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# How asymmetrical task dependence and task interdependence interact

## An individual level study into the effects on affective reactions

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Asymmetrical  
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### Abstract

**Purpose** – The purpose of this paper is to investigate whether research and practice on task design and work teams could benefit from a more nuanced perspective on task (inter)dependencies among team members. Prior research often overlooked that task interdependence captures the average exchange of resources, while asymmetrical task dependence captures the inequalities within an individual's work relationships. To date, no study on work teams has combined the two aspects.

**Design/methodology/approach** – Data were obtained from 262 individuals working in 67 work teams. Multilevel and bootstrapping analyses were used.

**Findings** – Drawing from interdependence theory and power-dependence theory it was argued, and subsequently found, that asymmetrical task dependence interacts with task interdependence, and affects the job satisfaction of individuals and their affective commitment to their team.

**Practical implications** – A key practical implication is that both asymmetrical task dependence and task interdependence should be taken into account when optimizing intra-team task dependencies, for instance when (re-)designing jobs or teams.

**Originality/value** – This study contributes to research on asymmetrical task dependence within work teams, by investigating its interaction with task interdependence, its effects on the affective reactions of workers, and its effects on the individual level of analysis.

**Keywords** Asymmetrical task dependence, Interdependence theory, Power-dependence theory, Quantitative field study, Task interdependence, Team and task design

**Paper type** Research paper

To meet the demands of an ever more complex business world there have been major changes in the last decades in the way jobs and tasks are organized. A key change is that increasingly more individuals are put into multidisciplinary work teams, ranging from task forces and project teams, to autonomous work groups and management teams (e.g. Cohen and Bailey, 1997; Wageman, 2001). This boost in working in teams has meant that increasingly more employees are dependent upon one or more colleagues for resources to complete their tasks. Research has shown that such task interdependence can increase an individual worker's motivation and performance if the



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exchange of resources with fellow colleagues goes smoothly (e.g. Kiggundu, 1983). However, other research has indicated that being task dependent on colleagues can also be frustrating when colleagues refrain from sharing the needed resources, as it then becomes hard, or even impossible, to complete one's assigned tasks (e.g. Tjosvold *et al.*, 2003). As such, it is crucial to consider task interdependencies carefully when (re-)designing the tasks and jobs of team members and, to this end, practitioners and scholars alike often turn to interdependence theory.

According to interdependence theory (Thibaut and Kelley, 1959; Kelley and Thibaut, 1978) interdependence among team members manifests itself in two distinct ways, namely task interdependence and asymmetrical task dependence. Task interdependence is defined as the amount to which an individual needs to exchange resources with other team members and thus captures the mutual or average exchange of resources (e.g. Brass, 1981). Asymmetrical task dependence is concerned with the inequalities within exchange relationships and is defined as the imbalance in resource exchange between an individual and his or her peer team members (e.g. De Jong *et al.*, 2007). For example, junior workers tend to depend more on seniors, and less knowledgeable or lower skilled workers depend more on others than vice versa. Given the increase in multidisciplinary team work it is likely that there are considerable asymmetrical task dependencies among workers in teams. Yet, although both concepts have been suggested to be theoretically important, most empirical studies focussed solely on task interdependence and ignored asymmetries in task dependence. Due to this lack of research, practitioners are left wondering what to do as the most up-to-date intervention framework (Van der Vegt and Van de Vliert, 2002) only suggests to split-up a team when asymmetrical task dependencies are found among its members. Yet, for many teams this advice is unpractical, or even impossible, as the diverse knowledge, skills, and abilities of the team members are needed to deliver the complex products or services for which the team was created.

Recently, research has taken the first steps to investigate this topic and these new studies suggests that ignoring the potential effects of asymmetries in task dependence is no longer viable (e.g. De Jong *et al.*, 2007; Van der Vegt *et al.*, 2010). These recent studies demonstrated that asymmetrical task dependence is not only present in work teams, but can also significantly affect important processes and outcomes, such as interpersonal helping behavior and team performance. However, even though recent research has demonstrated the importance of studying asymmetries in task dependence, there are several important gaps in scientific knowledge as the number of studies is still limited.

First, and foremost, despite the theorizing on an interaction effect of asymmetrical task dependence and task interdependence within interdependence theory (Thibaut and Kelley, 1959), no empirical study has yet investigated if there is indeed such an interaction effect present within work teams. The main scholarly goal of the present study is therefore to explore an often overlooked part of interdependency theory. Investigating this topic is, however, not only theoretically important, but also holds practical value as it creates more theoretically driven, and empirically tested, intervention options. In short, our key practical goal is to provide practitioners with a new alternative besides the current advice to split-up their team when asymmetries in task dependence are found (Van der Vegt and Van de Vliert, 2002). In addition to these core scholarly and practical contributions, we aim to address two other gaps. The second gap we want to shed more light on is how asymmetrical task dependence might influence individual team members. This question is still unresolved as the prior

two studies provided either detailed dyadic-level insights (De Jong *et al.*, 2007) or relatively broad team-level implications (Van der Vegt *et al.*, 2010). The third gap we will address is the lack of insight into the effects of asymmetrical task dependence on affective variables, given that the prior studies focussed mostly on behavioral measures (e.g. interpersonal helping), cognitive processes (e.g. team learning), or objective outcomes (e.g. team performance). Studying affective variables is important not only to complement the prior studied variables, but also because affective variables can serve as “early indicators” of (negative) behavioral and performance outcomes (e.g. Allen and Meyer, 1990).

