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Asymmetry in task dependence among team members

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**ASYMMETRY
IN TASK DEPENDENCE
AMONG TEAM MEMBERS**

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CHAPTER 1

INTRODUCTION

Humans are social by nature and like many other animals we tend to gather around in groups consisting of, for instance, family or friends. What makes us unique is the way we creatively interact with each other when we are in groups. This ingenious interplay often takes place in work teams where it has led, and continues to lead, to an ever-increasing amount of new products and technologies. Furthermore, many of us spend a large part of the day (and in fact our lives) working in these work teams, and the circumstances in them can significantly influence our well being, health and happiness (e.g., Sonnentag, 1996). Consequently, work teams represent one of the more essential groups to which we belong and gaining a deeper understanding of them does not only provide us with more insight into uniquely human qualities, but could also lead to more tangible results such as increased well being of the members of the team or improved team performance.

It might therefore come as no surprise that many researchers and practitioners have shared an interest into the functioning of groups at the workplace. One of the more important theories used to gain a deeper understanding of the functioning of work teams, is interdependence theory (e.g., Thibaut & Kelley, 1959). This theory is of great importance because it deals with a fundamental feature of work teams, namely the fact that team members are dependent upon each other (i.e. are interdependent; Lewin, 1948). As will be discussed below, this interdependence can be based on several sources, such as the distribution of skills and resources within the team or the way goals and rewards are provided to the team members (e.g.,

Wageman, 1995). The cumulative knowledge from the many studies and reviews regarding interdependence theory (e.g., Johnson & Johnson, 1989; Rusbult, 2000; Van Lange, 2000; Van der Veegt, Emans, & Van de Vliert, 2005; Van der Veegt & Van de Vliert, 2002; Wageman, 1995, 2001) provide firm evidence that interdependence significantly influences essential team processes and outcomes such as, helping (e.g., Wageman & Baker, 1997), trust (e.g., Alge, Wiethoff, & Klein, 2003), affective reactions (e.g., Van der Veegt, Emans, & Van de Vliert, 2001), and team performance (e.g., Saavedra Earley, & Vandyne, 1993).

Although many aspects of interdependence are already well understood, we will argue that most prior studies have overlooked a vital aspect of interdependence, namely the possibility that differences or asymmetries in dependence can exist between individuals. These asymmetries in dependence occur when a team member (A) is more dependent on another team member (B) to complete his or her task, than B is dependent on A (e.g., Blau, 1964; Kelley & Thibaut, 1978). As will be explained in more detail in the following chapters, investigating these asymmetries in task dependence is essential because they are associated with differences in power (e.g., Emerson, 1962). Since the powerful might use their power to their own advantage, asymmetry in task dependence might be detrimental for team processes and outcomes. Although some indirect evidence from studies regarding interpersonal (e.g., Rusbult & Van Lange, 2003) and inter-organizational relationships (e.g., Casciaro & Piskorski, 2005) supports this expectation, to date no study has actually investigated the effects of asymmetry in task dependence in work teams. The current thesis aims to contribute to interdependence theory and research by investigating the scarcely studied relationships between asymmetries in task dependence and various important organizational psychological variables, such as interpersonal helping and trust, affective reactions and team learning and performance. Below, we will first discuss the theoretical and methodological foundations of this topic, after which we will develop the conceptual framework and introduce the empirical studies that were conducted to test the hypotheses derived from our framework.

FOUNDATIONS

Theoretical foundations

The importance of the concept of interdependence for the organizational sciences was probably first noticed by Kurt Lewin (1948). He argued that a defining feature of a group is the fact that the group members are interdependent, which means that the outcomes which individual group

members strive to attain are affected by the actions of other team members (e.g., Johnson & Johnson, 1989). Interdependence theory states that team members will be motivated to cooperate with each other when they perceive such interdependence (Johnson, 2003). Deutsch (1949) extended Lewin's research by showing that not only various amounts of positive interdependence can exist, as described above, but that there also might be situations that are characterized by negative interdependence. This negative interdependence occurs when individuals perceive that they have to compete with their fellow team members to attain valued outcomes. Consequently, the importance of interdependence theory lies in the fact that it uses a core feature of teams to describe when, and to what extent, team members will cooperate or compete with each other.

Many researchers have used and extended Lewin's ideas and have investigated the effects of interdependence (e.g., Thibaut & Kelley, 1959; Thomas, 1957). However, because these early studies operationalized the concept of interdependence in different ways and at different levels, it was difficult to compare their findings. Scholars such as Johnson and Johnson (1989) and Wageman (1995) realized that these inconsistencies posed a serious problem to the advancement of interdependence theory and therefore reviewed the available literature. These and other authors (e.g., Saavedra et al., 1993; Shea & Guzzo, 1987) concluded from their analyses that there are two basic forms of interdependence, namely task and outcome interdependence. This basic distinction is still made in the most recent reviews (e.g., Van der Vegt & Van de Vliert, 2005).

Task interdependence. The members of a team are task interdependent when they must share materials, information, or expertise in order to achieve the desired output or performance (e.g., Cummings, 1978; Susman, 1976). As such, task interdependence can be viewed as rooted in the jobs of the team members and can be considered a structural feature of the instrumental relations between team members. Additionally, the reoccurring interactions between the members of a team might take on an institutionalized nature over time and thereby lead to more task interdependence (cf. Brass & Burkhardt, 1993; Van der Vegt et al., 2005). Generally speaking, task interdependence can be expected to be higher when the tasks become more difficult and when the team members need more support and assistance from each other to perform their jobs. Low task interdependence exists, for instance, between call-center employees who normally perform relatively simple tasks that can be successfully completed without the assistance of fellow team members. On the other hand, managers or engineers working on complex projects need to exchange knowledge and resources with their fellow team members in order to successfully complete

their tasks and therefore generally experience high levels of task interdependence.

Many studies have assumed that task interdependence is an attribute of the entire team and subsequently expected that all team members would respond similarly to task interdependence (e.g., Campion, Papper, & Medsker, 1993; Jehn, 1995; Rousseau, 1977, 1978; Saavedra et al., 1993; Van de Ven, Delbecq, & Koenig, 1976). Other studies have highlighted that in many situations task interdependence may vary across the members of a team (e.g., Van der Vegt, Emans, & Van de Vliert, 2000, 2001) because individuals with comparable jobs may focus on different (aspects of the) tasks (e.g., Kiggundu, 1983; Pearce & Gregersen, 1991). Furthermore, as the study of Olson, Walker, Ruekert, and Bonner (2001) has indicated, the level of task interdependence may change over time. These authors investigated product development projects and found that the total frequency of interaction and information exchange increased as the project matured. Consequently, existing evidence indicates that task interdependence does not only vary between groups, but also within groups and over time. As will be discussed later on, we will extend this current knowledge by investigating if task interdependence might also vary across the intrateam relationships of team members.

Outcome interdependence. A second dimension of interdependence that is distinguished in interdependence theory is the degree of outcome interdependence. Outcome interdependence is the extent to which significant consequences of work are contingent on the collective performance of tasks (Wageman, 2001; Van der Vegt et al., 2005). Outcome interdependence can be divided into three different sub-dimensions, namely reward interdependence (Wageman & Baker, 1997; Shea & Guzzo, 1987), goal interdependence (e.g., Deutsch, 1973; Thomas, 1957), and feedback interdependence (e.g., Campion et al., 1973; Saavedra et al., 1993). What these three sub-dimensions have in common is that they signal to the team members how, and to what extent, valued outcomes can be achieved. The difference between these three sub-dimensions lies in their projection into the future.

More specifically, reward interdependence determines how ultimate outcomes can be achieved, because it indicates what payments or benefits team members receive for their joint performance. These rewards can be both financial and non-financial in nature, such as for instance a bonus, a promotion, or an award. Goal interdependence reflects the joint purpose and mission of a group (Perrow, 1961) and signals to the team members what objectives they should complete as a team to obtain valued rewards. Feedback interdependence indicates to what extent the team members receive

information on the actual state of the group relative to a reference value or standard (cf. Algera, 1990). High feedback interdependence can thus be argued to provide the team members with information about how far their group currently is in achieving its goals and rewards, while low feedback interdependence provides team members with information how far they are with achieving their own goals and rewards. As Weldon and Weingart (1993) have observed, these three dimensions of outcome interdependence can be expected to have rather similar effects in work teams.

However, it should be noted that Weldon and Weingart (1993) assumed that the different dimensions of interdependence are all of the same type and are all provided at the same level. This would be the case if, for instance, the rewards, goals, and feedback are provided to the team as a whole. Under these circumstances all three dimensions consistently signal to every team member that valued outcomes can only be achieved by working together. However, if for instance, the type and level of feedback interdependence is changed so that it provides individual team members with strong incentives for achieving high individual performance, this consistency between the three dimensions would be broken. Under these circumstances, feedback interdependence signals to team members that they should work independently or even compete with each other, while the goals and overall rewards indicate that cooperation is required. As will be discussed further in Chapter 4, it is therefore important to specify the type and level of outcome interdependence precisely, which is something that has often been neglected in prior research.

Congruence hypothesis. The amount of outcome interdependence can vary independently from the amount of task interdependence (and vice versa), and task and outcome interdependence should therefore be viewed as independent constructs. For example, as mentioned above, the task interdependence between call-center employees is normally very low since each individual can perform his or her duties without any assistance from the other employees. When these team members are only rewarded for their individual performance, for instance, for the number of successful calls they themselves made within a week, the level of outcome interdependence is very low. On the other hand, the team members could experience high levels of outcome interdependence if the management decided to provide bonuses to the team as a whole for reaching a certain number of calls a week as a team.

The currently available evidence indicates that this latter decision would be ill advised, since many studies have confirmed the so-called "congruence hypothesis". This hypothesis states that positive outcomes are most likely when the degrees of task and outcome interdependence are congruent with each other, such that low task interdependence is coupled with low outcome

interdependence and high task interdependence with high outcome interdependence (Saavedra et al., 1993; Thomas, 1957). Congruent situations clearly signal to the team members how they should approach their jobs. More specifically, situations characterized by low task interdependence and low outcome interdependence indicate that there is neutral or even negative interdependence and consequently focus the team members on obtaining a good individual performance. On the other hand, high task interdependence and high outcome interdependence unambiguously indicate positive interdependence and thus focuses the team members on expending cooperative efforts to obtain high group performance.

Conversely, when task and outcome interdependence are incongruent the course of action is likely to be less clear to the team members. For instance when task interdependence is low and outcome interdependence high, team members might mistakenly focus on coordinating their actions with their colleagues, even though no coordination is required. Additionally, when task interdependence is high and outcome interdependence low, team members might erroneously focus on obtaining individual benefit when collaborative efforts are required. Because such mistakes are less likely when both the task and outcome interdependence provide the same cues, the congruence hypothesis states that team processes and performance will be better under congruent conditions. This expectation has received considerable support from both experimental (e.g., Saavedra et al., 1993; Wageman & Baker, 1998) and field studies (Wageman, 1995; Van der Vegt, Emans, & Van de Vliert, 1999; Van der Vegt et al., 2001). Consequently, prior research indicates that there is an important interaction effect between the different dimensions of interdependence theory. As we will discuss in Chapters 3 and 4, this interaction provided us with a strong incentive to investigate if there are interaction effects between the often overlooked possibility of asymmetry in task dependence and the other more extensively studied dimensions of interdependence theory, namely task interdependence and outcome interdependence.

Asymmetry in dependence. In contrast to the abundance of research regarding task and outcome interdependence, and their joint influence on shaping positive or negative interdependence, stands the amount of attention paid to another aspect of interdependence theory, namely the possibility that two individuals might differ in their task dependence on each other (Kelly & Thibaut, 1978; Lawler & Bacharach, 1987). These asymmetries in task dependence can be expected to be present in most work teams due to differences in the formal or informal resources controlled by group members as a function of different roles, tenures, or natural endowments (e.g., intelligence or charisma; cf. Ragins & Sundstrom, 1989). Because asymmetries

in dependence are often based on differences in resources needed to complete tasks we will focus on asymmetries in task dependence. We expect that investigating the effects of such asymmetries in task dependence is very important given their association with differences in power. As we will elaborate in Chapter 2, it can be expected that the more task dependent team member will try to accommodate to the wishes of the less dependent, and therefore more powerful person, in order to secure an adequate flow of resources. The more powerful persons, on the other hand, are less vulnerable, because their power enables them to exit the relationship at lower costs than their more dependent partners (Cook & Emerson, 1978; Giebels, De Dreu, & Van de Vliert, 2000). Based on the above reasoning our general expectation is that asymmetries in task dependence would frustrate interpersonal processes. To investigate this general expectation we conducted three field studies.

A MULTILEVEL MODEL OF ASYMMETRY

In order to provide an overview of the three empirical studies, and to expose their interrelatedness, a conceptual model is depicted in Figure 1.1. As can be seen in this figure, each study addresses a different level of analysis and this strategy enabled us to gain more insight into both the specific relational mechanisms associated with asymmetries in task dependence as well as its overall effects on team processes and performance. Below, we will first explain the different levels of analysis after which we will introduce the specific research questions and briefly explain the reasons for choosing each particular research design.

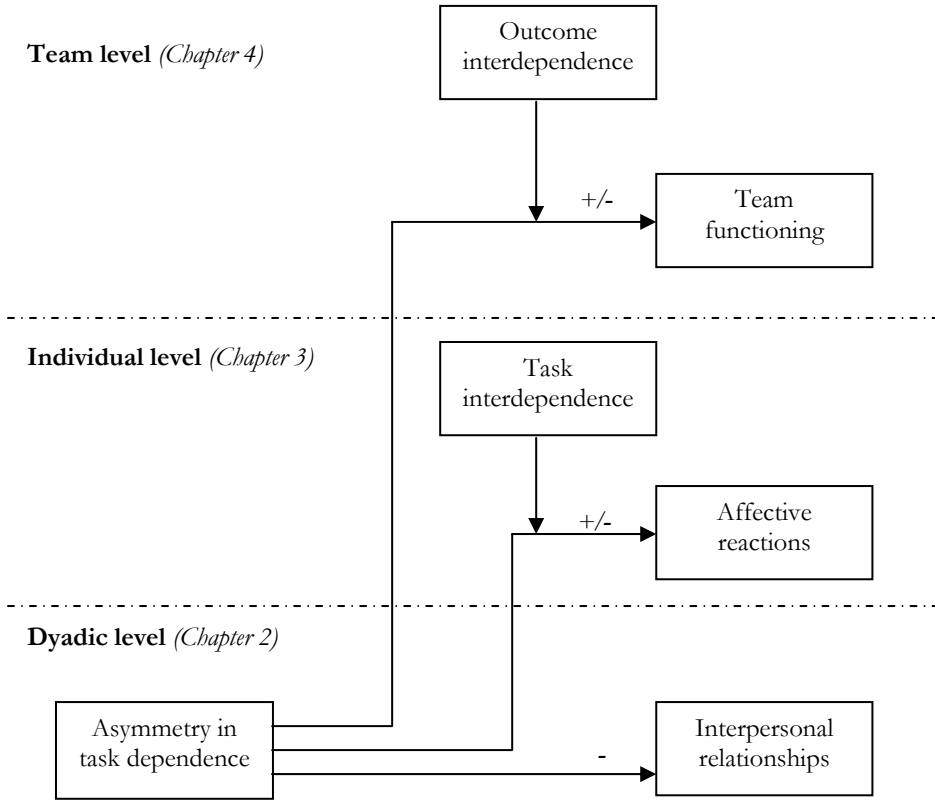


Figure 1.1: The Conceptual Model

Levels of analysis

One of the strengths of the present dissertation is the investigation of the effects of our core variable (asymmetries in task dependence) at various levels of analyses¹. The highest level we will use is the team level of analysis. At this level we will investigate if, and how, the total amount of asymmetry in task dependence within a team influences team processes and performance. The advantage of this level of analysis is that it can provide an overall picture of how asymmetries in task dependence can influence the functioning of whole work groups. However, a downside of this level is that it is impossible to investigate if differences between individuals in their asymmetries in task dependence are important for these individuals themselves and thus a certain level of detail is lacking at this level.

¹ A brief explanation of multilevel theory is provided in Appendix 1.

Fortunately, this shortcoming can be amended by studying the effects of asymmetrical task dependence at the individual level of analysis. This level is subordinate to the team level, because, in multilevel theory terms (e.g., Snijders & Bosker, 1999), individuals are "nested" within their respective teams and as such two randomly chosen individuals from our sample could belong to the same team or to two totally different teams. The advantage of the individual level is that it allows us to see if employees react similarly or differently to varying degrees of asymmetries in task dependence and it therefore provides a more fine-grained insight compared to the team level of analysis.

The lowest, and most detailed, level of analysis we will use is the dyadic level. At this level we will investigate if there are differences in the perceptions of two team members concerning their relationship with each other. Dyadic level phenomena have often been overlooked in studies regarding work teams, despite the fact that they have been argued to be important (e.g., Kelley & Thibaut, 1978; Rusbult & Van Lange, 2003). Consequently, to investigate the effects of asymmetry in task dependence systematically we will first examine the basic mechanisms operating at the dyadic level.

Study 1: Is asymmetry in task dependence (ab)used?

As was mentioned above, asymmetries in task interdependence have been associated with differences in power between individuals (e.g., Emerson, 1962; Kelley & Thibaut, 1978). To account for the fact that "power is a property of the social relation [and] not an attribute of the actor" (Emerson, 1962: p. 32), we began our first study with an investigation at the scarcely researched dyadic level. The main goals of this first study were to see if asymmetries in task dependence can actually be measured in real life teams and to test if the proposed power perspective would be a suitable framework for understanding the influence of asymmetry in task dependence on interpersonal processes.

The specific details are reported in Chapter 2, but as means of an introduction we will provide a quick overview of our reasons for taking a power perspective. Power has traditionally been associated with (the potential for) abuse and many sociologically and politically oriented scholars, such as for instance Niccolò Machiavelli and Max Weber, have investigated this issue. In light of the topic and orientation of this thesis we will not discuss such sociological and political works, but mainly focus on psychological studies regarding power. The roots of this more psychological approach go as far back as the beginning of the 20th century when Ross (1921) formulated his law of personal exploitation, which states that the person who cares less has

the power to exploit the person who cares more (see also; Waller and Hill, 1951). Given the focus of this thesis on teamwork we will not draw from these earlier sources that are less related to teamwork. Our references will only go as far back as to the works of Thibaut and Kelley (1959) and Emerson (1962), because they were the first to explicitly associate the key aspect of teamwork (namely interdependence; Lewin, 1948) with differences in power. However, as the above indicates, it seems that regardless of exactly how far we go back in history, most theories indicate that asymmetries in power can potentially be detrimental for interpersonal relationships.² Consequently, one of the main research questions of the first study was to inquire if these negative effects of asymmetries in task dependence would actually be observable in work teams and could significantly influence interpersonal relationships.

Study 2: Some room for optimism?

The second study expands on the first dyadic level study by investigating if asymmetries in task dependence can exert influence on the affective reactions of individual team members. As was mentioned above, investigating if asymmetries in task dependence might influence affective reactions is important, because affective reactions have been shown to significantly influence the health and well-being of team members (e.g., Sonnentag, 1996) as well as the productivity of the team as a whole (e.g., Ostroff, 1992).

Additionally, the second study investigates a boundary condition for the effects of asymmetrical task dependence by inquiring if some power disadvantaged team members are able to circumvent the negative consequences of their lack of power. Because prior research has shown that there are interaction effects between the different dimensions identified by interdependence theory, we decided to investigate if the amount of task interdependence might enable the power disadvantaged to convince the powerful to share their resources. We expected that high levels of task interdependence provide the power disadvantaged team members with resources to negotiate with (cf. Casciaro & Piskorski, 2005). Under these circumstances, both the power disadvantaged and the powerful have fewer alternatives for obtaining valued resources (i.e. they are both dependent) and as a result the cost for the powerful for abusing their power increases, because it could result in losing the valued resources possessed by the power disadvantaged (cf. Gulati & Sytch, 2007). Consequently, we expected that it is

² Asymmetries in power can exist for legitimate reasons, such as between parent and child, teacher and student, or doctor and patient. However, despite being legitimate, these relationships hold the potential for power abuse.

less likely that the powerful will actively use their power advantage under such conditions. Furthermore, high task interdependence can also increase the interaction frequency between the powerful and power disadvantaged, because they need to exchange resources more frequently (e.g., Anderson & Williams, 1996). An increase in interaction frequency not only increases the opportunities for the power disadvantaged to convey their needs to the powerful, but it can also increase the 'liking' between the team members due to the 'exposure effect' (Bornstein, 1989). Hence, the general expectation for the second study is that higher levels of task interdependence enable the power disadvantaged to keep the powerful informed about, and motivated in, their needs.

Study 3: Turning negative effects into positive ones

In the third and final study of this thesis (reported in Chapter 4) we will investigate if and how asymmetries in task dependence influence team performance. Given the above discussions, it seemed logical to expect that asymmetries in task dependence are negatively related to team performance due to power abuse, lower interpersonal relations, and less positive affective reactions. Because no study to date has empirically investigated this issue, examining this unexplored relationship could in and of itself be a valuable contribution. However, we tried to be a bit more ambitious and therefore asked ourselves the question if there could be situations in which asymmetries in task dependence are positively related to team performance.

Although posing this question might seem counterintuitive given the prior discussions of the negative effects of asymmetries in task dependence, there are good theoretical reasons for expecting a positive effect in some situations. These reasons became clear to us by investigating the nature of asymmetry in task dependence, because in work teams asymmetries in task dependence often arise from the differences between team members in experience, tenure, formal or informal roles, specialization, charisma, etcetera (e.g. Ragins & Sundstrom 1989). Past research has indicated that these sorts of differences can be an important input and impetus for intra-team learning and continuous improvement (King, 1998; Van der Vegt & Bunderson, 2005). Hence, as will be explained in more detail in Chapter 4, there are good reasons to expect that if the more powerful team members decide to share their resources with the less powerful team members, asymmetries in task dependence might be associated with more learning behaviors and a higher performance of the team.

It is this investigation of how teams can make use of their asymmetries in task dependence which is the main contribution of the third study. We will argue that when the amount and type of feedback focuses on

attaining group goals (instead of individual goals) asymmetries in task dependence can have a positive effect on team learning behaviors and, through team learning behaviors, on team performance outcomes. Consequently, the third study extends the first two studies by investigating the possible effects of asymmetry in task dependence at the team level and by investigating how the amount and type of feedback might be used to influence the consequences of asymmetries in task dependences. Because managers can influence the amount and type of feedback they provide to their team, we believe that this third study could be very beneficial to both practitioners as well as researchers, and provides them with more options besides changing the task interdependencies within a team.

CONCLUSIONS

To summarize the above, the reason for conducting the present dissertation was to investigate the often overlooked aspect of asymmetry in task dependence. More specifically, by drawing from theories regarding power (e.g., Emerson, 1962) we expected that asymmetry in task dependence might lead to negative outcomes if the powerful choose to (ab)use their power. However, based on a recent study of asymmetry in dependence at the organizational level (e.g., Casciaro & Piskorski, 2005) and on theories regarding learning (e.g., King, 1998), we also found reasons to believe that the possible negative effects of asymmetries in task dependence might sometimes be avoided or even be turned into positive effects. In order to systematically examine these ideas, we began by investigating if asymmetry in task dependence could actually be measured in work teams and if a power perspective would indeed be able to explain the findings. This first empirical study is reported in the following chapter and lays the theoretical and empirical basis for the subsequent two studies.

CHAPTER 2

THE RELATIONSHIPS AMONG ASYMMETRY IN TASK DEPENDENCE, PERCEIVED HELPING BEHAVIOR, AND TRUST³

Work teams consist of members who are at least moderately dependent upon each other because they are required to work together and/or to rely on each other to reach their goals (Hackman, 1987). For this reason, building and maintaining interpersonal trust is argued to be of crucial importance for the effective functioning of work teams (Dirks, 2000; Rousseau, Sitkin, Burt, & Camerer, 1998). This contention is supported by empirical research which shows that interpersonal trust among work team members indirectly increases team performance by improving the motivation to work together (Dirks, 1999; Larson & LaFasto, 1989), and also by removing the emotional and interpersonal obstacles to effective team functioning. This enables team members to “devote a greater proportion of their energies toward actual task work” (Hackman & Morris, 1975: p. 48).

Several antecedents of interpersonal trust in team contexts have been identified, such as communication (e.g., Butler & Cantrell, 1994), leadership (e.g., Podsakoff, MacKenzie, Moorman, & Fetter, 1990), procedural justice (e.g., Kosgaard, Schweiger, & Sapienza, 1995), and reward structures (e.g., Ferrin & Dirks, 2003). However, very little is known about how a team member’s reliance on others for materials, information, and other resources to complete his or her job (i.e. his or her task dependence) is related to interpersonal trust within teams. This is surprising since task dependence is generally considered to be an important defining characteristic of work teams (Ilgen, 1999), and has been mentioned as a core requirement for the

³ This Chapter is based upon De Jong, Van der Vegt, Molleman (2007).

development of trust (Rousseau et al., 1998). The few studies that have been conducted (e.g., Alge, Wiethoff, & Klein, 2003) have focused on situations in which team members were considered to be equally task dependent on each other, and overlooked the possibility that asymmetries in task dependence among members may exist that could affect their attitudes and behavior (Kelley & Thibaut, 1978). Moreover, research has so far not examined the interpersonal processes that mediate the relationship between work team members' patterns of task dependence and trust. As a consequence, we know very little about how team members working within various configurations of task dependence develop a conviction that fellow team members can (or cannot) be trusted.

This study aims to contribute to existing research on task dependence and trust by examining how different patterns of task dependence are related to interpersonal trust. Moreover, we examine the extent to which a team member's trust in another team member depends on the perceived receipt of help (i.e., on how cooperative the other team member appears to be). Drawing from theories of impression formation and social judgment (Fiske, 1993; Georgesen & Harris, 1998) and of power and dependence in social relationships (e.g., Emerson, 1962; Thibaut & Kelley, 1959; Rusbult & Van Lange, 2003; Wageman 1995; Van der Vegt et al., 2005), we develop a model that describes the relationship among various patterns of task dependence, perceived receipt of help, and trust. We then test the hypotheses derived from this model by analyzing 132 social relationships among 60 bank employees and engineers distributed across 29 teams.

THEORY AND HYPOTHESES

Definitions and levels of analysis

We start with the basic assumption that each member of a work team is necessarily, at least to some extent, task dependent on some of the other team members (Ilgen, 1999). Task dependence exists when a team member (A) needs information, resources, advice, knowledge, physical assistance, and/or equipment from another team member (B) to complete his or her task successfully (e.g., Cummings, 1978; Van der Vegt et al., 2005). In a similar way, B may be more or less task dependent on A. When A and B are equally task dependent on each other they are said to be symmetrically or mutually task dependent (cf. Casciaro & Piskorski, 2005; pp. 170-171). When A's task dependence on B is greater or less than B's task dependence on A these two individuals are said to be asymmetrically task dependent. Such asymmetry may result from the structure of the task or from differences in the resources controlled by group members due to different roles or natural endowments

(e.g., intelligence, charisma; cf. Ragins & Sundstrom, 1989). For example, a ‘newcomer’ is likely to depend more heavily on the knowledge and experience of an ‘old-timer’ than vice versa. As we elaborate below, such asymmetries in task dependence may have important consequences for the interpersonal relationships within work teams.

Existing research has mostly focused on the effects of symmetrical task dependence, usually labeled as task interdependence. This symmetrical task dependence has generally been conceptualized and measured at either the team or the individual level of analysis. At the team level of analysis, the focus has been on differences between teams in the extent of their symmetrical task dependence (e.g., Johnson & Johnson, 1989; Saavedra et al., 1993; Wageman, 1995), whereas at the individual level of analysis the focus has been on the extent to which a specific individual team member is symmetrically task dependent on the other members of the team (e.g., Van der Vegt, Van de Vliert, & Oosterhof, 2003; Van der Vegt et al., 2005). Not only do these conceptualizations ignore the possibility that team members may differ in their dependence on each other, which results in asymmetrical task dependence, they also fail to capture the possibility that a team member may depend more on some team members than on others. That is, both team level and individual level conceptualizations of symmetrical task dependence ignore potentially important variance at the interpersonal or dyadic level of analysis. In extending previous research, we therefore not only examine the possibility that task dependence can be more or less symmetrical, but also that this task dependence can differ across the relationships that one team member has with other team members.

