsequent peer-reported helping (the primary independent variable, measured at t=2), so as to account for perceptions of helping in the early stages of the project and its potential influence on performance. Task conflict was also measured at t=1, as explained in the next paragraph. All other independent variables were measured at t=2, and the dependent variable at t=3.

The 2SLS approach was utilized to account for concerns related to endogeneity. Instrument variables were chosen so as to fulfill validity requirements, such as not being significantly correlated with the performance dimension considered (Bellamy et al. 2015). These variables included the main independent and control variables measured at t=2. An exception represents task conflict, whose

measurement at t=2 was replaced with its measurement at t=1 (the former being correlated with performance, while the latter is not). The instrumental variables were included in Equation 1, which then served for the estimation of Equation 2 (with team project cost performance as dependent variable).

5.2. Descriptive Statistics

Means, standard deviations and correlations of the individual-level study variables are provided in Table 2. As expected, due to the coding of positive and negative inequity, these two variables are correlated. Subsequent peer-reported helping is correlated with both inequity dimensions, task interdependence, inspirational leadership, task conflict and group size. Both inspirational and intellectual leadership are correlated with task interdependence. Task conflict is correlated with positive inequity and task interdependence, and group size is correlated with negative inequity, task interdependence and both leadership variables. Means, standard deviations and correlations of the group-level study variables are summarized in Table 3. The only significant correlation (p<0.05) was between project cost performance and task conflict.

5.3. Inequity and Task Interdependence impacts on Subsequent Helping

A multi-level model with positive and negative inequity as spline variables was applied to test H1 through H4; fixed effects are summarized in Table 4a, and random effects in Table 4b. The sample of 591 technology workers was used for the analyses because the variables under consideration are individual-level measures. As noted above, the leadership variables were included on the group level, while the remaining variables were entered on the individual level.

The results confirm our expectation that positive inequity is positively associated with subsequent peer-reported helping (γ=0.111 p<0.05). However, negative inequity is not associated with subsequent peer-reported helping at statistically detectable levels, although the sign is in the hypothesized direction (γ=-0.012; p>0.1). These results provide support for H1, but not for H2. Task interdependence is significantly and positively associated with subsequent peer-reported helping (γ=0.472; p<0.001). The interaction term between positive inequity and task

interdependence is significant and negative (γ=-0.063; p<0.05), supporting H3 in that task interdependence negatively moderates the relationship between positive inequity and subsequent peer-reported helping. However, the interaction term of negative inequity and task interdependence is not significant (γ=0.010; p>0.1), offering no support for H4. This suggests that task interdependence does not moderate the relationship between negative inequity and subsequent peer-reported helping. This is also graphically illustrated in the interaction plots in Figure 3. Hayes' (2013) PROCESS syntax was applied to plot lines for task interdependence at the 10th, 25th, 50th, 75th, and 90th percentiles. The different slopes in the first graph of Figure 3 assert the muting effect of greater task interdependence in the case of positive inequity, i.e. the effect of positive inequity on helping is enhanced under lower levels of task interdependence. The almost parallel lines in the second graph are illustrative of the non-significant moderation effect of task interdependence for negative inequity. Task conflict served as influential control variable (γ=-0.109; p<0.001). On the group level, team membership (γ=0.919; p<0.05) was influential, but neither inspirational (γ=0.033; p>0.1) nor intellectual (γ=0.015; p>0.1) leadership style of the team leader exhibited an effect.

5.4. Subsequent Helping Impacts on Performance

Hypothesis 5 was tested with a two-stage least squares (2SLS) model (Table 5). The sample of 107 project teams was used for the analysis because the dependent variable, project cost performance, is a team-level variable. The inspirational and intellectual leadership style of the team leader, task conflict, group size, task interdependence and peer-reported helping were included as control variables.

The result for the primary independent variables of interest confirms our expectation that subsequent peer-reported helping is positively associated with project cost performance (β=0.256; p<0.05), supporting H5a. In addition, the quadratic term of subsequent peer-reported helping was negative and significant (β=-0.204; p<0.05), offering support for H5b. This suggests that helping is beneficial, however only to the saddle point of 3.6, after which helping yields a deterioration of performance.

