COORDINATING ACROSS BOUNDARIES WITHIN MULTITEAM SYSTEMS: THE IMPORTANCE OF MEMBERS' PERSONALITIES

Rick van der Kleij

TNO Behavioural and Societal Sciences, The Netherlands

Thomas A. de Vries, Frank Walter & Gerben S. van der Vegt

Department of HRM & OB, University of Groningen, The Netherlands

Inge Visser

Department of Social Psychology, University of Tilburg, The Netherlands

Peter J. M. D. Essens

TNO Behavioural and Societal Sciences, The Netherlands

Ad L. W. Vogelaar

Faculty Military Sciences, Netherlands Defense Academy, The Netherlands

ABSTRACT

Teams of teams, or multiteam systems, are increasingly used to complete challenging tasks in dynamic environments. Individual teams are integrated in multiteam systems as 'component teams' that heavily rely on each other's inputs, processes, and outcomes to perform effectively and to achieve shared, multiteam system goals. Members need to engage in *boundary spanning*: actions to establish linkages and manage interactions with other component teams. In this study we consider members' personalities as antecedents for such boundary spanning behavior. Specifically, we suggest that boundary spanners' similarity in extraversion communicates a compatible approach to coordination, which elicits boundary spanning and, in turn, enhances perceived boundary spanning effectiveness. Results of a multiteam system experiment confirm these expectations.

Keywords: multiteam systems, boundary spanning, extraversion, task coordination

INTRODUCTION

To accomplish complex tasks and respond to environmental contingencies, teams operating in dynamic environments must engage in external team relationships (Goodwin, Essens, & Smith, 2011). Individual members of teams need to establish linkages and manage interactions with other teams to organize task-related issues (Ancona & Caldwell, 1992b; Marrone, 2010). Researchers generally refer to such behaviors as 'boundary spanning behavior' (Davison & Hollenbeck, 2011), and have established its importance for team performance (Ancona & Caldwell, 1992b; Choi, 2002; Mathieu, Maynard, Taylor, Gilson, & Ruddy, 2007), as well as the performance of collections of interdependent teams (i.e., multiteam systems; DeChurch & Marks, 2006; Marks, DeChurch, Mathieu, Panzer, & Alonso, 2005).

Despite the importance of boundary spanning behavior, we know relatively little about the antecedents of such behavior. Prior research on this issue has typically focused on team members' collective boundary spanning as an aggregate team-level phenomenon (i.e., 'team boundary spanning': "a team's efforts to establish and manage external linkages"; Marrone, 2010: 912), and identified important team-level antecedents. Although this work has provided key insights, it does not account for the fact that a team's boundary spanning activities are inherently the result of individual behaviors between two members of different teams, and that such members may differ in the extent to which they engage in boundary spanning behavior with each other (Joshi, Pandey, & Han, 2009; Marrone, 2010). Little is known, however, about why some members engage in more boundary spanning behavior than others (Marrone, 2004).

The purpose of this study is to examine the role of boundary spanners' personalities in relation to their boundary spanning behavior. In line with previous theory building efforts (Joshi, 2006; Joshi, Pandey, & Han, 2009), we draw on the similarity-attraction paradigm

(Byrne, 1997) and suggest that a boundary spanner's (hereafter referred to as "A") similarity in terms of extraversion personality traits (i.e., being sociable, talkative, assertive, and active: Barrick & Mount, 1991) to his or her boundary spanning partner's (hereafter referred to as "B") extraversion influences A's boundary spanning behavior towards B. In addition, we investigate the implications of A's boundary spanning behavior for B's satisfaction with the boundary spanning relationship with A.

As such, we aim to contribute to research on boundary spanning in two important ways. First, we consider the joint influences of A and B's extraversion in relation to the intensity of A's boundary spanning behavior. Although extraversion is commonly believed to motivate a person to build external relationships (Joshi et al., 2009; Klein, Lim, Saltz, & Mayer, 2004), an extensive review of boundary-spanning literature concludes that an individual's personality in-and-of-itself weakly and inconsistently predicts the respective individual's boundary spanning behavior (Williams, 2002). We attempt to reconcile this conflicting pattern of results by diverting from this simplistic extraversion-promotes-boundary spanning model. We recognize that the influence of A's personality may not operate independent from its context, but instead can be shaped by the personalities of those who the focal individual has to interact with (Thorne, 1987). Therefore, we consider A's personality in the context of B's personality and address their interaction effect on A's boundary spanning behavior towards B.