To address all gaps simultaneously, we will investigate whether the interaction between asymmetrical task dependence and task interdependence is related to an individual's affective commitment to his or her team (Allen and Meyer, 1990) and satisfaction with his or her job (Agho *et al.*, 1992) at the individual level of analysis. Our study thus augments recent studies on asymmetrical task dependence (De Jong *et al.*, 2007; Van der Vegt *et al.*, 2010) by investigating an unexplored key interaction underlying interdependence theory (Thibaut and Kelley, 1959).

### Theory and hypotheses

Before developing our hypotheses in more detail it is important to stress that asymmetrical task dependence is distinct from task interdependence, even though both are defined in terms of the need for resources (Thibaut and Kelley, 1959). Imagine, for instance, an individual “X” and another individual “Y” who work in different teams, but who have to exchange a similar moderate amount of resources within their respective teams (e.g. an average of 4 units of resources). Despite their similar task interdependence, they might differ greatly in their asymmetrical task dependence, because individual X might only need 3 units from other team members, while her team members need 5 units from her. In contrast, individual Y might need six units from his colleagues, while his team members only need 2 units from him. Although both individuals have the same (average or mutual) task interdependence score of 4 units, their individual-level asymmetrical task dependence scores are very different (−2 and +4 units, respectively). Hence, it is important to investigate these two constructs separately. For a graphical illustration of why this distinction is important, see Casciaro and Piskorski (2005, p. 171).

#### *How asymmetrical task dependence relates to affective reactions*

A key insight for how asymmetrical task dependence might relate to the affective reactions of individual team members comes from research on power which has shown that less dependent individuals are in a better position to use power, as they can more easily withhold support or abandon a relationship given that they incur fewer costs from such actions than their more dependent colleagues (e.g. Giebels *et al.*, 2000). One consequence of these lower costs is that less dependent individuals are less committed to more dependent others and are more willing to switch exchange partners (Cook and Emerson, 1978). Relating these findings to the present topic of interest, it can be expected that being highly asymmetrically task dependent in a team where the low asymmetrically task dependent individuals are withholding support is very unpleasant. In essence, it would be a clear indication that the low asymmetrically task dependent coworkers are unlikely to fulfill their part of the social exchange processes in the future (Holmes and Rempel, 1989). Hence, high asymmetrically task dependent individuals can be expected to have lower levels of commitment to their team, because their colleagues do

not assist them. Additionally, high asymmetrically task dependent individuals can be expected to have lower levels of satisfaction with their job, because the resulting lack of resources makes completing tasks frustrating or even impossible.

Besides active (ab)use of power, there are also more passive, but equally damaging, reasons why high asymmetrically task dependent individuals might report lower affective reactions toward their team and job. Research regarding the effects of power on cognitive processes and information processing has indicated that being powerful diminishes an individual's need to devote cognitive effort to observe and interpret the behavior of those with less power (e.g. Fiske, 1993). Thus, high asymmetrical task dependent individuals might be receiving fewer resources than needed just because their low asymmetrical task dependent coworkers are less aware of their needs. In essence, being highly asymmetrically task dependent on others opens up the possibility of simply being overlooked.

Consequently, a high asymmetrically task dependent person's affective reactions can be expected to be more negative when he or she does not receive adequate resources, is being (ab)used, and/or overlooked. This expectation is supported by research which has shown that team members with little power tend to report fewer positive, and more negative, emotions than more powerful team members (e.g. Kemper, 1990). This also implies that high asymmetrically task dependent individuals could experience higher levels of affective commitment and job satisfaction when their colleagues do recognize their needs and provide the needed resources to them. Thus, the existence of asymmetrical task dependence does not necessarily mean that such power differences are always exploited (e.g. Fiske and Berdahl, 2007). As such, the key remaining question is; "what factor can explain how some individuals who are highly asymmetrically task dependent become dissatisfied with their team and job, while other, similarly highly asymmetrically task dependent individuals do not experience such negative affective reactions?" Below we will argue that an answer to this question lies in an individual's task interdependence with colleagues, as it describes the extent to which mutual needs for resources come into play.

#### *The interaction of asymmetrical task dependence and task interdependence*

A first reason why we expect that task interdependence can shape the relationship between asymmetrical task dependence and affective reactions is that higher levels of task interdependence provide high asymmetrically task dependent individuals with more bargaining power (cf. Casciaro and Piskorski, 2005). When there is high task interdependence, high asymmetrically task dependent individuals still need more resources from their low asymmetrically task dependent colleagues than vice versa, but now these colleagues also depend, at least to a certain extent, on the high asymmetrical task dependent individual for important resources. Hence, team members have to rely more upon each other when mutual task interdependence increases. For low asymmetrical task dependent individuals this increases the costs of (ab)using their power as high asymmetrical task dependent coworkers are now in a position to retaliate by withholding resources (Bacharach and Lawler, 1981).