5.5. Robustness Checks

To assess the robustness of the results derived for H1-H4, we included in a *post-hoc* test various control variables pertaining to team member characteristics. With this, we acknowledge that team members may not be homogeneous. Specifically, we included the team member's age, their education level (ranging from high school to doctoral level), and the number of years they had been working for the firm as controls. The additional control variables did not exhibit any influence (age: γ=-0.004; p>0.1; education level: γ=0.033; p>0.1; number of years at firm: γ=-0.002; p>0.1), nor did they alter the results substantially, suggesting that our above results are robust.

While above analysis for H1-H4 employs the sample of 591 individual technology workers, utilizing averages to construct the variables, as described above, we assessed in a further *post-hoc* analysis the robustness of the derived results with the sample of 2,848 dyads in our dataset. The same multi-level model was implemented. Similar as above, positive inequity is positively associated with subsequent peer-reported helping (γ=0.075 p<0.01). However, unlike the prior results, negative inequity is negatively associated with subsequent peer-reported helping, albeit at the 0.1 significance level (γ=-0.043; p<0.1). Task interdependence is also significantly and positively associated with subsequent peer-reported helping (γ=0.278; p<0.001). The interaction term between positive inequity and task interdependence is significant and negative, albeit at the 0.1 significance level (γ=-0.043; p<0.1). The interaction term of negative inequity and task interdependence is however significant (γ=-0.047; p<0.05). Similarly as with the main model, task conflict served as influential control variable (γ=0.154; p<0.001). On the group level, team membership (γ=1.102; p<0.01) was influential, but neither inspirational (γ=0.006; p>0.1) nor intellectual (γ=0.019; p>0.1) leadership style of the team leader exhibited an effect. Overall, these results offer support for and add robustness to our above findings utilizing average behaviors of the 591 technology workers.

In choosing our original analytical approach of spline regression analysis, we relied on the seminal work of Scheer et al. (2003), who introduced the dichotomy of negative and positive inequity and how to model it. As such, we emulate their approach so as to ensure consistency and comparability of our results to theirs. The same method was also recently applied by Griffith et al. (2016), being indicative of the approach being robust and sound. Nevertheless, in a further set of robustness checks, we assessed the impact of both positive and negative inequity when included in

the regression equation individually (i.e. without its counterpart), and when inequity was included as a single variable (i.e. no splines).

The results confirm that even when positive and negative inequity are included individually in respective models, positive inequity continues to exhibit a positive influence on helping (γ=0.112 p<0.05), while negative inequity continues to be not significant, albeit with the sign again in the hypothesized direction (γ=-0.029 p>0.1). Similar as above, the interaction term between positive inequity and task interdependence is significant and negative (γ=-0.066; p<0.05), while the interaction term of negative inequity and task interdependence is not significant (γ=0.028; p>0.1), when considering positive and negative inequity in separate equations. This offers added robustness to our results above.

In addition, when considering inequity as a single variable ranging from negative to positive inequity, the inequity variable exhibits a marginally significant impact on helping (γ=-0.063 p<0.1), while the interaction terms with task interdependence is significant (γ=-0.043 p<0.05). This confirms the deleterious effect of inequity when considered as a single variable, due to its ability to lower trust and diminish cooperation (e.g., Samaha et al. 2011). At the same time, however, the result highlights that important detail would have been overlooked if this variable was merely considered as a single dimension, offering support for the implementation of inequity as a dichotomous concept. The finding also confirms task interdependence as a critical dimension, even when considering inequity as a single construct (e.g., Bendoly et al. 2008, Peng et al. 2013).

A further set of *post-hoc* analyses aimed to develop additional insight into H5 as part of the 2SLS model. As such, we tested whether task interdependence would also serve as an influential variable in moderating the relationship between subsequent peer-reported helping and team project cost performance. While this would have bolstered the criticality of task interdependence, the interaction term was not significant (β=-0.088; p>0.1). This is suggestive of the importance of task interdependence in enhancing the effect of positive inequity on helping, with however task interdependence having no implications for an effect on ensuing project performance.