We assume that, over the course of an extended interaction, task-dependent team members will inevitably confront situations in which their own personal interests are pitted against the interests of one or more of the other team members (Wieselquist, Rusbult, Foster, & Agnew, 1999). Following Holmes and Rempel (1989), we argue that in such situations the trust of a team member (A) in another team member (B) is determined by A’s perception of B’s behavior. In line with attribution theory (e.g., Heider, 1958) and earlier research (e.g., Ferrin, Dirks, & Shah, 2006; Korsgaard et al., 2002), we propose that in such situations especially behavior that is perceived to be performed voluntarily, rather than formally required, will be considered as an indicator of B’s trustworthiness. In this study, we therefore focus on the role of a specific type of extra-role behavior, namely the extent to which A perceives that he/she receives help from B. We define perceived receipt of help as the perception by a team member that another team member has voluntarily assisted him or her with work-related tasks or with personal problems (cf. Settoon & Mossholder, 2002). In the workplace, such behaviors

are generally not included in job descriptions regarding task dependencies between team members, nor can they be planned for or anticipated in advance (Organ, 1990).

We define A's trust in B as A's expectation that B can be relied upon to behave in a benevolent manner (Sorrentino, Holmes, Hanna, & Sharpe, 1995). Thus, whereas perceived receipt of help refers to how another team member has behaved in the past, trust reflects the expectations about this team member's integrity and dependability in the future. As with task dependence, trust has mostly been examined, in the organizational sciences, at either the team or the individual level of analysis. At the team level, researchers have investigated the direct and indirect relationships between trust and team performance (e.g., Dirks, 1999, 2000; Williams, 2001), whereas at the individual level of analysis much of the theory and research has viewed this phenomenon as a disposition - a relatively enduring personal attribute that is assumed to yield considerable stability in cognition, affect, and behavior across a variety of situations and interacting partners (e.g., Rotter, 1980; Van Dyne, VandeWalle, Kostova, Latham, & Cummings, 2000). For the purposes of the present paper, however, we view trust as a quality that is specific to a particular relationship with a fellow team member (cf. Holmes & Rempel, 1989). With the core constructs of our research model (see Figure 2.1), and the level at which they will be examined, now specified, we can proceed to an examination of the theoretical relationships we expect to observe among these constructs.

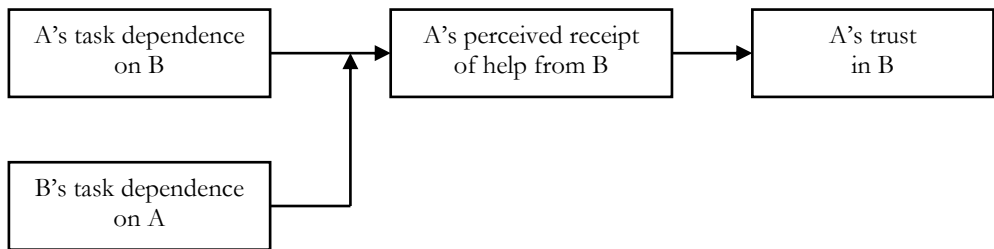


Figure 2.1: Theoretical Model

Asymmetrical task dependence and the perceived receipt of help

Although several studies in the literature on personal relationships (e.g., Rusbult & Van Lange, 2003) and supply chains (e.g., Kumar, Scheer, & Steenkamp, 1995) have acknowledged the importance of considering asymmetries in task dependence, to date, no empirical study has examined the relationship between asymmetry in task dependence and the receipt of help. The studies that have been carried out have all examined the relationship

between symmetrical task dependence and the extent to which team members help each other (e.g., Anderson & Williams, 1996). These studies suggest that, in general, higher levels of task interdependence result in greater interaction between team members (e.g., Brass & Burkhardt, 1993) which, in turn, makes the team members more aware of each other's needs and provides them with more opportunities to help each other (e.g., Anderson & Williams, 1996). Greater task interdependence may also lead to a more intense 'liking' of other team members simply as a result of the 'exposure effect' (e.g., Bornstein, 1989), and tends to increase feelings of responsibility for one another's job performance (Kiggundu, 1983; Pearce & Gregersen, 1991). These feelings of liking and responsibility, in turn, have been shown to result in higher levels of interpersonal help (Krebs, 1970; Schwartz & Howard, 1982). On the basis of these studies, it can be expected that higher levels of symmetrical task dependence will be associated with higher levels of helping behavior.

However, as we have argued above, not all intra-team relationships can be characterized by symmetrical task dependence: One team member may be more task dependent on another than vice versa. Interdependence theory (Kelley & Thibault, 1978; Thibault & Kelley, 1959) suggests that such asymmetry in task dependence between two actors will have a significant influence on the nature of their relationship. The reason is that asymmetries in task dependence are associated with differences in power between the members of the dyad. For instance, Rusbult and Van Lange (2003, p. 335) observed that "the concepts of dependence and power are inextricably related, in that to the extent that *one person (A)* is relatively more dependent, *the other (B)* is relatively more powerful" (italics added). Based on this, we will develop hypotheses about the relationship between A's task dependence on B and A's perceived receipt of help from B with both low and high levels of B's task dependence on A.⁴

When B's task dependence on A is low, a low level of A's task dependence on B reflects a situation in which both team members are task independent and equally powerful. Although these team members do not really need each other's input to perform their tasks effectively, they may nevertheless choose to voluntarily help each other (Ferrin et al., 2006). Especially in work team settings, they may become aware of the needs of

⁴ Casciaro and Piskorski (2005; p. 170) recently investigated interorganizational power and argued that "power imbalance captures the difference in the power of each actor over the other. Formally, this construct can be defined as the difference between two actors' dependencies". Although this difference score approach is a compelling way of thinking about the above processes, we chose to adopt a regression approach, in which the components and their interaction are used, to circumvent problems associated with the use of difference scores in team research (cf. Edwards, 2001).

another member and decide to assist in performing a work task, fill in when the other is absent, or provide innovative suggestions to optimize another's work performance. However, these individuals are only likely to help if the other reciprocates (Rusbult & Van Lange, 2003). If a team member does not offer help in return, this behavior may be penalized by choosing not to help in the future. As a result of this equality in power, we expect team members to offer at least moderate amounts of help and predict that this help will also be perceived of as such.

When B's task dependence on A is low, increasing levels of A's task dependence on B result in A having an increased power disadvantage. The problem this asymmetry in power creates is that the more powerful partner may choose to withhold support and can also exit the relationship more easily and at a lower cost than the less powerful team member (Cook & Emerson, 1978; Giebels et al., 2000). In such a situation, the more powerful team member may feel little need to invest in the relationship, which makes it less likely that he or she will voluntarily help the less powerful person. Moreover, because increasing asymmetrical task dependence tends to activate increased situation and person-relevant attention (Fiske, 1993), individuals in the less powerful position are also likely to accurately perceive the help they receive as limited.

When B's task dependence on A is high, the situation is very different. In such circumstances, the low task dependence of A represents a power advantage for A over B. We noted above that power disadvantages tend to focus the attention of the less powerful on the behavior of the more powerful. The reverse has been shown to be the case for the more powerful team members. Research has shown that A's low task dependence diminishes his or her need to devote cognitive effort to observing and interpreting the behavior of the dependent other (e.g., Depret & Fiske, 1999; Fiske, Harris, & Cuddy, 2004). As Fiske (1993, p. 621) noted "people in power ... do not need to pay attention, ... and they may not be personally motivated to pay attention". Thus, even when the more task dependent team member tries to signal trustworthiness to the more powerful team member by helping him or her, it is not certain that the powerful team member will recognize this extra-role behavior, and this will result in low levels of perceived receipt of help by the powerful team member. These perceptions may be inaccurate, but "this potential inaccuracy does not make the perception any less real to the employee or any less relevant as a basis for the employee's understanding and functioning within the organization" (Ferrin et al., 2006: p. 871).

If B's task dependence on A is high and A's task dependence on B increases, the relationship between A and B becomes more symmetrical and more task interdependent, which reduces their power difference and gives

both parties opportunities to control each other's behavior. The negative effects of asymmetrical task dependence on both attention and vulnerability diminish, and the relationship is characterized by increased voluntary interpersonal help, a placid and positive emotional experience, reduced use of threats or coercion, and greater stability and congeniality (Rusbult & Van Lange, 2003). As our brief review of previous research on the effects of task interdependence suggested, this is known to result in relatively high levels of perceived interpersonal help. This reasoning leads us to expect the following:

Hypothesis 1: B's task dependence on A will moderate the relationship between A's task dependence on B and A's perceived receipt of help from B: This relationship will be negative when B's task dependence on A is low and positive when B's task dependence on A is high.

Perceived receipt of help as a basis for trust

An individual's trust in another person is generally considered to be based upon his or her expectations concerning the intentions or behavior of that other person (Ferrin & Dirks, 2003; Mayer, Davis, & Schoorman, 1995; Rousseau et al., 1998). This is especially true when task dependent members of work teams encounter dilemmas involving conflict in interactions or incompatible preferences (Wieselquist et al., 1999). Holmes and Rempel (1989) labeled these as "diagnostic situations" because, in such situations, fellow team members' behavior can be considered to be indicative of their broader goals, values, and motives. When a team member foregoes immediate self-interest, this person is "signaling" a positive orientation towards the relationship, and this increases that person's perceived trustworthiness.

In work team settings, team members may signal their positive orientation in a relationship by their extra-role behavior. That is, team members can convincingly demonstrate their reliability and honesty, and hence their trustworthiness, to other team members by voluntarily helping them (Ferrin et al., 2006). Behaviors such as taking on extra responsibilities in order to help another team member or taking time to listen to a co-worker's problems and worries, demonstrate one's willingness to behave toward another in a generous and giving manner and to consider their interests and welfare. This will, in turn, result in increased trust in the helpful person's future behavior. This reasoning suggests a positive association between A's perceived receipt of help from B and A's trust in B. Combining this logic with our expectation that the relationship between A's task dependence on B and A's perceived receipt of help will be moderated by B's task dependence on A, we should also expect that:

Hypothesis 2: B's task dependence on A will moderate the relationship between A's task dependence on B and A's trust in B: The relationship will be negative when B's task dependence on A is low and positive when B's task dependence on A is high.

Hypothesis 3: A's perceived receipt of help from B will mediate the moderated relationship between A's task dependence on B and A's trust in B.

METHOD

Sample and procedure

In order to test our hypotheses, we contacted 29 teams in the Netherlands which amounted to 132 individuals in total. Most of the teams (90%) were from the banking sector. The others were engineering teams; two that provided information communication technology services, and one providing plant maintenance services. Specific jobs within our sample were, for instance, financial advisor, technical consultant, administrator, mortgage expert, business consultant, insurance expert, account manager, system engineer, software developer, auditor, analyst, and controller. These teams were selected because their higher management had indicated that asymmetries in task dependence between at least some of the team members were likely. For example, some employees in the banking sector frequently need information or advice (e.g., about specific clients or products) from other team members in order to sell more products. Furthermore, the length of time the team members had spent in the team and indeed in the organization varied, and this is likely to result in greater asymmetrical task dependence because more experienced members are likely to have greater insights into the (social) processes within the team or organization than newer ones.

We used two measurement methods (survey and network measures) and took measurements in two different periods when collecting our data. By measuring variables at two points in time, we minimize artifactual covariation between our study variables by temporally separating the measurement of the predictor and criterion variables (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The first measurement period (T1) was from December 2004 to February 2005. We introduced our research project to a group of managers by giving a presentation on it during a postgraduate course. Five managers indicated their interest in the project and agreed to participate in the study. These managers,

in turn, asked their subordinates whether they were willing to participate in the study. Given that the supervisors were aware of the purpose of our study their responses could be biased by this knowledge (e.g., demand characteristics). We therefore decided to only focus on the horizontal working relationships between team members.

Questionnaires were sent to all the 132 team members of the 29 teams that had agreed to participate in the study. These questionnaires contained questions related to the demographic background of the respondents and social network items assessing the extent of task dependence between the specific respondent and each of their fellow team members. A short introductory text explicitly guaranteed the confidentiality of their responses and explained that their names would only be used to link their responses in the two different research periods (T1 and T2). Of the 132 questionnaires that were distributed, 112 were returned (85%).

The second measurement period took place between February and April 2005. In this period, we approached only those respondents who had indicated their willingness to participate in a follow-up interview study. The interviews started with a short explanation of the purpose, and respondents were then encouraged to describe their organization and work team. We included this activity to obtain more background information about the teams under investigation and to help the respondents feel at ease before asking them to disclose the somewhat private information about their specific working relationships with fellow team members. At several times during the interviews, the respondents were asked to complete short questionnaires evaluating their perception of helpful behavior from, and their interpersonal trust in, specific other team members.

For those teams with five or more team members we randomly selected four members to be interviewed. Overall, 77 of the 90 individuals we tried to contact agreed to participate in the interview stage (85%). Each of these individuals answered questions about their relationships with up to three other team members ($M=2.39$). We used a round robin design, so that each individual team member rated and was rated by up to three other team members. This resulted in a dataset involving 184 working relationships. Our analysis strategy required a complete set of data from both individuals in a dyad. After omitting the incomplete dyads, we ended up with 132 directed perceptions from 60 individuals. Thus, the final sample included 67% of the 90 employees we first contacted for an interview, 54% of the 112 respondents who filled in the questionnaire, and 45% of the 132 individuals making up the 29 teams.

Table 2.1: Overview of the composition of the datasets at each stage of data collection

Time	Sample size		Gender		Age		Highest education			Mean tenure (years)		
	n	% female	M	SD	% Vocational qualification or higher	% Bachelor degree or higher	Org.	Team	Position			
T1	112	53.60	37.73	9.45	79.46	38.39	11.97	3.02	4.35			
T2 (all dyads)	77	44.20	38.09	10.54	81.81	35.06	13.13	2.79	4.33			
T2 (complete dyads)	60	40.00	38.78	11.04	83.33	38.33	13.63	2.83	4.37			

Note: The sample at T1 refers to the data obtained from the questionnaires. At T2, the datasets also included data from the interviews, the two subsets contained all dyads and only the complete dyads respectively.

Table 2.1 provides an overview of the characteristics of the different samples and shows that the final paired dyadic sample at T2 was not that different to the questionnaire sample at T1 or the unpaired sample at T2. The only noteworthy difference was in the gender balance of the samples (53% of the T1 sample were women and only 40% of the paired T2 sample). For this reason, we controlled for gender in all of our analyses.

Measures

A's task dependence on B. This variable was measured at T1 with a social network approach. We used a single-item based on the research of Van der Vegt et al. (2000) and adapted it to the dyadic level of analysis. For each of their fellow team members, we asked each respondent: "How dependent *are you on X* for materials, means, information, etc. in order to carry out your work adequately?" (1 = "not dependent", 7 = "fully dependent"). For each item, X was replaced by the name of a specific fellow team member. The labor-intensive character of scoring this item for all the team members precluded the use of more than one item per scale.

B's task dependence on A. This variable was again measured at T1 with a similar reformulated self-reporting item: "How dependent *is X on you* for materials, means, information, etc. in order to carry out his or her work adequately?" (1 = "not dependent", 7 = "fully dependent").

A's perceived receipt of help from B. This variable was measured during the interviews at T2 using six items adapted from Settoon and Mossholder (2002). We selected the three items from each of the task-focused and the person-focused interpersonal citizenship behavior subscales that Settoon and Mossholder had found to have the highest loadings and adapted these items to reflect the dyadic level of analysis. The selected items were; "X takes on extra responsibilities in order to help me when things get demanding at work"; "X helps me with difficult assignments, even when assistance is not directly requested"; "X assists me with heavy workloads even though it is not part of the job"; "X listens to me when I have to get something off my chest"; "X takes time to listen to my problems and worries"; and "X takes a personal interest in me" (1 = "totally disagree", 7 = "totally agree"). Before asking respondents to assess these helpfulness items, we explained that they should reflect their perceptions of X's behavior in the past. Cronbach's alpha for these six items was .87.

A's trust in B. This variable was also measured at T2, this time with six items adapted from McAllister (1995). As with the perceived receipt of help scale, we selected the three highest-loading items from each of the affective and cognitive trust subscales and adapted these to reflect the dyadic level of analysis. The items were: "I can freely share my ideas, feelings, and

hopes with X”; “I can talk freely to X about difficulties I am having at work”; “If I share my problems with X, I know (s)he will respond constructively”; “I can trust that X will approach his/her job with professionalism and dedication”; “I see no reason to doubt X's competence”; and “I can rely on X to not make my job more difficult by working carelessly” (1= “totally disagree”, 7=“totally agree”). We introduced the items by first stating that they pertained to how trustworthy the participants expected X to be in the future. This time, Cronbach’s alpha was .89.

Control variables. We controlled not only for team members’ gender but also for their age and length of team membership (i.e. team tenure) in all of our analyses, because these variables have previously been shown to be associated with interpersonal power (e.g., Carli, 1999), interdependence (e.g., Timmerman, 2000), and trust (e.g., Maddux & Brewer, 2005). These control variables were measured as part of the T1 questionnaire. As with other studies on team working (e.g., Van der Vegt et al., 2003), we also controlled for team size in our analyses.

Convergent and discriminant validity

We assessed the convergent and discriminant validity of the trust and the perceived receipt of help items using confirmatory factor analysis. We computed parameter estimates using the maximum likelihood method included in the LISREL 8.51 computer package. Since A’s perceived receipt of help from B, and A’s trust in B each had two sub-dimensions (see McAllister, 1995; Settoon & Mossholder, 2002) we selected a model that contained four first-order latent constructs (i.e. the sub-dimensions) and two second-order latent constructs (i.e. A’s perceived receipt of help from B, and A’s trust in B). The fit statistics were satisfactory: $\chi^2(49, 184) = 93.17, p < .001$; the standardized root mean square of the residuals (SRMSR) was .048; the goodness-of-fit index (GFI) was .92; and the comparative fit index (CFI) was .98. The factor “loading” of each item on its corresponding construct was significant at the .001 level or better.

We also computed two alternative models in order to evaluate the discriminant validity of our measurement model. The first alternative model contained only a single first-order construct. This model did not fit the data well: $\chi^2(54, 184) = 697.14, p < .001$; SRMSR = .14; GFI = .61; CFI = .67, whereas our initial measurement model fitted the data significantly better ($\Delta\chi^2[5] = 603.97, p < .001$). The second alternative model contained four first-order latent constructs (i.e. the sub-dimensions) but only one second-order latent construct. Although this model fitted the data reasonably well: $\chi^2(50, 184) = 105.87, p < .001$; SRMSR = .061; GFI = .91; CFI = .97, the fit was worse than that of the original model ($\Delta\chi^2[1] = 12.70, p < .001$). Hence, we

concluded that our original hypothesized measurement model was the most appropriate for the situation under consideration.

Inter-dyad agreement on task dependence measures

Following Kenny (2004), we examined the agreement between two perceivers of the extent of task dependence using both an analysis of variance and a correlational approach. A one-way analysis of variance, using the dyad number as the predictor and task dependence as the criterion variable, was significant ($F[131, 132] = 2.20, p < .001$), indicating that the variability in perceptions of task dependence between dyads was larger than the variability within dyads. Furthermore, the zero-order correlations between A's and B's perceptions of the extent to which A was task dependent on B ($r = .37$) and to which B was task dependent on A ($r = .38$) were positive and significant (both with a $p < .001$). Taken together, these results suggest that although dyad members do differ in their perceptions of each other's task dependence, there was a substantial reality to the perceived task dependence structure that both the team members could perceive and describe.

Statistical analyses

Given the specific nested structure of the data, with relationships nested within dyads, and both individuals and dyads nested within work teams, we conducted a multilevel analysis using a hierarchical linear modeling macro of the social relations model (SRM; see Snijders & Kenny, 1999, or Kenny, 1994, for more technical details). SRM analysis takes the specific nested structure of the dataset into consideration and differentiates between various levels of analysis, in our case the individual (i.e. the actor or the partner), dyadic, and team levels. Furthermore, a distinction is made between random and fixed effects. Random coefficients reflect the variance partitioning in patterns between and within groups, and fixed effects indicate the influence of the predictor variables at the group, individual, and dyadic levels.

To conduct an SRM analysis, one has to first calculate a null-model. This model does not contain any predictor variables and is used as a reference for subsequent analyses. This null-model provides an overview of how the variances in the dependent variables are partitioned (see Table 2.3): They estimate how much of the variance can be explained by characteristics of the actor (e.g., friendly people help others more often), the partner (e.g., friendly people receive more help from others), the dyad or relationship (e.g., only when both A and B are on friendly terms will they help each other), and the team (e.g., a friendly manager will induce more helpful behavior in all of his employees).

Next, in subsequent models, the predictor variables are added (see Tables 2.4 and 2.5). In Model 1, we added the control variables, and then we added the main effects (Model 2) and the two-way interaction between A's task dependence on B and B's task dependence on A (Model 3) to the hierarchical linear model. To test for the mediating role of A's perceived receipt of help from B, we controlled for this variable in Model 4 shown in Table 2.5.

We tested for a decrease in log-likelihood between each of the models in Tables 2.4 and 2.5 by means of a chi-square difference test. All the independent variables were standardized prior to the analysis to minimize the likelihood of multicollinearity problems and to facilitate comparison between the obtained coefficients. The interaction term was calculated from the product of the standardized variables (see Aiken & West, 1991).

RESULTS

Descriptive statistics

The means, the standard deviations, and the Pearson zero-order correlations between the variables are presented in Table 2.2. As can be seen, the zero-order correlations between length of team membership and A's trust in B ($r=.20, p<.05$), and between A's task dependence on B and A's perceived receipt of help from B ($r=.27, p<.01$) were both positive and significant. The zero-order correlation between B's task dependence on A, and A's perceived receipt of help from B was also positive and significant ($r=.22, p<.05$). A's perceived receipt of help from B, and A's trust in B were strongly and positively related ($r=.67, p<.001$). To obtain an indication of the number of asymmetrical task dependence relationships in our sample, we calculated for all A's the difference between their task dependence on B and these B's task dependence on them. This revealed that in 53% of the relationships at least one of the dyad members perceived asymmetry in task dependence in the relationship.

Table 2.2: *Descriptive Statistics and Pearson Zero-Order Correlations among the Study Variables*

#	Variable	M	SD	1	2	3	4	5	6	7
1	Gender	1.40	.49							
2	Age	38.78	11.04	-.41***						
3	Team tenure	2.83	5.28	-.19*	.25**					
4	Team size	4.59	4.15	.05	-.27**	-.13				
5	A's task dependence on B	4.21	1.81	-.30***	.32***	.07	-.40***			
6	B's task dependence on A	4.13	1.79	-.37***	.29***	.04	-.42***	.84***		
7	A's perceived receipt of help from B	4.71	1.22	.12	.18*	.10	-.23**	.27**	.22*	
8	A's trust in B	5.48	1.08	.02	.19*	.20*	-.10	.04	.03	.67***

Note: the correlations are calculated at the dyadic level. The Mean (M) and Standard Deviation (SD) of Gender, Age, and Team membership are calculated at the individual level. The M and SD of Team size are at the team level. With the other four variables, the M and SD are at the dyadic level.

* p < .05

** p < .01

*** p < .001

Variance partitioning

A's perceived receipt of help from B. The results from the variance partitioning for A's perceived receipt of help from B is presented in Table 2.3. No significant variation was found among the teams in terms of the perceived receipt of help, which is not unusual in social relations modeling (e.g., Kenny, 1994; Kenny, Mannetti, Pierro, Livi, & Kashy, 2002; pp. 127-128). Thirty-five percent of the variance in perceived receipt of help was attributable to actor effects (A) and 15% of the variance was attributable to partner effects (B). Forty-nine percent of the variance in perceived receipt of help was due to dyadic effects. These results indicate that the specifics of the relationship between A and B have the strongest influence on the perceived receipt of help, followed by the specific characteristics of the actor and then those of the partner.

A's trust in B. Table 2.3 shows that the level of A's trust in B did not significantly differ across teams. Forty-four percent of the total variance in interpersonal trust was due to actor effects, and 28% of the total variance could be attributed to partner effects. The remaining 27% of the total variance in interpersonal trust was due to dyad effects. These results not only provide some support for a trait approach to trust, but also indicate that the trust of one team member in another depends, to a large extent, on the characteristics of that fellow team member and on the characteristics of the relationship.

Table 2.3: *Variance Partitioning*

Source of variance	A's perceived receipt of help from B		A's trust in B	
	Estimate	SE	Estimate	SE
Group variance	.000 (0%)	.000	.000 (0%)	.000
Actor variance	.542 (35%)	.191	.529 (44%)	.150
Partner variance	.225 (15%)	.147	.334 (28%)	.115
Dyadic variance	.740 (49%)	.185	.326 (27%)	.071
χ^2		394.044		356.713

n=132

Hypotheses tests

Hypothesis 1 predicts that B's task dependence on A will moderate the relationship between A's task dependence on B and A's perceived receipt of help from B in such a way that this relationship will be negative when B's task dependence on A is low, and positive when B's task dependence on A is high. As can be seen in Table 2.4, after adding the control variables in Model 1 and the main effects of A's and B's task dependence to the hierarchical linear model in Model 2, the third step of the analysis, as reflected in Model 3, was significant ($\Delta\chi^2(1)=6.08, p<.05$). The coefficient for the interaction between A's task dependence on B and B's task dependence on A was also significant and with the expected positive sign ($b=.295, p<.05$).

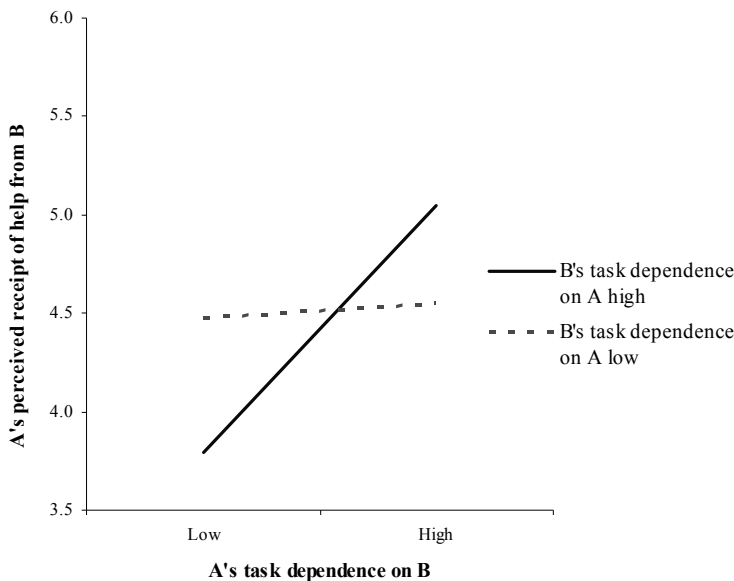


Figure 2.2: The Two-way Interaction for A's Perceived Receipt of Help from B

Figure 2.2 represents the significant two-way interaction between A's task dependence on B and B's task dependence on A, and A's perceived receipt of help. In creating the figure we followed the procedures suggested by Aiken and West (1991). This figure shows that, although the interaction coefficient was positive and significant, the pattern of results is somewhat different to what we expected. That is, it appears that A's task dependence on B was unrelated to A's perceived receipt of help when B's task dependence on A was low (simple slope: $b=.036, t=.18, n.s.$), and that this relationship was strongly positive when B's task dependence on A was high (simple slope: $b=.627, t=2.90, p<.01$).

Table 4: Results of SRM Analyses for A's Perceived Receipt of Help from B

Step	Variables	Model 1		Model 2		Model 3	
		Estimate	SE	Estimate	SE	Estimate	SE
Control variables	Gender of A	.268~	.141	.332*	.148	.228	.152
	Age of A	.202	.139	.174	.139	.171	.137
	Team tenure of A	.181	.152	.206	.152	.215	.150
	Gender of B	.268*	.122	.273*	.116	.265*	.115
	Age of B	.241~	.122	.255*	.117	.208~	.118
	Team tenure of B	-.010	.110	.028	.109	.038	.108
	Team size	-.139	.150	-.031	.160	-.102	.162
	$\Delta\chi^2$ (7)		11.95				
Main effects	A's task dependence on B			.301~	.175	.331~	.173
	B's task dependence on A			-.024	.185	-.047	.184
	$\Delta\chi^2$ (2)				5.32~		
2-way interaction	A's task dependence on B*					.295*	.118
	B's task dependence on A						
	$\Delta\chi^2$ (1)						6.08*

n=132

~ $p < .10$ * $p < .05$

Hypothesis 2 predicts that B’s task dependence on A will moderate the relationship between A’s task dependence on B and A’s trust in B in such a way that the relationship will be negative when B’s task dependence on A is low, and positive when B’s task dependence on A is high. As can be seen in Table 2.5, after we added the control variables in Model 1 and the main effects of A’s and B’s task dependence in Model 2, the third model was significant ($\Delta\chi^2(1)=9.20, p<.01$) and the coefficient of the interaction between A’s task dependence on B and B’s task dependence on A was significant and with the expected positive sign ($b=.318, p<.01$)⁵.