Second, we investigate the implications of A's boundary spanning behavior for B's perception of effectiveness of A's boundary spanning efforts. Previously, research related boundary-spanning behavior to individual level outcomes, as well as to team-level outcomes. Why boundary-spanning behavior is reinforced in some dyadic relationships but not others remains an open question. In this study we therefore consider how boundary-spanning may influence perceived boundary-spanning effectiveness, a crucial factor that may determine

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partners' future commitment in their external relationships (Kahn, Reizenstein, & Rentz, 2004; Maltz & Kohli, 1996; Massey & Dawes, 2007; Ruekert & Walker, 1987). As such, this study contributes to boundary-spanning research by exploring the dyadic-level foundations of boundary-spanners' perceptions of effectiveness.

THEORETICAL BACKGROUND

In order to understand the influence of boundary-spanners' extraversion on their boundary spanning behavior, we draw on the similarity-attraction paradigm. Research on similarity-attraction suggests that a person feels attracted to other persons with whom he or she perceives to share similar characteristics or attitudes. Generally, an individual (e.g., A) assesses other individuals' attitudes (e.g., B's attitudes) in relation to his or her own attitudes, because agreement of attitudes may help to validate the respective individual's own world view, fulfill his or her need to feel "logical", provide evidence that he or she is capable of predicting future events effectively, and, subsequently, may specify how conflict-free and prosperous a relationship will be (Byrne, 1997). Because of this preference for attitude agreement, similarity-attraction proposes that A will maintain and reinforce his or her interaction with B if A perceives overlap in attitude with B. As such, we use the similarity-attraction paradigm here as a framework that helps to explain A's engagement in boundary-spanning behavior towards specific unfamiliar members from different teams.

We propose that within boundary-spanning relations, the similarity between A and B's levels of extraversion strongly influences the similarity-attraction process, and, hence, reinforces boundary spanning activities. First, unlike other personality traits (e.g., agreeableness, neuroticism, openness to experience, and conscientiousness), B's extraversion is relatively easy to identify and may therefore assist A's assessment of B's similarity. For example, when Kenny, Albright, Malloy, and Kashy (1994) asked persons to try and assess multiple personality characteristics of unfamiliar others, only assessments of extraversion

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were substantially and significantly related to the personality self-reports of the persons that were rated. The salience of unfamiliar others' extraversion seems even so strong that job recruiters can reliably predict job applications' extraversion solely on the basis of the activities mentioned in their written résumés (Cole, Feild, & Giles, 2003). This capacity is, however, not restricted to job recruiters; also researchers can reliably trace a person's self-reported level of extraversion back to the contents of his or her pronoun use in written texts (i.e., Ickes, Reidhead, & Patterson, 1986). In extension, we suggest that within boundary spanning contexts, information about B's extraversion is a readily available input for A's cognitive similarity-attraction process.

Second, not only may B's extraversion be readily assessable, it can also provide A with rich information about B's attitudes towards tasks in work-related contexts. Previous research, for example, suggests that a person's extraversion is related to his or her attitude towards problem solving, decision-making and task execution (Nutt, 1986). Also, similarity in extraversion can reveal A's compatibility and coherence of interaction styles with those of unfamiliar members. Thorne (1987), for instance, found evidence that distinct, yet equally coherent interaction styles emerged in dyads of unacquainted conversation partners that shared similar levels of extraversion. Whereas dyads of introverts engaged in focused problem talk about a narrower range of topics, dyads of extraverts tended to focus on the similarities between a wider range of topics (Thorne, 1987). Mixed introvert-extravert dyads, however, did not develop such coherence during conversations. In extension, we propose that B's extraversion provides A with rich insights in B's attitudes and, when compared with A's own extraversion, B's compatibility as a potential boundary spanning partner.