We further assessed the potential impact of early task interdependence (measured at t=1) on performance, with the associated coefficient exhibiting marginal significance (β=0.215; p<0.1). This is indicative of early perceptions towards task interdependence seeming to have a stronger impact on performance than later perceptions of task interdependence, stressing the importance to structure the project and its associated tasks among the individual team members carefully from the beginning.

6. Discussion and Conclusion

With task interdependence crucial to team dynamics in IT projects, we set out to investigate one of these dynamics, helping among IT project team members. In doing so, we are the first to explicitly examine the way task interdependence influences shifts in helping – both within and across teams – over time, with associated implications for IT implementation costs. We further set our research apart by distinguishing between team member perceptions of positive and negative inequity in help received versus that provided by team mates. We examine our expectations with a unique dataset of 591 members in 107 IT implementation teams, recorded at three distinct points in their project cycles with multiple respondents to help guard against common source bias.

The results from our analysis show that while positive inequity determines subsequent peer-reported helping, negative inequity does not exhibit an influence at statistically detectable levels. Specifically, individuals that receive more help than they are providing others (experiencing positive inequity) aim to rebalance their ratios to achieve equity by subsequently helping more. This finding is consistent with predictions forwarded by equity theory, in that under conditions of positive inequity individuals may feel guilt for not providing their fair share and thus augment their contributions. It is further in line with the reciprocity imperative in social psychology that has investigated the effects of helping (e.g., Cropanzano and Mitchell 2005). It stands however in contrast to findings on the inter-firm and consumer-firm level, where positive inequity did not trigger actions to rebalance equity (Griffith et al. 2016, Scheer et al. 2003, Wangenheim and Bayón 2007). This calls attention to the context in which positive inequity is studied. While differences in intra-firm teams exist, such differences seem to be absent in inter-firm relationships. This however makes sense, since accountability and the desire to contribute one's fair share may be heightened in project teams as opposed to buyer-supplier relationships. A contributing factor may be that project teams

generally have a tangible outcome to achieve (in our context, the implementation of the bolt-on), while studies in buyer-supplier relationships usually consider longer-term outcomes such as trust and future collaboration (which can be regarded as more fuzzy, as no specific project is dealt with). In addition, intra-firm teams can be thought of as being more likely to be pulling on the same strings, since their objectives are more likely to be consistent. With this distinction, while extending equity theory to our setting, we at the same time bounded its applicability by contrasting our findings for the intra-firm level to those on the inter-firm level.

In contrast to the reciprocity exhibited in response to positive inequity, individuals that provide more help than they are receiving from others (experiencing negative inequity) do not tend to limit their amount of helping in an attempt to reestablish equity, thus failing to adhere to predictions inherent to equity theory and the "regression to the mean" expectation (Schultz et al. 2010). While the coefficient was negative, as expected, and consistent with research on the inter-firm level (Griffith et al. 2016, Scheer et al. 2003), it was not significant. This yet again emphasizes the importance to consider the context in which inequity is studied, and that in intra-firm project teams the cohesion may be strong enough to avoid the deleterious effects of negative inequity. In our setting, others providing less help may be accepted due to one's role or desire to provide mentorship. Further, more help provided on this project not triggering an action may be associated with possibly the expectation that others will provide their fair share in future projects as their roles demand it. As such, giving more help may be able to generate goodwill from a longer-term perspective (beyond the current project assignment, expecting members to positively reciprocate in the future (cf. Endres and Chowdhury 2013)), or to acknowledge more help received in a prior project. This is consistent with the "paying it forward" reciprocity perspective in social psychology (Baker and Bulkley 2014), a principle that seems logical to be present in the intra-firm context considered herein. Investigating this distinction, we again established boundary conditions on the applicability of equity theory.