Plotting this interaction effect and testing the simple slopes revealed a pattern of results that was similar to that obtained for A’s perceived receipt of help (see Figure 2.3): A’s trust in B was unrelated to A’s task dependence on B provided B’s task dependence on A was low ($b=-.151, t=-.84, n.s.$) but positively related to A’s task dependence on B when B’s task dependence on A was high ($b=.485, t=2.59, p<.05$). Thus, although the hypothesized moderating effect of B’s task dependence on A was significant, the pattern of results was again somewhat different to what we had expected.

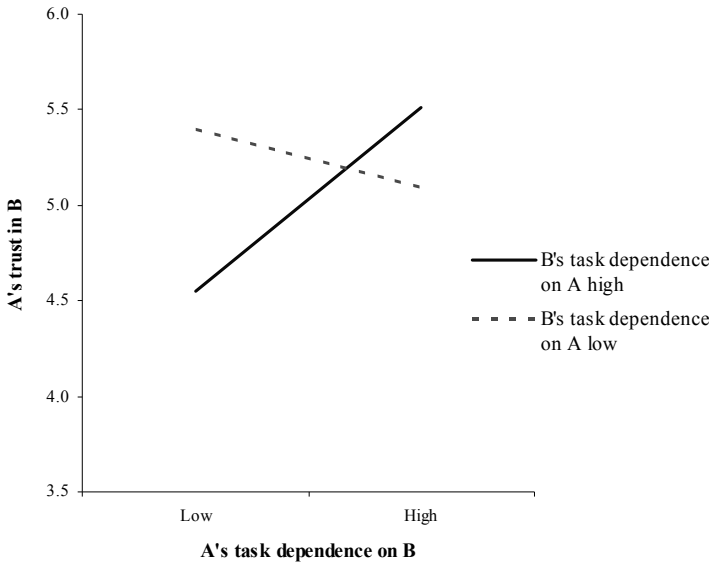


Figure 2.3: The Two-way Interaction for A's Trust in B

⁵ The results from the interaction models were similar when we dropped the control variables from the analyses. More specifically, the results from these SRM analyses for A’s perceived receipt of help from B were $b=.351$ ($se=.170$) for A’s task dependence on B, $b=-.043$ ($se=.171$) for B’s task dependence on A, and $b=.303$ ($se=.109$) for the interaction term. The results for A’s trust in B were, $b=.166$ ($se=.150$) for A’s task dependence on B, $b=-.102$ ($se=.154$) for B’s task dependence on A, and $b=.297$ ($se=.094$) for the interaction term.

Table 2.5: Results of SRM Analyses for A's Trust in B

Step	Variables	Model 1		Model 2		Model 3		Model 4	
		Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Control variables	Gender of A	.186	.136	.185	.144	.101	.137	-.034	.102
	Age of A	.131	.136	.122	.139	.108	.129	-.008	.098
	Team tenure of A	.260~	.146	.261~	.149	.268~	.141	.172~	.108
	Gender of B	.248*	.113	.254*	.114	.251*	.111	.116	.085
	Age of B	.153	.116	.163	.117	.110	.116	-.015	.091
	Team tenure of B	.006	.106	.000	.109	.013	.105	-.001	.081
Team size	.020	.160	.041	.167	-.036	.173	-.018	.139	
$\Delta\chi^2 (7)$		8.35							
Main effects	A's task dependence on B			.173	.156	.166	.152	-.076	.129
	B's task dependence on A			-.115	.169	-.109	.163	-.057	.134
$\Delta\chi^2 (2)$		1.12							
2-way interaction	A's task dependence on B *					.318**	.101	.193*	.083
	B's task dependence on A								
$\Delta\chi^2 (1)$						9.20**			
Mediation	A's perceived receipt of help from B							.628***	.075
$\Delta\chi^2 (1)$								55.64***	

n=132

~ $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

As can be seen by comparing the results of Model 4 with those from Model 3 (both shown in Table 2.5), the significance of the two-way interaction between A's task dependence on B and B's task dependence on A fell when we controlled for A's perceived receipt of help (from $b=.318, p<.01$ in Model 3 to $b=.193, p<.05$ in model 4). The coefficient for perceived receipt of help in Model 4 was positive and significant ($b=.628, p<.001$). Although the strength of the two-way interaction had decreased by almost 40 percent compared with Model 3, the interaction effect was still significant. This suggests that A's perceived receipt of help from B partially mediated the relationship between (asymmetrical) task dependence and trust⁶. These results, to an extent, support Hypothesis 3.

DISCUSSION

Our SRM analyses at the dyadic level of analysis generally supported the finding from prior research that higher levels of task interdependence (i.e. symmetrical task dependence) result in more (perceived) helping (e.g., Johnson & Johnson, 1989; Van der Vegt et al., 2005; Wageman, 1995). The amount of perceived receipt of help was highest when both team members were highly task interdependent and lower when both were independent.

The pattern of results with regard to asymmetrical task dependence turned out to be more complex than expected. From insights gained from the impression formation and social judgment literature (Fiske, 1993; Georgesen & Harris, 1998), we had hypothesized that when the interaction partner was more dependent and therefore less powerful, the focal team member's task dependence would be positively related to the perceived help from and trust in the other partner, and our evidence supports this. However, in contrast to what is suggested in the power-dependence literature (Emerson, 1962; Thibaut & Kelley, 1959; Rusbult & Van Lange, 2003), we found that increased task dependence was unrelated to perceived receipt of help and trust when the other team member was more powerful. The extent of trust by the less powerful team members in our sample was apparently undiminished by the potentially greater vulnerability to possible power abuse by more powerful team members. Our third hypothesis received some support in that we found that the perceived receipt of help mediated, albeit only partially, the relationship between asymmetry in task dependence and trust. Below, we will first discuss the somewhat complex findings of the simple slopes analyses,

⁶ As was mentioned by one of the reviewers mean differences across the groups could have created artifactual correlations among the variables. We therefore repeated all the analyses with a dataset containing only the bank employees to examine whether team type affected our findings. The results from these analyses were similar to the results presented here.

followed by a discussion on the theoretical implications of our results, the strengths and weaknesses of our study, and some possible directions for future research. We conclude the discussion by highlighting the most important practical implications.

Interpretation of the simple slopes

An initial potential explanation for the unexpected simple slope findings is that while the more-powerful team members in our sample did actually abuse their power by not providing help, the less powerful team members cognitively distorted their view of this behavior because they needed the resources and could simply not afford to be honest or balanced in assessing the other's destructive behavior. Although we cannot rule out this possibility from the data obtained in this study, it should be noted that such an explanation would be inconsistent with social judgment literature (e.g., Fiske, 1993; Georgesen & Harris, 1998) which has shown that less powerful members are usually more accurate in their assessments of the behavior of more powerful members than vice versa.

A second possible explanation is suggested by the information that was gathered during the interview phase of this study. This information revealed that many of the teams in our sample were collectively accountable for the team product. For example, many team members received bonuses based on a good collective performance. As a consequence, the more powerful members in our sample may not have abused their power simply because it was in their own interests to help the less powerful team members. This explanation is consistent with earlier research which suggested that collective rewards increase interpersonal trust (Ferrin & Dirks, 2003).

A third explanation for the absence of negative relationships between task dependence and both perceived helpfulness and trust may lie in the fact that interactions and relationships are dynamic phenomena that tend to mutate and evolve over time (Rusbult & Van Lange, 2003; Wieselquist et al., 1999). It is possible that the negative effects of power differences are more likely to occur in the early stages of a working relationship. When a powerful partner continuously abuses his or her power, the weaker team members may search for alternative sources of crucial resources (e.g., Wageman, 1995). This reasoning suggests that asymmetrical task dependence structures may become more symmetric or more cooperative over time. Given that the research participants had been part of their teams for some considerable time, it is possible that the asymmetrical relationships in our sample had become more cooperative than those found in newer relationships. As is apparent from the discussion above, a lot of work still needs to be done to fully understand the precise relationships among the various patterns of task dependence,

helpfulness, and trust; and some interesting avenues for future research are suggested below. However, we believe that while our findings do indicate a need for more research, they also offer several important insights.

Theoretical implications

First, our SRM analyses revealed that substantial proportions of the variance in perceived receipt of help and trust were due to differences in the dyadic relationships among team members within work teams. The fact that our dyadic task dependence measures explained a substantial portion of the variance implies that it would be beneficial to broaden the traditional focus in the interdependence literature – which tends to be either on the individual (e.g., Pearce & Gregersen, 1991) or the team level of analysis (e.g., Liden, Wayne, & Bradway, 1997) - to include the interpersonal level of analysis. Moreover, by focusing on the interpersonal or dyadic level of analysis, we were able to observe the effects of asymmetry in task dependence on helpfulness and trust - something that cannot easily be established at higher levels of analysis.

Second, the results indicated that asymmetry in task dependence (or power) was only important when the asymmetry was in the perceiver's favor. In such cases, the dependent team member tended to be perceived as less helpful and trustworthy than was generally the case in other situations. That is, the results suggest that when person A is asymmetrically independent of person B, person B tends to be perceived as being unhelpful and untrustworthy, even when B has the opposite perception. If person A is the most independent member of a team, then he or she is unlikely to see B, a member who is more dependent on A than vice versa, as all that helpful or trustworthy. B may not share A's view of their relationship but will tend to have similar perceptions of those team members who are, in turn, relatively dependent themselves. Our results contribute to theories about power by indicating that power might be in the eye of the beholder, and that any distortions in the perceptions of the powerful (e.g., Fiske, 1993) might be more important than the actual use and abuse of power (e.g., Emerson, 1962).

Third, our results support Rousseau et al.'s (1998) contention that task dependence is important for the development of trust. Moreover, our results extend current knowledge by suggesting that a more detailed look at the relationship between task dependence and interpersonal trust might be a fruitful avenue for future research. Our finding that interpersonal trust in work partnerships can be related to positive past behaviors by the other person (Mayer et al., 1995; Rousseau et al., 1998) adds to existing knowledge (e.g., Ferrin & Dirks, 2003) by providing a deeper insight into the relatively

unknown processes of how interpersonal trust develops at the dyadic level within work teams.

Fourth, our findings add to the limited literature on the role of helpfulness in interpersonal working relationships. Mutual help among peers has been little researched (Flynn, 2003) and, as Podsakoff, MacKenzie, Paine, and Bachrach (2000) observed, the fields understanding of the task-related antecedents of helpful behavior is far from complete. The findings of our study show the usefulness of adopting an interpersonal or dyadic focus in trying to understand helpful behavior and reveal that the degree of (a)symmetrical task dependence is an important antecedent of perceived helpful behavior among team members.

Strengths and weaknesses

The present study naturally has both strengths and weaknesses, and the latter may warrant some caution in interpreting the results. A possible weakness is our use of self-reporting measures, since this may introduce common source bias. However, the potential impact of any such bias should be reduced by the fact that we measured task dependence at T1 using a questionnaire and assessed trust and perceived helpful behavior at T2 during an interview. Taking measurements on two separated occasions makes it less likely that response biases (e.g., daily moods) will distort the findings (e.g., Podsakoff et al., 2003). Moreover, it would be difficult to attribute the significant two-way interactions found to common method bias. Nevertheless, future research could set out to confirm the validity of our findings by using data from different sources and by measuring all the variables at each point in time in order to provide firmer evidence for the direction of causality suggested by our findings.

Another potential weakness of the present study is the use of single-item measures for the two task dependence variables. In line with other studies involving social networks (e.g., Bowler & Brass, 2006), we opted for single-item measures because the demands on the respondents were already quite high and we wanted to investigate all the work relationships within a team. However, given the fact that our items were adopted from existing scales that have shown good reliability and validity in previous research (Van der Vegt et al., 2000), we believe that our use of single-item measures does not invalidate our conclusions. Nevertheless, future research might benefit from using several items for each variable.

Finally, our sample was fairly homogeneous in terms of backgrounds, since most of our respondents were from the banking sector. This homogeneity not only raises questions about the generalizability of our findings to other industries and settings, it might also be a factor in our

finding that group-level variations in perceived help and trust were absent (see Table 2.3). Conversely, this homogeneity in our sample could also be seen as an advantage, because it helps to rule out alternative explanations such as team and organizational climate (e.g., Parker et al., 2003).

A related issue is that we only investigated relationships among employees on a similar level to each other, and did not include supervisor-subordinate relationships in the sample. As was explained in the Method section, this was done for methodological reasons although, from an equity perspective, it might be worthwhile to include such hierarchical relationships, since it can be reasoned that the asymmetry in power between a supervisor and a subordinate is perceived to be more "normal" and "fair" than any asymmetry between "equals" (e.g., Adams, 1963). Future research could therefore investigate whether, and to what extent, the findings from this study apply to these other types of relationships.

Future research

Given the paucity of empirical research into the effects of asymmetry in task dependence in work teams, many interesting avenues for future research can be identified. First, an important question that should be addressed in future research is which variables can reduce the negative effects on help and trust of asymmetry in task dependence. One promising variable to consider may be the degree of outcome interdependence in work teams (e.g., Van der Veegt & Van de Vliert, 2002). Earlier research has found that task and outcome interdependence interact in their effects on attitudinal and behavioral outcomes in such a way that positive outcomes are to be expected when the degrees of task and outcome interdependence are similar (i.e. when both are high or low; Jonhson & Johnson, 1989; Van der Veegt et al., 2005; Wageman, 1995). These studies suggest that powerful team members might be more motivated to expend cognitive effort on observing the "pro-relationship behaviors" of the less powerful when their team has a high outcome interdependence. Furthermore, using their power is perhaps more attractive to powerful team members when the outcome interdependence is low, simply because helping the more dependent team members takes time away from their own tasks and increases the performance of the less powerful team members. This might be especially the case when outcomes are divided on a competitive basis. As these suggestions illustrate, the inclusion of moderators such as outcome interdependence might help to explain when and why cognitive processes play an important role and when the active use or abuse of power becomes an important process. Additionally, future studies could also investigate whether the use of power is a process that operates independently from the cognitive processes, or whether a decline in the

motivation to pay attention to the powerless is an antecedent of increased use of power (cf. Fiske et al., 2004).

Another interesting avenue for future research might be to examine how the relationships between dyadic task dependence and a number of outcome variables are influenced by the characteristics of the relationship partner. Our results shown in Table 2.3 suggest that, at least with this sample, 15% of the variance in perceived helpfulness and 28% of the variance in trust could be explained by the characteristics of one's partner. It might be interesting and fruitful to investigate, for example, whether the relationship partner's position in the intra-team task interdependence network affects the actor's perceived helpfulness and trust. Building on this, it might be beneficial to investigate triads or larger networks of task interdependencies within work teams (cf. Casciaro & Piskorski, 2005).

In addition, we found that perceived helpfulness only partially mediated the relationship between task dependence and trust. This suggests that other variables must also influence this relationship. Future research might therefore consider the role of other mediating variables such as another's "willingness to sacrifice" and "forgiveness" (see, e.g., Wieselquist et al., 1999; Ferrin & Dirks, 2003).

Our final suggestion is that, as a further refinement to our study, one could investigate the role of the task environment (e.g., Steiner, 1972; Thompson, 1967). It seems likely that if the performance of a team reflects the performance of its most capable member, as will be the case in some problem-solving tasks (i.e. a disjunctive task; Steiner, 1972), then the types of task dependence and power will differ from the types of task dependence and power found in a team where overall performance reflects the task performance of the least capable member (i.e. a conjunctive task) as, for example, on an assembly line. Although both of the individuals described could have equal amounts of coercive power, the more capable team member is more likely to have significant expert power (Raven, 1992), and, hence, different effects on a number of outcome variables can be expected. Future research could therefore explore to what extent such differences in the task environment shape the relationship between asymmetry in task dependence and power.

Practical implications

Although much work still needs to be done, the results of the present research suggest that practitioners should consider the presence and consequences of asymmetry in task dependence within their teams. Our results suggest that powerful team members do not always fully recognize helpful behavior by their more dependent colleagues and that this can lead to

a decrease in interpersonal trust. On the basis of these findings, we recommend that practitioners try to decrease the amount of asymmetry within their teams by making team members symmetrically task dependent upon each other. They could achieve this, for example, by reorganizing the work or by implementing training and mentoring programs. If it is impossible to decrease the asymmetry in task dependence, one could try to motivate the powerful to pay attention to the powerless by increasing the amount of outcome interdependence. This could also reduce the potential attraction of abusing power advantages within a team. Although such an intervention might seem logical, and is in line with findings from earlier research into interdependence (e.g., Johnson & Johnson, 1989; Van der Vegt et al., 2005; Wageman, 1995), future research is needed to establish if such an intervention would actually have the desired effects. We therefore argue that our results indicate a need for further research into asymmetry in task dependence between employees and hope that we have provided a good starting point and encouragement for undertaking such endeavors.

CHAPTER 3

THE INFLUENCE OF TASK INTERDEPENDENCE ON THE RELATIONSHIPS BETWEEN POWER DISADVANTAGE AND AFFECTIVE REACTIONS⁷

Creating positive affective reactions within a team, such as high affective team commitment and job satisfaction, is of great importance for the health and well-being of team members (e.g., Sonnentag, 1996) as well as the productivity of the team as a whole (e.g., Ostroff, 1992). Additionally, the value of having employees with positive affective reactions is important for organizations in light of the increasing problem of retaining qualified employees due to the shortages on several segments of the labor market (cf. Cappelli, 2005). This importance arises from the fact that the turnover (intentions) of these employees strongly depends on their affective reactions towards their team and their job (e.g., Hellman, 1997; Van Knippenberg & Sleebos, 2006). Consequently, it is of great worth to both researchers and practitioners alike to gain insight into the antecedents of positive affective reactions.

Previous research has already identified several antecedents, such as individual differences in affectivity (e.g., Connolly & Viswesvaran, 2000), role ambiguity and role conflict (e.g., Jackson & Schuler, 1985), and experienced meaningfulness and felt responsibility for outcomes of the work (e.g., Fried & Ferris, 1987). Recently, Rasmussen and Jeppesen (2006: p. 123) observed that the majority of studies regarding interdependence and satisfaction reported a positive relationship, which indicates that the interdependence among team members might also be an important antecedent of affective reactions.

⁷ This Chapter is based upon De Jong, Van der Vegt, Molleman (Submitted).

Consequently, it can be argued that the more team members have to exchange materials, information, and resources with other team members, the more satisfied they generally are with their jobs and their team (e.g., Sprigg, Jackson, & Parker, 2000; Van der Vegt et al., 2000; Van der Vegt et al., 2001; Wageman, 2001).

However, most prior studies have only examined the effects of the *level* of task interdependence and ignored the possibility that inequalities or *asymmetries* in task dependence can exist between team members (e.g., Kelley & Thibaut, 1978). Although empirical evidence is still scarce, recent studies focusing at the relational level (De Jong, Van der Vegt, & Molleman, 2007; Rusbult & Van Lange, 2003) indicate that such asymmetries in task dependence are associated with power imbalance in work relations. In this study we will extend these findings by examining the relationship between asymmetry in task dependence and team members' affective reactions. Based on empirical studies and theories regarding power and dependence (e.g., Emerson, 1962) we will argue that team members who are more task dependent upon colleagues than vice versa (e.g., whom are power disadvantaged) will report more negative affective reactions unless they are able to convince their more powerful colleagues to pay attention to their needs. By drawing from research regarding social exchange and interdependence (e.g., Anderson & Williams, 1996; Borstein, 1989) we will argue that higher levels of task interdependence enable the power disadvantaged to convince their powerful team members to share their resources (cf. Casciaro & Piskorski, 2005).

Hence, by explicitly separating the effects of asymmetry in task dependence from the effects of the level of task interdependence, we are able to investigate the unexplored relationship between power disadvantage, task interdependence and affective reactions. By doing so we not only aim at increasing the insights into the antecedents of affective reactions (e.g., Rasmussen & Jeppesen, 2006), but also aim at increasing the knowledge about the scarcely researched effects of asymmetry in task dependence (cf. De Jong et al., 2007; Casciaro & Piskorski, 2005). The hypothesis will be tested with multi-level analyses of a dataset containing 262 employees.

THEORY AND HYPOTHESES

Definitions and research model

Since one of the main contributions of the present study is to disentangle the effects of the level of task interdependence and asymmetries in task dependence, we will discuss these two constructs first. The concept of task interdependence has received an ample amount of attention from researchers

(for reviews see, e.g., Johnson & Johnson, 1989; Van der Vegt et al., 2005; Van der Vegt & Van de Vliert, 2002; Wageman, 2001) and has often been defined as the degree to which the design of an individual team member's tasks and job requires that he or she coordinates activities and exchanges materials and information with other members of the team for being able to carry out the job (Brass, 1981; Kiggundu, 1983; Van der Vegt et al., 2000, 2001; Van der Vegt & Van de Vliert, 2005). Most of these studies reported a positive relationship between the level of task interdependence and positive affective reactions (e.g., Rasmussen & Jeppesen, 2006). Task interdependence might increase job satisfaction, because higher levels of task interdependence are often associated with more varied and challenging work (e.g., Van der Vegt et al., 2001: p. 54).

In sharp contrast to the efforts spent on investigating the level task interdependence stands the amount of attention paid to asymmetry in task dependence. Asymmetry in task dependence has been defined at the relational level as the degree to which a team member (A) needs more/less information, resources, advice, knowledge, physical assistance, and/or equipment from another team member (B) in order to complete his or her task successfully than vice versa (e.g., Cummings, 1978; De Jong et al., 2007; Van der Vegt et al., 2002). As will be explained below, such asymmetries in task dependence could exert an influence on the individual level due to their association with differences in power between individuals (e.g., De Jong et al., 2007; Rusbult & Van Lange, 2003). More specifically, individuals who are more task dependent on their colleagues than vice versa need more resources than they themselves can offer in return and are therefore in a position of power disadvantage (cf. Emerson, 1962). Since individuals will only use the power they perceive to have, we developed our model by explicitly taking these self-perceptions into consideration (cf. De Jong et al., 2007; Ferrin et al., 2006). For the above reasons, we focus on perceived power disadvantage as the basis of our model (see Figure 3.1) and, inline with the classical formulation of power (Emerson, 1962), we define perceived power disadvantage as the awareness of a team member of being more task dependent upon his or her colleagues than vice versa.

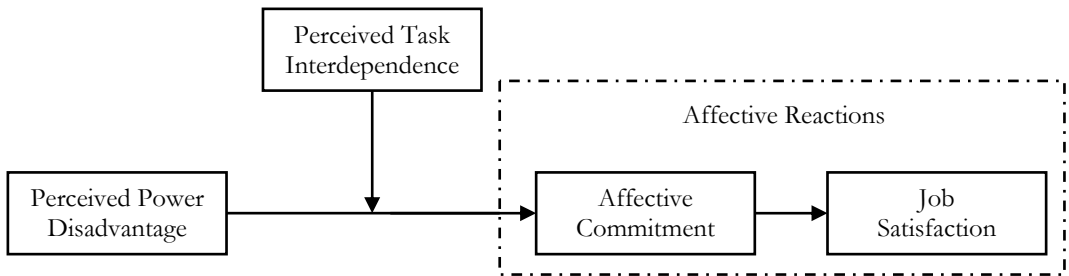


Figure 3.1: Research Model

As the above discussion indicates our model builds on the recently emerged evidence that power differences due to asymmetries in task dependence can significantly influence social exchange processes at the relational level (De Jong et al., 2007). An individual's affective commitment to the team captures the result of such social exchange processes, because affective commitment is derived from an individual's perceptions of how the other party is living up to their part of the social exchange processes (cf. Van Knippenberg & Sleebos, 2006). Consequently, due to this association with social exchange processes, we will argue that affective commitment mediates the relationship between perceived power disadvantage and job satisfaction. Furthermore, we expect that the relationship between perceived power disadvantage and affective reactions is influenced by perceived task interdependence (cf. Casciaro & Piskorski, 2005). Before explaining this moderating effect of perceived task interdependence we will first discuss the core of our model, namely the relationship between asymmetry in task dependence and perceived power disadvantage.

Perceived power disadvantage and affective commitment

The association between differences in dependence and differences in power was already made by Richard Emerson in 1962, who mentioned (p. 33) that: "the power of A over B is equal to, and based upon, the dependence of B upon A". Emerson not only related differences in dependence with power imbalance, he also distinguished this concept from the level of dependence. However, as Casciaro and Psikorski (2005, pp. 168-169) recently observed, these two different aspects of dependence were combined in one concept of interdependence in the original formulation of resources dependence theory. Unfortunately, this integration of the level of and the differences in dependence into one construct happened not only in inter-organizational studies, but also in studies investigating task interdependence in work teams. As a result affective reactions have only been investigated in relation to the level of task interdependence (e.g., Sprigg et al., 2000; Van der Vegt & Van de

Vliert, 2000; Van der Vegt et al., 2001; Wageman, 2001) and not in relation with differences in dependence and power.

This oversight is problematic because team members who perceive themselves to be power disadvantaged can be expected to report less positive affective commitment if the powerful team members are abusing them. The essence of being more powerful is the ability to potentially use this power, and research has shown that the powerful are indeed in a position to withhold support or to leave the relationship since they incur less costs from such actions than less powerful team members (e.g., Cook & Emerson, 1978; Giebels et al., 2000). It is reasonable to expect that being powerless in a team where the powerful are actively abusing their power is highly unpleasant and a clear indication that the powerful have no intention of fulfilling their part of the social exchange processes. For these reasons we argue that perceived power disadvantage is associated with less affective commitment to the team and less satisfaction with one's job.

In addition, research into the effects of power on cognitive processes and information processing has indicated that being powerful diminishes an individual's need to devote cognitive effort in observing and interpreting the behavior of the power disadvantaged (e.g., Depret & Fiske, 1999; Fiske, 1993; Fiske et al., 2004). Thus, the power disadvantaged team members might not only be receiving less help than needed due to power abuse of the powerful, but also due to the fact that the powerful are simply not aware of their needs. Consequently, being power disadvantaged opens up the possibility of being abused and/or simply being overlooked. Regardless of the precise reason (or mix of reasons) for the lower helping behavior of the powerful, the power disadvantaged person's affective commitment to the team can be expected to be less when he or she does not receive adequate resources.

However, the above also implies a positive relationship between power disadvantage and affective commitment when the powerful recognize the need for help and choose to provide resources to the power disadvantaged. These circumstances are very beneficial to the power disadvantaged, because they now receive the required resources despite the risks of being overlooked or abused due to the asymmetry in their task dependence. Newcomers to a team or junior team members, for example, are aware that they are dependent on the other team members to learn how to perform their job adequately and this dependence increases their sensitivity to the helpful behaviors of the more powerful team members (e.f. Fiske, 1993; Holmes & Rempel, 1989). Therefore, they can be expected to have high affective commitment to the team and satisfaction with the job when the other team members readily provide these resources. Consequently, we expect that if the power disadvantaged are provided with an adequate amount of

resources, the relationship between perceived power disadvantages and affective commitment becomes positive instead of negative. The question which then remains is how might the power disadvantaged be able to persuade the powerful? We will argue that an answer to this question lies in the level of task interdependence.

The moderating effect of perceived task interdependence

High levels of task interdependence provide the power disadvantaged bargaining power (cf. Casciaro & Piskorski, 2005). Under conditions of task interdependence both parties have fewer alternatives, since they are both dependent upon the other. Although a power disadvantaged team member still needs more resources from the powerful than vice versa, the powerful also depends on the power disadvantaged for important resources. In other words, the alternatives for the powerful team members are lower with high task interdependence as compared to low task interdependence and as a result the cost of actively abusing ones power goes up, making it subsequently less likely that the powerful will take such actions. Hence, the power disadvantaged are in a much better position to persuade the powerful to share their resources under high levels of task interdependence compared to low levels of task interdependence.

High task interdependence not only increases the cost of the powerful, but also provides power disadvantaged persons with more opportunities to communicate their needs due to the higher frequency of exchange associated with high task interdependence (e.g., Anderson & Williams, 1996). An increase in interaction frequency can increase the 'liking' between the team members due to the 'exposure effect' (Bornstein, 1989) and enable the power disadvantaged to keep the powerful informed about, and motivated to fulfill, their needs.