A second reason why higher task interdependence can be expected to be beneficial for high asymmetrical task dependent individuals, can be found in the studies regarding power and positions in networks, because "[...] an actor in a workflow position with many transaction alternatives (*i.e. high task interdependence*) would have more potential influence than one in a position with few transaction alternatives (*i.e. low task interdependence*)" (Brass, 1981, p. 522; italic text added). This benefit for high asymmetrically task dependent

individuals further restrains the power (ab)use by their low asymmetrically task dependent coworkers, as the high asymmetrically task dependent individual might not only retaliate by withholding resources during a certain transaction, but might even decide to quit the relationship altogether and obtain their resources from other team members if the situation becomes too disadvantageous. Hence, higher levels of task interdependence increase the transaction alternatives of high asymmetrically task dependent individuals and put them in a better position to obtain their needed resources.

A third reason is that higher task interdependence is associated with a higher frequency of exchange and as such also provides high asymmetrical task dependent individuals with additional opportunities to communicate their needs (e.g. Anderson and Williams, 1996). Based on Lawler's affect theory of social exchange (e.g. Lawler *et al.*, 2008) high task interdependence, and the associated higher exchange frequency, can also be expected to increase the shared responsibility for the successful completion of tasks, given that the tasks become more non-separable and indistinguishable. This shared responsibility is argued to subsequently increase the level of cooperation as well as positive affective reactions toward other team members. Consequently, higher levels of task interdependence can keep low asymmetrically task dependent team members informed about, and motivated to fulfill, the needs of high asymmetrically task dependent coworkers.

However, the above processes also have a darker side, as they imply that high asymmetrically task dependent team members who have low task interdependence with their fellow coworkers, not only have less to offer to their low asymmetrically task dependent colleagues, they also have fewer alternatives to obtain resources from others and less opportunities to inform and motivate their colleagues to attend to them. We therefore expect that individuals who are high asymmetrical task dependent will experience lower levels of affective commitment and job satisfaction when task interdependence is low, and higher levels of affective reactions when task interdependence is high. We expect that the affective reactions of workers who are low asymmetrically task dependent will be much less influenced by different levels of task interdependence, since they can operate more freely and with fewer social constraints (Keltner *et al.*, 2003). Formalizing these arguments we expect:

- H1. An individual team member's asymmetrical task dependence is negatively associated with his or her affective commitment to the team when his or her task interdependence with other team members is low and positively when high.
- H2. An individual team member's asymmetrical task dependence is negatively associated with his or her job satisfaction when his or her task interdependence with other team members is low and positively when high.

## Method

### *Sample and procedure*

We gathered data as part of a larger research program and contacted the managers of 67 teams in the Netherlands comprising 337 individuals in total, of which 262 individuals returned usable questionnaires. We provided management reports (which, for privacy reasons, only reported group-level findings) to those companies which wanted them. To increase the external validity of our study we included teams with very diverse backgrounds, including the financial (36 teams), healthcare (six teams), and technology (six teams) sectors. The remaining 19 teams were spread among the

retail, real estate, consultancy, education, food, and government sectors. The average team size was 5.04 team members ( $SD = 3.47$ ). We focussed exclusively on peer relationships since leader-follower relations contain unique features such as formal reward power (e.g. Fiske and Berdahl, 2007). A short introductory text explicitly guaranteed confidentiality. In our sample, 164 respondents were female, average age was 36.32 years ( $SD = 10.56$ ), and average team tenure was 2.94 years ( $SD = 3.76$ ).

### *Measures*

*Asymmetrical task dependence.* We measured asymmetrical task dependence by asking each team member to answer the following two items reported in De Jong *et al.* (2007) for all of his or her work relationships with fellow team members, “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). With both items, X was replaced by the name of a specific team member. Consistent with conceptualizing asymmetrical task dependence as resource dependence (Emerson, 1962; Fiske and Berdahl, 2007) and in line with other recent studies (Van der Veegt *et al.*, 2010), we first calculated each individual’s asymmetrical task dependence per relationship, by calculating the difference between the responses to the two questions, such that higher scores indicated higher asymmetrical task dependence (cf. Casciaro and Piskorski, 2005). Subsequently, we combined all the assessments of an individual by taking the mean of the above reported scores. This resulted in a continuous measure which reflects the perception of an individual about his or her asymmetrical task dependence with their coworkers.

*Task interdependence.* Based on recent research (Casciaro and Piskorski, 2005; Van der Veegt *et al.*, 2010) we calculated an individual’s task interdependence by taking for each individual the average score of the above-described two questions per relationship; the more positive the score, the greater the perceptions of task interdependence. Subsequently, we combined all these assessments by taking the mean of an individual’s scores. The resulting continuous measure reflects an individual’s perception of his or her average task interdependence with all the other team members.

