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Informal Hierarchy and Team Creativity: The Moderating Role of Empowering Leadership

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Although there is growing evidence that strong informal influence hierarchies can enhance teams' core task performance, recent theorising suggests that such informal hierarchies may, at the same time, stifle team creativity. The current study draws from the Motivated Information Processing in Groups (MIP-G) model to empirically examine this latter notion. Moreover, we build on functional leadership theories to propose that the link between informal hierarchy strength and team creativity hinges on a formal team leader's empowering leadership. Using a sample of 56 organisational work teams comprising 304 individuals from a wide range of industries, we found that stronger informal influence hierarchies related negatively with team creativity when the formal leader exhibited little empowering behaviour. When the formal leader acted in more empowering ways, by contrast, this negative relationship was dampened. These findings provide new knowledge on the role of informal influence hierarchies for team creativity and advance our understanding of how informal hierarchical relations and formal leadership processes can jointly shape important team outcomes.

INTRODUCTION

Informal hierarchies, defined as naturally developed influence differences between individuals, are considered a universal feature of many groups and teams (Leavitt, 2004; Magee & Galinsky, 2008; Mazur, 1985). Scholars have

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proposed that teams can benefit from a strong informal influence hierarchy because it offers clarity about who yields influence over whom and, thus, facilitates smooth within-team interactions (Anderson & Brown, 2010; Halevy, Chou, & Galinsky, 2011; Magee & Galinsky, 2008). Empirical evidence increasingly supports this notion, suggesting that strong informal hierarchies may reduce conflict within teams, facilitate coordination, and enhance team performance, particularly in teams working on complex and interdependent tasks (Bunderson, Van der Vegt, Cantimur, & Rink, 2016; Ronay, Greenaway, Anicich, & Galinsky, 2012).

Yet, this prior work has primarily examined the consequences of stronger or weaker informal hierarchies for a team's core processes and performance (i.e., immediate task accomplishment). It remains an open question, therefore, whether strong informal hierarchies are equally advantageous for other important aspects of team functioning. Team creativity (i.e., a team's production of novel and useful ideas; Amabile, 1983; Madjar, Oldham, & Pratt, 2002), in particular, represents a critical outcome variable that may profoundly shape a team's ability to reach high-quality decisions and innovative outcomes (Amabile, 1988; Zhang & Bartol, 2010), and there are good theoretical reasons to assume that the consequences of a team's informal influence hierarchy are different for team creativity than core task performance (Ford, 1996; Madjar, Greenberg, & Chen, 2011).

Specifically, the Motivated Information Processing in Groups (MIP-G) model suggests that teams are most creative when they are motivated to engage in deliberate information processing (De Dreu, Nijstad, Bechtoldt, & Baas, 2011; Hinsz, Tindale, & Vollrath, 1997). Deliberate information processing is stimulated, for example, by constructive controversy and dissent, which enables team members to build on each other's ideas and helps them to jointly reach creative solutions (De Dreu et al., 2011). Rather than stimulating constructive dissent, member inputs, and conjoint decision-making, however, strong informal influence hierarchies may create an environment in which team interactions are dominated by individuals at the top of the hierarchy. Creative discourse within the team may be minimised, then, as lower-level members' idea sharing and independent contributions are suppressed (Berdahl & Martorana, 2006; Islam & Zyphur, 2005). Accordingly, a strong informal hierarchy may negatively (rather than positively) associate with team creativity.

Importantly, however, teams are usually not governed by their informal influence relations alone. Most organisational teams also have official leadership structures, as typically represented by a formal leader in charge of managing team processes and outcomes (e.g., supervisors or managers vested with formal authority by the organisation; Devine, Clayton, Philips, Dunford, & Melner, 1999; Zaccaro, Rittman, & Marks, 2001). To fully understand the relationship between informal influence hierarchies and team creativity, we posit that it is crucial to take into account such formal leadership aspects. Scholars

have suggested an empowering leadership style (i.e., formal leadership behaviour that encourages team members to express their opinions and participate in collaborative decision making; Lorinkova, Pearsall, & Sims, 2013) to be particularly relevant for stimulating team creativity (Arnold, Arad, Rhoades, & Drasgow, 2000; Srivastava, Bartol, & Locke, 2006; Zhang & Bartol, 2010). Consequently, we cast formal leaders' empowering behaviour as a key moderating factor that may counteract the detrimental consequences associated with strong informal hierarchical differentiation and, thus, buffer the negative relationship between a team's informal hierarchy strength and creativity.[1]

We investigate this notion using multi-source data from a diverse sample of 56 organisational work teams. In doing so, we strive to build and test new theory on the relationship between informal hierarchy strength and team creativity, thus making a number of important contributions to the team literature. First, we shed light on team creativity as a heretofore neglected outcome of informal hierarchy strength. As such, we hope to demonstrate that the same factors, which previous research has shown to benefit teams' core task performance (i.e., a strong informal influence hierarchy; He & Huang, 2011; Ronay et al., 2012), may also explain why teams find it difficult to reach high creativity as an alternative (and oftentimes equally vital) outcome. Second, the existing work on informal team hierarchies has often neglected the concurrent role of a team's formal hierarchy (McEvily, Soda, & Tortoriello, 2014). By addressing this issue, we aim to illustrate that informal and formal hierarchical relations should be examined in conjunction to more fully understand their complex and interrelated associations with key team outcomes.