The less optimistic side of the above processes is that power disadvantaged team members who are in low task interdependence relationships not only have less to offer to the powerful team members, but also have fewer opportunities to inform and motivate the powerful. As a result, both the active use of power and the decline in information processing would be higher under low levels of task interdependence. Consequently, we expect that perceived power disadvantage is negatively related to affective commitment and job satisfaction when perceived task interdependence is low and positively when perceived task interdependence is high. Stated more formally:

Hypothesis 1a: Perceived power disadvantage is negatively associated with affective commitment when perceived task interdependence is low.

Hypothesis 1b: Perceived power disadvantage is positively associated with affective commitment when perceived task interdependence is high.

Hypothesis 2a: Perceived power disadvantage is negatively associated with job satisfaction when perceived task interdependence is low.

Hypothesis 2b: Perceived power disadvantage is positively associated with job satisfaction when perceived task interdependence is high.

Hypothesis 3: Affective commitment is a mediator between perceived power disadvantage, perceived task interdependence, and job satisfaction.

METHOD

Sample and procedure

In order to test our hypotheses, we contacted 67 teams in the Netherlands consisting of 337 individuals in total, of which 262 individuals (78%) returned useful questionnaires. In order to increase the external validity of our study we approached teams with very diverse backgrounds, and teams in our sample came from, for example, the health care, banking, industrial, and retail sector. Specific jobs within our sample were, for instance, financial advisor, nurse, technical consultant, administrator, real estate agent, mortgage expert, business consultant, marketer, insurance expert, educational professional, account manager, system engineer, call center employee, software developer, auditor, analyst, and controller. On average the teams consisted of 5.04 team members ($SD=3.47$). Our questionnaire contained questions related to the demographic background of the respondents and social network items assessing the extent of perceived power disadvantage and perceived task dependence between the specific respondent and each of their fellow team members. Additionally, the questionnaire contained the affective commitment and job satisfaction items. A short introductory text explicitly guaranteed confidentiality. Since we had to get permission from the supervisors to investigate their teams, we decided to only focus on the horizontal working relationships between team members given the possibility that the supervisors' knowledge of the purpose of our study could have introduced

biases in their responses (e.g., demand characteristics). In our sample 164 of the 262 respondents were female (63%), the average age was 36.32 years (SD=10.56), and average team tenure was 2.94 years (SD= 3.76).

Measures

Perceived power disadvantage. We measured perceived power disadvantage at the dyadic level by using the following two items reported in De Jong et al. (2007): “How dependent *are you on X* for materials, means, information, etc. in order to carry out your work adequately?” and “How dependent *is X on you* for materials, means, information, etc. in order to carry out his or her work adequately?” (1 = “*not dependent*”, 7 = “*completely dependent*”). In all items, X was replaced by the name of a specific fellow team member and we inquired about all relationships. Consistent with a conceptualization of power disadvantage as resource dependence (Emerson, 1962), we calculated each individual's power disadvantage within a dyad by calculating the differences between the two questions, such that a positive score resulted in greater perceptions of power disadvantage (cf. Casciaro & Psikorski, 2005). Subsequently, we aggregated these dyadic power scores to the individual level by taking the mean. The resulting measure reflects the perception of each individual about his or her average power disadvantage within the team.

Perceived task interdependence. Consistent with prior research (Casciaro & Piskorski, 2005) we calculated perceived task interdependence by taking the average of the above-mentioned two questions for each dyad, such that a positive score resulted in greater perceptions of task interdependence. Subsequently, we averaged these dyadic scores to the individual level by taking the mean. The resulting measure reflects the perception of each individual about his or her average task interdependence within the team.

Affective commitment. This variable was measured using three items adapted from past research (Allen & Meyer, 1990): “I feel a strong sense of belonging to my team”; “I really feel as if this team's problems are my own”; “I feel like 'part of the family' in this team”. These items were rated on a seven-point scale (1 = “*totally disagree*”, 7 = “*totally agree*”). Cronbach's alpha was .89.

Job satisfaction. We measured this variable with four items from Agho, Price, and Mueller's (1992) satisfaction scale: “I find real enjoyment in my job”; “I am seldom bored with my job”; “I am very satisfied with my job”; “I would not consider taking another kind of job”. These items were rated on a seven-point scale (1 = “*totally disagree*”, 7 = “*totally agree*”). Cronbach's alpha was .91.

Discriminant and convergent validity

We used confirmatory factor analysis to assess the discriminant and convergent validity of the affective commitment and job satisfaction scales. We computed parameter estimates with the LISREL 8.51 computer package, using the maximum likelihood method. We first tested a model in which the three affective commitment items and the four job satisfaction items loaded on two corresponding latent constructs. The overall fit of the model to the data was adequate ($\chi^2 [13, 262] = 41.99, p < .001$, the standardized root mean square of the residuals (SRMSR) was .05, the goodness-of-fit index (GFI) was .96, and the comparative fit index (CFI) was .97). The factor loading of each item was significant at the .001 level or better. In order to further evaluate the discriminant validity of our scales we computed an alternative model, in which all seven items loaded on one latent construct. The fit of this model was significantly worse than that of the hypothesized measurement model ($\Delta\chi^2 [1] = 381.41, p < .001$, SRMSR = .17, GFI = .68, CFI = .68). Hence, we concluded that the hypothesized two-factor measurement model was the most appropriate for the situation under consideration.

Analyses

To acknowledge the nested structure of the data, with individuals nested within work teams, we conducted multilevel analyses (e.g., Snijders & Bosker, 1999), starting with a model without any predictor variables to assess a baseline condition. As can be seen in Table 3.2 and 3.3, we then calculated a model containing only team size as a control variable, after which we added the main effects to the subsequent model. The two-way interaction was added in the third model. For the job satisfaction analyses we added the moderating mediation terms to the fourth model (e.g., Muller, Judd, & Yzerbyt, 2005). We tested the decrease in log-likelihood between each of the models by means of a chi-square difference test. All the independent variables were standardized prior to the analysis to minimize the likelihood of multicollinearity problems and to facilitate comparison between the obtained coefficients. The interaction term was calculated from the product of the standardized variables (see Aiken & West, 1991).

RESULTS

Descriptive statistics

The means, the standard deviations, and the Pearson zero-order correlations between the variables are presented in Table 3.1. As can be seen, the zero-order correlation between affective commitment and job satisfaction was positive and significant ($r = .42, p < .001$). The correlation between affective commitment and perceived task interdependence was positive and significant

($r=.15, p<.05$), and the correlation between job satisfaction and perceived task interdependence was positive and approached significance ($r=.11, p<.10$). The relationship between team size and perceived task interdependence was negative and significant ($r=-.35, p<.001$), indicating that individuals in larger teams perceive lower levels of task interdependence. To account for the possible confounding effects of team size we controlled for this variable in all our analyses.

Table 3.1: *Descriptive Statistics and Pearson Zero-Order Correlations (n=262)*

Variable	M	SD	1	2	3	4
1 Affective commitment	5.17	1.34				
2 Job satisfaction	5.47	1.16	.42 ***			
3 Team size	5.04	3.47	-.08	.04		
4 Perceived Power Disadvantage	.10	1.04	-.02	.02	.01	
5 Perceived Task Interdependence	3.77	1.33	.15 *	.11 ~	-.35 ***	-.09

~ $p<.10$

* $p<.05$

*** $p<.001$

Note; The M and SD of team size are measured at the team level, all the other statistics are at the individual level.

Hypothesis tests

Hypothesis 1 and 2 predicted a moderation effect of perceived task interdependence on the relationship between perceived power disadvantage and affective commitment. As can be seen in Table 3.2, the second model (including the main effects of perceived power disadvantage and perceived task interdependence) had significantly more predictive power than first model which only contained the control variable ($\Delta\chi^2=5.69, df=2, p<.05$). This effect can be attributed to the positive and significant coefficient for perceived task interdependence ($b=.19, p<.05$). In model 3 we added the interaction between perceived power disadvantage and perceived task interdependence which significantly improved the model ($\Delta\chi^2=5.19, df=1, p<.05$). The interaction coefficient had the expected positive sign ($b=.26, p<.05$).

Table 3.2: *Results of Multilevel Analysis for Affective Commitment*

Model	Variable	Model 1		Model 2		Model 3	
		B	SE	B	SE	B	SE
1 Control variable	Team size	-.10	.13	-.02	.14	-.01	.14
2 Main effects	Perceived Power Disadvantage (PPD)			-.04	.07	.03	.08
	Perceived Task Interdependence (PTI)			.19*	.09	.19*	.09
3 Interaction	PPD * PTI					.26*	.11
	$\Delta\chi^2$.57		5.69*		5.19*
n=262	* $p < .05$						

Figure 3.2 represents the significant two-way interaction between perceived power disadvantage and perceived task interdependence for affective commitment. In creating the figure we followed the procedures suggested by Aiken and West (1991). As was expected, perceived power disadvantage was negatively related to affective commitment at low levels of perceived task interdependence (simple slope: $b = -.226$, $se = .110$, $p < .05$) and positive related at high levels of perceived task interdependence (simple slope: $b = .284$, $se = .162$, $p < .05$). These results support Hypotheses 1a and 1b.

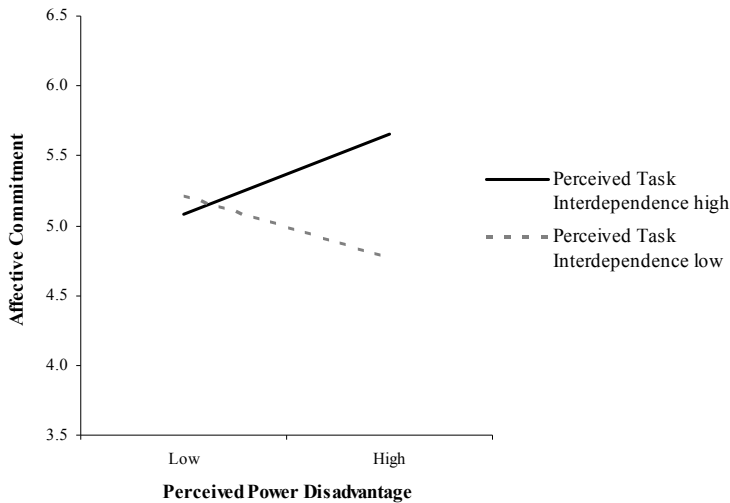


Figure 3.2: *Perceived Power Disadvantage and Affective Commitment at Different Amounts of Perceived Task Interdependence*

Table 3.3: Results of Multilevel Analysis for Job Satisfaction

Model	Variable	Model 1		Model 2		Model 3		Model 4	
		B	SE	B	SE	B	SE	B	SE
1	Control variable								
	Team size	.04	.11	.10	.11	.11	.11	.11	.09
2	Main effects								
	Perceived Power Disadvantage (PPD)			.00	.07	.06	.07	.04	.07
	Perceived Task Interdependence (PTI)			.13	.08	.13	.08	.07	.07
3	Interaction								
	PPD * PTI					.20 *	.10	.12	.09
4	Mediation								
	Affective Commitment (AC)							.47 ***	.07
	AC * PTI							.13 *	.06
	$\Delta\chi^2$.16		3.04		4.14 *	34.63 ***

n=262

* $p < .05$

*** $p < .001$

Hypothesis 2a and 2b predicted an interaction effect of perceived power disadvantage and perceived task interdependence on job satisfaction. As can be seen in Table 3.3, after adding the control variable in Model 1, and the main effects of perceived power disadvantage and perceived task interdependence in Model 2, adding the interaction term significantly improved the model ($\Delta\chi^2=4.14$, $df=1$, $p<.05$). The interaction coefficient had the expected positive sign ($b=.20$, $p<.05$).

The interaction is plotted in Figure 3.3 and this figure shows that perceived power disadvantage was negatively, albeit weakly, related to job satisfaction at low levels of perceived task interdependence (simple slope: $b=-.146$, $se=.098$, $p<.10$). At high levels of perceived task interdependence the relationship between perceived power disadvantage and job satisfaction was positive and significant (simple slope: $b=.256$, $se=.145$, $p<.05$). These results support Hypothesis 2a and 2b.

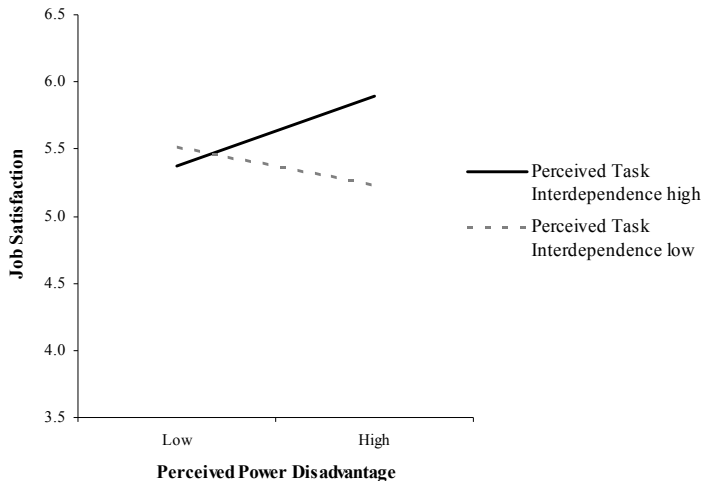


Figure 3.3: Perceived Power Disadvantage and Job Satisfaction at Different Amounts of Perceived Task Interdependence

The final step of our analyses tested the mediating effect of affective commitment. As can be seen in Table 3.3 (model 4), the interaction between perceived power disadvantage and perceived task interdependence dropped by 40% and became non-significant after adding the mediation terms to the model ($\Delta\chi^2=34.63$, $df=2$, $p<.001$). Furthermore, the coefficient for affective commitment was in the expected direction and highly significant ($b=.47$, $p<.001$) as was the moderated mediation term ($b=.13$, $p<.05$). Consequently, hypothesis 3 is fully support by our analyses.

DISCUSSION

Past research has indicated that task interdependence and affective reactions are positively related (e.g., Rasmussen & Jepperson, 2006). However, we argued that only inquiring about the level of task interdependence overlooks the possibility that differences in task dependence might exist that influence positive affective reactions (e.g., De Jong et al., 2007; Casciaro & Piskorski, 2005). By using theories regarding power, social exchange, and dependence (e.g., Emerson, 1962; Kelley & Thibaut, 1978; Rusbult & Van Lange, 2003) we hypothesized that the power disadvantaged in a team would report negative affective reactions when they perceive low levels of task interdependence and positive affective reactions when they perceive high levels of task interdependence. These hypotheses received strong support in our multi-level analyses. Additionally, our results also provided support for our final hypothesis that affective commitment mediated the relationship between perceived power disadvantage, perceived task interdependence, and job satisfaction. The theoretical implication of these findings will be discussed below, after which we will address the strengths and weaknesses of the current research, followed by our suggestions for future research and the practical implications.

Theoretical implications

This study has at least three important implications for research on affective reactions, (inter)dependence, and power. First, as Table 3.2 shows, our results support the previously observed positive association between the level of task interdependence and affective commitment (e.g., Sprigg et al., 2000; Van der Vegt & Van de Vliert, 2000; Van der Vegt et al., 2001; Wageman, 2001). However, as was hypothesized, this main effect was overshadowed by an interaction between the differences in dependence (i.e. perceived power disadvantage) and the level of task interdependence. The subsequent theoretical implication is that the main effect of the level of task interdependence found in past research is especially strong for the power disadvantaged while it is non-existent for the powerful. This finding implies that future studies into (inter)dependence and affective reactions might benefit from not only drawing from social exchange theories (e.g., Anderson & Williams, 1996), but also from theories regarding power (e.g., Emerson, 1962). Our first contribution is therefore to the affective reactions literature, by introducing differences in task dependence, and the associated power theories, to this field.

Second, our results support and extend the scarce empirical evidence regarding asymmetry in task dependence by indicating that theories regarding

power and dependence are not only applicable for this issue at the relational level (e.g., De Jong et al., 2007; Rusbult & Van Lange, 2003) but can also be used at the individual level. Furthermore, our findings extend both these relational level studies as well as the recent organizational level study of Casciaro and Piskorski (2005) by demonstrating that the scarcely researched interaction between asymmetry in dependence and the level of interdependence is a significant predictor for the development of affective reactions at the relational level. Our study therefore fills the gap which existed between the recent organizational level studies and the relational level studies and as such contributes to theories regarding social exchange and interdependence by indicating that the level of interdependence and the asymmetry in dependence should be investigated as separate variables.

Third, in contrast to the suggestion of Emerson (1962: p. 40) that the powerful are more prone to exit the team, our result indicate that it could be the power disadvantaged whom are actually preparing to leave the team. As can be seen in Figure 3.2 and 3.3, power disadvantaged team members who perceive low levels of task interdependence report the lowest amount of positive affective reactions. This finding becomes very logical if it is realized that the power of the powerful is based on the social structure of the team and as such could loose some power if the power disadvantaged decide to quit. Hence, viewed with the association between affective reactions and turnover intentions in mind (e.g., Hellman, 1997; Van Knippenberg & Sleebos, 2006), our results indicate that the powerful are apparently not in a hurry to leave and the reason for this is that leaving entails the risk of losing power. This line of reasoning also implies that power disadvantaged team members who perceive little opportunity to persuade the powerful to provide them with enough resources (i.e. who perceive a low level of task interdependence) have little to loose by leaving the team. By being less committed to the team and less satisfied with their job, the power disadvantaged might actually be putting pressure on the powerful not to push them too far, and signal to the powerful that their power is at risk if they decide to quite the team (cf. Ross, 1921; Waller & Hill, 1951). Consequently, our results contribute to theories regarding power (e.g Emerson, 1962) by indicating that it are the power disadvantaged, not the powerful, who are less committed to the team and less satisfied with their job and they might therefore be the ones who are preparing to leave the team.

As we will discuss further on, this delicate balancing act (cf. Emerson, 1962) between the powerful and the power disadvantaged might be a worthwhile topic for future research. But, first we will discuss some strengths and weaknesses of the current study.

Strengths and weaknesses

Naturally there are some strengths and weaknesses associated with our choices in theory, methodology, and sample which may warrant some caution in interpreting the results. A first weakness might be the use of self-report data, which could have introduced common source biases. Although we acknowledge that this is a potential weakness, it should be realized that in line with other studies (e.g., De Jong et al., 2007; Ferrin et al., 2006) our research question was based around the perceptions of individual team members and consequently we had to inquire about the self-perceptions of each individual. We tried to alleviate some of these concerns by using multiple methods for our measures (e.g., dyadic level measures and individual level measures). Moreover, the significant two-way interactions are difficult to attribute to common source bias. Nevertheless, the validity of our findings could be tested in future research by using data from different sources.

Another potential weakness of the present study might be the use of single-items for assessing the dyadic level differences in dependence (i.e. assessing power disadvantage). In line with prior research regarding social networks (e.g., Bowler & Brass, 2006), we decided to use single-item measures because the demands on the respondents were already quite high and we wanted to investigate all the work relationships within a team. However, this approach can also be viewed as a strong point of the current study since the use of dyadic level data to construct an individual level measure enabled us to really inquire about these relationships. Moreover, since our items were adopted from existing scales that have shown good reliability and validity in previous research (e.g., Van der Vegt et al., 2000; De Jong et al., 2007) and since we constructed individual level measures from multiple dyadic level items, we believe that our way of measuring power disadvantages is actually a strength of the present study and could be used in future studies.

A final weakness of the present study is the use of cross sectional data, which prevented us from fully testing the causality of our model. Although the results are inline with our theoretical development, the actual causality might be different than hypothesized. Future research could test the causality by employing more measurement moments or by conducting laboratory experiments.

Future research

Testing the causality is by no means the only option which future studies could take. For instance, it could also be worthwhile to investigate how the resource exchange process underlying our theoretical model exactly works. Based on the work of Emerson (1962) it can be expected that the power disadvantaged transfer status to the powerful in order to receive their help.

This transferal of status is argued to balance the relationship since the powerful make their resources available and the power disadvantaged are providing the powerful with appreciation in return (i.e. intangible resources). Based on our results it can be argued that this process is happening in work teams, since we found that power disadvantaged who are highly task interdependent report the most affective commitment to each other and their teams, while the powerful only report modest amounts of affective commitment. Consequently, it appears that both the powerful and the power disadvantaged are providing resources to their team, although the type of resources will likely be different. In our opinion disentangling these processes would be a very interesting research topic.

Another interesting avenue for future research might be to focus more on the outcomes of our model by distinguishing between different types of affective reactions (e.g., Allen & Meyers, 1990; Hackett, Bycio, & Hausdorf, 1994). If the above line of reasoning concerning the exchange of different types of resources is valid, it can also be expected that the powerful and the power disadvantaged are differently affected by these exchanges. Our results provide some support for this line of reasoning given our finding that it are the power disadvantaged who differ in their affective reactions, while the powerful are unaffected. However the reversed might be true if one would investigate other aspects of commitment, such as normative commitment (i.e. an employee's feeling of obligation to stay with the organization; Hackett et al., 1994: p. 15). For instance, some of the powerful might believe that responsibility comes with power and although such individuals can still be expected to report lower levels of affective commitment than the power disadvantaged, their normative commitment might be higher given their believes about "nobility obliges". As this example indicates our results imply that the framework of Casciaro and Piskorski (2005) and the associated theories regarding power and dependence (e.g., Emerson, 1962; Rusbult & Van Lange, 2003) might provide future research with a framework that can be used to tackle the remaining challenge of commitment research to demonstrate that the different components have differential relationships to other variables (cf. Hackett et al., 1994: p. 22).

As a final suggestion for future research we suggest to investigate in more depth how both concepts of task dependence influence affective reactions. As was mentioned in the introduction, task interdependence can increase the frequency of communication (e.g., Anderson & Williams, 1996) and increase the liking of each other (e.g., Bornstein, 1989). These processes were argued to increase the information processing of the powerful and diminish the abuse of power respectively and our results support this view. Future studies might investigate if these processes are operating at the same

time or if they are influenced by other variables. However, in our opinion it would be even more interesting to investigate a third possible mechanism of higher levels of task interdependence, namely the possibility that high task interdependence could enable coalition forming. Emerson (1962) already noted that dyadic power-dependence relationships might be influenced by the network of relationships within the team (e.g., two power disadvantaged team members form a partnership against a powerful team member). Although we went beyond dyadic relationships by using the average amount of perceived task interdependence as a measure, we were unable to really investigate the process of coalition forming. Given our encouraging results, future investigation could explicitly investigate triads or networks in order to investigate coalition forming.

Practical implications

There are at least two important practical implications to be drawn from the present study. First, our results clearly indicate that both the level of task interdependence as well as the differences in task dependence should be considered when trying to increase affective commitment and job satisfaction of the members of the team. Although our results support prior studies (e.g., Rasmussen & Jeppesen, 2006) in their conclusions that increasing the average level of task interdependence in the team would result in more positive affective reactions, our results also point out that only specific team members (i.e. the power disadvantaged) benefit from such an action. In light of this finding we would advice practitioners to pay attention to the possibility of power differences within the team, since interventions aimed at increasing affective reactions, such as raising the level of task interdependence, might only work within teams in which there are power disadvantaged.

Second, our results demonstrated that some of the power disadvantaged report the lowest levels of affective commitment and job satisfaction. Given the association between positive affective reactions and lower turnover intentions (e.g., Hellman, 1997; Van Knippenberg & Sleebos, 2006), it should be realized that the power disadvantaged might be the ones who are preparing to leave the team. As such we would advice to not focus mainly on the possibility that the powerful are leaving (cf. Emerson, 1962: p. 40), but to also consider the possibility that some of the power disadvantaged team members could be closer to quitting the team. If, for example, this power disadvantaged team member is a young graduate who has promise but who still has to learn the tricks of the trade, it would pay of in the long run to retain such an employee. Based on our results, we suggest that such employees might be retained by increasing their level of task interdependence within the team.

CHAPTER 4

WHY POWER ASYMMETRY DOESN'T ALWAYS STIFLE TEAM LEARNING: THE MODERATING ROLE OF GROUP AND INDIVIDUAL PERFORMANCE FEEDBACK⁸

A growing body of research evidence in the organization and management literatures suggests that work teams can differ considerably in the extent to which they pursue activities related to learning and continuous improvement and that these differences have important implications for team performance (Bunderson & Sutcliffe, 2002, 2003; Edmondson, 1999, 2002; Gibson & Vermeulen, 2003; Schippers, Den Hartog, Koopman, & Wienk, 2003; Van der Vegt & Bunderson, 2005; see also Argote, Gruenfeld, & Naquin, 2001). In today's market environments where a firm's success is contingent on its ability to improve and adapt more quickly than its competitors, teams with the capacity to continually improve processes and approaches in order to operate more quickly, efficiently, and intelligently have become a critical competitive advantage. Understanding the factors that promote or inhibit learning behaviors within a team has therefore become an important research agenda for management scholars (Argote, 1999).

One key factor that has emerged from this research agenda as being important for team learning is the configuration of power within a team. Specifically, many studies have suggested that teams simply will not engage in processes of learning, reflection, and improvement when there are power asymmetries within the team. For example, Brooks (1994) found that group reflection and process improvement did not occur when even one team

⁸ This Chapter is based upon De Jong, Van der Vegt, Bunderson, & Molleman (Working paper).

member had significant power over others. Similarly, Edmondson (2002) conducted a qualitative study of learning behavior in 12 teams and found that in teams where learning behaviors were emphasized, “power differences were either absent or actively minimized ...” (p. 139). Other research has suggested that in teams where there is stratification or inequality in power relations, team members do not learn from member differences (Bunderson, 2003a, 2003b; Pitcher & Smith, 2001). Van der Vegt, Bunderson, & Oosterhof (2006) found that power asymmetries arising from expertise perceptions led to patterns of intra-group commitment and advice-giving that advantaged the powerful. And Eisenhardt and Bourgeois (1988) found that power inequality heightens intra-group politics and undermines team self-improvement. In sum, the combined research evidence seems to suggest that team learning behaviors will be stifled if not crushed when power asymmetries exist within a team.

But power differences exist in virtually all teams. Power, in classic formulations, is defined as a function of dependence (Emerson, 1962). A has power over B (i.e., dyadic asymmetry in power exists) when B is more dependent on A for valued or needed resources (physical, emotional, informational) than A is dependent on B (Blau, 1964). In task groups, where multiple individuals coordinate their efforts to complete a particular task or achieve a particular goal, resource dependence among group members is simply a fact of life. Furthermore, while there may be cases where the power-dependence relations that exist between task group members will balance out (i.e., A’s dependence on B is balanced by B’s dependence on A such that neither has a power advantage), it is unreasonable to assume that perfect balance among all group members will be the normal or even a common state of affairs in interdependent task groups. In most groups, asymmetries in power-dependence relations will always exist due to differences in the formal or informal resources controlled by group members as a function of different roles, tenures, or natural endowments (e.g., intelligence, charisma; cf. Ragins & Sundstrom, 1989).

Moreover, these power-dependence asymmetries may actually point to important opportunities for learning to occur within a team. The very differences between team members that lead to power asymmetries – differences in experience, knowledge, information, ability, access, etc. – could lead a team to engage in discussion, reflection, debate, and information sharing in the service of more effective task accomplishment. In other words, one might argue that power-dependence asymmetries in task groups should be positively associated with team learning and that in teams where no power-dependence asymmetries exist, there may be limited motivation and opportunity for members to learn together (see King, 1998: p. 60).

This leads to an interesting and practically important research problem. On one hand, power asymmetry within a team seems to stifle team learning behaviors. On the other hand, power asymmetries exist in virtually all teams and particularly in those teams where opportunities for members to learn from one another are the greatest. How, then, can teams leverage their power-dependence asymmetries for learning instead of allowing those power-dependence asymmetries to stifle learning? We will suggest that one answer to this question can be found by considering the effect of performance feedback on the relationship between power-dependence asymmetry and team learning behavior. Performance feedback plays a critical role in virtually all theories of learning by shaping goal-directed behavior (e.g., Ilgen, Fisher, & Taylor, 1979; Nadler, 1979). We will argue here that when teams receive feedback on group as opposed to individual performance, power-dependence asymmetry can have a positive effect on team learning behavior and, through team learning behavior, on team performance outcomes. We tested hypotheses based on this general proposition in a sample of 218 employees from 46 work teams.

THEORY AND HYPOTHESES

Power and team learning

We conceptualize team learning in this paper using a group process lens (Edmondson, 1999). That is, we define team learning as “activities by which team members seek to acquire, share, refine, or combine task-relevant knowledge through interaction with one another” (Van der Veegt & Bunderson, 2005: p. 534). Examples of team learning behaviors include experimenting with new approaches or ideas, reflecting on past actions and action-outcome relationships, seeking different perspectives, and evaluating alternatives (e.g., Edmondson, 1999, 2002; Gibson & Vermeulen, 2003; Schippers et al., 2003; West, 2000). These team learning behaviors are a specific class of “interaction processes” in teams, processes involving interactions between team members which play a key role in transforming input factors into performance outcomes (Hackman & Morris, 1975). We therefore view team learning as conceptually distinct from the outcomes that might result from an engagement in learning-related activities, outcomes such as more adaptive decisions and actions, improved performance, or, perhaps in some cases, decreased efficiency resulting from a misallocation of effort (see Bunderson & Sutcliffe, 2003).