*Affective commitment to the team.* Research on commitment has used different foci of commitment, ranging from “global” foci assessing an individual’s commitment to their organization to more “local” foci such as an individual’s commitment to one’s colleagues or work team (e.g. Becker, 1992). We followed the latter approach and measured how affectively committed each individual team member was to his or her team by using three items adapted from past research (Allen and 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 also rated on a seven-point scale (1 = totally disagree, 7 = totally agree). Cronbach’s  $\alpha$  was 0.89.

*Job satisfaction.* To measure how satisfied each individual team member was with his or her job we used four items taken from Agho *et al.*’s (1992) satisfaction scale, “I find real enjoyment in my job”; “I am very satisfied with my job”; “I am seldom bored with my job”; “I would not consider taking another kind of job.” These items were again rated on a seven-point scale (1 = totally disagree, 7 = totally agree). Cronbach’s  $\alpha$  was 0.91.

### *Discriminant and convergent validity*

Confirmatory factor analysis of the four-factor model containing our key variables revealed a good fit ( $\chi^2[24, 262] = 69.58, p < 0.001, SRMR = 0.05, GFI = 0.95, CFI = 0.96$ ).

For the task asymmetry and interdependence measures we assumed a conservative reliability of 0.70 (Richardson and Van den Berg, 2005). An alternative two-factor model, collapsing affective commitment and job satisfaction and the asymmetry and interdependence measures, did not fitted well ( $\Delta\chi^2[4] = 603.32$ ,  $p < 0.001$ , SRMR = 0.16, GFI = 0.63, CFI = 0.49). Additionally, a one-factor model did not fitted well either ( $\Delta\chi^2[3] = 361.37$ ,  $p < 0.001$ , SRMR = 0.14, GFI = 0.72, CFI = 0.68). Hence, our assumed four-factor measurement model is the most appropriate.

## Results

### *Descriptive statistics*

The means, the standard deviations, and the Pearson zero-order correlations between the variables are presented in Table I. As can be seen there, the mean value of asymmetrical task dependence was 0.10 (with a standard deviation of 1.04). This standard deviation of 1.04 indicates that 95 percent of the scores were between  $-1.98$  (less asymmetrically task dependent than colleagues) and  $+2.18$  (more asymmetrically task dependent). Table I also shows that the zero-order correlation between asymmetrical task dependence and task interdependence was small and non-significant ( $r = -0.09$ , ns) indicating that these two constructs are empirically distinct. The correlation between affective commitment and job satisfaction was positive and significant ( $r = 0.42$ ,  $p < 0.001$ ). The correlation between affective commitment and task interdependence was also positive and significant ( $r = 0.15$ ,  $p < 0.05$ ), and the correlation between job satisfaction and task interdependence was positive and approached statistical significance ( $r = 0.11$ ,  $p < 0.10$ ).

### *Hypothesis testing*

*H1* predicted an interaction effect of asymmetrical task dependence and task interdependence on affective commitment. Given our nested data, we conducted multilevel analyses with a random intercept and fixed terms for all other variables and we started with a zero-model to establish a baseline condition (Hox, 2002). As can be seen in Table II, the second model (including the main effects of asymmetrical task dependence and task interdependence) had significantly more predictive power ( $\Delta\chi^2 = 6.70$ ,  $df = 2$ ,  $p < 0.05$ ) than the first model containing only the control variable. This is attributed to the positive and significant coefficient for task interdependence ( $\gamma = 0.23$ ,  $p < 0.05$ ). In Model 3, we added the interaction between asymmetrical task dependence and task interdependence which further significantly improved the model ( $\Delta\chi^2 = 6.41$ ,  $df = 1$ ,  $p < 0.05$ ). The interaction coefficient ( $\gamma = 0.29$ ,  $p < 0.05$ ) had the expected positive sign.

*H2* predicted an interaction effect of asymmetrical task dependence and task interdependence on job satisfaction. As can be seen in Table III, after adding the control variables in Model 1, and the main effects of asymmetrical task dependence and task interdependence in Model 2, adding the interaction term significantly improved the model ( $\Delta\chi^2 = 5.51$ ,  $df = 1$ ,  $p < 0.05$ ). The interaction coefficient ( $\gamma = 0.23$ ,  $p < 0.05$ ) had the expected positive sign.

Both interactions are graphically represented in Figure 1 following the procedures of Aiken and West (1991) and given our directional hypotheses we tested the simple slopes one-sided. As expected, asymmetrical task dependence was negatively related to an individual's affective commitment to their team at low levels of task interdependence (simple slope,  $\gamma = -0.213$ ,  $p < 0.05$ ) and positively related at high levels of task interdependence (simple slope,  $\gamma = 0.358$ ,  $p < 0.05$ ). These results support