Taken together, the informative nature and salience of B's extraversion may guide A's similarity-attraction process and help to determine the prospect of establishing a positive boundary-spanning relationship with B. Advantages associated with such prospects may be

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pronounced and form an important motivational force for boundary spanners. For example, extraverts-extraverts and introverts-introverts dyads engage in more interaction, develop more effective initial interaction patterns, and perceived more natural, smooth, and relaxed interaction, as compared to mixed dyads of introverts-extraverts (Cuperman & Ickes, 2009). Based on the above, we propose that A may feel more motivated to engage in boundary spanning behavior towards B to the extent that B is similarly extraverted. More formally:

Hypothesis 1: The relationship between A's extraversion and A's boundary spanning behavior towards person B is moderated by B's extraversion, so that A's extraversion is positively related to A's boundary-spanning behavior towards B when B's extraversion is similar and negatively related when B's extraversion is dissimilar.

We further suggest that A's boundary-spanning behavior towards B establishes and maintains a strong relationship with B from the different team. Specifically, boundary-spanning behavior allows A to transmit a broad range of external knowledge, expertise, information, resources, and support to the team of B (Richter, Scully, & West, 2005; Richter, West, Van Dick, & Dawson, 2006). As such, A's boundary-spanning behavior may indicate his or her commitment to B's team and thereby show B that maintaining the relationship with A is worthwhile, equitable, productive and satisfying effort (Fisher, Maltz, & Jaworski, 1997; Ruekert & Walker, 1987). We therefore propose that A's boundary spanning behavior relates to B's evaluation of A's effectiveness as a boundary spanner. More formally stated:

H2: A's boundary spanning behavior towards B is positively related to B's perception of A's boundary spanning effectiveness.

We summarized our hypotheses in Figure 1.

INSERT FIGURE 1 ABOUT HERE

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METHOD

Sample and Procedure

To test our hypotheses, we conducted an experiment involving 76 participants divided over 19 multiteam systems with two 2-member component teams (one boundary spanner and one non-boundary spanning team member). We focus in this study on the 38 persons in boundary spanning positions. During the experiment the two component teams worked in separate rooms on a multiteam system version of PLATT: The Planning Task for Teams (see Kamphuis, Gaillard, & Vogelaar, 2011). In PLATT, a multiteam system of two teams with two persons each had to develop a plan on the basis of complex, regularly updating, and ambiguous information to evacuate a group of people from a hostile area. Within each component team, each member is assigned to a specific role that requires unique expertise and has unique responsibilities. These roles correspond to important functional domains in the military: Intelligence and logistics. Driven by a real-time scenario, messages are sent to team members, and information is selectively made available on multiple websites during the time span of the task.

In each team there were two distinct roles: a boundary spanner role and a non-boundary spanner role. Boundary spanners (A and B) acted as representatives of their teams and could contact each other through email, while non-boundary spanners could not contact the other component team. Non-boundary spanners could only send emails within their component team. At the same time, only non-boundary spanners within each component team had access to websites with additional information. To plan the evacuation route, team members had access to at least one shared whiteboard with a digitized map of the area on which the evacuation has to take place. In total there were three shared whiteboards: one for planning within each team, and one for planning between teams to be used only by the boundary spanners of each team. Thus, boundary spanners had access to and needed to update

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two whiteboards.

Participants were randomly assigned to a team and randomly assigned to one of two roles in each team. Participants' age ranged from 18 to 40 years (M = 24.80, SD = 4.43) and they had on average about 4 years of work experience. Forty-eight percent of the participants were male. Participants were paid €40 and the bestperforming multiteam system could earn an extra bonus of €120 to enhance motivation, create goal interdependency, and stimulate the multiteam members to perform at their best. None of the members knew each other prior to the experiment. Participation was voluntary, confidentially was guaranteed, and all participants were debriefed after the experiments.

Measures

A and B's extraversion. We gauged individual A and B's extraversion personality traits with a 10-item bipolar extraversion self-report measure taken from Goldberg's (1992) International Personality Item Pool. Before each experiment we asked individuals to indicate on a 7-point Likert scale to what degree these personality traits described how they typically act and behave. Cronbach's Alpha for this scale was .89.

A's boundary spanning behavior towards B. A's boundary spanning behavior toward B was measured by the number of emails participants in boundary-spanning positions (A) sent to their boundary-spanning partner (B) in the other component team. We counted all emails that A sent to B, forwarded to B, and replied to B.