We are one of the first to dichotomize the concept into positive and negative dimensions, particularly within the operations management, project management and IT implementation contexts. With this finer grained insight we provide greater theoretical precision to expectations inherent to equity theory, investigations into which primarily focused on the dichotomy between equity and inequity. By differentiating inequity based on the level of help received versus offered, we overcome

conceptual limitations in prior research and contribute knowledge of the underlying dynamics created by inequity. Most importantly, we point to the fact that negative inequity does not influence subsequent peer-reported helping, insight that would have been overlooked by not differentiating based on this dichotomy. From a meta-theoretic perspective, we offered support for Scheer et al.'s (2003) contention that predictions of classic equity theory may not always apply. As such, while members tend to react immediately to conditions of positive inequity, negative inequity may be more likely to be rationalized based on more help potentially received previously, thus reciprocating prior positive inequity, or the expectation that more help will be provided in the future by those that one is currently helping more.

We further scrutinized the link between inequity and subsequent peer-reported helping with the contingency of task interdependence to investigate how much members are willing to adjust their inputs. While our theoretical arguments for the muting effect of task interdependence on the relationship between positive inequity and helping were supported, the moderation effect was non-significant in the relationship between negative inequity and helping. Task interdependence muting the impact of positive inequity on subsequent peer-reported helping confirms our theoretical contemplations on the motives for helping, in that it is seen more as a matter of necessity driven by the project context, rather than based on altruistic motives. An individual's feeling of reciprocity is thus not invoked to as great an extent under greater task interdependence (necessitating greater levels of coordination) – the additional help received is perceived as warranted and substantiated by the context. In contrast, in low task interdependence environments, where the experienced positive inequity may be less likely to be rationalized due to the context, the reactions are stronger. The altruistic behavior of team members factors into this, as does the ability to more easily quantify individual contributions and to thus pinpoint causes for poor project performance. Overall, these results suggest that project teams, whose members primarily experience positive inequity, can be more readily brought to equity under conditions of low task interdependence. Supervisors could therefore design projects as such (making sure that tasks are as independent as possible), in order to promote equitable contributions.

Our expectations for the muting effect of task interdependence on the relationship between negative inequity and subsequent peer-reported helping were not supported by the data. Individuals in negative inequity situations do not reduce their helping, a behavior which is also present irrespective of the task interdependence context. The lack of desire to achieve a common goal and be a good team player, which we expected to be higher under lower task interdependence, did not motivate members to decrease their subsequent helping. Our theoretical arguments on members in high task interdependence contexts then aiming to carry the weight of their peers were thus also not supported, as was our expectation that higher task interdependence generates greater cooperation and trust. A possible explanation is that the project teams considered regard negative inequity as perhaps inherent to the setting in which some members are simply expected to do more than others, based on the assignment of roles and responsibilities. These individuals accept their positions and willingly continue to help disproportionally more, without the desire to restore equity. Overall, we confirmed task interdependence as a boundary condition for the behavioral response to positive inequity, but not to negative inequity, further highlighting the importance to differentiate between positive and negative inequity.

Having confirmed task interdependence and inequity as two important dimensions in project teams, one may contemplate how these insights can influence managerial action. While we acknowledge that managers do not have complete control over work allocation decisions – heterogeneous skillsets constrain who can do what/when, and the number of workers to be assigned – we contend that they may have *some* discretion in terms of the redesign of tasks and the selection of members; certain workload allocation decisions may be able to push task interdependence and initial inequity levels in particular directions. This seems especially relevant when considering the interplay between task characteristics and team characteristics, which may influence managers to design the composition of the team so as to reduce concerns of inequity. For instance, assigning the first eight steps all to worker A and the last eight steps all to worker B suggests a less interdependent workflow – as opposed to interweaving the 16 steps between them (A-B-A-B-etc.). Past research has stressed the importance of managing such task interdependencies in team settings (Bailey et al. 2010, Gulati and Singh 1998, Hoegl and Weinkauf 2005). Similarly for inequity, the allocation of tasks by the project manager among team members should impact the extent to which they feel they should expect help, and provide it. When some team members appear to receive larger workloads,

perceptions of positive and negative inequity may be exacerbated. We thus suggest that managers may have potentially some, although subtle, influence on project team performance through work design and delegation decisions.