THEORY AND HYPOTHESIS DEVELOPMENT

Informal Hierarchy Strength: Definition and Prior Research

A team's informal influence hierarchy reflects the overall pattern of dyadic influence relations between a team's members (Bunderson et al., 2016; Chase, 1980; Everett & Krackhardt, 2012), with influence representing an individual's ability to change another team members' actions in some intended fashion (Thibaut & Kelley, 1959). Dyadic influence differences may arise from differentiation across a wide variety of valued dimensions, including individuals'

[1] Although formal empowering leadership behaviour may motivate individual members to engage in influence attempts within the team (Carson, Tesluk, & Marrone, 2007), it is unlikely to determine whether team members are willing to yield to others' respective influence attempts (DeRue & Ashford, 2010; Tiedens & Fragale, 2003). It appears plausible, therefore, to assume that empowering leadership and a team's informal hierarchy strength may vary independently from one another.

perceived competence, personality characteristics, demographic traits (e.g., age, tenure or education), and formal rank within the organisation (Anderson & Kilduff, 2009; Berger, Rosenholtz, & Zelditch, 1980; Magee & Galinsky, 2008). Given the present study's interest in the consequences of *informal* team hierarchy, we focus on influence relations between peers (i.e., team members that do not differ in formal rank). In doing so, we aim to avoid potential confounds between aspects of a team's formal and informal hierarchy.

In a strong informal hierarchy, team members' influence relations are structured in a clear-cut, unidirectional, top-down, and acyclical manner, such that individual members do not have direct or indirect influence over someone who has direct or indirect influence over them (Krackhardt, 1994). Put differently, "influence relations in a true hierarchy are cascading and, like water cascading over rocks, never flow upstream" (i.e., when member A has influence over B, member B cannot yield influence over A at the same time; Bunderson et al., 2016, p. 1268). Within weaker informal hierarchies, by contrast, members' informal influence relations do not consistently follow this downward-cascading principle. If member A has influence over B, for example, member B may also be able to yield direct or indirect influence over A. In other words, at least some team members in lower positions within the informal hierarchy (i.e., with informal influence over relatively few others) can influence more highly positioned members (i.e., with influence over a larger number of others), and there may be patterns of reciprocal influence (Everett & Krackhardt, 2012; Krackhardt, 1994). These cyclical and/or reciprocal relations break the clear downward stream of influence, diminish the clarity of a team's informal influence-ordering, and create ambiguity about who is in charge (Bunderson et al., 2016).

On this basis, scholars have concluded that strong informal influence hierarchies may prove beneficial for teams' core task performance (Anderson & Brown, 2010). Strong informal hierarchies may facilitate complementarity of members' actions (i.e., one leads, the other follows), thus paving the way for smooth cooperation and coordination (De Kwaadsteniet & van Dijk, 2010; Tiedens & Fragale, 2003). Supporting this notion, research has shown that dyadic collaborations with strong influence differentials require less explicit consultation (compared to more egalitarian dyads), as both partners more clearly understand who should defer to whom when it comes to decision-making (de Kwaadsteniet & van Dijk, 2010). Collaborative dyads with clear-cut influence differences have been shown, accordingly, to outperform more egalitarian dyads in coordination-intensive tasks (Estroff & Nowicki, 1992; Tracey & Sherry, 1993). Similarly, recent team-level studies have illustrated that a strong informal hierarchy can facilitate team task performance, particularly in task environments that require intricate coordination between members (Bunderson et al., 2016; Halevy, Chou, Galinsky, & Murnighan, 2012; Ronay et al., 2012).

Informal Hierarchy Strength and Team Creativity

Research suggests that it is important to distinguish teams' core task performance and creativity as distinct outcome variables, because processes that favour a team's core task performance may negatively affect its ability to be creative, and vice versa (Ford, 1996; Madjar et al., 2011). After all, markedly different inputs are required for routine task performance (e.g., efficient, standardised, habitual actions) rather than creative outputs (e.g., effective retrieval and processing of information, new idea development; Madjar et al., 2011). Hence, although the research reviewed above has shown strong informal influence hierarchies to potentially strengthen teams' core task performance, we expect such hierarchies to aggravate team creativity.

We build on the Motivated Information Processing in Groups (MIP-G; De Dreu, Nijstad, & van Knippenberg, 2008) model to support this notion. This model postulates that teams, much like individuals, have to process information to enable task performance and creativity (Hinsz et al., 1997; Laughlin, VanderStoep, & Hollingshead, 1991). In doing so, teams can utilise two distinct information processing types that differentially shape their outputs. On the one hand, teams can follow a relatively shallow information processing strategy that primarily relies on generalised heuristics and routines. This strategy fits well when teams engage in day-to-day, standardised activities that require efficient core task accomplishment, but it is likely to hinder team creativity (Bechtoldt, De Dreu, Nijstad, & Choi, 2010). On the other hand, teams can engage in more deliberate information processing, characterised by the systematic and effortful evaluation of all relevant information available within the team and its environment. Such deliberate processing has the potential to enhance a team's creativity, as it facilitates access to novel inputs, approaches, and solutions (Chaiken & Trope, 1999; De Dreu et al., 2011).