Past research has suggested that teams can differ considerably in the extent to which they engage in learning behaviors and that these differences matter for performance. So, for example, positive relationships between team

learning behaviors and supervisor ratings of team effectiveness have been reported in the pharmaceutical and medical products industry (156 teams; Gibson & Vermeulen, 2003), the oil and gas industry (57 teams; Van der Vegt & Bunderson, 2005), and the furniture manufacturing industry (51 teams; Edmondson, 1999). Furthermore, Bunderson and Sutcliffe (2003) found that learning behaviors in 44 management teams were significantly associated with business unit performance (unit profitability), although the relationship was curvilinear (teams could engage in too much learning behavior) and moderated by past performance (team learning was more beneficial for lower-performing teams). On the whole, these results provide robust support for learning behaviors as an important performance capability in teams.

But researchers have also suggested that learning behaviors are unlikely to emerge in teams where there are power asymmetries between members. A summary of that research was provided above. The argument for a negative effect between power asymmetry and team learning behaviors is based on the fact that team learning behaviors are inherently threatening because they require that team members acknowledge mistakes (in order to reflect on and learn from those mistakes), admit ignorance (in order to learn from others' competence), and expose themselves to the possibility of failure (a likely outcome when experimenting with new ideas). As a result, before individuals will engage in a collective process of team learning, they need to feel that they will not be punished, reprimanded, or made to feel inadequate as a result. And this environment of "psychological safety" (Edmondson, 1999), the argument continues, is simply less likely when there are power asymmetries within the team. Power asymmetries between team members create an environment where individuals become concerned about negative evaluations from more powerful team members (e.g., those who are more senior in tenure, rank, or experience). They lead to patterns of deference which privilege the opinions and ideas of the powerful instead of allowing the full range of knowledge and ideas to emerge, clash, and recombine (Ridgeway, 2001). Power asymmetries can create a political dynamic within a team as each member competes for the attention of and favored relations with those in positions of higher power (Eisenhardt & Bourgeois, 1988). In sum, power asymmetries within teams can create an environment which is simply antithetical to honest and open reflection, risk-taking, and learning.

This line of reasoning leads to the natural conclusion that team learning will only really occur when team members have equivalent amounts of power. In designing teams where learning is a desired goal, we should therefore work to assemble members who have equal amounts of power. But this conclusion is problematic for at least two reasons. First, asymmetries in power are virtually unavoidable in teams. As noted above, power is

traditionally defined as asymmetrical dependence of one person on resources held by another (e.g., information, knowledge, emotional support; Emerson, 1962; Blau, 1964). In the context of a task group, A has power over B when 1) A holds resources that B needs to perform his or her portion of the group's task and 2) the dependence of B on those resources is greater than the dependence of A on resources held by B. In task groups, these resource dependencies emerge naturally from the structure of the task, from formal roles and authority relations, and from informal social relationships. Furthermore, these dependencies will be asymmetrical in almost all cases since members almost invariably differ (and often by design) in key sources of power-dependence such as experience, seniority, formal authority, tenure, or charisma.

Second, power asymmetries within a team may point to real opportunities for members to learn from one another by actively engaging in team learning behaviors. As noted above, power asymmetries arise from member differences along dimensions such as experience, tenure, formal or informal roles, specialization, etc. We know from past research that these sorts of differences between team members can be an important input and impetus for intra-team learning and continuous improvement (Van der Vegt & Bunderson, 2005). In fact, educational psychologists have argued that “when same-ability peers are involved, ... learning activities are usually restricted to lower-level learning: mutual comprehension checking and mutual rehearsal of facts and concepts” (King, 1998: p. 60)⁹. So, power asymmetries within a team may actually motivate team learning since they signal an opportunity for members to apply their different perspectives, experience, information, and expertise to solving team problems and improving team processes. Moreover, these opportunities for learning are likely to be most pronounced in teams where member differences – and associated power asymmetries – are greatest.

In other words, the goal of fostering team learning behavior by working to eliminate power asymmetries within a team is both impossible and misdirected; asymmetries in power can never be eliminated and attempts to do so will only dilute the learning potential of a team. What we need are not power-neutral teams but, rather, a better understanding of how teams might overcome the negative implications of power-dependence asymmetries in order to realize the learning opportunities suggested by those asymmetries. That is, we need to move beyond a simplistic, main effects model of power

⁹ Interestingly, while King (1998) argues that learning opportunities are limited in same-ability groups, she suggests that same ability groups may be preferable to different-ability groups because of the very power and status dynamics that concern us here. Her solution is to teach same-ability groups to engage in “higher-order” learning processes.

and learning which assumes that power is always bad for learning in order to explore the possibility that the positive or negative relationship between power asymmetry and team learning behavior is contingent on other factors within (or even outside of) the team. This paper identifies and examines one such factor – the type of performance feedback that the team receives.

The moderating role of performance feedback

Feedback can be defined simply as information about the effects of one's actions or efforts on some criterion of interest (see Herold & Greller, 1977; Taylor, Fisher, & Ilgen, 1984). In its original cybernetic formulation (Wiener, 1948), the concept of feedback was used to describe the process by which systems (human or machine) self-regulate. Feedback about system performance allows a system to adapt and self-correct until desired performance standards are achieved. Feedback scholars have referred to this function of feedback as a “cueing” function (see Nadler, 1979; Vroom, 1964). In human systems, feedback also serves a “motivational” function by reinforcing the promise of a reward and by reinforcing behavior-reward instrumentalities (Annett, 1969; Ilgen et al., 1979: p. 361; Vroom, 1964). Given these key functions, feedback has long played a central role in theories of learning, continuous improvement, and performance achievement (Annett, 1969).

Feedback researchers have made an important distinction between feedback which provides information about the performance of individuals within a group (individual feedback) and feedback which provides information about the performance of a group as a whole (group feedback) (see Barr & Conlon, 1994; Nadler, 1979; Hinsz, Tindale, & Vollrath, 1997; DeShon, Kozlowski, Schmidt, Milner, & Wiechmann, 2004). So, for example, an individual might be working as a sales person within a team of sales people where each team member covers a different region within the broader sales district. This individual could be given feedback about their sales for the year (individual feedback), the sales figures for their team (group feedback), or both. Several studies have examined the independent and combined effects of individual and group feedback on performance in groups. While findings from these studies have been inconsistent, some important patterns have emerged. For example, DeShon et al. (2004) recently found that the effects of feedback on effort and performance were homologous across group and individual levels such that feedback (group or individual) increased attention and effort toward (group or individual) goals which led to higher (group or individual) performance. They also found that combinations of individual and group feedback led to weaker results than either feedback type independently. Based on a review of the group feedback literature, Nadler (1979: p. 324)

suggested that task interdependence may be an important boundary condition for a group feedback effect in that “[w]here the group task is structured interdependently, group level feedback may be most effective.”

A possible explanation for the effects of group feedback on group attention and effort observed by DeShon et al. (2004) and others (e.g., Barr & Conlon, 1994) can be found in the work of Hinsz et al. (1997). They suggest that group feedback “may change the self-attributional focus from the individual to the group, which is consistent with the notions of social categorization theory” (p. 53). That is, when feedback is received at the individual level of analysis, it directs attention toward the individual as the relevant actor and therefore motivates the individual to think about things that he or she could do as an individual to improve performance. But when feedback is received at the group level of analysis, attention is directed toward the group as the relevant actor and the individual as one piece of that larger collective. As a result, individual group members are motivated to think about things that they can do as a group to improve performance, e.g., better coordination, greater information sharing, etc. This argument is consistent with a study by Zander & Wolfe (1964) in which it was found that group feedback led to more cooperation and less interpersonal strain within a group than did individual feedback. This argument is also consistent with the broader literature on social categorization effects which has suggested that a shared group identity increases intra-group cooperation and mitigates intra-group conflict, even when group members are very different from one another (Brewer & Miller, 1984; Gaertner, Dovidio, & Bachman, 1996; Van der Veegt & Bunderson, 2005).

Given these effects of individual and group feedback on attention and effort in groups, it seemed plausible to us that the type of feedback a group receives could influence the effects of power asymmetry on group learning and performance and, more specifically, on whether power asymmetry becomes a stumbling block or an opportunity for a group. We might hypothesize, for example, that individual performance feedback will simply reinforce power and status differences in power asymmetric groups by drawing further attention to individual contributions and by motivating individuals to focus on their individual performance. In other words, individual performance feedback stimulates a competitive dynamic in power asymmetric groups by encouraging member-to-member social comparison and by fostering status-seeking behaviors (e.g., efforts to “move up in the pecking order” by outshining other group members). While these efforts could stimulate individual learning efforts, they are unlikely to create an environment where group members are motivated to share information with

one another, admit areas of ignorance, or problem solve together around team problems, i.e., team learning behaviors. We therefore expect that:

Hypothesis 1: Individual performance feedback moderates the relationship between power asymmetry within a team and team learning behavior; power asymmetry is more strongly and negatively related to team learning behavior when individual performance feedback is high.

In contrast, we might expect that group performance feedback will stimulate team learning behaviors by inducing a collective mindset within the group. When feedback is received at the group level, asymmetries in power are likely to be cast in a very different light. That is, group feedback recasts power asymmetries not as an individual resource which team members jealously guard in order to maximize their own performance and subsequent status within the group, but as a group resource which can be leveraged by the group in order to influence the collective performance metric. So, whereas individual performance feedback sets up a competitive dynamic within a power asymmetric team, group performance feedback should stimulate a cooperative learning dynamic as individuals with different resources and degrees of power-dependence work together to solve problems and improve performance. In other words, we hypothesize that:

Hypothesis 2: Group performance feedback moderates the relationship between power asymmetry within a team and team learning behavior; power asymmetry is positively related to team learning behavior when group performance feedback is high but negatively related to team learning behavior when group performance feedback is low.

Power asymmetry, learning, and team performance

Finally, we would expect that the above effects of power asymmetry on team learning behavior will have important implications for team performance. As noted in our earlier review, several studies have demonstrated a positive relationship between team learning behaviors and team performance (Bunderson & Sutcliffe, 2003; Edmondson, 1999; Gibson & Vermeulen, 2003; Schippers et al., 2003; Van der Vegt & Bunderson, 2005). The argument for a relationship between team learning behaviors and team performance rests on the assumption that adaptation and continuous improvement is a critical performance capability in all teams, regardless of what they do or how much innovation is required in their context. Teams that engage in learning

behaviors are more likely to learn from their mistakes, integrate new information about their environment, benefit from member experience, effectively utilize member diversity of information and perspective, and better coordinate their efforts.

These arguments suggest a relationship between power asymmetry and team performance which is mediated through team learning behavior. That is, we would expect that power asymmetric teams which receive group performance feedback will perform better and that power asymmetric teams which receive individual performance feedback will perform worse. Furthermore, we expect that these effects of power asymmetry on performance will operate through team learning behavior. So, power asymmetric teams which receive group performance feedback will perform better because they are more likely to engage in team learning behavior. These arguments suggest the following hypotheses:

Hypothesis 3: Individual performance feedback moderates the relationship between power asymmetry within a team and team performance; power asymmetry is more strongly and negatively related to team performance when individual performance feedback is high

Hypothesis 4: Group performance feedback moderates the relationship between power asymmetry within a team and team performance; power asymmetry is positively related to team performance when group performance feedback is high, but negatively related to team performance when group performance feedback is low.

Hypothesis 5: Team learning behavior mediates these moderated relationships between power asymmetry and team performance.

METHOD

Sample and procedure

The above hypotheses were tested using a sample of 268 employees from 46 teams. These teams worked in a variety of settings ranging from the banking sector to the medical sector and consisted of at least 3 team members ($M=5.83$, $SD=3.68$). In most of these teams at least some hierarchical differences and/or differences in degree of specialization between team members were present. For example, teams from the banking sector included a product advisor and an assistant, the medical teams consisted of different types of

nurses with different specializations and/or different levels of authority within the team, and the technical, management and consultancy teams consisted of senior team members and more junior professionals. We reasoned that these intrateam differences, which are characteristic of the types of member differences that exist in many work teams, should result in considerable power-dependence asymmetries within these teams.

We approached the teams via personal contacts with and a presentation to managers about the research project during a post-graduate MBA course. When a manager agreed to participate, s/he informed the team and two different types of questionnaires were subsequently sent to the team: a supervisor questionnaire and a team member questionnaire. The supervisor questionnaire was primarily used to collect team performance data, whereas the team member questionnaire was used to collect power asymmetry, feedback, and learning data¹⁰. We approached 50 supervisors and received 46 usable supervisor questionnaires (92%) and 218 team members (out of 268) returned their questionnaire (81%). Of these respondents, 146 were female (67%) and the mean age of the respondents was 36.9 years (SD= 10.4). Twenty percent of these respondents had a high school degree, 44% a vocational degree, 29% a bachelor degree, and 7% of the respondents possessed a master's degree or higher. Educational background also varied within our sample: 31% of the respondents had a degree related to economics, 21% had a degree related to the medical field, 12% had a degree related to engineering, and 10% had a degree related to business. Degrees in other fields (e.g., law, linguistics, social or natural sciences) were held by less than 10% of the respondents.

Measures

Power asymmetry. This variable was measured using a peer rating approach. Consistent with a conceptualization of power as resource dependence (Thibaut & Kelley, 1959; Emerson, 1962), we used the following two items to measure the task dependence of a team member (A) on another team member (B): “How dependent *are you on B* for materials, means, information, etc. in order to carry out your work adequately?” and “How dependent *is B on you* for materials, means, information, etc. in order to carry out his or her work adequately?” (1=“*not dependent*”, 7=“*completely dependent*”). In all items, B was replaced by the name of a specific fellow team member.

Because we measured A's dependence on B as well as B's dependence on A from the perspectives of both A and B, we were able to examine the

¹⁰ Supervisors were not included as part of a team for the purposes of this analysis.

relationship between A's perception of his or her dependence on B and B's perception of A's dependence on him or her. This correlation was .31 ($p < .001$)¹¹, indicating considerable agreement between the two parties. Additionally, a univariate analysis of variance indicated that within-dyad variance was significantly smaller than between-dyad variance ($F[1402,1096] = 1.81, p < .001$). We therefore used the pooled perspectives of A and B in each relationship to compute our power asymmetry measure (cf. Borgatti & Everett, 1999). More specifically, we averaged A's and B's ratings of A's dependence on B to obtain a pooled measure of A's dependence on B, and A's and B's rating of B's dependence on A to obtain a pooled measure of B's dependence on A. Next, we computed the absolute difference between A's dependence on B and B's dependence on A for each pair of team members and averaged all these scores per individual. We then aggregated these individual scores to obtain a team-level power asymmetry score. This operationalization of power asymmetry is summarized in the following formula:

$$\frac{\sum_{j=1}^k \left[\left(\frac{\sum_{i=1}^r [DBA_i - DAB_i]}{r} \right) \right]}{k}$$

Where DBA_i is the mean of A's and B's perceptions of the task dependence of B on A in relationship i , DAB_i is the mean of A's and B's perceptions of A's dependence on B in relationship i , r is the number of relationships which team member j has in the team, and k is the number of team members. The amount of power asymmetry in these teams ranged from 0 to 1.75 ($M = .60, SD = .42$), with higher scores indicating more power asymmetry between team members¹².

¹¹ The magnitude of this correlation is in line with prior research involving dyads (e.g., Kenny & Acitelli, 2001; see p. 443, Table 3; the correlations they reported ranged from .20 to .47).

¹² Our measure of power asymmetry is related to but conceptually and mathematically different from prior conceptions of power centralization (e.g., Bunderson, 2003b; Freeman, 1979). Power centralization scores are normally calculated from individual level influence nominations despite the fact that power centralization is argued to capture the "stratification or inequality in the extent to which actors are involved in relations" (Ibarra, 1992: p.170). Our measure of power asymmetry explicitly accounts for the dyadic nature of power as proposed by Emerson (1962) by using dyadic dependence measures. It is, however, possible to calculate a power centralization score from these dyadic data using more traditional centralization formulae:

Group performance feedback. This variable was measured with three items adapted from Van der Vegt et al. (2003). The items were; "We receive feedback as a team about the team performance"; "When we do not perform well, we are held responsible as a team"; "We regularly receive feedback about how good or bad we performed as a team". These items were measured on a seven-point scale (1= "totally disagree", 7="totally agree"). Cronbach's alpha for the individual-level responses was .84.

Individual performance feedback. This variable was also measured with three items adapted from Van der Vegt et al. (2003): "I receive individual feedback about my own performance"; "When I do not perform well, I am held responsible as an individual"; "I regularly receive feedback about how good or bad I performed". These items were measured with a seven-point scale (1= "totally disagree", 7="totally agree") and Cronbach's alpha was .86.

Team learning behavior. This variable was measured with six items used by Schippers et al. (2003). The items were: "We talk about different ways in which we can reach our objectives"; "In this team the results of actions are evaluated"; "If things don't work out as planned, we consider what we can do about it"; "We ask ourselves how effective our procedures for reacting to changes are"; "We regularly discuss whether the team is working effectively"; "The team often reviews its methods for getting the job done". These six items were selected out of the original 24 items based on factor loadings and were measured on a seven-point scale (1= "totally disagree", 7="totally agree"). Cronbach's alpha was .89.

Team performance. Since we focused on a rather diverse sample of teams with different tasks and responsibilities we used a broad measure of team performance (cf. Ancona & Caldwell, 1992). Specifically, we asked each manager to compare the performance of his or her team with that of relevant other teams with similar tasks and customers on the following performance criteria: efficiency, continuity of the production process, use of capacities, speed with which the team produces, control over the production process,

$$APA_j = \frac{\sum_{i=1}^r [DBA_i - DAB_i]}{r} \qquad PC = \frac{\sum_{j=1}^k [P_{\max} - APA_j]}{(k-1)}$$

Where APA_j stands for Average Power (dis)Advantage of team member j , PC stands for Power Centralization, and P_{\max} is the largest power advantage score in the team. All other symbols were defined above. The correlation between this more traditional measure and our measure of power asymmetry was .80 ($p < .001$). Also, analyses using this more traditional measure generated similar, albeit weaker, results to those obtained with our power asymmetry measure. We used our alternative power asymmetry measure because we felt that it more fully captures the range of dyadic power asymmetries that exist within a team.

quality of work, and overall team performance. They rated the team's performance using a seven-point scale (1="far below average", 4="average", 7="far above average"). Cronbach's alpha was .90.

Control variables. Given that group size has been shown to relate to team learning and team performance in past research (e.g., Bunderson & Sutcliffe, 2003), we controlled for team size in all of our analyses. Team size information was collected using the supervisor questionnaire. Additionally, past research suggests that the overall level of task interdependence might be associated with team learning (e.g., Molleman & Timmerman, 2003). In order to explicitly consider the possible effects of task interdependence we also controlled for this variable in all of our analyses. Task interdependence was measured using team member responses to four items adapted from past research (Van der Vegt & Van de Vliert, 2005): "I have a one-person job"; "I rarely have to check or work with the other team members (reversed)"; "I have to work closely with my team members to do my work properly"; "The other team members and I depend on each other for information and resources to complete our tasks successfully". These items were rated on a seven-point scale (1= "totally disagree", 7="totally agree"). Cronbach's alpha was .77.

Discriminant and convergent validity. We used confirmatory factor analysis to assess the discriminant and convergent validity of the group feedback, individual feedback, and team learning behavior scales. We computed parameter estimates with the LISREL 8.51 computer package, using the maximum likelihood method. We first tested a model in which the group and individual feedback and team learning behavior items loaded on three corresponding latent constructs. The overall fit of the model to the data was adequate (χ^2 [51, 218] = 166.65, $p < .001$, the standardized root mean square of the residuals (SRMSR) was .05, the goodness-of-fit index (GFI) was .89, and the comparative fit index (CFI) was .92). The factor loading of each item was significant at the .001 level or better.

In order to further evaluate the discriminant validity of our scales we computed two alternative models. In the first model all feedback items loaded on one latent feedback construct and the learning items on a separate learning construct. The fit of this model was significantly worse than that of the hypothesized measurement model ($\Delta\chi^2$ [2] = 219.87, $p < .001$, SRMSR= .07, GFI= .77, CFI= .82). The second alternative model contained only one latent variable. Again, the fit of this model was significantly worse than that of the original model ($\Delta\chi^2$ [3] = 496.07, $p < .001$, SRMSR= .11, GFI= .66, CFI= .68). Hence, we concluded that the hypothesized three-factor measurement model was the most appropriate for the situation under consideration.

A separate confirmatory factor analysis had to be conducted for team performance because the performance ratings were provided by team managers. We tested a model in which all seven team performance items loaded on a single factor and the overall fit of this model was very good (χ^2 [14, 46] = 13.95, n.s.). The fit indices were all satisfactory: the SRMSR was .043, GFI was .92 and CFI was .99, and all factor loadings were significant at the .001 level or better.

Inter-rater agreement and reliability. We measured feedback and learning by asking all team members to evaluate these variables within their team. Since all team members are rating the same team-level constructs, we would expect that ratings from members of the same team are similar to one another and that these ratings are more similar to one another than they are to the ratings of these constructs by members of other teams (see Bliese, 2000). This expectation was investigated by calculating the average inter-rater agreement coefficient (r_{wg} ; James, Demaree, & Wolf, 1984) and the intra-class correlation coefficients (ICC[1] and ICC[2]; Bliese, 2000). Median r_{wg} values were .69 for group feedback, .74 for individual feedback, and .78 for team learning behavior. These numbers suggest that team members agreed in their ratings of these variables.

One-way analyses of variance suggested that team member ratings of group and individual feedback and team learning behavior all differed significantly ($p < .01$) between teams. The ICC(1) was .21 for group feedback, and .17 for individual feedback and learning. These figures indicate that a considerable amount of the variance in ratings was due to team membership (Bliese, 2000). The reliability of the group means was examined by calculating the ICC(2) coefficients. The ICC(2) values were .69 for group feedback, .63 for individual feedback, and .62 for team learning behavior. Overall, these results support the aggregation of individual team member responses to create team-level variables for group feedback, individual feedback, and team learning behavior¹³.

Analyses

We used hierarchical multiple regression analyses to test our hypotheses. Following the recommendations of Aiken and West (1991) we standardized all independent variables and computed interaction effects by taking the product of the respective standardized independent variables. We tested four models to isolate the contribution of different terms. The first model tested the effects of our control variables. In the second model, the main effects of

¹³ The inter-rater agreement for level of task interdependence within the team was .66, ICC(1)= .10, and ICC(2)= .48. This variable was aggregated by taking the average score within the team.

power asymmetry and group and individual feedback were added to the regression model, followed by the inclusion of the hypothesized 2-way interactions between power asymmetry and feedback in the third model. In the case of our performance dependent variable, we also examined a fourth model to test the mediating effect of team learning behavior.

RESULTS

Descriptive statistics

The means, standard deviations, and Pearson zero-order correlations between variables are presented in Table 4.1. As can be seen, the correlation between group and individual feedback was positive and significant ($r = .73, p < .001$), indicating that these variables share slightly more than 50% of their variance. While this correlation is below the .75 standard above which multicollinearity becomes particularly problematic (Ashford & Tsui, 1991), it was high enough to warrant careful examination of variance inflation factors in all regression models. Team learning behavior was positively related to both types of feedback ($r = .58, p < .001$ for group feedback and $r = .62, p < .001$ for individual feedback). Finally, perceptions of team learning behavior were positively associated with supervisor ratings of team performance ($r = .40, p < .01$).

Table 4.1: Descriptive Statistics and Pearson Zero-Order Correlations

Variable	M	SD	1	2	3	4	5
1 Team size	5.83	3.68					
2 Task interdependence	3.73	.93	-.24				
3 Power asymmetry	.60	.42	.06	-.12			
4 Group performance feedback	4.37	.92	.02	.31*	.07		
5 Individual performance feedback	4.67	.90	.10	.06	.12	.73***	
6 Team learning behavior	4.61	.76	.13	.26~	.00	.58***	.62***
7 Team performance	4.77	.75	.06	.02	.13	-.02	.14

~ p<.10

* p<.05

** p<.01

*** p<.001

Hypothesis tests: team learning behavior

Regression results for models with team learning behavior as the dependent variable are summarized in Table 4.2. There was some evidence for a positive relationship between task interdependence and team learning behavior in Model 1, although the effect of the control variables was not significant. The addition of power asymmetry and group and individual feedback in Model 2 significantly increased the explanatory power of the model ($\Delta R^2 = .36, p < .001$) with a positive and significant coefficient for individual feedback; groups that reported receiving more individual feedback also reported more learning behavior. The coefficients for the interactions between group feedback and power asymmetry and between individual feedback and power asymmetry, added in Model 3, were both significant at $p < .01$ ($b = -.51$ for individual feedback and $.44$ for group feedback) and the addition of these two terms significantly increased the explanatory power of the model ($\Delta R^2 = .11, p < .05$). Variance inflation factors (VIF) for the third model were all well below 4, suggesting that multicollinearity was not a problem in these analyses (e.g., Langfred, 2004; Miles & Shevlin, 2001).

Simple slope tests suggested that power asymmetry was negatively related to team learning behavior when individual feedback was high ($b = -.85, SE = .28, p < .001$) and positively related to team learning when individual feedback was low ($b = .52, SE = .24, p < .05$). These findings support Hypothesis 1. To facilitate interpretation we plotted this interaction in Figure 4.1a. Simple slope tests also suggested that power asymmetry was positively associated with learning when group feedback was high ($b = .38, SE = .23, p < .05$) and negatively associated with learning when group feedback was low ($b = -.71, SE = .27, p < .01$), consistent with Hypothesis 2 (see Figure 4.1b).

Table 4.2: Results of Regression Analysis for Team Learning Behavior

Model	Variable	Model 1		Model 2		Model 3		VIF
		B	SE	B	SE	B	SE	
1 Control variables	Team size	.16	.11	.10	.09	.08	.08	1.09
	Task interdependence	.24 *	.11	.16	.10	.18 ~	.09	1.28
2 Main effects	Power asymmetry			-.05	.11	-.12	.11	1.08
	Group performance feedback			.13	.14	.22	.14	2.62
	Individual performance feedback			.39 **	.14	.28 **	.13	2.46
3 2-way interaction	Power asymmetry * Group performance feedback					.44 **	.16	2.14
	Power asymmetry * Individual performance feedback					-.51 **	.17	2.28
	R ²		.11		.47		.58	
	ΔR^2		.11 ~		.36 ***		.11 *	

n=46

~ p< .10

* p< .05

** p< .01

*** p< .001

Figure 1a. Individual performance feedback

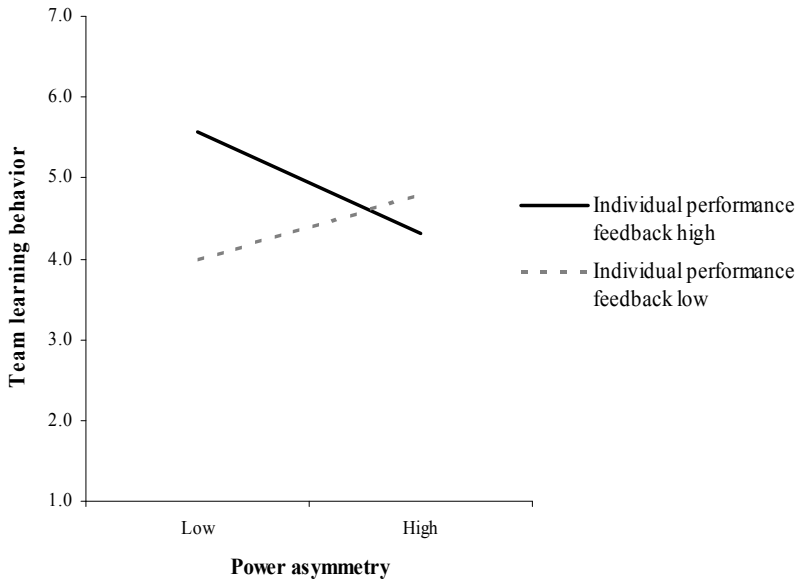


Figure 1b. Group performance feedback

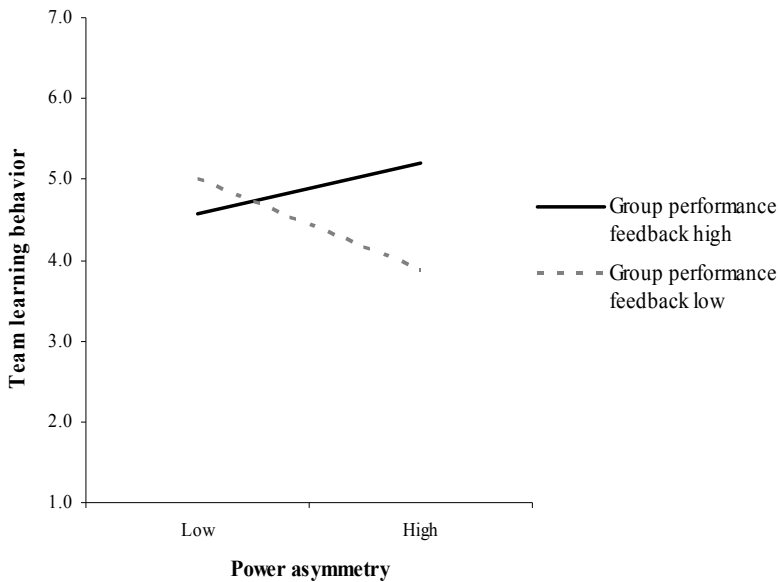


Figure 4.1: Power Asymmetry and Team Learning Behavior at Different Amounts and Types of Feedback

Hypothesis tests: team performance

Regression results for models with team performance as the dependent variable are summarized in Table 4.3. Neither of the control variables was significantly related to team performance in Model 1 and the addition of power asymmetry along with both types of feedback in Model 2 did not increase the explanatory power of the model. The addition of the two interaction terms in Model 3 did explain significant variance in performance ($\Delta R^2 = .15, p < .05$) with a positive and significant coefficient for the group feedback interaction ($b = .44, p < .05$) and a negative and significant coefficient for the individual feedback interaction ($b = -.61, p < .01$), as suggested in Hypotheses 3 and 4. Once again, multicollinearity did not appear to be a problem given that VIF scores for the fourth model were all well below 4.