The current results also confirm a positive influence of subsequent peer-reported helping on project cost performance, with however too much helping being detrimental (as reflected by the inverted U-shaped relationship). The theoretical expectations that too much helping creates a drag on the ability of helpers to complete their own work, and increases potential role overload and the need for greater cognitive processing, were thus supported, as was the notion that members receiving help may lose psychological ownership and conscientiousness. These non-monotone findings confirm that helping others may hinder one's own work (Drago and Garvey 1998, Rapp et al. 2013), and those receiving help may perceive a loss of autonomy and identification with their work (Avey 2009, Sonenshein 2014).

As with all research, limitations exist that have to be noted. First, while the comparability of the projects represented an advantage in that it reduced variance in project structure and complexity, it potentially limits the generalizability of the results to other types of IT projects. Albeit we do not expect there to be too disparate dynamics present in different IT implementation contexts, future research is advised to investigate this possibility. Second, while we were able to account for the team leaders' leadership traits, there may be other influential characteristics of both the leader and the team members that we were not able to control for. In addition, the leadership dimensions considered in the multi-level model, assessed with established measures, turned out to not be significant. This is surprising, and may point to the fact that alternate measures of leadership may have been more appropriate, such as years of experience as a project lead. Similarly, while we considered cost performance as our final dependent variable, other dimensions, such as quality and features, are worthwhile to include in future studies – the outcome on these variables may be different as observed within the context of cost performance in our setting. Third, it will be interesting in future research to distinguish between direct and indirect reciprocity, which we were not able to partial out in our data. And fourth, as with any empirical research relying on perceptual measures, we are dependent on respondents accurately and diligently answering the questions. While we asked team members to specifically only consider *voluntary* helping, as opposed to required

helping, and provided examples of what this may entail, we are not able to assess whether individuals distinguished between these when completing the questionnaire.

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Table 1: Group Size Frequencies

Group Size	Frequency	Percentage	Group Size	Frequency	Percentage
3	4	3.7	6	27	25.2
4	22	20.6	7	19	17.8
5	28	26.2	8	7	6.5

Table 2: Individual-Level Variables: Means, Standard Deviations, and Correlations

Variable	Mean	Std Dev	PI	NI	TI	PH	ISL	ITL	TC	GS
Positive Inequity (PI)	0.617	0.884	1							
Negative Inequity (NI)	0.533	0.763	-0.488**							
Task Interdependence (TI)	2.999	1.006	0.067	0.041	1					
Subsequent Peer-Reported Helping (PH)	2.882	1.295	0.206**	-0.187**	0.335**	1				
Inspirational Leadership (ISL)	2.354	0.774	-0.078	0.027	0.081*	0.110**	1			
Intellectual Leadership (ITL)	2.186	0.776	0.048	0.040	0.090*	0.045	-0.045	1		
Task Conflict (TC)	2.103	0.970	-0.169**	-0.014	-0.186**	-0.146**	-0.042	0.052	1	
Group Size (GS)	5.520	1.235	0.015	-0.082*	-0.174**	-0.124**	-0.325**	-0.243**	0.007	1

N=591; * $p < 0.05$; ** $p < 0.01$. Independent and control variables measured at t=1; dependent variable (subsequent peer-reported helping) measured at t=2.

Table 3: Group-Level Variables: Means, Standard Deviations, and Correlations

Variable	Mean	Std Dev	PH	PC	TI	ISL	ITL	TC	GS
Subsequent Peer-Reported Helping (PH)	2.922	1.180	1						
Project Cost Performance (PC)	0.546	0.211	0.173	1					
Task Interdependence (TI)	3.000	1.242	0.155	0.025	1				
Inspirational Leadership (ISL)	2.607	1.309	0.101	0.018	0.148	1			
Intellectual Leadership (ITL)	2.514	1.313	-0.047	0.037	0.060	-0.030	1		
Task Conflict (TC)	1.976	0.558	-0.111	0.205*	0.056	0.125	0.127	1	
Group Size (GS)	5.520	1.284	-0.147	-0.149	-0.079	-0.056	-0.060	0.183	1

N=107; * $p < .05$. Independent and control variables measured at *t*=2; dependent variable (team project cost performance) measured at *t*=3.