**Table I.**  
Descriptive statistics and  
pearson zero-order  
correlations among the  
study variables

Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1. Team size	5.04	3.47										
2. Finance sector (dummy)	0.47	0.50	0.07									
3. Healthcare sector (dummy)	0.13	0.33	0.06	-0.35***								
4. Technology sector (dummy)	0.07	0.26	-0.09	-0.26***	-0.11***							
5. Gender (1 = female)	0.63	0.48	0.10	-0.06	0.29***	-0.21***						
6. Age	36.32	10.56	0.01	0.03	0.33***	0.08	-0.11***					
7. Years in team	2.94	3.76	0.01	-0.08	0.17**	0.16**	0.05	0.28***				
8. Asymmetrical task dependence	0.10	1.04	0.01	0.02	0.10	-0.05	0.03	0.04	-0.09			
9. Task interdependence	3.77	1.33	-0.35	0.03	0.08	0.08	-0.15*	0.14*	-0.06	0.15*	-0.02	
10. Affective commitment	5.17	1.34	-0.08	-0.02	0.05	-0.12*	0.00	0.10	0.15*	-0.02	0.15*	
11. Job satisfaction	5.47	1.16	0.04	0.06	0.18**	-0.19**	0.08	0.31***	0.16*	0.02	0.11***	0.42***

**Notes:** The M and SD of team size are measured at the team level, all other statistics are at the individual level. \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ; \*\*\*\* $p < 0.10$

Model	Variable	0 Model		Model 1		Model 2		Model 3	
		$\gamma$	SE	$\gamma$	SE	$\gamma$	SE	$\gamma$	SE
0 Intercept	$\beta_{0ij}$	5.18***	0.11	5.16***	0.11	5.16***	0.11	5.18***	0.18
1. Controls	Team size			-0.12	0.13	-0.04	0.13	-0.02	0.13
	Financial sector (dummy)			-0.06	0.12	-0.10	0.12	-0.11	0.12
	Healthcare sector (dummy)			-0.04	0.13	-0.09	0.13	-0.09	0.13
	Technology sector (dummy)			-0.25*	0.11	-0.27*	0.11	-0.27*	0.11
	Gender (dummy)			-0.06	0.09	-0.03	0.09	-0.02	0.09
	Age			0.08	0.10	0.07	0.09	0.06	0.09
	Years in team			0.18*	0.09	0.20*	0.09	0.21*	0.09
2. Main effect	Asymmetrical Task Dependence (ATD)					0.01	0.08	0.07	0.08
	Task Interdependence (TI)					0.23*	0.09	0.23*	0.09
3. Interaction	ATD $\times$ TI							0.29*	0.11
Variance, individual level		1.41 (0.14)		1.42 (0.14)		1.38 (0.14)		1.34 (0.13)	
Variance, team level		0.35 (0.12)		0.27 (0.11)		0.27 (0.11)		0.26 (0.11)	
Total variance		1.76		1.69		1.65		1.60	
$\chi^2$		875.46		850.33		843.63		837.22	
$\Delta\chi^2$		-		25.13***		6.70*		6.41*	
% of total variance explained		-		0.07***		0.11*		0.16*	

Notes:  $N_i = 262$ ;  $N_j = 67$ . \* $p < 0.05$ ; \*\*\* $p < 0.001$

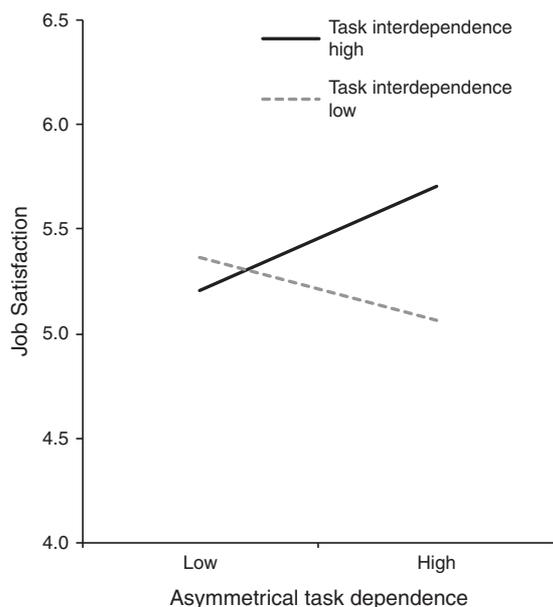
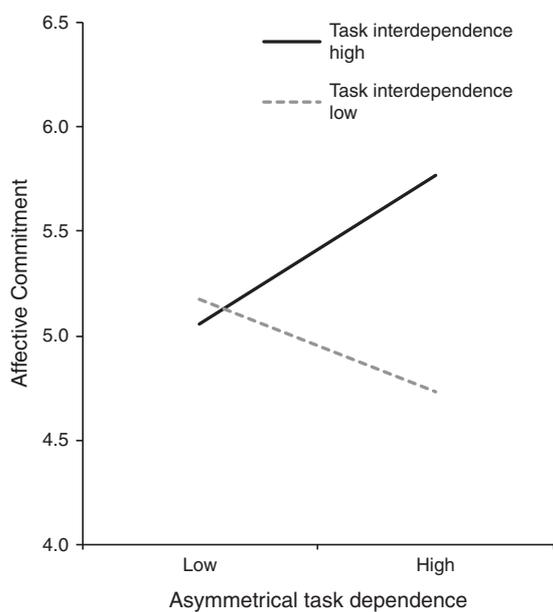
**Table II.**  
Results of multi-level  
analyses for affective  
commitment at the  
individual level of analysis