In support of Hypothesis 3, the simple slope tests revealed that power asymmetry was negatively related to team performance when individual feedback was high ($b = -.58, SE = .29, p < .05$) and positively related to team performance when individual feedback was low ($b = .65, SE = .24, p < .01$). And simple slope tests for the interaction between power asymmetry and group feedback suggested that power asymmetry was positively related to team performance when group feedback was high ($b = .48, SE = .24, p < .05$), but only weakly negatively related to team performance when group feedback was low ($b = -.40, SE = .27, p < .10$) which is generally consistent with Hypothesis 4¹⁴. These effects are plotted in Figure 4.2.

Finally, Model 4 tests for a mediated effect (as hypothesized in H5) by adding team learning behavior to the regression model. The addition of team learning behavior to the model resulted in a significant increase in R^2 ($\Delta R^2 = .10, p < .05$) with a positive and significant coefficient for team learning behavior ($b = .36, p < .05$). Furthermore, with team learning behavior in the model, the group and individual feedback interactions became non-significant ($b = .23, n.s.$, for power asymmetry x group feedback and $b = -.37, n.s.$ for power asymmetry x individual feedback). These results suggest that team learning mediated the moderated effects of power asymmetry on team performance as suggested in Hypothesis 5.

¹⁴ We did not find any support for three-way interactions between power asymmetry and individual and group feedback. The coefficients for these three-way interactions were $b = -.20, SE = .13, n.s.$ in the team learning behavior regression and $b = -.12, SE = .17, n.s.$ for the team performance analyses. All the hypothesized two-way interactions remained significant, and the additional two-way interaction of individual and group feedback did not reach significance.

Table 4.3: Results of Regression Analysis for Team Performance

Model	Variable	Model 1		Model 2		Model 3		Model 4		VIF
		B	SE	B	SE	B	SE	B	SE	
1	Control variables	.05	.12	.04	.12	.01	.11	-.02	.11	1.12
	Task interdependence	.02	.12	.09	.13	.11	.12	.03	.12	1.41
2	Power asymmetry			.12	.15	.04	.14	.09	.13	1.11
	Group performance feedback			-.26	.19	-.16	.18	-.26	.18	2.80
	Individual performance feedback			.27	.18	.14	.17	.01	.17	2.76
3	Power asymmetry * Group performance feedback					.44*	.22	.23	.22	2.55
	Power asymmetry * Individual performance feedback					-.61**	.23	-.37	.24	2.81
4	Team learning behavior							.36*	.15	2.37
	R ²		.01		.08		.23		.33	
	ΔR ²		.01		.07		.15*		.10*	

n=46

* p< .05

** p< .01

Figure 2a. Individual performance feedback

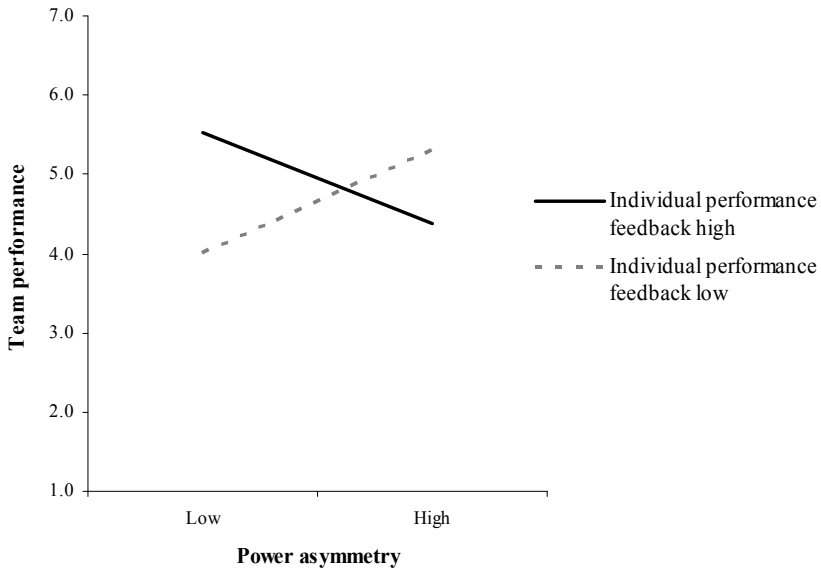


Figure 2b. Group performance feedback

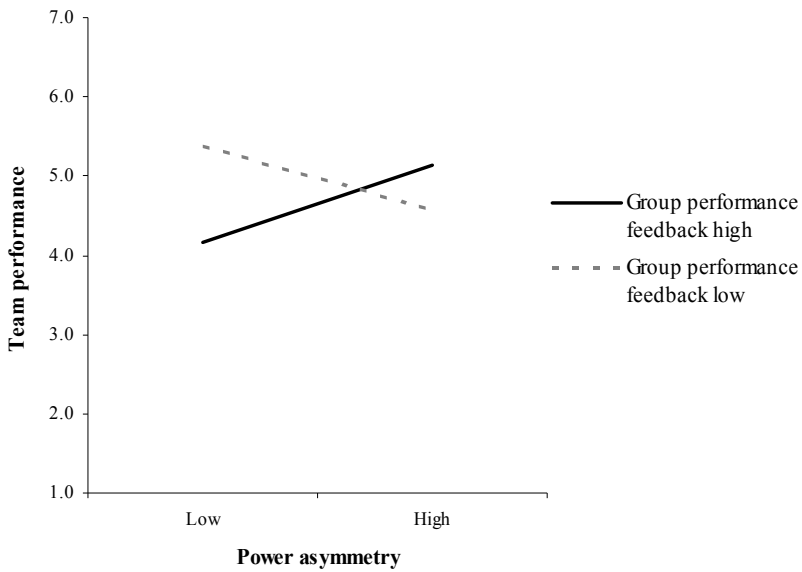


Figure 4.2: Power Asymmetry and Team Performance at Different Levels and Types of Feedback

DISCUSSION

Past research has suggested that an active involvement in team learning will be difficult if not impossible to achieve in teams where power differences exist between and among team members. While we acknowledge the very real obstacles to reflection and feedback-seeking that result from intra-team power differences, we also recognize that the very differences between members that lead to power asymmetries in teams could also spur learning, dialogue, and debate within a group, i.e., a greater engagement in team learning behaviors. Our goal in this paper has been to examine one key factor which may explain when intra-team power differences will motivate as opposed to dampen learning efforts within a team: the nature of performance feedback that the team receives. Specifically, we argued that whereas individual performance feedback would strengthen a generally negative relationship between power asymmetry and team learning behavior, group performance feedback would result in a positive relationship. These hypotheses were strongly supported overall. In terms of specific results, we found that the relationship between power asymmetry and both team learning behavior and team performance was positive under conditions of high group or low individual performance feedback but negative under conditions of high individual or low group performance feedback. We also found that team learning behavior mediated the relationship between power asymmetry and team performance.

Theoretical implications

The theory, method, and results of this study have several important implications for research on teams, learning, and power. First, this study directly challenges the notion that power differences always stifle learning behaviors within a team and suggests that, in fact, power differences may be an impetus for team learning behaviors under certain conditions. That is, we suggest that the relationship between power asymmetry and team learning may be contingent on other factors within a group. We identified one such factor – the nature of performance feedback received by the group – but there may be others. In fact, we would expect that any group design element which serves to foster a collective mindset and sense of group identification within a team should help to mitigate the negative effects of power asymmetry. Future research can begin to elaborate those elements.

Second, most research on power asymmetry within groups has conceptualized power at the individual and/or the group level, i.e., power is something which each member possesses to greater or lesser degrees and which can be evaluated to capture power configurations within a group (e.g.,

power centralization). But power, in classic formulations, is a relational property which emerges from the dependence of one actor on resources controlled by another (Emerson, 1962; Thibaut & Kelley, 1959). It is therefore possible – and even likely – that a given group member will have a power advantage in one relationship but not in another. This study explicitly acknowledges this possibility by conceptualizing power asymmetry within a group as something which emerges from dyadic resource dependence. That is, we suggested that in order to fully represent power asymmetry within a group, one must attend to patterns of asymmetric dependence between each of the dyadic relationships within that group. This study therefore introduces an approach to conceptualizing and measuring power differences in groups which more directly builds on the theoretical underpinnings of power and dependence research.

Third, this study contributes to the literature on feedback by confirming that group and individual performance feedback can have very different implications for group process and performance. We found that while group and individual feedback do seem to be correlated (suggesting that teams adopting one type of feedback are more likely to also adopt the other type of feedback), these are two separate constructs which exhibit markedly different moderating effects on a key input-to-process relationship. Furthermore, these results suggest that the type of feedback group members receive (i.e., individual or group) is important in part because it influences whether group members adopt a collective versus an individual mindset (Hinsz et al., 1997). Our results therefore contribute to the literature on feedback in teams by empirically investigating the scarcely researched effects of different types of performance feedback (DeShon et al., 2004).

Unexpected findings and future research directions

While the pattern of results described here was largely consistent with our expectations, several of our findings raise important follow-up questions which suggest important directions for future research. For example, we found a positive and significant direct relationship between individual performance feedback and team learning behavior in our regression analysis but no significant direct relationship between group performance feedback and team learning behavior (after accounting for the effect of the control variables in our analysis). This result initially appears somewhat counter-intuitive since it suggests that team learning behaviors – i.e., behaviors associated with reflection, feedback seeking, and experimentation within a team – are more likely to result when team members receive feedback on their own as opposed to the group's performance. If individual feedback prompts attention and effort toward individual goals and group feedback

prompts attention and effort toward group goals (i.e., DeShon et al., 2004), wouldn't we expect that group feedback will be more likely to encourage collective learning efforts?

The answer to this question may derive from the fact that, ultimately, team learning behaviors rely on individual team members engaging other team members in processes of reflection and discussion. So whereas group feedback may help to induce a collective mindset within a group, individual feedback more directly motivates individual effort. This possibility suggests an interesting dilemma. On one hand, the use of individual performance feedback in power-asymmetric teams may reinforce the negative effects of power differences and dampen learning behaviors, suggesting the need for group performance feedback. On the other hand, individual performance feedback seems to have a stronger direct effect on team learning behaviors than does group performance feedback. This suggests that there may be some ideal combination of group and individual performance feedback in teams which motivates individuals to engage in learning behaviors while still attending to the performance goals of the group. In other words, there may be some optimal configuration of individual feedback, group feedback, and power asymmetry which maximizes learning behaviors within a team.

While this is an interesting possibility, we did not find a significant relationship between a linear power asymmetry X group feedback X individual feedback interaction term and team learning behaviors in our post hoc analyses (described above). And the interaction between group feedback and individual feedback was also unrelated to team learning behavior. So if the interaction between feedback type and power asymmetry does affect team learning behavior, that relationship is likely more complex than is captured in a linear-by-linear-by-linear interaction term. It may be, for example, that the optimal combination of individual performance feedback, group performance feedback, and power asymmetry involves quadratic-by-linear-by-linear or even quadratic-by-quadratic-by-linear interactions. Deeper investigation of these interactions is one provocative and interesting direction for future research.

Secondly, we hypothesized that individual performance feedback would serve to amplify and group performance feedback would serve to attenuate a generally negative relationship between power asymmetry and team learning behavior. But while we did find that the direct relationship between power asymmetry and team learning behavior was negative (albeit weak and not statistically significant), we also found that the relationship between power asymmetry and team learning behavior was positive under conditions of low individual performance feedback. After further reflection, we attribute this result to an avoidance dynamic among survey respondents. That is, it seems likely that survey respondents who "strongly disagreed" with

statements about whether their team receives individual feedback are signaling that, in fact, their team deliberately and consciously avoids individual performance feedback – which points to a set of shared values around recognizing collective as opposed to individual efforts. The positive relationship between power asymmetry and team learning behavior in teams where individual performance feedback was low may, therefore, result from the same theoretical mechanism that we believe is triggered by group performance feedback: a collective mindset. This suggests that if we had measured feedback using extent scales rather than agree/disagree scales, we may not have found this unexpected effect. This may be a useful design consideration for future research in this area.

Study limitations

As with any study, certain aspects of the present study suggest the need for caution in how these results should be interpreted and/or generalized. For example, this study adopted a cross-sectional design which limits our ability to draw firm conclusions about the direction of causality. While alternative arguments about reverse causality are not as likely from a theoretical standpoint in this case, the fact remains that we cannot conclusively eliminate them and must therefore leave that exercise for future research.

One might also question whether the use of a survey to collect measures of power asymmetry, feedback, and team learning behavior might have introduced common method bias into these results (Podsakoff et al., 2003). Given that group measures of power asymmetry were constructed from dyadic comparisons, it seems highly unlikely that correlations between these measures and the other group process measures would be artificially inflated. But it is possible that relationships among the two types of feedback and team learning behavior could be inflated due to common method variance. We explicitly considered the effect of the high correlation between our two types of feedback by examining variance inflation factors. And any inflated correlations between team learning behavior and the two types of feedback should not affect the relationships of core theoretical interest in this study. We would therefore suggest that common method variance should not be a major concern in this study.

Practical implications

Based on the premise that any differences in member power frustrate intra-team learning behaviors, some researchers have suggested or implied that in cases where team learning is the goal, teams should be constructed in ways that minimize or eliminate power differences. So, for example, differences in tenure or experience should be minimized, authority relations should be

eliminated, etc. We question this approach for several reasons. First, attempts to eliminate or minimize power differences cannot ever succeed entirely since power and status differences can and will emerge around any number of member differences, however subtle or intangible (e.g., assertiveness, gender, age, informal coalitions). Second, even if these attempts were successful at reducing power differences, they come at a high cost since they reduce the very richness of experience, perspective, contact, and expertise that stimulates and facilitates intra-group learning.

This paper offers an alternative solution to the design and operation of teams where intra-team learning is the goal. Specifically, we suggest that when power differences exist between and among group members, it is particularly important that members adopt a collective mindset and base of identification rather than an individual mindset. Furthermore, we suggest that one way of inducing this collective mindset is to provide group rather than individual performance feedback to group members. In other words, we argue that the solution to dealing with power differences in teams where learning is a goal is not to eliminate those differences but, rather, to manage them so that they become an asset rather than an impediment.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

The impetus for the present dissertation was to investigate the often overlooked aspect of asymmetry in task dependence in order to advance interdependence theory and research (Thibaut & Kelley, 1959). Our general expectation was that asymmetry in task dependence would lead to negative outcomes if the less dependent, and hence more powerful, employees opted to (ab)use their power (e.g., Emerson, 1962). On the other hand, by drawing from theories regarding learning (e.g., King, 1998), we also anticipated that there might be situations in which the negative effects of asymmetries in task dependence could be avoided or might even become positive. To systematically investigate this matter, we conducted three empirical studies of which the details were reported in the preceding chapters. In the next section we will provide a short overview of their results, followed by a discussion of the strengths and weaknesses of these three studies. After this, the theoretical, methodological, and practical implication of this thesis will be discussed, to end with some suggestions for future research and an overall conclusion.

FINDINGS

Summary of main findings

The main finding of this dissertation is that asymmetry in task dependence is present in work teams and can significantly affect interpersonal relations at the dyadic level, affective reactions at the individual level, and processes and

performance at the team level. Our findings also strongly support our expectation that asymmetries in task dependence can damage or benefit team processes and performance depending on other factors in the work environment. Before discussing these other factors from study 2 and 3, we will discuss the findings from the first study.

Study 1: Is asymmetry in task dependence (ab)used? Because the concept of asymmetry in task dependence has received little empirical attention, the aim of the first study was to investigate if, and how, asymmetries in task dependence would influence interpersonal processes. More specifically, we proposed that team members will inevitably confront situations in which their own personal interests are pitted against the interests of one or more of the other team members (Wieselquist et al., 1999). Based on attribution theory (e.g., Heider, 1958) and earlier research (e.g., Ferrin et al., 2006; Korsgaard et al., 2002), we expected that in such situations especially voluntarily, rather than formally required, behavior will be used as an indicator of the partner's trustworthiness. Because the powerful might choose to use their power to their own advantage, and thus be reluctant to offer assistance to the more dependent partner, we hypothesized that asymmetry in task dependence could be detrimental for perceptions of helping behavior. This perceived refusal to help would consequently signal to the more dependent team member that their powerful partner cannot be trusted.

The results from the first study largely supported these expectations. In line with our hypotheses and the impression formation and social judgment literature (Fiske, 1993; Georgesen & Harris, 1998), we found that in relationships characterized by asymmetrical task dependence, the focal team member's task dependence is only positively related to the perceived help from, and trust in, the other partner when the focal team member is the powerful party in the relationship. However, in contrast with our expectations and the power-dependence literature (Emerson, 1962; Thibaut & Kelley, 1959; Rusbult & Van Lange, 2003), our analyses also revealed that increased task dependence was unrelated to perceived receipt of help and trust when the other team member was more powerful. Consequently, in our sample, the extent of trust by the less powerful team members was unaffected by the possible abuse of power by more powerful team members. Overall, the results of the first study thereby indicated that asymmetries in task dependence can be measured in real work teams and showed that a power perspective is suitable for explaining the observed patterns. However, the results also demonstrated that the more powerful person in the asymmetrical relationship does not always (ab)use his or her power. Or stated from the power disadvantaged perspective; our results indicate that the more task

dependent team members can sometimes apparently avoid the use of power by the more powerful team members.

Study 2: Some room for optimism? In the second study we investigated in more detail how some of the power disadvantaged team members might be able to circumvent the possible negative consequences of their own lack of power. Additionally, we investigated if asymmetries in task dependence are more than a dyadic level phenomenon and exert an influence on the affective reactions of employees. We chose to focus on affective commitment and job satisfaction as dependent variables, because these affective reactions have been shown to significantly influence the health and well-being of team members (e.g., Sonnentag, 1996) as well as the productivity of the team as a whole (e.g., Ostroff, 1992).

We hypothesized that the power disadvantaged team members would report more negative affective reactions when they perceived low levels of task interdependence and more positive affective reactions when they perceived high levels of task interdependence, because higher levels of task interdependence provide the power disadvantaged team members with more resources to negotiate with (cf. Casciaro & Piskorski, 2005). This hypothesis received strong support in our multi-level analyses as our results showed that power disadvantage is negatively associated with positive affective reactions under conditions of low perceived task interdependence. In other words, our findings indicated that asymmetries in task dependence can indeed exert a negative influence on an individual's affective reactions. However, there also was some room for optimism, because our results showed that the power disadvantaged reported more positive affective reactions than their more powerful colleagues under conditions of high perceived task interdependence. Hence, our analyses indicated that, under the right conditions, employees who are vulnerable due to their asymmetries in task dependence might actually be very affectively committed to their team and very satisfied with their jobs. Consequently, the second study demonstrated that asymmetries in task dependences can be negatively or positively associated with the affective reactions of employees, depending on the perceived level of task interdependence. The results from the second study thereby provided, for the first time, clear evidence that there are interaction effects between the scarcely researched aspect of asymmetries in task dependence and one of the better researched dimensions of interdependence theory, namely the level of task interdependence.

Study 3: Turning negative effects into positive ones. In the third study we continued our investigation of factors that could influence the effects of asymmetries in task dependence and we extended our two prior studies by investigating if asymmetries in task dependence could affect team

performance. Based on the theory and results of the first two studies we expected that asymmetries in task dependence might be negatively related to team performance due to processes associated with power differences. However, because asymmetries in task dependence are often based on differences in experience, knowledge, information, ability, access, etc. between team members (e.g. Ragins & Sundstrom 1989), we also found reasons to expect that asymmetries in task dependence could lead a team to engage in discussion, reflection, debate, and information sharing if the more powerful team members decided to share their knowledge and resources. Hence, there are good reasons to expect that other factors in the work environment are able to influence the effects of asymmetry in task dependence.

As was mentioned in previous sections, most reviews (e.g., Johnson & Johnson, 1989; Rusbult, 2000; Van Lange, 2000; Van der Veegt et al., 2005; Van der Veegt & Van de Vliert, 2002; Wageman, 1995, 2001) state that there is an interaction effect between the two most researched dimensions of interdependence theory, namely task interdependence and outcome interdependence. Our second study demonstrated that task interdependence interacts with asymmetry in task dependence at the individual level and we reasoned that outcome interdependence might be an important moderator at the team level. More specifically, we focused on a sub dimension of outcome interdependence, namely feedback interdependence, because the type of performance feedback group members receive (i.e., individual or group) could influence whether team members adopt a collective versus an individual mindset (Hinsz et al., 1997). We hypothesized that asymmetries in task dependence would be positively related to team learning and team performance under conditions of high group or low individual performance feedback, but negative under conditions of high individual or low group performance feedback. Additionally, we expected that team learning behavior would mediate the relationship between power asymmetry and team performance. These hypotheses were all supported by our analyses.

Consequently, the results of the third study indicated that asymmetries in task dependence can influence vital team processes, such as team learning, and can subsequently influence the performance of the team. Additionally, our findings indicated that the amount and type of performance feedback interdependence can turn the negative effects of asymmetry into positive ones, if the feedback focuses the team members on attaining a high collective performance. The last study thereby demonstrated again that interaction effects between the different dimensions of interdependence theory can significantly influence key organizational psychological processes and outcomes.

Overall results of the three studies. Viewed together, our findings indicate that asymmetries in task dependence can negatively influence, dyadic, individual, and team processes and outcomes when the power associated with these differences can be used by the powerful or leads them to forget to pay attention to the needs of their powerless colleagues. Our results indicated that these negative effects of asymmetry in task dependence occur when the level of task interdependence between team members is low or when the type of performance feedback focuses the team members on attaining a high level of individual performance. However, our results also point out that asymmetries in task dependence can be beneficial for intrateam processes when the amount of task interdependence between team members is high or when the amount and type of performance feedback focuses the team members on attaining a high group performance. As will be discussed below, these results extend contemporary knowledge by demonstrating that there are more interaction effects between the different dimensions of interdependence theory, other than between the two well studied dimensions of task interdependence and outcome interdependence (e.g., Johnson & Johnson, 1989; Rusbult, 2000; Van Lange, 2000; Van der Veegt et al., 2005; Van der Veegt & Van de Vliert, 2002; Wageman, 1998, 2001). Our results are also of practical value, because, as we will discuss further in the management implication section, the variables making up these interactions are mostly under the control of managers.

Weaknesses and strengths

Naturally, there were certain weaknesses in our studies which might warrant some caution in interpreting their results. The first weakness might be the use of mainly cross-sectional data, since this prevented us from observing and testing causal relationships. For instance, as was indicated in Chapter 2 the observed relationship between asymmetry in task dependence, perceived helping behavior and interpersonal trust, might also be explained by multi-cyclical growth models and the direction of causality could therefore be different than hypothesized. The use of cross-sectional data puts similar limitations on the other two studies. However, if we combine the results from the three studies, the theoretical arguments behind our causal ordering of the models gain in strength, because the results consistently support the power perspective. As such, it becomes more difficult to explain our results at different levels, and containing different variables, from other theoretical perspectives. Nevertheless, future research should employ longitudinal and/or experimental designs to find further evidence for these causal relationships. We will discuss some avenues for doing this in the future research section.

A second weakness might be the fact that the three studies relied mostly on questionnaire data from employees. This could raise concerns about both common source as well as common method bias. Consequently, there might be concerns that some of the main effects reported in this thesis could be attributed to method variance and/or response tendencies of the employees. However, taken together, the three studies did make use of multiple measurement methods (e.g., dyadic level measures, individual level measures, and team level measurements) and multiple sources (e.g., self-report, peers, and managers). Moreover, the significant two-way interactions are difficult to attribute to these biases. Consequently, common source and common method bias do not appear to have significantly influenced our results.

A third potential weakness of the present dissertation might be the fact that all three studies made use of single-items for assessing the differences in task dependence (i.e. assessing power differences). Based on research regarding social networks (e.g., Bowler & Brass, 2006), we chose to use single-item measures because we wanted to investigate all the work relationships within a team and using more than one item would have placed too high demands on the respondents. However, because we used dyadic level data to construct dyadic, individual and team level measures this approach can also be viewed as a strong point, since the use of this particular methodology enabled us to really inquire about work relationships of the team members at all three levels. Moreover, our items were adopted from existing scales that have shown good reliability and validity in previous research (e.g., Van der Vegt et al., 2000) and we therefore believe that our way of measuring asymmetries in task dependence and power differences is actually a strength of the present study and could be used in future studies.

Related to this point is the fact that we did not actually measure power differences and only used the above mentioned dyadic measures of asymmetry in task dependence as a proxy for power differences. Although Emerson (1962) convincingly argued that power and dependence are two sides of the same coin, and even though our results are all explainable from a power perspective, a weak point of the present studies might be that actual power was not measured. To circumvent this shortcoming, future studies might employ multiple measures of power, besides our asymmetry in task dependence measure, to establish if asymmetry in task dependence is really directly associated with power differences. For instance, future studies could use the priming based measures of Cameron Anderson and Adam Galinsky (e.g., Anderson & Galinsky, 2006; Galinsky, Gruenfeld, & Magree, 2003). By using the strengths of each power measure some of the weaknesses in the other measures could be alleviated. Consequently, although future research

should evaluate if, and how, our new measures are related to other measures of power, one of the strengths of this thesis is that it introduced a new way of measuring power. In our opinion this extension of the "research toolbox" is beneficial for research regarding asymmetry in task dependence as well as research regarding power.

IMPLICATIONS AND FUTURE RESEARCH

Theoretical implications

The first and main theoretical implication is that all three studies indicated that asymmetries in task dependence are present in work teams and can significantly influence interpersonal relations, the affective reactions of employees, as well as vital team processes and outcomes. Consequently, our results provide firm evidence that asymmetry in task dependence is an important aspect of interdependence that should be considered in future studies and interventions. However, besides this general implication our results also provide a more refined view of how asymmetry in task dependence might exert its influence. We will discuss these implications in line with the preceding chapters and the conceptual framework developed in Chapter 1 (see Figure 1.1).

The second theoretical implication is most easily understood by looking at the dyadic level results from the first study. These findings contributed to theories regarding power by indicating that power might be in the eye of the beholder, and that any distortions in the perceptions of the powerful (e.g., Fiske, 1993) might be more important than the actual use and abuse of power (e.g., Emerson, 1962). The usefulness of making a distinction between the powerful and the powerless in an asymmetrical relationship was also supported by the results from the second study. These results indicated that, if perceived task interdependence is low, the power disadvantaged could be the ones who are preparing to leave the team, instead of the powerful (cf. Emerson, 1962: p. 40). Consequently, taken together, our results indicate that asymmetries in task dependence can be largely explained by theories regarding power and that differences between the powerful and the power disadvantaged are important and should be acknowledged. This implies that future studies, particularly regarding power, trust, helping behavior, affective reactions, and asymmetries in task dependence, should both theoretically and methodologically allow for differences between relational partners.