Although it is difficult to pinpoint the exact processes, research using the MIP-G perspective points to a variety of factors associated with motivated information processing and, thus, team creativity. Examples of such factors are members' participation in decision-making, minority dissent, and constructive controversy (Amabile, Conti, Coon, Lazenby, & Herron, 1996; De Dreu & West, 2001; Nemeth, Personnaz, Personnaz, & Goncalo, 2004). Members' broad participation in making team decisions is important for creativity, for instance, because it increases the likelihood that diverse views, perspectives, and approaches are shared within the team (Amabile et al., 1996; West, 2002). In fact, brainstorming techniques established to increase team creativity often focus on designing an environment in which all members feel free to provide their inputs (Paulus, 2000). Furthermore, minority dissent, which occurs when a minority openly opposes the opinion of a team's majority, is critical for a team's creative performance (Smith, Paulus, & Nijstad, 2003). After all, teams will only be able to recognise and incorporate diverse, novel, and non-intuitive

ideas if a minority with divergent opinions can openly express opposing views (De Dreu & West, 2001; Nijstad, Berger-Selman, & De Dreu, 2014). And finally, constructive controversy has been found to increase team creativity, because it forces team members to think about opposing positions and to reconcile different perspectives—creating the possibility of new, creative combinations of the information available within the team (Nemeth et al., 2004). Consequently, factors that stimulate member participation, minority dissent, and constructive disagreements may strengthen a team's creative potential, whereas factors that encourage conformity, agreement, and uniform opinions are likely to diminish team creativity (Chirumbolo, Livi, Mannetti, Pierro, & Kruglanski, 2004; Goncalo & Staw, 2006).

Drawing from this theoretical backdrop, we propose that the strength of a team's informal hierarchy may negatively relate with team creativity by diminishing the key aspects of a team's deliberate information processing discussed before. In teams with weaker informal hierarchies, members share similar influence over each other and have similar chances to participate in team decision-making, voice concerns, and provide constructive criticism and recommendations (Choi, 2007). Weak informal hierarchies may, therefore, stimulate deliberate information processing between a team's members, contributing to the team's creative success. Stronger informal influence hierarchies, in contrast, establish clear influence differences between team members, such that more highly positioned members may dominate team decisions, whereas others are silenced (Bales, Strodtbeck, Mills, & Roseborough, 1951; Camacho & Paulus, 1995). As a result, team members with lower influence are less likely to participate in decision-making and express dissent, reducing potentials for constructive controversy. Diminishing a team's deliberate information processing, this should prove detrimental for team creativity.

Consistent with this reasoning, research has shown that individuals in positions of superior influence are often allowed to control team interactions, while members with less influence tend to defer to the respective decisions and keep their opinions to themselves (Anderson, Srivastava, Beer, Spataro, & Chatman, 2006; Keltner, Gruenfeld, & Anderson, 2003). Similarly, individuals positioned at the lower levels of an informal hierarchy are often reluctant to share ideas and refrain from voicing their views in the presence of more influential authority figures (Mullen, Johnson, & Salas, 1991). Even when team members with lower influence do speak up, strong informal hierarchical differences frequently lead others to place greater value on the opinions and ideas of more highly positioned individuals, such that inputs from members in lower positions of the informal hierarchy carry less weight in shaping a team's decisions and actions (Galinsky, Magee, Inesi, & Gruenfeld, 2006). Consequently, by reducing critical team processes such as participation in decision making, minority dissent, and constructive controversy, stronger informal influence hierarchies should decrease the likelihood that teams will effectively consider

and incorporate all of their members' thoughts, ideas, and suggestions, limiting the deliberate processing of diverse perspectives necessary for producing creative output (Berdahl & Martorana, 2006; Berger et al., 1980; Galinsky, Magee, Gruenfeld, Whitson, & Liljenquist, 2008).

Importantly, we further suggest that the relationship between informal hierarchy strength and team creativity may be more complex than the above reasoning seems to suggest. Beyond an informal influence hierarchy between peer members, in particular, most organisational teams are also characterised by formal leadership structures (e.g., through formal supervision). Hence, scholars have emphasised the importance of conjointly examining both formal *and* informal hierarchical aspects to realistically depict the consequences of a team's hierarchical differentiation for team processes and outcomes (Blau & Scott, 1962; Magee & Galinsky, 2008; McEvily et al., 2014). Building on this notion, we draw from functional leadership theories (e.g., Morgeson, DeRue, & Karam, 2010) to propose that a formal team leader's behaviour will serve as a critical boundary condition for the potentially negative linkage between informal hierarchy strength and team creativity.

The Moderating Role of Formal Empowering Leadership

Functional leadership theories argue that formal team leaders' most important role is to help teams to improve in areas in which their performance is not up to par (Fleishman, Mumford, Zaccaro, Levin, Korotkin, & Hein, 1991; Morgeson et al., 2010). Hence, formal leaders' key function is "to do, or get done, whatever is not being adequately handled for group needs" (McGrath, 1962, p. 5). When it comes to motivated information processing, *empowering leadership* appears to be a particularly promising leadership style that may help teams to overcome key obstacles toward reaching high creativity (Raub & Robert, 2010; Zhang & Bartol, 2010).