Asymmetrical  
task dependence

**Table III.**  
Results of multi-level  
analyses for job  
satisfaction at the  
individual level of analysis

Model	Variable	0 Model $\gamma$	SE	Model 1 $\gamma$	SE	Model 2 $\gamma$	SE	Model 3 $\gamma$	SE
0 Intercept		5.47***	0.09	5.46***	0.08	5.46***	0.07	5.48***	0.07
1. Controls	Team size			0.02	0.09	0.07	0.09	0.08	0.08
	Financial sector (dummy)			0.02	0.09	0.00	0.09	-0.01	0.08
	Healthcare sector (dummy)			0.04	0.09	0.02	0.09	0.01	0.09
	Technology sector (dummy)			-0.24**	0.08	-0.25**	0.08	-0.25**	0.07
	Gender (dummy)			0.06	0.07	0.08	0.07	0.08	0.07
	Age			0.33***	0.08	0.33***	0.08	0.32***	0.08
	Years in team			0.11	0.07	0.12	0.07	0.14	0.07
2. Main effect	Asymmetrical Task Dependence (ATD)					0.00	0.07	0.07	0.07
	Task Interdependence (TI)					0.14***	0.07	0.14***	0.07
3. Interaction	ATD $\times$ TI					0.14***	0.07	0.23*	0.10
Variance, individual level		1.10 (0.11)		1.08 (0.11)		1.07 (0.11)		1.06 (0.11)	
Variance, team level		0.23 (0.09)		0.07 (0.06)		0.06 (0.06)		0.05 (0.06)	
Total variance		1.33		1.15		1.13		1.11	
$\chi^2$		806.30		759.29		755.98		750.47	
$\Delta\chi^2$		-		47.01***		3.31		5.51*	
% of total variance explained		-		0.18***		0.20		0.22*	

**Notes:**  $N_i = 262$ ;  $N_j = 67$ . \* $p < 0.05$ , \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ ; \*\*\*\* $p < 0.10$



**Figure 1.**  
How asymmetrical task dependence relates to an individual's affective commitment to their team and job satisfaction under low and high task interdependence

the interaction effect predicted in *H1*. The lower graph shows that asymmetrical task dependence was negatively related to an individual's job satisfaction at low levels of task interdependence (simple slope,  $\gamma = -0.158$ ,  $p < 0.05$ ). At high levels of task interdependence this was positive and significant (simple slope,  $\gamma = 0.300$ ,  $p < 0.05$ ). These results support the interaction effect predicted in *H2*.

## Discussion

A key starting point for this study was the observation that, until very recently, most studies regarding task interdependence overlooked the effects of asymmetrical task dependence (Thibaut and Kelley, 1959). Drawing from theories of power and dependence in social and exchange relationships (e.g. Casciaro and Piskorski, 2005; Emerson, 1962; Fiske and Berdahl, 2007), and building upon recent studies (De Jong *et al.*, 2007; Van der Vegt *et al.*, 2010), we argued, and found, that there is an interaction between asymmetrical task dependence and task interdependence. The theoretical implications of this are discussed below after which the strengths and weaknesses, ideas for future research, and practical implications will be discussed.

### *Theoretical implications*

First, and foremost, our study extends research on interdependence theory (e.g. Thibaut and Kelley, 1959) by demonstrating that asymmetrical task dependence is positively related to job attitudes when task interdependence is high, and that these relations are negative when task interdependence is low. Concrete examples of why this is important are that it suggests that some of the inconclusive results reported by previous studies (e.g. Wageman and Baker, 1997) might be due to the fact that, until recently, most studies overlooked the possibility of asymmetrical task dependence. Additionally, our results also indicate that the positive effects of task interdependence reported by others studies (e.g. Sprigg *et al.*, 2000) might especially be there for the high asymmetrically task dependent. In short, our findings thus show that the current practice of investigating solely the average levels of task interdependence, and ignoring the possibility of asymmetries in task dependence, is no longer advisable.

Second, our results support and extend the limited empirical evidence regarding asymmetrical task dependence in work teams by indicating that theories regarding power and dependence (Emerson, 1962; Thibaut and Kelley, 1959) are not only applicable at the relational level (e.g. De Jong *et al.*, 2007) and the team level (Van der Vegt *et al.*, 2010), but can also be used at the individual-level of analysis in real-life work teams. Hence, our results complement prior work by filling the gap that existed between the dyadic- and team-level studies on asymmetrical task dependence and, as we discuss below, thereby provide new avenues for future research and practical interventions.

Third, we extend prior research by investigating affective variables as this augments the previously studied cognitive (e.g. team learning), behavioral (e.g. interpersonal helping behavior), and objective (e.g. team performance) variables. Our study thus not only provides a link between the different levels of analysis used by previous studies, but also complements the previously used concepts and constructs by demonstrating that asymmetries also affect such “early indicators” of performance (e.g. Allen and Meyer, 1990).

### *Strengths and weaknesses*

Naturally, our research has some strengths and weaknesses. One weakness might be that we used self-report data since this could have introduced common source biases. Following the arguments of Conway and Lance (2010) it is valid to use self-report data given that our research question was, in line with other studies (e.g. Ferrin *et al.*, 2006), based on the perceptions of individual team members. Moreover, our CFA analyses showed that all our constructs were distinct and that the four-factor model fitted significantly better to the data than alternative models. Lastly, as research by

Siemsen *et al.* (2010) has demonstrated, it is very difficult to attribute significant two-way interactions to common source biases. Hence, common source biases are unlikely to play a significant role in our study, but future research could further establish the validity of our findings by using multiple sources.