Table 4a: Fixed-Effects Model on Subsequent Peer-Reported Helping

Parameters	Estimate	Std. Error	df	t	Sig.
Intercept	1.646	0.177	414.408	9.319	<0.001
Positive Inequity	0.111	0.050	563.355	2.220	0.027
Negative Inequity	-0.012	0.053	548.709	-0.224	0.822
Task Interdependence	0.472	0.035	540.929	13.564	<0.001
Task Conflict	-0.109	0.030	511.213	-3.686	<0.001
Positive Inequity × Task Interdependence	-0.063	0.031	502.576	-2.007	0.045
Negative Inequity × Task Interdependence	0.010	0.030	517.822	0.334	0.738

Table 4b: Random-Effects Model on Subsequent Peer-Reported Helping

Parameters	Estimate	Std. Error	Wald Z	Sig.
Residual	0.242	0.016	15.434	<0.001
Intercept [Group] Variance	0.919	0.428	2.148	0.032
Inspirational Leadership Variance	0.033	0.048	0.689	0.491
Intellectual Leadership Variance	0.015	0.050	0.303	0.762

Table 5: 2SLS Model on Project Cost Performance

Parameters	Unstandardized Coefficients		Beta	t	Sig.
	Coefficient	SE			
Constant	0.223	0.144		1.551	0.124
Inspirational Leadership	-0.035	0.099	-0.035	-0.355	0.723
Intellectual Leadership	0.004	0.098	0.004	0.138	0.970
Task Conflict (*t*=1)	0.101	0.146	0.101	0.690	0.492
Group Size	-0.148	0.100	-0.148	-1.485	0.141
Task Interdependence	-0.027	0.097	-0.027	-0.282	0.779
Peer-Reported Helping (*t*=1)	-0.074	0.123	-0.074	-0.605	0.574
Subsequent Peer-Reported Helping	0.256	0.126	0.256	2.025	0.046
Subsequent Peer-Reported Helping^2	-0.225	0.110	-0.204	-2.050	0.043

DV: Team Project Cost Performance.