Specifically, empowering leaders encourage team members to openly express opinions and ideas, promote participation in collaborative decision-making, and support information sharing and teamwork (Arnold et al., 2000; Lorinkova et al., 2013; Sharma & Kirkman, 2015). As such, we expect this type of formal leadership behaviour to buffer the negative relationship between informal hierarchy strength and team creativity by counterbalancing a strong informal hierarchy's potentially detrimental consequences for a team's deliberate information processing. Indeed, a highly empowering formal leader's promotion of open information sharing and free expression of ideas may ameliorate the tendency of teams with a stronger (rather than weaker) informal hierarchy to suppress or ignore minority dissent and prohibit constructive controversy, thus diminishing a stronger informal hierarchy's negative implications for these key sources of team creativity (cf. De Dreu & West, 2001; Nemeth et al., 2004). Similarly, a formal leader's empowering behaviour may

preserve members' motivation to engage in critical thinking even within a stronger informal hierarchy. Such leadership may, in particular, increase lower-level members' tendency to share ideas and opinions, creating a psychologically safe team climate in which even less influential individuals dare to speak up despite strong informal hierarchical differentiation (Gao, Janssen, & Shi, 2011; Srivastava et al., 2006; Zhang & Bartol, 2010).

For teams with a less empowering formal leader, in contrast, we expect that the negative relationship between informal hierarchy strength and team creativity will be particularly pronounced. Although they may not deliberately prohibit members' participation, such leaders offer no active support for team members' voice, and they do not encourage members to share ideas and opinions and partake in team decisions (Arnold et al., 2000; Lorinkova et al., 2013). Consequently, when the formal leader refrains from empowering behaviour, he or she does little to counteract the tendencies toward restricted participation, minority dissent, and constructive controversy that are frequently present in teams with a strong informal hierarchy. Members at lower levels of the informal hierarchy may find it particularly problematic, then, to effectively voice their opinions and ideas, rendering it difficult for more hierarchical teams to uphold high creativity levels when their formal leader exhibits a lack of empowering behaviour. Teams with a relatively weak informal hierarchy, by contrast, may be in a better position to reach high creativity even if their formal leader is not empowering. Without pronounced informal influence differences, the members of such teams may find it easier to contribute their unique ideas, to challenge each other's opinions, and to share minority perspectives—even if their leader does not explicitly encourage and support such behaviours (Amabile et al., 1996; De Dreu & West, 2001; Nemeth et al., 2004). Consequently, we anticipate that with a non-empowering formal leader, teams that exhibit a weaker (rather than stronger) informal hierarchy will be able to reach higher creativity levels.

Hypothesis 1: Formal empowering leadership behaviour moderates the relationship between informal hierarchy strength and team creativity. This negative relationship is less pronounced when empowering leadership is higher rather than lower.

METHOD

Sample and Procedures

Because the effects of hierarchy may vary across team types (Bunderson et al., 2016), we collected data from a diverse sample of teams, relying on both our research group's and university's contacts (for similar approaches see Bunderson et al., 2016; Mayer, Aquino, Greenbaum, & Kuenzi, 2012). In order to

identify teams, we relied on a standardised data collection protocol, and we approached teams based on the criteria that they (a) consisted of four or more members, (b) internally coordinated efforts for joint goal accomplishment, (c) contained members that frequently interacted face-to-face, and (d) consisted of members with interdependent tasks (Kozlowski & Bell, 2003). We contacted teams' formal leaders and invited them to participate in a study about work team functioning. When the formal leader agreed to participate, he/she provided additional information, including all team members' names (required for measuring informal hierarchy strength; see below).

Of the 63 work teams that had initially agreed to participate in the study, seven teams were excluded because less than 50 per cent of the members provided the data necessary to assess informal hierarchy strength (cf. Bunderson, 2003). The final sample thus consisted of 56 teams, comprising 248 members and 56 leaders. Members' average team tenure was 5.76 years ($SD = 6.32$), their average age was 36.47 years ($SD = 13.55$), and 47.2 per cent were female. Eighty-nine percent of the team members had a vocational degree or higher. For the formal leaders, average team tenure was 9.03 years ($SD = 8.55$), average age was 42.77 years ($SD = 10.15$), 35.7 per cent were female, and 94.6 per cent had a vocational degree or higher.

The sample teams came from organisations operating in different industries across the Netherlands, such as retail (33.9%), education (16.1%), construction (14.3%), government (7.1%), business services and finance (8.9%), hospitality (10.7%), health care (5.4%), and ICT (3.6%). Twenty of the teams worked in small organisations with fewer than 20 employees, 15 teams in organisations with 20 to 99 employees, 15 teams in organisations with 100 to 499 employees, and 5 teams in organisations with 500 or more employees (for one organisation, this data was missing).