Another possible limitation was already introduced earlier, as we acknowledge that due to the nature of our constructs the possibility for asymmetrical task dependence is restricted at extremely high, or extremely low, levels of task interdependence. However, our results show that the level of task interdependence is very close to the midpoint of our scale and, as the standard deviation of 1.04 indicates, extreme situations thus only rarely occurred in our sample. Hence, in our sample the average team member was not more or less asymmetrical task dependent than their colleagues and this is fully in line with power-dependence and interdependence theory (Emerson, 1962; Thibaut and Kelley, 1959). Additionally, our study uses exactly the same items as developed by De Jong *et al.* (2007) and our procedures are similar to previous studies in this field (e.g. Van der Vegt *et al.*, 2010) as well as in related fields (e.g. Casciaro and Piskorski, 2005). Moreover, these possible restrictions also occur in other published studies which investigated the interaction between the mean and standard deviation of the same construct (see Harrison and Klein, 2007). Although there are thus many similarities between our procedures and those of previous studies, future research could benefit from separating the measurement of task interdependence and asymmetrical task dependence to avoid the above mentioned measurement restrictions. One concrete option would be to assess asymmetry with the scales developed by De Jong *et al.* (2007) and measure interdependence with a more “traditional” measure, such as reported in Van der Vegt *et al.* (2000). Additionally, when splitting-up these two variables, future researchers could also separate the measurement sources, such that, for instance, team members assess the asymmetries in task dependence and supervisors assess the average task interdependence.

Although our approach had some disadvantages, it also had some advantages, such as that it became possible to assess the average task interdependencies and asymmetries in task dependence of each individual with all of his or her peer-level team members. The benefit of this approach is that there were no missing data per analyzed individual. Additionally, our approach conforms very closely to our theorizing from interdependence theory (Thibaut and Kelley, 1959) and power-dependence theory (Emerson, 1962) as well as to recent characterizations of power, such as by Fiske and Berdahl (2007). Overall, our study thus shows that the scales developed by De Jong *et al.* (2007) can be used not only for dyadic- or team-level analyses (cf. Van der Vegt *et al.*, 2010), but also for individual level analyses. As such, combining the theory, methods, and findings from our study with previous work provides scholars and practitioners with a range of ideas to measure, and subsequently deal with, task asymmetries and interdependencies in the workplace.

#### *Future research*

Given the strong focus of the current research on interdependence theory and power-dependence theory, we will focus on future research directly related to these theories. First, as addressed in the theoretical implication section, using the “power due to asymmetrical task dependence” perspective might be very worthwhile for future studies since it is closely related to the relational roots of differences in power within work teams (cf. De Jong *et al.*, 2007; Fiske and Berdahl, 2007; Van der Vegt *et al.*, 2010). As such, future studies could use this perspective and investigate in-depth how our

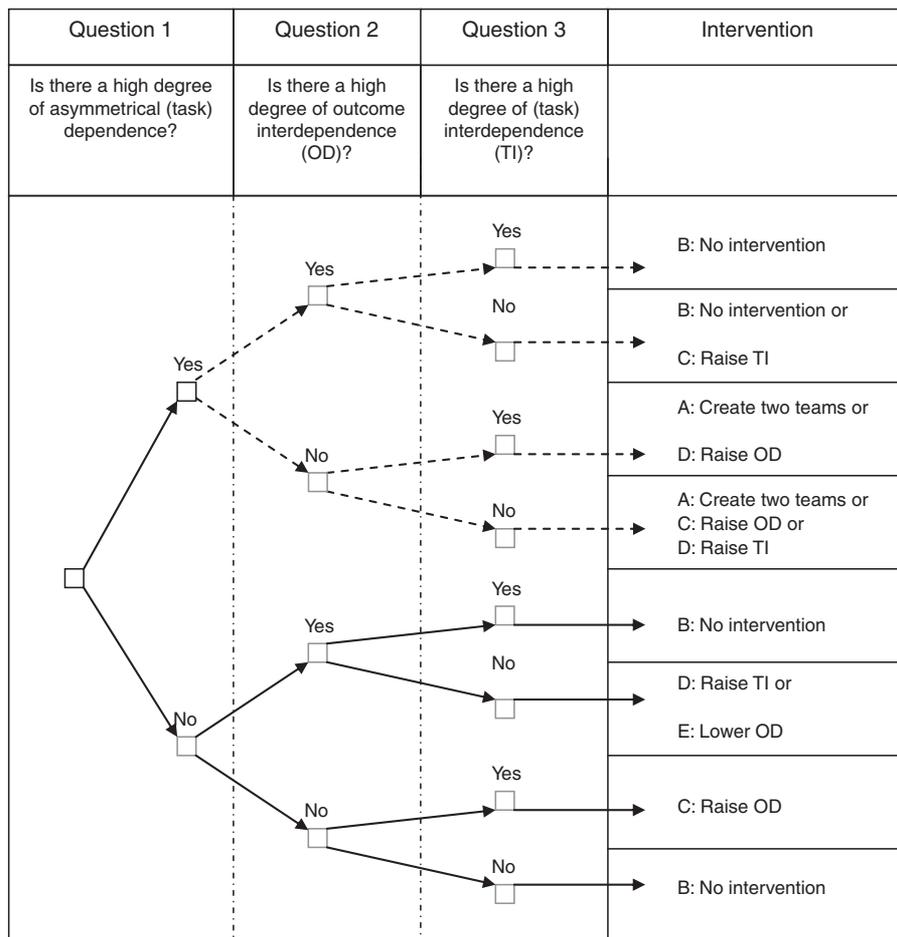
theorized mechanisms of bargaining power (Casciaro and Piskorski, 2005), transaction alternatives (Brass, 1981), interaction and communication opportunities (Anderson and Williams, 1996), and cognitive processes (Fiske, 1993; Keltner *et al.*, 2003) are all contributing toward the observed interaction effects between asymmetrical task dependence and task interdependence.