Figure 1. The Moderating Role of Task Interdependence

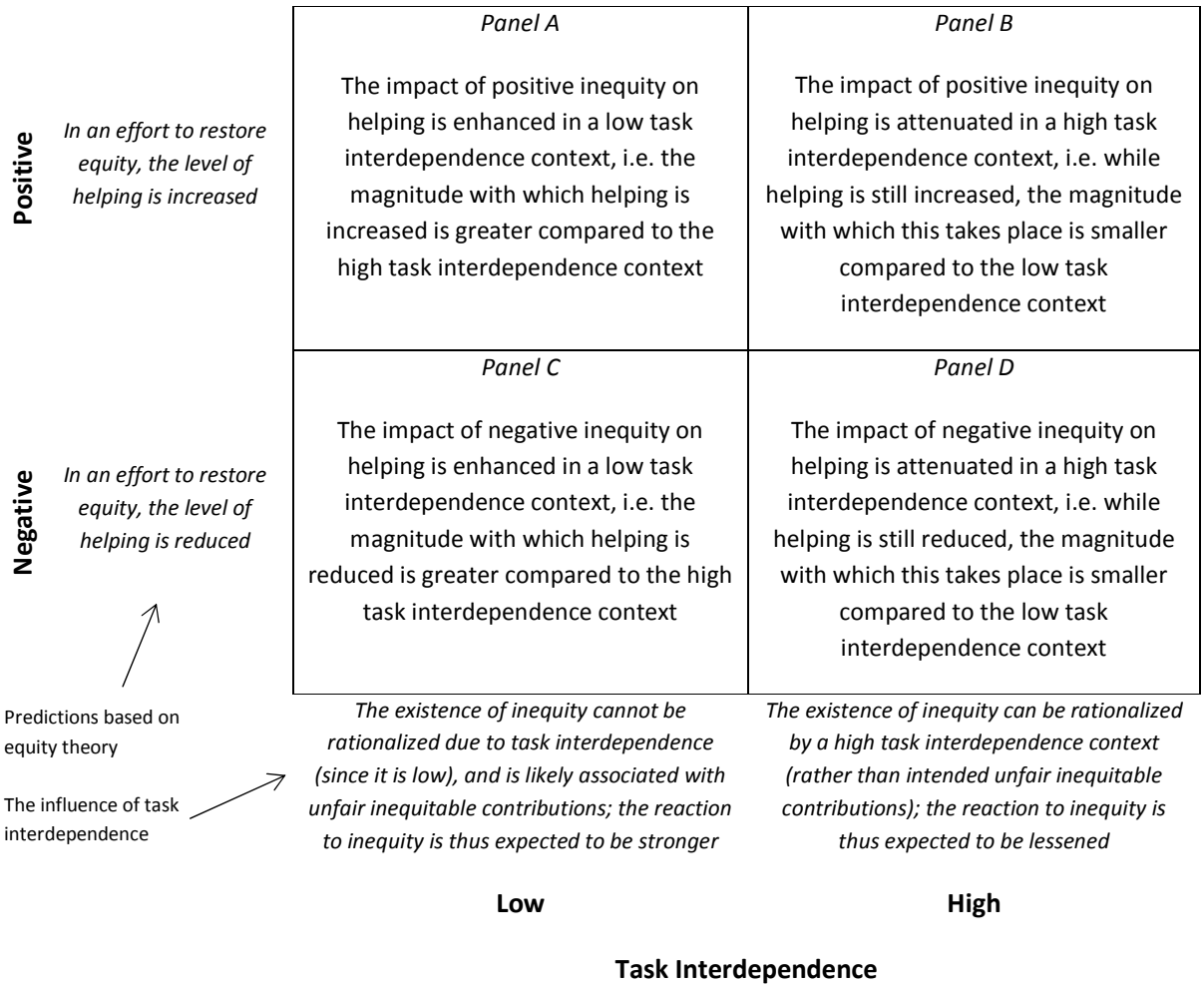

Figure 2. Overview of Research Model Linking Helping Inequity to Subsequent Performance

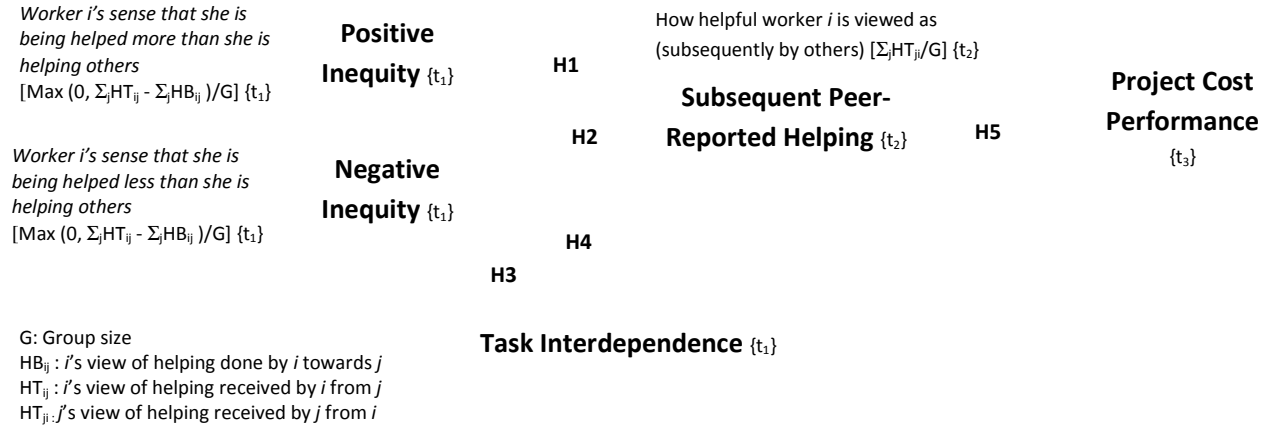

Figure 3. Interaction Plots