The third theoretical implication stems mostly from the second and third study. The second study contributed to the affective reactions literature by indicating that the interaction between the differences in dependence (i.e. perceived power disadvantage) and the level of task interdependence

overshadows the previously observed positive association between the level of task interdependence and affective commitment (e.g., Sprigg et al., 2000; Van der Vegt & Van de Vliert, 2000; Van der Vegt et al., 2001; Wageman, 2001). A specific theoretical implication of this finding is that this indicates that future studies into (inter)dependence and affective reactions might benefit from drawing from theories regarding power (e.g., Emerson, 1962; Fiske, 1993). However, a broader implication is that there might be more interaction effects between the dimensions of interdependency theory than previously expected (e.g., Johnson & Johnson, 1989; Rusbult, 2000; Van Lange, 2000; Van der Vegt et al., 2005; Van der Vegt & Van de Vliert, 2002; Wageman, 1995, 2001). The results of the third study provide further support for this notion, by indicating that asymmetries in task dependence also interact with feedback interdependence. Consequently, our results demonstrate that there are more interaction effects than the interaction between task and outcome interdependence. What is more, our findings provide some indications that these newly observed interaction effects might be working through an affective mechanism related to trust and psychological safety, rather than a strictly cognitive route as proposed by the congruence hypothesis (e.g., Van der Vegt et al., 2005). Taken together the above implies that both researchers and practitioners could benefit from taking up a more complex framework of interdependency theory which recognizes multiple interactions between the dimensions of interdependence theory and which goes beyond cognitive mechanisms.

Methodological implications

The main methodological implication of the results reported in this dissertation is that asymmetries in task dependence, measured with dyad level items, can explain a substantial portion of the variance in important variables at the dyadic, individual, and team level. This indicates that it would be beneficial to broaden the traditional focus in the interdependence literature – which tends to be either on the individual (e.g., Pearce & Gregersen, 1991) or the team level of analysis (e.g., Liden et al., 1997) - to include the interpersonal level of analysis. The use of dyad level measures has an additional advantage, because in classical formulations power is described as a relational property which emerges from the dependence of one actor on resources controlled by another (Emerson, 1962). We explicitly acknowledged this by conceptualizing power asymmetry within a group as something which emerges from dyadic resource dependencies. The main methodological implication is therefore that future studies could use our methodology and measures in order to conceptualize, measure, and analyze power differences

in groups in a way which is more directly based on the theoretical bases of power and dependence.

A broader, but related, methodological implication is that future studies could use the Social Relations Model (SRM) methodology, reported in Chapter 2, to investigate relational level effects within organizational settings. Although this approach requires both a good deal of trust from the respondents as well as a substantial time investment, our results testify that it can be done. Consequently, our results imply that the use of SRM can open up new opportunities for (field) researchers.

Lastly, the overall approach of this thesis might be valuable, because in our opinion, the three studies combined provide a deeper insight into the mechanisms of asymmetry in task dependence than the three studies viewed separately. If we had only studied the effects of asymmetries in task dependence at the dyadic level, doubts could have risen about if, and how, asymmetries in task dependence influence individual and team level processes. Under these conditions, a critique might have been that the dyad level study merely points towards a relational effect with no real implications for practitioners and more group-oriented researchers. However, this critique subsides in light of our individual and team level results. On the other hand, had we only investigated individual or team level effects, a critique might have been that the underlying processes are not well known and effects found at these levels could have been argued to be due to unobserved other variables and processes. In our opinion, our approach of studying the dyadic level foundations as well as the individual level and group level relations, provides a richer and more in-depth insight into the processes operating within the group. Consequently, besides using a multi-level, multi-source, multi-method approach, researchers might benefit by simultaneously employing a multi-study approach as was done in this thesis.

Future research

The findings and implications of this dissertation clearly indicate the need to further investigate the effects of asymmetries in task dependence. We hope that we have provided a good starting point by demonstrating that asymmetries in task dependence are indeed present in work teams, can be measured, and influence key variables at different levels of analysis. Given the small number of empirical studies regarding the effects of asymmetry in task dependence in work teams, many interesting topics for future research can be identified which, in line with the conceptual model (Figure 1.1) and the preceding chapters, we will discuss from the dyadic level to the team level.

An interesting avenue for future researchers would be to investigate in more depth how the underlying resource exchange process between team

members exactly works and to focus on what is precisely exchanged in the dyads. As we discussed above, our findings indicated that there are differences in perceived helping behavior between the powerful and powerless and this indicates that there might be differences in the resources exchanged. Future research could extent our results by drawing from the work of Emerson (1962), who argued that the power disadvantaged transfer status to the powerful in order to balance the relationship and in order to persuade the powerful to offer their assistance. Without this transferal of status it is difficult to arrive at a stable relationship, because then the powerful are contributing more to the relationship than the powerless. According to Equity Theory (e.g., Adams, 1965) there would be little incentive for the powerful to stay in the asymmetrically task dependent relationship and the powerful team members can be expected to try to lower their inputs or might even choose to exit the dyad. The relationship would be more balanced, and presumable more stable, if the power disadvantaged are providing the powerful with appreciation in return. In other words, we expect that intangible status resources might sometimes be exchanged for more tangible task-related resources, especially in stable asymmetrically task dependent relationships. The results reported in Chapter 3 indicate that this process might indeed be happening in work teams, because we found that power disadvantaged team members who are highly task interdependent report the most affective commitment, while the powerful only report modest amounts of affective commitment. Hence, given these high levels of affective commitment the power disadvantaged appear to be more involved, loyal, and dependent on the team than the powerful and this might be a reaction to the more tangible resources provided by the powerful. In other words, there is some indirect evidence that the power disadvantaged might indeed be providing more intangible resources than the powerful under high levels of task interdependence. Future research could expand on our findings by investigating if status transferal does indeed play a (stabilizing) role in asymmetrically task dependent relationships.

Related to this is that our measure of asymmetry in task dependence did not differentiate between different types or resources and as such task dependence based on information, expertise, and materials were grouped together. There are at least two reasons why future research may want to differentiate between different types of resources. Firstly, some sources of power might be viewed as more legitimate if used than others. For instance, having more experience than other employees might bestow the employee with referent power (e.g., Raven, 1992), which might be viewed as more legitimate to be used than coercive power due to, for instance, the possession of valued materials. As a result, the use of power based on illegitimate

resources might trigger stronger aversive reactions, such as distrust, than the use of power based on more legitimate resources. Secondly, resources might differ in their worth and value to other team members. For instance, it can be expected that some resources (e.g., control over mundane materials such as for instance, hammers or staplers) do not signal trust and voluntary helping when shared, since these resources are universalistic and concrete in nature (e.g., Foa, 1971). On the other hand, offering personal advice can be very specific to both the actor and the partner and can therefore indicate that the actor trusts the partner, precisely because these particularistic resources are scarce and personal. Our hypothesis would then be that particularistic resources influence interpersonal relations to a greater extent than universalistic resources, because universalistic resources provide to a lesser extent a "diagnostic situation" (cf. Holmes & Rempel, 1989). Hence, distinguishing between different resources, by considering which sources of power are seen as more legitimate to use and/or by acknowledging that there are universalistic and particularistic resources, could be very useful in future research. Consequently, in our opinion, investigating if different resources are exchanged in different relationships and disentangling the associated processes would give more insight into the antecedents and processes associated with asymmetries in task dependence and could lead to more refined theoretical models and practical interventions.

Future studies might also focus on how the more well-known dimensions of interdependence theory interact with asymmetry in task dependence. As was mentioned before, task interdependence might increase the frequency of communication (e.g., Anderson & Williams, 1996), the felt responsibility (Kiggundu, 1988), or the liking between the team members (e.g., Bornstein, 1989). These processes were argued to increase the information processing of the powerful and diminish the abuse of power and our results support this view. It would be interesting to see if these processes are all operating at the same time, if one of these processes is stronger, or if other variables interact with these processes. This research into the interaction effects between the dimensions of interdependence theory might investigate more complex relationships than reported in this thesis, given the results of the third study. These findings pointed toward the possibility of a complex relationship at the team level between asymmetries in task dependence and the different types of performance feedback. It could therefore be that the optimal combination of individual performance feedback, group performance feedback, and power asymmetry involves more complex interaction effects, such as quadratic-by-linear-by-linear interactions. Investigating quadratic effects would be interesting if, for instance, a threshold level is required before feedback is noticed by individual team

members. If this is the case, only feedback which is above a certain threshold would change the focus of team members on attaining either an individual or a team performance. Additionally, this perspective indicates that from a certain point onwards the influence of a certain type of feedback might become maximized. Because our results indicated that the effects of asymmetry might differ for the powerful and the power disadvantaged, there are reasons to expect that these threshold- and maximizing-effects might differ between individuals. Based on the work of Fiske (1993) and Holmes and Rempel (1989) it can be argued that the powerless spend more cognitive effort observing their environment than the powerful and subsequently it can be expected that the power disadvantaged have a lower threshold level than the powerful. Deeper investigation of these more complex processes and interactions is, in our opinion, an interesting direction for future research.

The search for more complex interaction effects is also necessary from a more practical viewpoint, because it is needed to fill in some of the gaps in our current knowledge about interdependence in work teams (see figure 5.1 below). At present, there is no empirical evidence to guide practitioners in making a decision when asymmetry in task dependence is high, but task and outcome interdependence are low. Based on the intervention framework of Van der Vegt and Van de Vliert (2002), and in line with the congruence hypotheses, practitioners are advised to provide the team with low outcome interdependence under conditions of low task interdependence, and this seems to be the wisest course of action if asymmetry in task dependence is low. However, if there are many asymmetries in task dependence within the team, our results indicate that low task interdependence or low outcome interdependence can exert a significant negative influence on the affective reactions of individuals and on team processes and performance respectively. Hence, we expect that in teams which have both low task interdependence and low outcome interdependence, the negative effects of asymmetries in task dependence arise, because in such situations there is nothing to prevent the powerful team members from using their power. Consequently, future research should not only investigate if there are non-linear interactions, but also if there are higher-order interaction effects (e.g., a three-way interaction between asymmetry in task dependence, task interdependence, and outcome interdependence). As we will discuss below, investigating these complex interactions at the team level would be very beneficial for both researchers and practitioners.

Practical implications

Although the prior section indicated that much research is still needed, the results reported in this thesis do hold several important practical implications for (re)designing work teams. We will present these practical implications by integrating our results in the intervention framework of Van der Vegt and Van de Vliert (2002), which summarizes the most important practical implications from the interdependence literature. Our proposal for updating the framework is depicted in Figure 5.1. The purpose of this figure is to provide practitioners with the most up-to-date knowledge and this objective has the additional benefit of making the gaps in our current knowledge clear. As we indicated above, these gaps demonstrate that much research is still needed, especially regarding the more complex higher-order interaction effects. However, we recognize that some practitioners might not be able to find enough time or resources to conduct such thorough inquiries and our proposed update for the intervention framework might be especially beneficial for them. The original framework of Van der Vegt and Van de Vliert is presented by the dotted lines, while our proposed extensions to this model are represented by solid lines.

Van der Vegt and Van de Vliert's original framework (2002; p. 61) rests on two general guidelines, namely that task and outcome interdependence should be congruent to obtain positive organizational consequences and that high levels of job complexity might be able to alleviate the negative effects of incongruence. As can be seen in Figure 5.1, both the original as well as our proposed updated framework consists of four questions. In order to answer these questions, a systematic diagnosis of the asymmetries in task dependences, the level of task interdependence, the level of outcome interdependence, and the level of job complexity within the team is needed. This can be done by using the methods and measurement scales reported in the three empirical chapters of this thesis and by using the scales of Van der Vegt and Van de Vliert. By answering the four questions in successive order with YES or NO, professionals can come to theory-based and empirically-supported interventions which are depicted in the final column of Figure 5.1. Akin to the original framework, our proposed updated framework assumes that there are five interventions possible, namely:

A: Create two teams, by creating one team consisting of high task interdependent team members and another team consisting of low task interdependent team members.

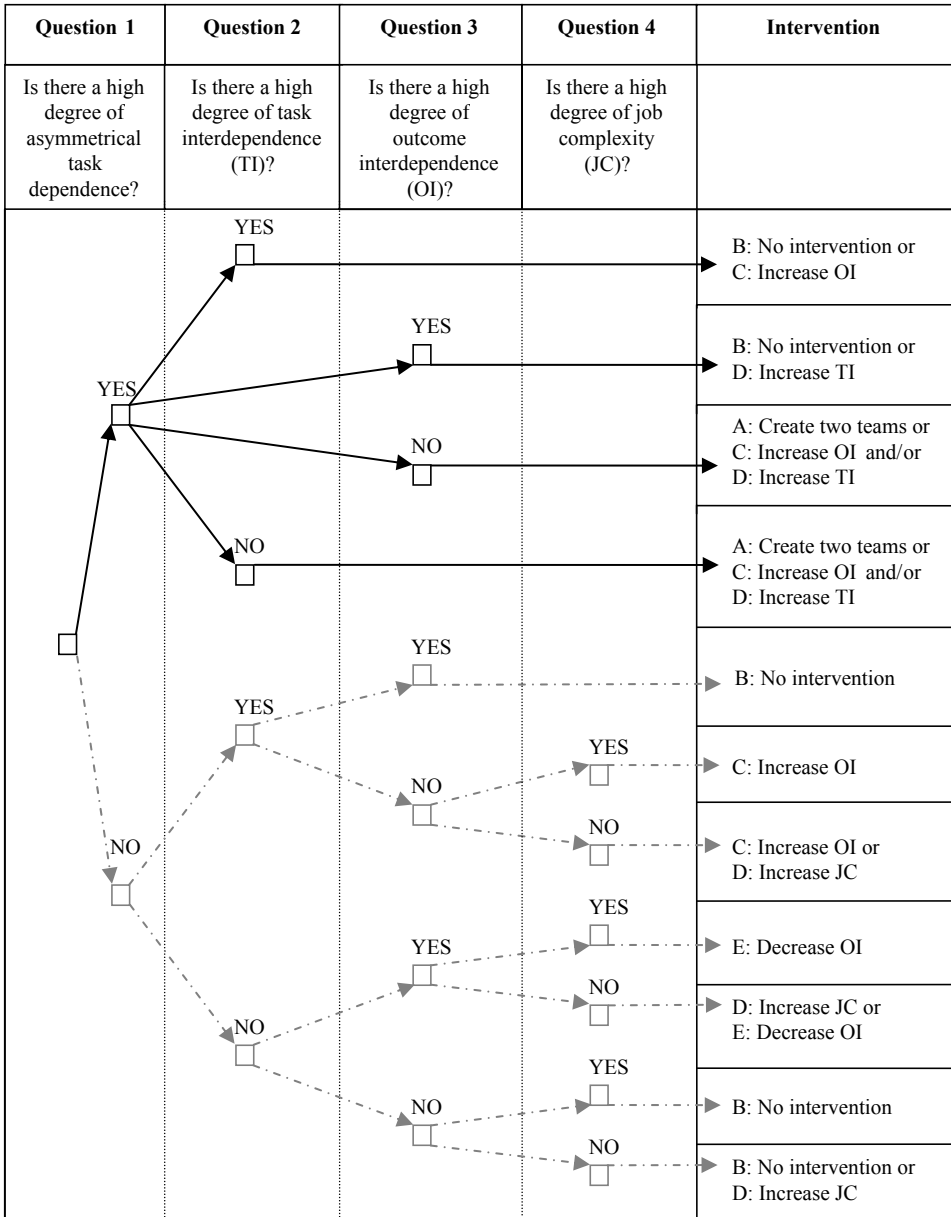
B: No intervention.

C: Increase the degree of outcome interdependence. This can be done by increasing the reward, goal and/or feedback interdependence within the team in such a way that the team members unambiguously focus on obtaining team goals and rewards.

D: Increase the degree of perceived job complexity.

E: Decrease the degree of outcome interdependence. This can be done by decreasing the reward, goal and/or feedback interdependence within the team in such a way that the team members unambiguously focus on obtaining individual goals and rewards.

Based on our results we propose new ways of dealing with the first question of the intervention framework. Given that the original dotted lines have already been discussed by Van der Vegt and Van de Vliert (2002), we will only focus on our own additions which are represented in Figure 5.1 by the solid lines. In the original framework answering question 1 affirmatively led to intervention A and this meant that the team had to be divided into two different teams. However, this can be undesirable or even impossible when, for instance, the tasks to be done are so multifaceted and challenging that team members with different sets of knowledge, skills, and abilities are essential for successful completion. Additionally, as was reported in Chapter 4, asymmetries in task dependence can result in more team learning and better team performance under the right conditions of feedback interdependence. Consequently, dividing a team into two different teams might not always be advisable and our suggestions for updating the framework provides practitioners with insights into how they can avoid splitting up the team, while still obtaining good organizational consequences.



Note: The dotted lines are taken from the original framework of Van der Vegt and Van de Vliert (2002) and the solid lines are our additions to this model.

Figure 5.1: The Proposed Updated Intervention Framework

In our proposed updated intervention framework an affirmative answer to the first question does not directly lead to an intervention, but requires that additional questions are answered; namely, "Is there a high degree of task interdependence within the team?" and/or "Is there a high degree of outcome interdependence ". If one, or both, of these questions are answered with a YES, our results reported in Chapter 3 and 4 indicate that no intervention might be needed within the team. Additionally, although there is currently no empirical support regarding the interaction effects of high asymmetry in task dependence, high task interdependence, and different levels of outcome interdependence; it seems prudent to investigate both questions. For instance, if the answer to question 2 was affirmative it seems wise to investigate if the outcome interdependence within the team is high or low, because, as was reported in Chapter 4, asymmetries in task dependence are associated with more team learning and higher team performance under conditions of high outcome interdependence. Similarly, if question 3 was answered before question 2 it seems prudent to investigate what one would answer to question 2 given the results reported in Chapter 3¹⁵.

To summarize, with our suggestions for updating the intervention framework we aim to provide managers with more options if question 1 is answered affirmatively. The original model only proposed intervention A, which means splitting up the team. Our findings, point however to two other options, namely increasing the level of task interdependence between the team members and/or providing high outcome interdependence. Because, dividing a team into two separate teams is a very resolute and definite thing to do, it seems prudent to try the other two alternatives if time constrains allow it. Although these alternatives need to be investigated in more detail in future studies, for the moment, it seems sensible to try to deal with asymmetries in task dependence by creating high task interdependence and/or high outcome interdependence.

¹⁵ As can be seen in Figure 4.1 and 4.2 a focus on individual performance (e.g. high levels of individual performance feedback or low levels of group performance feedback) is associated with more team learning and team performance than a focus on attaining a high group performance under conditions of low asymmetry in task dependence. The "congruence hypothesis" might therefore also be applicable to asymmetry in task dependence. However, future research is needed to establish if it is indeed wise to accompany low levels of asymmetry in task dependence with a focus on individual performance and high levels of asymmetry with a focus on team performance.

CONCLUDING REMARKS

The results of this dissertation clearly demonstrated that the scarcely investigated aspect of asymmetries in task dependence significantly influences interpersonal helping and trust at the dyadic level, job satisfaction and affective commitment on the individual level, and intrateam learning and performance at the team level. However, our empirical inquiries went further than merely investigating main effects and showed that interaction effects of both the level of task interdependence and as well as the amount and type of performance feedback are important. Taken together, these findings not only contribute to the scholarly understanding of asymmetry in task dependence and power, but also provide strong incentives for investigating dyad level phenomena in future (field) research. Additionally, we hope to have provided practitioners with some practical recommendations with which they can recognize and manage asymmetries in task dependence effectively. Lastly, our results clearly indicate a need for more research regarding asymmetry in task dependence and we believe that it might be beneficial to take a more complex view of interdependence theory than currently exists. This thesis provides a good starting point, both in terms of methods and insights, for studies examining the effects of intrateam interdependence in more detail.

SUMMARY

Many of us spend a large part of our lives working in work teams, and our experiences in these teams can significantly influence our well-being, health and happiness (e.g., Sonnentag, 1996). As a result, gaining a deeper understanding of the organization and functioning of work teams is not just interesting, but could also lead to such desirable results as increased well-being or improved team performance (e.g., Ostroff, 1992).

One of the more important theories that both practitioners and scholars use for understanding the functioning of work teams is interdependence theory (e.g., Thibaut & Kelley, 1959). This thesis aims to further the understanding of interdependence in work teams by investigating the role of differences or asymmetries in dependence between team members. These asymmetries in dependence occur when a team member (A) is more dependent on another team member (B) to complete his or her task, than B is dependent on A (e.g., Kelley & Thibaut, 1978). This vital element of interdependence has been largely overlooked in research so far, and in this thesis I aim to fill this gap in the interdependence literature.

In **Chapter 1** an overview of interdependence research and theory is provided, which indicates that there are two basic forms of interdependence, namely task and outcome interdependence. Task interdependence is the extent to which team members must share materials, information, or expertise in order to achieve the desired output or performance (e.g., Cummings, 1978), while outcome interdependence is the extent to which significant consequences of work are contingent on the collective performance of tasks (e.g., Van der Vegt et al., 2005). The amount of outcome interdependence can vary independently from the amount of task interdependence (and vice versa). For example, the task interdependence between call-center employees is normally very low because each individual can perform his or her duties without any assistance from the other employees. However, the level of outcome interdependence could be high if the management decided to provide bonuses to the team as a whole, but could also be low if the team members were only rewarded for the number of successful calls they made themselves. Consequently, task and outcome interdependence must be seen as independent constructs. The currently available evidence indicates that positive outcomes are most likely when the degrees of task and outcome interdependence are congruent with each other, such that low task interdependence is coupled with low outcome interdependence and high task interdependence with high outcome interdependence.

In contrast to the abundance of research regarding task and outcome interdependence, only very few studies to date have considered the possibility

that two individuals might differ in their task dependence on each other and the aim of this thesis is to shed some light on this dark corner of interdependence research. Asymmetries in dependence can be expected to exist in most work teams due to differences in the formal or informal resources controlled by group members as a function of different roles, tenures, or natural endowments (e.g., intelligence or charisma). Because asymmetries in dependence are thus often based on differences in resources needed to complete tasks, this thesis focuses on asymmetries in task dependence.

Asymmetries in task dependence have been associated with differences in power. For instance, Emerson (1962) mentioned that "the power of A over B is equal to, and based upon, the dependence of B upon A" (p. 33). Given that the powerful might use their power to their own advantage, our general expectation was that asymmetries in task dependence were detrimental for team processes and outcomes. Although some indirect evidence from recent studies regarding interpersonal and inter-organizational relationships supports this expectation, to date no study has actually investigated the effects of asymmetry in task dependence in work teams. To systematically investigate this matter we conducted field studies at the dyadic, individual, and team level of analysis. Since "power is a property of the social relation [and] not an attribute of the actor" (Emerson, 1962: p. 32) and because dyadic level phenomena have often been overlooked in studies regarding work teams, despite the fact that they have been argued to be important (e.g., Rusbult & Van Lange, 2003), the basic mechanisms operating at the dyadic level are examined first.

The first study is reported in **Chapter 2**. The main goals of this study were to see if asymmetries in task dependence could actually be measured in real life teams and to test if the proposed power perspective would be a suitable framework for understanding the influence of asymmetry in task dependence on interpersonal processes, such as interpersonal helping and trust. Extending the knowledge about trust is important because building and maintaining interpersonal trust is crucial for the effective functioning of work teams and team performance. The review of the literature indicated that, even though task dependence has been mentioned as a core requirement for the development of trust (Rousseau et al., 1998), only few studies have actually investigated this relationship empirically. A shortcoming of these studies was that they only considered team members to be equally task dependent on each other and thereby overlooked asymmetries in task dependence. As a consequence, very little is currently known about how team members working within various configurations of task dependence develop a conviction that fellow team members can (or cannot) be trusted.

To address this issue, we conducted a study involving 132 working relationships among 60 individuals from 29 teams. Social relations analyses revealed that an increase in a team member's task dependence on another team member was associated with higher levels of perceived help from, and interpersonal trust in, that specific team member, provided the other member is highly task dependent on the focal member. The results also indicated that the more powerful person in the asymmetrical relationship does not always (ab)use his or her power. The degree to which an actor perceived a relationship with a partner to be helpful partially mediated the relationship between task dependence and trust. These findings highlight the importance of attending to asymmetries in task dependence, and provide valuable insights into mechanisms that can explain the development of trust in organizational work teams. Taken together the results from the first study contribute to the advancement of interdependency theory by demonstrating that asymmetries in task dependence can indeed be measured in work teams and by showing that a power perspective is suitable for explaining the observed patterns.

The second study, reported in **Chapter 3**, expanded on the first dyadic level study by investigating if asymmetries in task dependence can exert an influence at the individual level and influence the affective reactions of individuals. Investigating these relationships is important, because affective reactions have been shown to significantly influence the health and well-being of team members as well as the productivity of the team as a whole. We hypothesized that team members who are more task dependent upon colleagues than vice versa (i.e., whom are power disadvantaged) report more negative affective reactions, such as lower job satisfaction and affective commitment to the team, when they perceived low levels of task interdependence and more positive affective reactions when they perceived high levels of task interdependence. The reasoning behind these expectations was that high levels of task interdependence provide the power disadvantaged team members with resources to negotiate with (cf. Casciaro & Piskorski, 2005) and as a result the cost of actively abusing ones power increases, making it less likely that the powerful will take such actions. Hence, the power disadvantaged are in a much better position to persuade the powerful to share their resources under high levels of task interdependence compared to low levels of task interdependence.

As our first study indicated power differences due to asymmetries in task dependence can significantly influence social exchange processes. Because an individual's affective commitment to the team captures the result of such social exchange processes (cf. Van Knippenberg & Sleebos, 2006), we also hypothesized that affective commitment mediated the relationship between perceived power disadvantage and job satisfaction. Our findings

from a multilevel field study among 262 team members indicated that asymmetries in task dependence can indeed exert a negative influence on an individual's affective reactions. The analyses also showed that the power disadvantaged report more positive affective reactions than their more powerful colleagues under conditions of high perceived task interdependence. The results of the third study extend current knowledge by demonstrating that asymmetries in task dependence are not just a dyadic level phenomenon, but are also important for individual level affective reactions. Additionally, the findings contribute to contemporary knowledge by demonstrating that there are more interaction effects in interdependence theory than the often mentioned interaction between task and outcome interdependence.

In **Chapter 4** the third study of this thesis is reported and in this final study we investigated if and how asymmetries in task dependence influence team performance. It seemed logical to expect that asymmetries in task dependence are negatively related to team performance due power abuse, lower interpersonal relations, and less positive affective reactions. However, based on problem solving and learning literature (e.g., King, 1998) there were also reasons to expect a positive effect of asymmetry in task dependence on team performance under certain conditions. We used one of the sub dimensions of outcome interdependence, namely the type of performance feedback group members received (i.e., individual or group) as a moderator, because previous research has shown that this variable could influence whether team members adopt a collective versus an individual mindset (e.g., Hinsz et al., 1997). We hypothesized that asymmetries in task dependence would be positively related to team learning and team performance under conditions of high group or low individual performance feedback, but negative under conditions of high individual or low group performance feedback. Additionally, we expected that team learning behavior would mediate the relationship between power asymmetry and team performance. Analysis of multi-source, multi-method data obtained from 218 individuals in 46 teams provided strong support for these arguments. These findings supported our hypotheses and extended present day knowledge by indicating that power asymmetry is not just an obstacle to team learning and performance but might sometimes be a resource for teams.

The results of the three studies are summarized and discussed in **Chapter 5**. Viewed together, the findings indicate that asymmetries in task dependence can negatively influence, dyadic, individual, and team processes and outcomes when the power associated with these differences can be used by the powerful or when the power of the powerful leads them to forget the needs of their powerless colleagues. The results also indicate that these negative effects of asymmetry in task dependence occur when the level of

task interdependence between team members is low or when the type of performance feedback focuses the team members on attaining a high individual performance (i.e., high individual or low group performance feedback). Asymmetries in power can be beneficial for intrateam processes when the amount of task interdependence between team members is high or when the amount and type of performance feedback focuses the team members on attaining a high group performance.

One of the strong points of this thesis is that the three studies used multiple measurement methods at multiple levels of analysis (e.g., dyadic, individual, and team level measures), multiple-sources (e.g., self-report, peers, and managers), and used different statistical techniques (e.g., Social Relations Modeling, Multi-level analysis, and OLS regression techniques). Naturally, each study also contains some weaknesses, but the use of different methods, measures, analytical techniques, and levels of analysis causes that many of these weaknesses are alleviated.