Measures

Informal Hierarchy Strength. As noted before, formal and informal aspects of hierarchical differentiation within teams can be related, as formal rank differences may be a source of informal influence (McEvily et al., 2014; Ravlin & Thomas, 2005). Hence, to clearly separate between these constructs, we measured informal hierarchy strength among peers with equivalent formal ranks in their teams (i.e., the respective measure did not include the formal team leader). Following prior research (Bunderson et al., 2016; Everett & Krackhardt, 2012), we captured teams' informal hierarchy strength using a dyadic rating approach. Team members were presented with the names of all of their teammates, and they were asked to indicate to what extent each of these individuals exerted influence over them. Answering options were 1 = "not at all"; 2 = "somewhat"; 3 = "to a large extent". Given that (a) the calculation of informal hierarchy strength requires dichotomous data (Krackhardt, 1994),

and (b) only 7.1 per cent of the respondents indicated that another team member exerted influence over them "to a large extent" (52.2% of the responses were in the "not at all" category, and 40.7% in the "somewhat" category), we collapsed the latter two categories to create a dichotomous variable (0 = "not at all"; 1 = "somewhat/to a large extent"). We subsequently summarised all dyadic influence ratings into an influence matrix for each team, indicating which team members influenced which other members. Based on these matrices, we calculated the number of symmetrical dyads (i.e., A and B mutually influence each other, directly or indirectly) and asymmetrical dyads in each team (i.e., influence only flows one way, such that A influences B, but B does not influence A; or team member A and B do not influence each other). Of the 427 rated dyadic relationships within the 56 sample teams, 169 were symmetrical (39.6%) and 258 were asymmetrical (60.4%). The information from the influence matrices served as input for Krackhardt's (1994) network hierarchy measure at the team level, calculated as $1 - [v/\max(v)]$, where v is the number of dyads with symmetrical influence and $\max(v)$ is the total number of dyads in a team. Hierarchy values could range from 0 (i.e., low informal hierarchy strength, with symmetrical influence across all dyads in the team) to 1 (i.e., high informal hierarchy strength, with no symmetrical influence across any dyad in the team).

Empowering Leadership. Formal leaders' empowering behaviour was rated by all of their team members using seven items from Lorinkova, Pearsall, and Sims (2013). Example items include, "The team leader gives the team autonomy and freedom of action" and "The team leader encourages team members to exchange information with one another". Items were rated on a scale from 1 (strongly disagree) to 7 (strongly agree). Cronbach's alpha was .90, and aggregation statistics supported aggregation to the team level, ICC1 = .21, $p < .01$; ICC2 = .54; mean $r_{wg(j)} = .83$ (using a rectangular reference distribution; Bliese, 2000; James, Demaree, & Wolf, 1984).

Team Creativity. Formal leaders rated their team's overall creativity using an adapted six-item measure from Zhou and George (2001; items were framed to reflect the team instead of the individual level) on a scale from 1 (strongly disagree) to 7 (strongly agree). The items were: "To what extent does your team suggest new ways to achieve goals or objectives?", "...search out new work methods, processes and techniques?", "...come up with creative solutions to problems?", "...come up with new ways to increase quality?", "...suggest new and practical ideas to improve performance?" and "...provide new ways of performing work tasks?". Cronbach's alpha was .95.

Control Variables. Given that we gathered data from a diverse sample of teams, we considered a number of control variables to account for possible

creativity differences due to industry or task characteristics. Specifically, we checked whether teams from different industries varied in creativity. A one-way analysis of variance on team creativity did not yield significant industry effects, however (F [7,48] = 1.61, p = .16). Moreover, we considered teams' task complexity and environmental turbulence as control variables when testing the hypothesis because these aspects may shape the extent to which teams face internal and external demands for creativity (Akgün, Byrne, Lynn, & Keskin, 2007; De Dreu et al., 2011). *Task complexity* is defined as the clarity, routineness, and predictability of team tasks (Withey, Daft, & Cooper, 1983). We measured this construct in the team member questionnaire using eight items (Withey et al., 1983; reverse-coded sample item: "We follow an understandable sequence of steps in performing our group tasks"; 1 = strongly disagree; 7 = strongly agree). Cronbach's alpha was .81, and aggregation statistics supported aggregation to the team level (ICC1 = .42, $p < .01$; ICC2 = .76, mean $r_{wg(j)}$ = .85). *Environmental turbulence* reflects the extent to which changing technologies and customer preferences are present within a team's environment (Akgün & Keskin, 2014). We measured this construct in the leader questionnaire using a six-item instrument by Akgün and Keskin (2014; sample item: "Customer preferences change quite a bit over time"; 1 = strongly disagree; 7 = strongly agree). Cronbach's alpha was .79.

Also, we calculated connectedness scores for all teams in our sample, to explore whether the absence of influence relations between some members may have biased our results. A team's connectedness describes the extent to which all of its members are connected by at least one influence relation (Krackhardt, 1994). Connectedness is computed as $1 - [(W–1)/(n–1)]$, where W is the numbers of team members that do not have an influence relation with any other members, and n is the overall number of team members. A score of 1 means that the entire team is connected (so there is at least one influence relation from or to every team member), a score of 0 means that there are no influence relations at all.[2]

Additionally, we considered both team size and average team tenure as potential control variables because past research suggests that these features can influence team processes and outcomes (e.g., Ancona & Caldwell, 1992; Finkelstein & Hambrick, 1990).