Second, researchers could also investigate if asymmetries in outcome dependence are equally important as asymmetries in task dependence. Prior research has indicated that there are three types of outcome interdependence, namely feedback, goal, and reward interdependence (cf. Weldon and Weingart, 1993). Although recent research has already looked at the interaction between asymmetries in task dependence and (average) feedback interdependence (Van der Vegt *et al.*, 2010), to date, no study has investigated how asymmetries in task dependence are affected by asymmetries in outcome dependence. Recent research on leadership by Wu *et al.* (2010) hints that this might be an interesting topic to study, as they found that differences in, or so-called “differentiation” of, leadership behaviors among team members can be detrimental for group processes and outcomes. In light of the advancements in the field of interdependence theory, and in related fields such as leadership research, it seems worthwhile to investigate the effects of asymmetries in outcome dependence in future studies and/or connect asymmetries in task dependence to studies on differentiation of leadership among followers. Given that this topic has not yet been empirically investigated the proposed update to the intervention framework (Figure 2) only describes average outcome interdependence in order to stay close to current theorizing and empirical support.

Third, future research could also “zoom-out” and attempt to integrate the recent findings that asymmetries in task dependence are important to dyadic-level helping behavior and interpersonal trust (De Jong *et al.*, 2007), team-level learning and performance (Van der Vegt *et al.*, 2010), and individual-level affective reactions (this study) into one overarching framework. Such an endeavor could include all the detailed processes we mentioned above, but could also go beyond this and try to systematically include the moderators which have been studied. As a first step toward building such a framework we provide an updated version of the intervention framework of Van der Vegt and Van de Vliert (2002) in Figure 2. Although more research on the effects of asymmetries in task dependence is necessary to validate this model and explore it in more depth, we hope that by updating the current framework practitioners will have more guidelines for their interventions and researchers more concrete ideas for future studies.

#### *Practical implications*

As Figure 2 illustrates, our main practical implication is that asymmetrical task dependence should be acknowledged when optimizing intra-team task dependencies, for instance when (re-)designing jobs, work flows, or work teams. We advise practitioners to first investigate if some individuals are asymmetrically task dependent and, if so, first try to decrease this asymmetrical task dependence. One option is to split-up the team in one high and one low interdependent group, as the intervention framework of Van der Vegt and Van de Vliert (2002) suggests. Yet, this is often difficult, if not impossible, to do in today’s complex business setting. The recent study of Van der Vegt *et al.* (2010) provided an alternative, by indicating that high asymmetrical task dependence within a team can also be managed by creating high outcome interdependence, for example, by giving group feedback. Our results provide an extra option, by indicating that increasing



**Notes:** The above framework is an extension of the framework of Van der Vegt and Van de Vliert (2002). The solid lines represent the original relationships, while the dotted lines represent our extensions

## Asymmetrical task dependence

1129

**Figure 2.**  
The proposed updated intervention framework of interdependence theory

the task interdependence of high asymmetrically task dependent individuals might also work. We advice to focus on specific workers, instead of just raising the task interdependence for everybody within the team as has sometimes been suggested (cf. Molleman, 2009). A potential issue with raising the interdependence for everybody is that it might shift the problem by inadvertently creating new asymmetrically task dependent team members elsewhere in the team. By optimizing the structural task (inter)dependencies as described above, managers have to spend less time fixing any problems arising from inadequate job or task design (e.g. by actively and frequently giving feedback) and thus have more time for other managerial tasks (Hooijberg *et al.*, 2007).

To conclude, given the increasing evidence that asymmetrical task dependence influences important work processes and outcomes, ranging from interpersonal helping behavior and trust (De Jong *et al.*, 2007), team learning and team performance

(Van der Vegt *et al.*, 2010), to the affective reactions of individual team members (this study), it is becoming increasingly more apparent that it is important to not only acknowledge the existence of asymmetrical task dependence in work teams, but also to deal with its, potentially negative, effects. As this study has shown, one option is to manage the task interdependence of individual team members.

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