B's perception of A's boundary spanning effectiveness. After each experiment we gathered B's peer-ratings of A's boundary spanning effectiveness. For this purpose we administered a subset of Richter, Scully, and West's (2005) Intergroup Effectiveness Scale to measure A's responsiveness (2-items), viability (2 items), and resource exchange (2-items) towards B. Cronbach's alpha for this scale was .81.

Data Analysis

To account for the nesting of A and B within their joint A-B boundary-spanning relationship, we analyzed the data with multilevel regression analyses. Multilevel regression analysis produces regression coefficients that are comparable to the unstandardized regression coefficients obtained from ordinary least square regression analysis. Model fit can be assessed by chi-square differences between subsequent models (Cohen, Cohen, West, & Aiken, 2003; Snijders & Bosker, 1999). As such, this method allows us to test our individual-level hypotheses, while partialling out biases that may be caused by individuals' nesting within specific boundary spanning relationships.

RESULTS

Descriptive Statistics

Means, standard deviations and bivariate correlations are reported in Table 1. As shown, there are no significant correlations between extraversion and boundary spanning behavior, indicating the relevance of considering interaction effects. Furthermore, there is a positive and significant correlation between boundary spanning behavior and peer-rated boundary-spanning effectiveness. This provides initial support for Hypothesis 2.

INSERT TABLE 1 ABOUT HERE

Hypotheses Testing

Hypothesis 1 proposes that the relationship between A's extraversion and his or her boundary spanning behavior towards B depends on B's extraversion. We expect higher levels of boundary spanning behavior either when a lower level of A's extraversion is accompanied by a lower level of B's extraversion, or when a higher level of A's extraversion is accompanied by a higher level of B's extraversion. To test this hypothesis we first included

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respondents' age and gender in the regression analysis. We then regressed A and B's extraversion on A's boundary spanning behavior towards B. In the following step we included the interaction term of A and B's extraversion in the equation.

Results indicate a significant crossover interaction effect (Table 2). We graphically explored this interaction effect in Figure 1 (Aiken & West, 1991). As hypothesized, we find that A's extraversion is positively and significantly related to A's boundary spanning behavior towards B, when B's extraversion is higher (simple slope at +1SD: $B = 2.37$, $p < .05$). Furthermore, A's extraversion is negatively and significantly related to A's boundary spanning behavior towards B, when B's extraversion level is lower (simple slope at -1SD: $B = -1.95$, $p < .05$). Therefore, we find support for Hypothesis 1.

Our second hypothesis states that A's boundary spanning behavior towards B is positively related to B's perceptions of boundary spanning effectiveness. To assess this relationship, we regressed A's boundary spanning behavior on B's rating of boundary spanning effectiveness of A. Similar to the test of our first hypothesis, we controlled for age and gender. We find a positive and significant relationship ($B = .23$, $p < .05$) and, hence, Hypothesis 2 is also confirmed (Table 3).

INSERT TABLE 2, TABLE 3, AND FIGURE 2 ABOUT HERE

CONCLUSION

This study investigated the influence of extraversion in the context of specific boundary spanning relationships. Based on the similarity-attraction paradigm, we suggested that the relationship between a person's extraversion and boundary spanning behavior is influenced by the extraversion of the person to whom such behavior is directed. Specifically, we proposed that the correspondence between a boundary spanner's level of extraversion and

that of his or her partner induces similar attitudes that may motivate boundary spanning behavior, and, ultimately help to reinforce and maintain an effective boundary spanning relation with that person. In line with our expectations, results indicate that extraversion similarity between a boundary spanner and his or her partner is associated with increased levels of boundary spanning behavior directed towards that partner. Also, we find that such boundary spanning behavior is associated with the partner's perceptions of the responsiveness, viability, and information exchange of the respective boundary spanner.

Limitations and Future Research

Some limitations should be kept in mind when interpreting our study's result. First, our small sample size and experimental design preclude direct generalization of results to organizational settings. The relatively small sample of this research limits the statistical power of this study. As a consequence, this study does not provide the statistical power to firmly dismiss the tests that were not statistically significant. Furthermore, although we build on the similarity-attraction paradigm as implicit mechanism that explains our results, we did not directly measure this mechanism. Replication studies in organizational settings are therefore needed before generalization is warranted. Currently, such an effort is underway. In this effort, we also explore potential mediator variables from contrasting theories that may help to further understand why partners' extraversion is important in boundary spanning relations (cf. Leavitt, Mitchell, & Peterson, 2010).