Finally, we measured teams' core task performance in the leader survey to (a) control for this construct when testing the hypothesis and (b) explore possible differences in the role of informal hierarchy strength for different performance dimensions (i.e., team creativity vs core task performance). Following Van der

[2] Notably, a large majority (87.5%) of the teams in our sample had connectedness scores of 1. To probe our findings' robustness, we repeated our hypothesis tests both with and without the seven teams that had less-than-perfect connectedness scores. The pattern of results was virtually identical across both analyses and yielded equivalent conclusions. Hence, we decided to only report full-sample results.

Vegt and Bunderson (2005), formal leaders rated their team's efficiency, ability to meet deadlines, speed of work, productivity, and quality of work on a scale from 1 (strongly disagree) to 7 (strongly agree; Cronbach's alpha = .78).

RESULTS

Descriptive Statistics

Table 1 reports descriptive statistics and bivariate correlations for all study variables. As shown, informal hierarchy strength was not significantly correlated with either team creativity or empowering leadership. Of the potential covariates, task complexity ($r = .31$, $p = .02$), environmental turbulence ($r = .28$, $p = .04$), and task performance ($r = .60$, $p = .00$) correlated significantly with team creativity, whereas there was no significant correlation with team creativity for connectedness, team size, and average team tenure. Furthermore, although the correlation between teams' task performance and creativity may seem relatively high, we note that (a) previous work has reported similar correlations, and (b) a positive association between these constructs is to be expected—despite their theoretical distinctiveness—because both aspects are general indicators of well-functioning teams (e.g., Harris, Li, Boswell, Zhang, & Xie, 2014; Madjar et al., 2011).

Hypothesis Testing

Table 2 summarises the results of a moderated hierarchical regression analysis (with standardised predictors) on team creativity. We entered the control variables that were significantly correlated with the dependent variable (i.e., team performance, task complexity, and environmental turbulence; cf. Becker, 2005)

TABLE 1
Means, Standard Deviations and Correlations of Study Variables

Variables	M	SD	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1. Task complexity	4.01	.76								
2. Environmental turbulence	4.41	1.07	.17							
3. Task performance	5.45	.89	.20	.16						
4. Connectedness	.92	.21	.12	.07	−.08					
5. Team size	5.66	1.53	−.16	−.07	.03	−.07				
6. Team average tenure	5.51	5.08	−.04	−.05	.10	−.18	.11			
7. Informal hierarchy strength	.61	.38	−.26†	−.13	−.02	−.11	−.04	−.12		
8. Empowering leadership	5.14	.68	.30*	−.02	.28*	.13	−.01	−.11	−.13	
9. Team creativity	4.85	1.22	.31*	.28*	.60**	.10	.05	−.18	−.21	.31*

Note: $N = 56$. ** $p < .01$, * $p < .05$, $^{\dagger}p < .10$.

TABLE 2
Regression Results of Moderation Analyses on Team Creativity

	Step 1	*Step 2*	*Step 2*
Control variables			
Task complexity	.22 (.13)	.14 (.14)	.14 (.13)
Environmental turbulence	.19 (.13)	.19 (.13)	.19 (.12)
Team performance	.64 (.13)**	.62 (.13)**	.59 (.13)**
Independent variables			
Informal hierarchy strength		−.16 (.13)	−.17 (.13)
Empowering leadership		.13 (.14)	.17 (.13)
Interaction			
Informal hierarchy strength × empowering leadership			.25 (.11)*
Interaction R^2			.05
R^2	.42	.45	.50

Note: $N = 56$. Values are unstandardised regression coefficients. Standard error estimates are in parentheses.
* $p < .05$.

in Step 1 and added informal hierarchy strength and empowering leadership in Step 2. The results demonstrated no significant main effects of informal hierarchy strength and empowering leadership on team creativity.

To test our moderation hypothesis, we entered the interaction term of informal hierarchy strength and empowering leadership in Step 3 of the regression analysis. As expected, we observed a significant informal hierarchy strength × empowering leadership interaction on team creativity ($B = .25$, $SE = .11$, $p = .03$). Figure 1 depicts the pattern of this interaction (Aiken & West, 1991). Simple slope analyses revealed that informal hierarchy strength did not significantly relate with team creativity when formal leaders exhibited relatively strong empowering leadership behaviour (+1 SD: $B = .09$, $SE = .17$, $p = .61$). With relatively low empowering leadership (–1 SD), however, the negative relationship between informal hierarchy and team creativity was significant ($B = –.42$, $SE = .17$, $p = .02$). We note that the pattern and interpretation of these results remained virtually unchanged (a) when excluding all control variables and (b) when incorporating connectedness, team size and average team tenure as additional covariates.[3]

[3] To further explore our findings' robustness, we tested our hypothesis using a micro-macro multilevel model in MPlus, incorporating empowering leadership as a disaggregated Level-1 variable (Croon & Van Veldhoven, 2007; Mehta & Neale, 2005; Preacher, Zyphur, & Zhang, 2010). The respective results yielded a significant informal hierarchy strength × empowering leadership interaction ($B = .55$, $SE = .28$, $p = .05$), and the pattern of this interaction was consistent with our main analyses.