The main implications of this thesis are that asymmetries in task dependence can be largely explained by theories regarding power (e.g., Fiske, 1993) and that differences between the powerful and the power disadvantaged are important and should be acknowledged by both practitioners and scholars alike. This implies that future studies and interventions should both theoretically and methodologically allow for differences between relational partners. The measures and methods used in this thesis could be used for such purposes. Another important contribution of this thesis is that the results demonstrated that there are more interaction effects than the interaction between task and outcome interdependence than previously thought. This contributes to our understanding of interdependence theory, because it suggest that it might be beneficial to consider a more complex framework of interdependency theory which recognizes that there are more, and possibly non-linear or higher-order, interactions between the dimensions of interdependence theory.

The main practical implication is that prior to this thesis the recommended intervention was to divide the team into two teams when there were many intra-team asymmetries in task dependence. This thesis extents the options available to practitioners by indicating that increasing the level of task interdependence or increase the outcome interdependence might also be valuable interventions. This thesis also indicates that more research regarding asymmetry in task dependence is needed. The proposed intervention model developed in Chapter 5 aims to provide both practitioners and researchers with valuable guidelines for undertaking such endeavors.

SAMENVATTING

Dit proefschrift gaat over een onderwerp waaraan veel mensen een groot gedeelte van hun leven besteden, namelijk het werken in teams. De omstandigheden in deze teams kunnen een grote invloed uitoefenen op onze gezondheid (o.a. Sonnetag, 1996). Het verkrijgen van meer inzicht in het functioneren van werkteams is daarom niet alleen interessant vanuit een puur academisch oogpunt, maar kan ook een concrete bijdrage leveren aan het verhogen van het welzijn van medewerkers of het verhogen van de teamprestatie (o.a. Ostroff, 1992). Eén van de belangrijkste theorieën die zowel managers als wetenschappers gebruiken om het functioneren van werkteams te begrijpen is de interdependentie theorie (Thibaut & Kelley, 1959). Dit proefschrift focust op een dimensie van de interdependentie theorie waar tot nu toe nog weinig onderzoek naar is gedaan, te weten de mogelijkheid dat er verschil, oftewel asymmetrie, in taak afhankelijkheid kan bestaan tussen medewerkers.

Om het hoofdonderwerp van dit proefschrift beter te begrijpen wordt er in **Hoofdstuk 1** een overzicht gegeven van het onderzoek naar de interdependentie theorie. Uit dit overzicht blijkt dat er twee basisvormen van interdependentie te onderscheiden zijn, namelijk taak- en uitkomstafhankelijkheid. Taakafhankelijkheid is de mate waarin teamleden materialen, informatie of expertise moeten uitwisselen om een gewenste uitkomst of prestatie te bereiken (o.a. Cummings, 1978). Uitkomstafhankelijkheid is de mate waarin belangrijke resultaten van het werk afhangen van de collectieve taakprestaties (o.a. Van der Vegt et al., 2005). De mate van uitkomstafhankelijkheid kan onafhankelijk variëren van de mate van taakafhankelijkheid (en vice versa). Dat beide dimensies onafhankelijk van elkaar zijn kan goed gezien worden in bijvoorbeeld een callcenter. Normaal gesproken is de mate van taakinterdependentie in een callcenter laag, omdat de teamleden elkaar niet nodig hebben om de eigen taken te volbrengen. Echter, ongeacht deze lage taakafhankelijkheid kan de mate van uitkomstafhankelijkheid hoog zijn indien er bijvoorbeeld bonussen worden gegeven voor collectieve teamprestaties of juist laag zijn indien de medewerkers alleen op hun eigen prestaties worden beoordeeld en beloond. Uit veel studies is gebleken dat positieve werkuitskomsten het meest waarschijnlijk zijn indien taak- en uitkomstafhankelijkheid congruent zijn. Dit betekent dat een lage mate van taakafhankelijkheid gekoppeld moet worden aan een lage mate van uitkomstafhankelijkheid en een hoge mate van taakafhankelijkheid aan een hoge mate van uitkomstafhankelijkheid.

Hoewel er veel onderzoek is gedaan naar taak- en uitkomstafhankelijkheid is er tot op heden nog weinig onderzoek verricht naar de

mogelijkheid dat twee individuen kunnen verschillen in hun taakafhankelijkheid. Het doel van dit proefschrift is om meer inzicht te verkrijgen in dit vaak over het hoofd geziene aspect van de interdependentie theorie. Het is aannemelijk dat asymmetrie in taakafhankelijkheid relatief vaak voorkomt tussen medewerkers omdat er binnen een team vaak verschillen zijn in de controle over formele en informele bronnen. Dit kan komen doordat teamleden bijvoorbeeld verschillende rollen uitoefenen of doordat ze verschillen in bijvoorbeeld intelligentie of charisma. Aangezien asymmetrie in afhankelijkheid vaak gebaseerd is op verschillen in de controle over bronnen die nodig zijn om de taken te voltooien richt dit proefschrift zich op asymmetrie in taakafhankelijkheid.

Het is belangrijk om asymmetrie in taakafhankelijkheid te onderzoeken, omdat voorgaande studies een relatie tussen asymmetrie in taakafhankelijkheid en macht hebben geopperd. Emerson (1962) vermeldt bijvoorbeeld dat "de macht van A over B gelijk is aan, en gebaseerd is op, de afhankelijkheid van B op A" (p. 33). Omdat de minder afhankelijke persoon in een relatie macht kan uitoefenen op de meer afhankelijke persoon, was de algemene verwachting dat asymmetrie in taakafhankelijkheid negatief kan zijn voor teamprocessen en -uitkomsten. Met het beter begrijpen van asymmetrie in taakafhankelijkheid zouden teamprocessen en -prestaties dus mogelijk verbeterd kunnen worden. Tot op heden heeft echter nog geen enkele studie daadwerkelijk de effecten van asymmetrie in taakafhankelijkheid in werkteams onderzocht en is er alleen maar enig indirect bewijs van recente studies naar inter-persoonlijke en inter-organisationale relaties. Om asymmetrie in taakafhankelijkheid systematisch te onderzoeken hebben wij drie veldstudies verricht op het dyadische, individuele en teamniveau van analyse. Gezien het feit dat "macht een eigenschap is van de sociale relatie [en] niet een attribuut van een persoon zelf" (Emerson, 1962; p. 32) en gezien het feit dat er weinig onderzoek op dyadische niveau in werkteams is verricht, ondanks dat het belang hiervan al wel is beargumenteerd (o.a. Rusbult & Van Lange, 2003), begint dit proefschrift met een studie naar de basale processen op het dyadische niveau.

Deze eerste studie is beschreven in **Hoofdstuk 2**. De hoofddoelen van deze studie waren het onderzoeken of asymmetrie in taakafhankelijkheid daadwerkelijk gemeten kan worden in werkteams en het bestuderen of machtstheorieën in staat zijn om de aan asymmetrie gerelateerde inter-persoonlijke processen, zoals helpen en vertrouwen, te verklaren. Het verkrijgen van meer inzicht in vertrouwen is belangrijk, omdat het bouwen en onderhouden van inter-persoonlijk vertrouwen cruciaal is voor het effectief functioneren van werkteams en omdat inter-persoonlijk vertrouwen de teamprestaties kan beïnvloeden. Ondanks het feit dat taakafhankelijkheid als

één van de kernvereisten voor het ontwikkelen van vertrouwen wordt gezien (Rousseau et al., 1998), zijn er tot op heden weinig studies verricht die dit daadwerkelijk hebben onderzocht. De tot nu toe verrichte studies gingen er vaak van uit dat de teamleden even taakafhankelijk van elkaar waren en door deze assumptie was het onmogelijk om te onderzoeken of er misschien onderlinge verschillen in taakafhankelijkheid bestaan. Hierdoor is er momenteel weinig bekend over hoe teamleden, die werken onder verschillende configuraties van taakafhankelijkheid, de overtuiging ontwikkelen dat hun collega's wel of niet te vertrouwen zijn. Om meer inzicht in deze materie te krijgen worden in de eerste studie van dit proefschrift 132 werkrelaties van 60 individuen uit 29 teams onderzocht. Uit de sociale relatie analyses bleek dat een verhoging van de taakafhankelijkheid van een teamlid op een ander teamlid gerelateerd was aan een hogere mate van waargenomen hulp van, en vertrouwen in, dat specifieke teamlid. Echter, dit was alleen het geval indien dit andere teamlid taakafhankelijk was ten opzichte van het eerder genoemde teamlid. De mate waarin een teamlid de relatie met de partner waarnam als behulpzaam medieerde gedeeltelijk de relatie tussen taakafhankelijkheid en vertrouwen. Tot slot bleek dat de minder afhankelijke persoon zijn of haar macht niet altijd volledig gebruikte. Deze bevindingen demonstreren het belang van onderzoek naar asymmetrie in taakafhankelijkheid en vergroten het inzicht in de ontwikkeling van vertrouwen in werkteams. De resultaten vergroten ook de kennis over interdependentie theorie, doordat zij laten zien dat asymmetrie in taakafhankelijkheid daadwerkelijk gemeten kan worden in werkteams en dat een machtsperspectief de geobserveerde patronen kan verklaren.

De tweede studie, beschreven in **Hoofdstuk 3**, bouwt voort op de dyadische studie door te onderzoeken of asymmetrie in taakafhankelijkheid ook invloed heeft op het individuele niveau en de affectieve reacties van individuen kan beïnvloeden. Onderzoek naar deze relaties is belangrijk, omdat affectieve reacties een significante invloed kunnen hebben op de gezondheid en het welzijn van teamleden. Bovendien kunnen affectieve reacties de productiviteit van het gehele team beïnvloeden. De hypothese was dat teamleden die meer taakafhankelijk waren van hun collega's dan vice versa (de minder machtige) meer negatieve affectieve reacties, zoals lagere werktevredenheid en affectieve betrokkenheid met het team, zouden rapporteren wanneer zij waarnemen dat er een lage mate van taakafhankelijkheid was met hun collega's. We verwachtten ook dat de teamleden meer positieve affectieve reacties zouden melden wanneer zij een hoge mate van taakafhankelijkheid waarnamen. Anders geformuleerd, de verwachting was dat de mate van taakafhankelijkheid de relatie tussen asymmetrie in taakafhankelijkheid en affectieve reacties zou modereren. De redenering

achter deze verwachtingen was dat een hoge mate van taakafhankelijkheid de minder machtige teamleden middelen verschaft om mee te onderhandelen (cf. Casciaro & Piskorski, 2005) en hierdoor wordt het kostbaarder voor de machtige om hun macht te gebruiken. Dit betekent dat de minder machtige teamleden in een veel betere positie zijn om de machtige over te halen om hun middelen te delen wanneer er een hoge mate van taakafhankelijkheid is, dan wanneer er een lage mate van taakafhankelijkheid is.

De laatste hypothese was gebaseerd op de resultaten van de eerste studie die aantoonde dat machtsverschillen door asymmetrie in taakafhankelijkheid een belangrijke invloed kunnen hebben op de sociale uitwisselingsprocessen. De affectieve betrokkenheid van een individu met zijn of haar team representeert de uitkomsten van deze sociale uitwisselingsprocessen (cf. Van Knippenberg & Sleebos, 2006) en daarom was de laatste hypothese dat affectieve betrokkenheid de relatie tussen minder machtig zijn en werktevredenheid medieerde. De affectieve reacties van 262 teamleden werden geanalyseerd met multi-level analyses en hieruit bleek dat asymmetrie in taakafhankelijkheid inderdaad een negatieve invloed kan uitoefenen op de affectieve reacties van individuen. Verder bleek dat de minder machtige teamleden hogere affectieve reacties rapporteerden dan de machtige teamleden wanneer er een hoge mate van waargenomen taakafhankelijkheid was. Deze resultaten breiden de hedendaagse kennis uit doordat zij aantonen dat er meer interacties zijn in de interdependentie theorie dan de vaak gerapporteerde interactie tussen de mate van taak- en uitkomstafhankelijkheid. Deze nieuwe kennis verschaft zowel wetenschappers als professionals meer mogelijkheden om het functioneren van teams te optimaliseren.

In **Hoofdstuk 4** wordt de derde studie van dit proefschrift beschreven en in deze laatste studie wordt onderzocht of, en hoe, asymmetrie in taakafhankelijkheid de teamprestaties beïnvloedt. Het leek logisch om te verwachten dat asymmetrie in taakafhankelijkheid een negatief effect heeft op teamprestatie, gezien de in dit proefschrift aangetoonde negatieve invloed op inter-persoonlijke relaties en affectieve reacties. Echter, gebaseerd op de literatuur over probleemoplossen en leren (o.a. King, 1998) waren er goede redenen om een positief effect te verwachten onder bepaalde omstandigheden. Om deze omstandigheden te onderzoeken is één van de subdimensies van uitkomstafhankelijkheid gebruikt, namelijk feedbackafhankelijkheid. De reden hiervoor was dat voorgaand onderzoek heeft aangetoond dat het type prestatiefeedback dat medewerkers ontvangen (i.e., individuele of groepsfeedback) de teamleden kan beïnvloeden in het aannemen van een meer collectieve of een meer individuele oriëntatie (o.a. Hinsz et al., 1997). De hypothese was dat asymmetrie in taakafhankelijkheid

positief gerelateerd was aan teamleren en teamprestatie wanneer er veel groeps- of weinig individuele feedback werd gegeven en negatief wanneer teamleden weinig groeps- of veel individuele feedback ontvingen. De laatste hypothese was dat teamleergedrag de relatie tussen asymmetrie in taakafhankelijkheid en teamprestatie zou medieren. De analyse van een multi-source, multi-method dataset van 218 individuen uit 46 teams ondersteunde deze verwachtingen. Deze bevindingen breiden onze kennis uit, omdat ze laten zien dat asymmetrie in taakafhankelijkheid niet alleen een obstakel hoeft te zijn voor teamleren en teamprestaties, maar ook aangewend kan worden als een belangrijke bron voor teamleren en teamprestaties.

De resultaten van de drie studies worden samengevat en bediscussieerd in **Hoofdstuk 5**. Samengenomen wijzen de resultaten uit dat asymmetrie in taakafhankelijkheid een negatieve relatie kan hebben met dyadische, individuele en teamprocessen en -uitkomsten. Uit de resultaten blijkt dat deze negatieve effecten optreden wanneer de mate van taakafhankelijkheid tussen teamleden laag is of wanneer het type prestatiefeedback de teamleden richt op het behalen van een hoge individuele prestatie (i.e., hoge individuele of lage groepsfeedback). Asymmetrie in taakafhankelijkheid kan dus negatieve effecten hebben wanneer de macht die samenhangt met verschillen in taakafhankelijkheid gebruikt kan worden door de machtige of wanneer deze verschillen ertoe leiden dat de machtige de behoefte van de minder machtige over het hoofd ziet. Uit de resultaten bleek echter ook dat asymmetrie in taakafhankelijkheid positief kan zijn voor intrateam processen wanneer de mate van taakafhankelijkheid hoog is of wanneer het type prestatiefeedback de teamleden richt op het behalen van een hoge groepsprestatie.

Een sterk punt van dit proefschrift is dat de drie studies gebruik maakte van verschillende meetmethoden op verschillende niveaus (dyadische, individuele en teammeetmethoden), meerdere bronnen (o.a. zelfrapportage en inschattingen van collega's en leidinggevende) en verschillende statistische technieken (o.a. Social Relations Modeling, Multi-level analyses en OLS regressie technieken). Elke studie heeft natuurlijk ook zwakkere punten, maar door gebruik te maken van verschillende meetmethoden, bronnen en analysetechnieken kunnen veel van de zwakheden verminderd worden.

De belangrijkste implicaties van dit proefschrift zijn dat de effecten van asymmetrie in taakafhankelijkheid goed verklaard kunnen worden door machtstheorieën (o.a. Fiske, 1993) en dat het voor zowel wetenschappers als managers belangrijk is om deze verschillen tussen de machtige en de minder machtige te erkennen. Dit impliceert dat toekomstige studies, zowel theoretisch als methodologisch, ervan uit moeten gaan dat er verschillen kunnen zijn tussen de personen in een werkrelatie. De methoden en

technieken die gebruikt zijn in dit proefschrift kunnen hiertoe van dienst zijn. Een andere belangrijke bijdrage is onze bevinding dat er meer interactie effecten kunnen zijn tussen de dimensies van interdependentie theorie dan tot nu toe werd aangenomen. Deze bevindingen wijzen erop dat zowel wetenschappers als professionals een complexer beeld van interdependentie dienen aan te nemen om het functioneren van teams te optimaliseren.

Een belangrijke praktische bijdrage van dit proefschrift is dat het professionals meer opties verschaft dan er tot nu toe beschikbaar waren. Voorgaand onderzoek adviseerde om een team waarin een hoge mate van asymmetrie in taakafhankelijkheid voorkwam op te delen in een team met laag taakafhankelijke teamleden en een team met hoog taakafhankelijke teamleden. Uit dit proefschrift komt naar voren dat het creëren van een hoge mate van taak- of uitkomstinterdependentie mogelijk ook goede interventies kunnen zijn om met een hoge mate van asymmetrie om te gaan. Het voorgestelde interventiemodel geeft richtlijnen voor zowel interventies als vervolgonderzoek.

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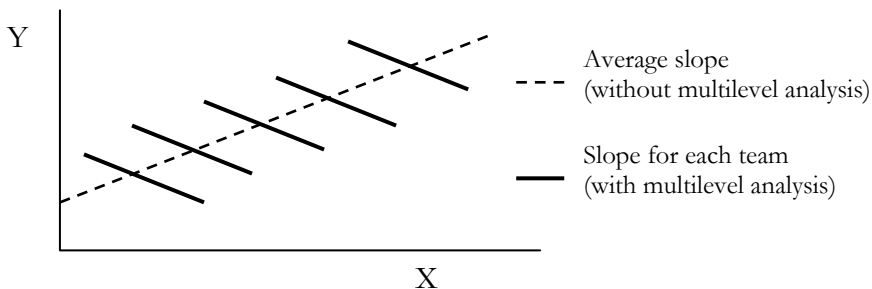
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APPENDIX 1: MULTILEVEL THEORY

Why should one care about distinguishing between different levels of analysis and what is the use of multilevel theory? These questions have been addressed by several authors (e.g., Hox, 1996; Snijders & Bosker, 1999). In short, these sources state that it is important to distinguish between different levels of analysis because a failure to acknowledge such issues could lead to erroneous conclusions. More specifically, multi-level theory addresses the possible violation of the "assumption of independent observations", which is typically made in many widely used analytical techniques (e.g., regression analysis). This assumption states that a given observation should not depend on another observation in the sample. This assumption is violated in teams, because members of the same team can be expected to be more similar to each other than they are to other randomly drawn individuals from the sample, as they share the same working environment (e.g., they not only share the same colleagues, but also the same leader, etcetera). The problem that might occur by ignoring this violation is often explained by a figure (cf. Snijders & Bosker, 1999, p. 28) similar to the one below (Figure A.1).

Figure A.1: The Importance of Multilevel Analyses



In figure A.1, a hypothetical relationship between two variables (X and Y) is depicted. For reasons of clarity we have left out all the observations (i.e., the points) from this figure, but let's assume that the best fitting regression line through these observations is the dotted line. This line indicates a positive relationship between X and Y. However, if we draw lines through the observations while accounting for the fact that these observations belonged to members of different teams this positive average slope would turn out to mask the negative slopes! So, if the multilevel structure of the data was ignored our analyses could, for instance, indicate that asymmetry in task dependence is positively related to interpersonal processes when in reality asymmetry in task dependence would influence

interpersonal processes negatively. Because we will investigate the asymmetry in task dependence of individuals who are working in different teams, and because we will theorize about asymmetry in task dependence at different levels of analysis, we needed to develop our theory, hypotheses, and research designs from a multilevel theory perspective in order to avoid the pitfalls described above.

DANKWOORD

Na vier jaar lang onderzoek te hebben gedaan naar werkteams zou men mogen verwachten dat ik het team waarmee ik jarenlang samengewerkt heb moeiteloos kan opnoemen en bedanken. Helaas is dat toch iets minder gemakkelijk dan het lijkt. Het probleem is dat een interessant idee geboren kan worden in de (congres)kroeg, kan voortkomen uit een geïnteresseerde vraag van familie of vrienden, of "gewoon" ontstaat in een werkoverleg met directe collega's. Verder hebben veel personen ook een indirecte bijdrage geleverd door voor de broodnodige ontspanning te zorgen. Vandaar dat de mensen die voor vertier gezorgd hebben ook de nodige lof verdienen. Achteraf gezien was het misschien handig geweest om een "ranking" bij te houden, zodat ik iedereen precies die waardering kan geven die hij of zij verdient. Bij het gebrek aan een dergelijk boekhouding hoop ik dat jullie eventuele missers in de onderstaande provisorische ranking met enige clementie willen bekijken.

Wie o wie zou er hoog in mijn "dank-ranking" moeten staan? De beide promotoren? Zonder twijfel heb ik zeer veel geleerd van het divergerende commentaar van Eric Molleman en het convergerende commentaar van Gerben van der Vegt. Zonder promotoren was er natuurlijk nooit een proefschrift geweest en zeker niet een proefschrift in de huidige vorm. Echter, er zijn meer mentoren geweest. Zonder bijvoorbeeld Nico Van Yperen's inspirerende begeleiding van mijn leeronderzoek of Onne Janssens' hulp bij het publiceren van mijn afstudeerscriptie in G&O was ik waarschijnlijk nooit begonnen aan een promotietraject. Maar met een dergelijke redenering begeef ik me op een hellend vlak, want als ik nog verder terugredeneer, dan was ik er zonder mijn ouders helemaal niet geweest. Dus misschien moeten juist zij op 1? Zonder hun eindeloos geduld en ondersteuning was deze hele onderneming nooit geslaagd. Het punt is natuurlijk dat mijn ouders ook ergens vandaan komen en daarom moeten misschien de opa's en oma's op nummer 1. Hoewel zij alle vier zeker een eerste plek verdienen, komt hiermee gelijk een nieuw probleem om de hoek kijken, aangezien mijn oma altijd zegt dat vele handen licht werk maken. Zoals algemeen bekend is, hebben oma's altijd gelijk en daarom vermoed ik dat er meer mensen hebben meegeholpen aan de totstandkoming van dit proefschrift dan alleen begeleiders en familie. Echter, voordat ik mij tot deze personen richt, houd ik het nog even in de familie door te switchen naar een laatste familielid, te weten dr. J.J.D. de Jong (vaak gewoon Jaap genoemd). Zoals Jaaps' titel al doet vermoeden heeft hij een grote invloed gehad op mijn keuze om ook een promotietraject in te gaan. Zijn lichtend voorbeeld heeft,

op meerdere niveaus bezien, ervoor gezorgd dat de juiste reacties plaatsvonden waardoor mijn project niet in het donker bleef staan.

Enfin, volgens oma zijn er dus nog meer mensen betrokken bij het maken van een proefschrift. Zoals alle organisaties en respondenten die de tijd en moeite hebben genomen om mee te werken aan mijn onderzoek en uiteraard de leden van de leescommissie. Allemaal van harte bedankt voor jullie medewerking! Verder ben ik natuurlijk ook dank verschuldigd aan mijn directe wetenschappelijke collega's (en niet te vergeten de "ondersteuners" zoals, Elli, Tineke en Barka). Het maken van een sub-ranking is zeer moeilijk, mede vanwege het feit dat er misschien wel zeer grote bijdragen zijn geleverd op een van de borrels of uitjes (maar ja, wie kan zich dat nog herinneren?). Vandaar dat ik de groep maar als geheel bedank, jullie verdienen ook zeker een nummer één plaats. Hoewel ik met de volgende actie waarschijnlijk mensen over het hoofd zie, toch nog enkele noemenswaardige collega's wiens aanwezigheid de promotietijd extra hebben veraangenaamd, zoals bijvoorbeeld het dynamische duo Kees en Richard (momenteel helaas gescheiden). Het rooie gevaar, bestaande uit "Swamp Thing" Oosterhuis en Frouke. Uiteraard ook dank aan al mijn verschillende kamergenoten, en met name Pruisische Nele en Caviagirl Hanneke. Borrel- en lunchgenoten, zoals "sterke verhalen verteller" Arvid, Herr Henrich, tijsssssüeee, Ali, Mister Streefland, Broodje Boogers, Niek "The Dude" en de Deense Rakkerman. Verder ook lof naar golfbuddy Jasper "ik hou hem niet op het Veldman" en SOM-prominent Jasper "misschien moet ik eens drankjes leren mixen" Hotho. Special thanks to Abdul Erumban, it was a pleasure to write my first international article with you! Tot slot nog dank aan "buitenaio" Aad voor o.a. het betere congreswerk in Istanbul en Philly. Ai, congressen ... als ik nu iedereen moet bedanken wordt de lijst wel erg lang. Om het maar samen te vatten: iedereen bedankt voor de leuke congressen! Teneinde het internationale dankronkje compleet te maken; Many thanks to the people at Olin School of Business in St. Louis for their excellent hospitality! Special thanks to Stuart Bunderson for his willingness to be a co-author on the team level paper and spending so much time with us (of course many thanks to his family as well for their kindness). Additionally, I would like to thank Rachel and Peter for showing us around and explaining how "you Americans" do things and Claus Langfred for introducing us to American BBQ-cuisine.

Gedurende een academische carrière komt men ook individuen tegen die zorgen voor vertraging en mindere resultaten. De meest beruchte personen van deze groep waren voor mij de leden van de ongebonden jaarclub Phorneus (bestaande uit; Peppe, Snuitje, Teeeess, Allegandro, Decibel, Eddih, Base en externe leden waarvan ik de bijnaam maar weglaat, Joene & Robbie) Vele jaren zorgden zij voor vertraging! Bij dezen wil ik alle heren

hiervoor van harte bedanken, zonder jullie was er überhaupt niks aan geweest en jullie verdienen daarom sowieso ook een eerste plaats (natuurlijk samen met andere drinkbroeders zoals Commando Bas, Lange Freek en alle basketbalvrienden en café Mijn Moeder-gangers die ik nu vergeet). Ik hoop dat de clubavonden weer van start gaan in Amstelveen en omstreken!

Niet geheel toevalligerwijs bevindt mijn nieuwe werkgever zich in Amstelveen en vandaar dat dit een mooi bruggetje is om een aantal personen te bedanken voor hun hulp bij het regelen van dit vervolg op mijn promotietijd. Zoals oplettende lezers al hadden kunnen zien, zijn zowel een oude collega alsmede een nieuwe collega (en Phorneuslid) tot nu toe over het hoofd gezien, respectievelijk Niels van der Kam en Johan (Juan) van Dijk. Johan heeft (samen met Jordan Bish) mij enthousiast gemaakt voor het werken bij Deloitte en gezamenlijk hebben zij gezorgd voor de eerste contacten. Vanwege zowel zijn bijdrage aan het verkrijgen van mijn nieuwe baan, alsmede als representant van Phorneus, en als vertegenwoordiger van mijn nieuwe collega's leek Johan mij een zeer geschikte keus als paranimf (en gelukkig was hij het hiermee eens). Maar waarom dan Niels als tweede paranimf? Onder het motto, verleden, heden en toekomst leek hij mij een mooie vertegenwoordiger voor mijn oude collega's en zoals bekend verwacht ik nog steeds dat hij in de toekomst ook gewoon naar Amstelveen en omstreken verhuist. (Verder is de keuze ook een beetje een goedmaker dat ik hem nu alleen laat met al die vrouwen op de afdeling en ik hoop dat Dennis mijn nobele taak wil overnemen om over (on)zinnige dingen en grootse plannen te praten met Niels).

Het bovenstaande teruglezende herinner ik mij ook weer waarom ik geen ranking bijgehouden heb al deze jaren, want geheel in stijl met veel hedendaagse rankings is ook de mijne een warboel geworden. Omdat dit niet geheel onverwachts is heb ik één speciaal persoon voor het laatste bewaard, om er zeker van te zijn dat zij echt op nummer 1 komt te staan. Di om kort te zijn, zonder jouw steun was het onmogelijk geweest om te promoveren (en natuurlijk niet alleen vanwege het feit dat je meegeholpen hebt met het verzamelen van data in een cruciale fase). Je zorgde er altijd voor dat ik nog voldoende contact bleef houden met de wereld buiten mijn onderzoek en jouw aanwezigheid heeft er voor gezorgd dat ik de vaak besproken eenzaamheid van het doen van onderzoek niet gevoeld heb. Bedankt voor alles, ik hoop dat je nog vele jaren op nummer 1 wilt blijven staan!