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FIGURE 1

Conceptual Model

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                    ┌─────────────────┐
                    │  Extraversion B │
                    └────────┬────────┘
                             │
                             │
                             ▼
┌─────────────────┐    H1   ┌──────────────────┐   H2   ┌─────────────────┐
│  Extraversion A │────────▶│   A's Boundary   │───────▶│  A's Boundary   │
│                 │         │    Spanning      │        │    Spanning     │
│                 │         │ Behavior towards │        │  Effectiveness  │
│                 │         │        B         │        │                 │
└─────────────────┘         └──────────────────┘        └─────────────────┘
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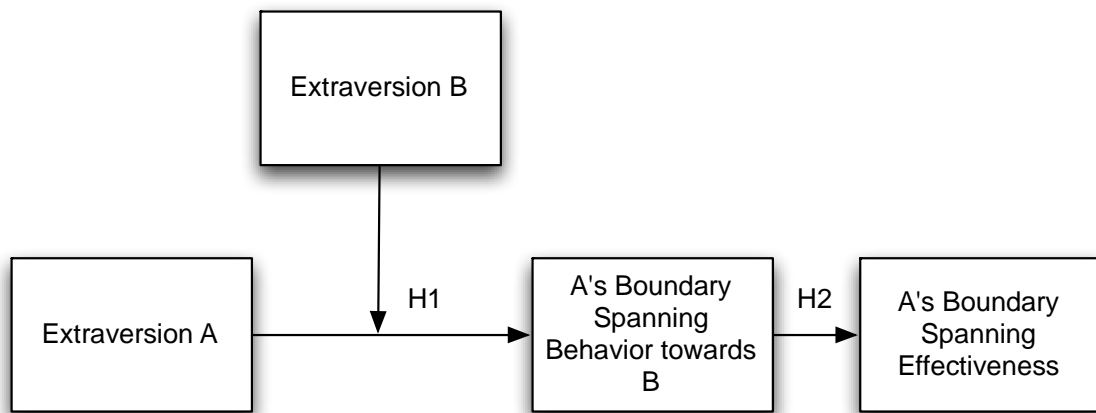
TABLE 1

Means, Standard Deviations, and Correlations

Variables	*M*	*SD*	1	2	3	4	5
					r		
1. Age	24.89	4.48					
2. Gender	.48	.50	-.08				
3. Extraversion A	4.95	.85	.11	-.27†			
4. Extraversion B	4.95	.85	-.14	-.03	-.15		
5. Boundary Spanning Behavior A	6.95	.55	-.15	.04	.04	.06	
6. Boundary Spanning Effectiveness	3.06	.54	.02	-.23†	-.04	.05	.361*

Note: N = 38 individuals nested in 38 boundary spanning relations.

† *p* < .10; * *p* < .05; ** *p* < .01

TABLE 2

Results of Multilevel Analysis of Boundary Spanning Behavior

Variables entered	Model 1		Model 2		Model 3	
	B	*Std. Err.*	*B*	*Std. Err.*	*B*	*Std. Err.*
Age	-.42	.45	-.41	.46	-.74	.48
Gender	-.64	.55	-.63	.58	-.74	.41
Extraversion A			.07	.59	.15	.50
Extraversion B			.16	.56	.15	.48
Extraversion A * Extraversion B					2.51***	.68
$\Delta\chi 2$ *(df)*	2.20 (2)		.09 (2)		11.54*** (1)	

Note: N = 38 individuals nested in 38 boundary spanning relations.

* *p* < .05; ** *p* < .01; *** *p* < .001

TABLE 3

Results of Multilevel Analysis of Boundary Spanning Effectiveness

Variables entered	Model 1		Model 2	
	B	*Std. Err.*	*B*	*Std. Err.*
Age	.01	.08	.05	.08
Gender	-.03	.10	.05	.09
Boundary Spanning Behavior			.23*	.09
Δχ2 *(df)*	.16 (2)		5.81 * (1)	

Note: N = 38 individuals nested in 38 boundary spanning relations.

* *p* < .05; ** *p* < .01; *** *p* < .001

FIGURE 2

A's Extraversion, B's Extraversion, and A's Boundary Spanning Behavior