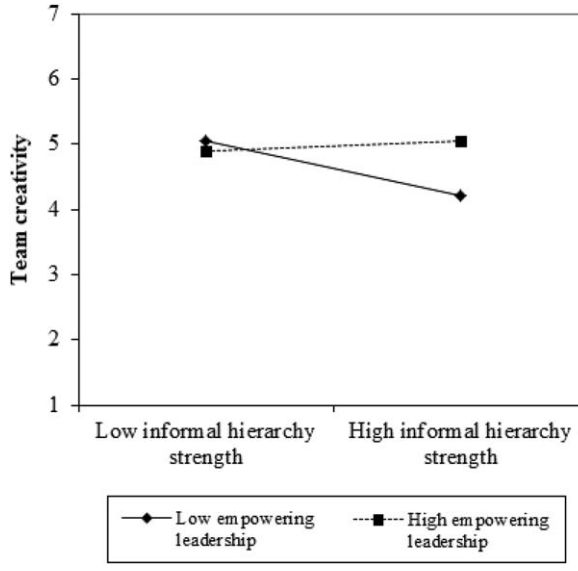

FIGURE 1. Team creativity at different levels of informal hierarchy strength and empowering leadership.

Supplementary Analyses

To further explore our results, we examined whether the observed informal hierarchy strength × empowering leadership interaction was unique to team creativity, or whether a similar interaction could be found for core task performance. Repeating our analyses with this alternative dependent variable (including the control variables team creativity, task complexity, and environmental turbulence) did not yield a significant interaction of informal hierarchy strength and empowering leadership ($B = –.06$, $SE = .09$, $p = .55$). This pattern of results remained unchanged both when excluding all control variables and when including connectedness, team size, and average team tenure as additional covariates. We therefore conclude that the present interaction findings are unique to creativity as a specific team outcome.

Moreover, although we did not find a significant main effect of informal hierarchy strength on teams' core task performance, supplementary analyses revealed a significant informal hierarchy strength × task complexity interaction on task performance ($B = -.36$, $SE = .15$, $p = .02$, without control variables). Consistent with previous research (e.g., Bunderson et al., 2016; Ronay et al., 2012), informal hierarchy strength and teams' task performance were positively related under conditions of higher task complexity (+1 SD; $B = .32$, $SE = .17$, $p = .06$) but negatively related with lower task complexity ($B = -.40$,

$SE = .21$, $p = .06$). The pattern of results remained very similar when adding all of the control variables (i.e., team creativity, environmental turbulence, connectedness, team size, and average team tenure), although the negative simple slope under conditions of relatively low task complexity became non-significant in these additional analyses ($B = -.19$, $SE = .18$, $p = .31$). Further details on these auxiliary analyses are available from the first author.

DISCUSSION

This study examined the joint role of informal hierarchy strength and formal empowering leadership for team creativity. Results supported the hypothesised moderation model, demonstrating that the relationship between informal hierarchy strength and team creativity was negative only when formal team leaders exhibited little empowering behaviour, but not when formal empowering leadership was more pronounced. It appears, therefore, that empowering formal leaders can ameliorate creativity problems that might otherwise occur in teams with a strong informal hierarchy, enabling such teams to reach creativity levels comparable to those obtained in teams with weaker informal influence hierarchies. In other words, our results indicate that teams are less creative when they both exhibit a strong informal hierarchy *and* lack formal empowering leadership. When a team's informal hierarchy is less pronounced or when its formal leader exhibits empowering behaviour, by contrast, these creativity losses are less likely to ensue. These findings extend previous research in several important ways.

First, the current results advance knowledge on the consequences of teams' informal influence hierarchies. The existing research has mostly identified positive relationships between informal hierarchy strength and teams' core task performance, particularly in complex task settings (Bunderson et al., 2016; Ronay et al., 2012) and the present study's supplementary analyses support these findings. So far, however, important alternative outcomes associated with teams' informal hierarchies, such as team creativity, have been largely absent from consideration. This is particularly interesting because previous work has shown that team processes favouring task performance are often in contrast with those favouring creativity (Ford, 1996; Madjar et al., 2011). In line with this reasoning, the present study has drawn from the MIP-G model (De Dreu et al., 2011) to show that a strong informal hierarchy can negatively associate with team creativity, particularly if a team's formal leader does not exhibit empowering behaviour. As such, the present results demonstrate that strong informal hierarchies are not uniformly beneficial. Rather, the consequences associated with a team's informal influence hierarchy seem to depend on the outcome under investigation. Future research could benefit from further examining this notion by incorporating different types of team processes and

outcomes to paint a more complete picture of the beneficial and detrimental effects of teams' informal hierarchical differentiation.

Second, scholars investigating the consequences of hierarchies in teams have called for an integrative perspective that includes both formal and informal elements of hierarchical differentiation (Blau & Scott, 1962; Diefenbach & Sillince, 2011; McEvily et al., 2014). Empirical work, however, has mostly focused on either one of these hierarchy types, leaving the literatures on formal and informal hierarchies largely disconnected (Soda & Zaheer, 2012). In the current study, we bring together these disparate lines of inquiry by showing that formal team leaders play a crucial role in shaping the consequences of informal hierarchical differentiation. Building on functional leadership theories (Fleishman et al., 1991; McGrath, 1962; Morgeson et al., 2010), we demonstrate that formal team leaders may mitigate potentially negative effects of informal team hierarchies by empowering their members. As such, our research lends support to the notion that formal and informal hierarchical elements conjointly affect team processes and outcomes, and it alerts scholars to the importance of simultaneously incorporating both of these elements in future research endeavours.

Practical Implications

The present results demonstrate that formal leaders play a critical role in determining whether a strong informal influence hierarchy is detrimental for teams' creative performance. By engaging in empowering leadership behaviours, formal team leaders may buffer informal hierarchies' potentially negative creativity effects. Hence, this type of leadership seems particularly important in teams characterised by strong informal hierarchical differentiation, and organisations may benefit from encouraging formal leaders' empowering behaviour in such teams (e.g., by rewarding this type of behaviour or emphasising it in their leadership development efforts). In fact, teams with strong informal hierarchies *and* highly empowering formal leaders may be able to capitalise on the coordinative and structuring advantages of a strong informal hierarchy (potentially boosting their core task performance when faced with complex tasks; Halevy et al., 2012; Ronay et al., 2012)—without suffering from potential creativity losses at the same time.

Strengths, Limitations, and Future Research Directions

An important strength of the present research is that we collected data from a variety of real-life teams operating in diverse organisations and business sectors, thus strengthening our findings' generalisability. Furthermore, data were collected from both team members and formal leaders, using distinct measurement and aggregation approaches for the different constructs. For example, informal hierarchy strength was calculated based on peer ratings of influence,

whereas creative performance was rated by team leaders. Together, these research design features should minimise common method and common source concerns (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Nevertheless, some study limitations deserve mention. Consistent with prior research (e.g., Bunderson et al., 2016), for example, we measured informal hierarchy strength based on team member ratings of dyadic influence, rather than using direct (e.g., behavioural) indicators. In doing so, we tapped into team members' perceptions about which other members were influential over them. It may be interesting to verify our results using behavioural observations in future studies. Similarly, although reliance on formal leaders' judgments of team creativity is an accepted and widely used approach (e.g., Shin & Zhou, 2007; Zhang, Tsui, & Wang, 2011), future research that corroborates the present findings using more objective measures of team creativity would be helpful to ascertain our results' robustness. Moreover, we collected all of our measures at the same time point and in one country (i.e., the Netherlands), using a correlational research design. As such, conclusions about causality and cross-cultural generalisability are not warranted, although our reasoning is predicated on a strong theoretical background and is not tied toward specific cultural considerations. Future research that constructively replicates our study using longitudinal or experimental designs and that corroborates our findings in different cultural contexts is required to address these issues.

Additionally, it may be worthwhile to consider possible connections between formal leadership and informal hierarchy strength. Past research suggests that empowering and supportive types of formal leadership may shape influence dynamics between team members, for example by increasing members' willingness to claim influence and informal leadership (Carson et al., 2007). For strong informal hierarchical *differences* to emerge, however, asymmetrical dyadic influence relations need to be present within a team. Such asymmetrical influence relations only develop when one team member claims influence over another member, and the other member yields to the respective influence attempt. That is, if individual A can influence individual B, this implies that A has claimed *and* B has granted such influence (DeRue & Ashford, 2010). Although formal empowering leadership may stimulate individual team members' influence claiming, we see little reason to assume that this type of formal leadership will decisively shape members' decisions to grant informal influence to others. Consistent with the small and non-significant correlation between empowering leadership and informal hierarchy strength observed in our study, we therefore believe these two constructs represent distinct and largely independent phenomena.

Nevertheless, it would be interesting for future research to further disentangle formal leaders' role for the interpersonal dynamics of influence claiming and granting within their teams and, thus, for the development of informal team hierarchies. Building on theoretical work that has cast informal hierarchy as an important mechanism for reducing ambiguity and offering structure

(Friesen, Kay, Eibach, & Galinsky, 2014; Tiedens, Unzueta, & Young, 2007), for example, one might expect that strong informal hierarchies are less likely to arise when formal team leaders exhibit directive behaviours that proactively provide such structure and clarity (cf. Lorinkova et al., 2013). With this type of formal leadership, it may appear less important for individual members to claim informal influence to structure team interactions. Also, to the extent such influence claims still occur, other members are less likely to grant informal influence in response (Tiedens & Fragale, 2003). Hence, asymmetrical informal influence relations are less likely to emerge, potentially contributing to a negative association between formal directive leadership and informal hierarchy strength.

Lastly, future research may more closely examine possible mediators of the relationships observed in our study. Based on the MIP-G perspective, we have depicted different team processes (e.g., participative decision-making, minority dissent, and constructive controversy) as key mechanisms linking informal hierarchy strength and team creativity. To better understand the role of informal hierarchy and the relative importance of different mediating processes, future research may therefore benefit from simultaneously incorporating a range of mechanisms associated with teams' motivated information processing. This may provide opportunities to pinpoint more precisely the processes through which empowering leadership can alleviate the potential downsides of strong informal team hierarchies uncovered in the present research.

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