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**Article — Published Version**

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Journal of Management Studies

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*Suggested Citation:* Breugst, Nicola; Patzelt, Holger; Shepherd, Dean A. (2020) : When is Effort Contagious in New Venture Management Teams? Understanding the Contingencies of Social Motivation Theory, Journal of Management Studies, ISSN 1467-6486, Wiley, Hoboken, NJ, Vol. 57, Iss. 8, pp. 1556-1588,  
<https://doi.org/10.1111/joms.12546>

This Version is available at:

<https://hdl.handle.net/10419/230120>

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## When is Effort Contagious in New Venture Management Teams? Understanding the Contingencies of Social Motivation Theory

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**ABSTRACT** Consistent with social motivation theory, prior research on managerial motivation suggests that effort is contagious across management team members. In this study, we draw on belongingness theory to develop a model on important boundary conditions to social motivation theory in the management team context. The model predicts that new venture managers react to their teammates' higher effort levels by investing higher effort levels themselves primarily when they are confronted with a threat – namely, low venture performance and high environmental hostility – but that effort is less contagious when managers face little threat. We test our model with a sample of 103 new venture managers nested in 51 management teams in a longitudinal setting capturing managerial effort over 26 weeks. While we do not find a direct relationship between teammates' effort and a new venture manager's subsequent effort, we find support for the crucial role of threat in triggering the contagion of managerial effort. We discuss the contributions of our study for research on management teams, performance feedback, and entrepreneurial effort in new ventures.

**Keywords:** entrepreneurial effort, entrepreneurial team, environmental hostility, firm performance, new venture management team, social motivation

### INTRODUCTION

Understanding managers' motivation is a central topic of contemporary management research (Ahmadi et al., 2017; Wowak et al., 2017). Traditionally, this stream of research has focused on the role of incentives and contracts for ensuring that managers are motivated to act in the best interest of their firms (Chng et al., 2012; Devers et al., 2008;

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Kocabiyoğlu and Popescu, 2007). More recently, however, scholars have emphasized that these explanations are not sufficient to fully understand motivation within a top management team (TMT) context. For example, Fredrickson et al. (2010) find that pay dispersion is lower in teams whose members are likely to engage in social comparisons among each other, and that pay dispersion is negatively related to firm performance. Others also find that considering social comparison processes in management teams is key to understanding the relationship between incentives and firm performance (Ridge et al., 2015) as well as managerial turnover (Ridge et al., 2017). These studies emphasize the importance of social psychological processes in management teams and, consistent with social motivation theory (De Jong et al., 2014; Geen, 1991; Quigley et al., 2007), suggest that managers tend to reciprocate their teammates' behaviours based on social comparison processes within the team.

However, an important assumption of extant studies is that management teams work under conditions conducive to social motivation. Specifically, the commonly held view is that through social comparison, management team members motivate and inspire each other (Blatt, 2009). Less acknowledged, however, is the possibility that management teams work under conditions that do not facilitate and may even counteract the contagion of motivation within the team. Indeed, factors such as rewards at the team level (Barua et al., 1995), limited discernibility of the outcomes of individuals' effort (Liden et al., 2004), conflict (Breugst and Shepherd, 2017), and perceptions of injustice (Breugst et al., 2015) are known to potentially undermine the motivation of individual team members. Thus, social motivation within management teams may not be as automatic as prior studies have assumed. This suggests that we can gain important new insights into managerial motivation when we explore boundary conditions of social motivation theory in the management team context. Therefore, the current paper investigates the following research question: *Under what conditions does the level of effort teammates invest in their venture increase a focal manager's effort levels?*

We address this question theoretically by drawing on belongingness theory (Baumeister and Leary, 1995). This theory assumes that individuals have the tendency to build up and keep relationships to others, and that this tendency becomes stronger when they are confronted with threats *external to their group* (Baumeister and Leary, 1995). That is, individuals feel closer to their group if they experience group-external threats (Lee et al., 2018; Spoelma and Ellis, 2017). Following work on managerial motivation (Dewald and Bowen, 2010), we distinguish between threats arising at the firm level based on managers' assessment of their firms as well as threats at the industry level. Specifically, we take into account threats external to the management team that are highly salient for the members: their perception of the firm's performance<sup>1</sup> (i.e., low venture performance; Shepherd, 2003; Ucbasaran et al., 2013) and their perception of the firm's environment (i.e., environmental hostility; Bradley et al., 2011; Elbanna and Child, 2007; Verbeke and Yuan, 2013). Our model suggests that managers tend to reciprocate the effort previously invested by their teammates under conditions of low venture performance and high environmental hostility because they affiliate more strongly with their teams under these threatening conditions. We find empirical support for our model based on the analysis of 1,197 accounts of managerial effort by 103 individuals nested in 51 new venture

management teams over a period of six months. In doing so, our study makes three primary contributions.

First, our study contributes to management team research by identifying important boundary conditions of social motivation theory in this context. While the existing literature drawing on social motivation theory (De Jong et al., 2014; Geen, 1991; Quigley et al., 2007) suggests that effort is contagious, we clarify conditions that facilitate (or prevent) effort contagion in management teams. Specifically, we theorize and show that perceived threats at the level of the firm and the firm's environment represent critical contingencies for social motivation theory in the TMT context. The important theoretical implication is that future work on managerial motivation should not assume that motivation transmits automatically, but that the team's external context (i.e., levels of external threat) represents a catalyst of social motivation processes.

Second, research on performance feedback (Lounsbury and Beckman, 2015) has established that low firm performance represents an important feedback mechanism impacting subsequent strategic decisions (Greve, 1998; Klueter and Monteiro, 2017; Latham and Braun, 2009). By establishing a novel link between performance feedback and managerial effort, we provide new insights into the behavioural outcomes of low firm performance. Specifically, our study illustrates that effort in management teams is more contagious when performance is low than when performance is high. These insights are important because implementing strategic change in response to low performance requires that managers invest high effort (Chen and Miller, 2007; Klueter and Monteiro, 2017); however, our study suggests that they only tend to do so when their teammates do so as well. Prior findings that owner-managers withdraw from low performing firms (Wennberg et al., 2010) might apply primarily to teams that *collectively* invest low effort. Thus, we challenge prior studies that focus on the direct behavioural consequences of performance feedback by highlighting the team context as a key factor explaining the levels of effort that managers invest in response to the perception of low performance.

Finally, we extend prior research focused on the effort investments by individual entrepreneurs (Edelman and Yli-Renko, 2010; Foo et al., 2009; Uy et al., 2015). This research has shown that individual entrepreneurs' perceptions of low firm progress (i.e., low performance) tend to decrease effort (Uy et al., 2015). By showing how teammates' effort can trigger a focal entrepreneur's effort under conditions of low performance and environmental hostility, we provide novel insights into the social processes that trigger effort and the contingencies of these processes. Intriguingly, we find that perceptions of low performance can, in fact, motivate an entrepreneurial team member to invest more (rather than less) effort given that his or her teammates have also previously invested high levels of effort. This finding highlights the importance of considering the team context for theorizing on entrepreneurial effort.

## **A MODEL OF MANAGERIAL EFFORT UNDER THREAT**

In Figure 1, we illustrate our conceptual model explaining the effort managers invest in their firms as a key motivational concept that influences important work outcomes (e.g., Brett and Stroh, 2003; Ennasri and Willinger, 2014; Latham and Pinder, 2005). This link between managerial effort and firm performance is particularly strong in new ventures

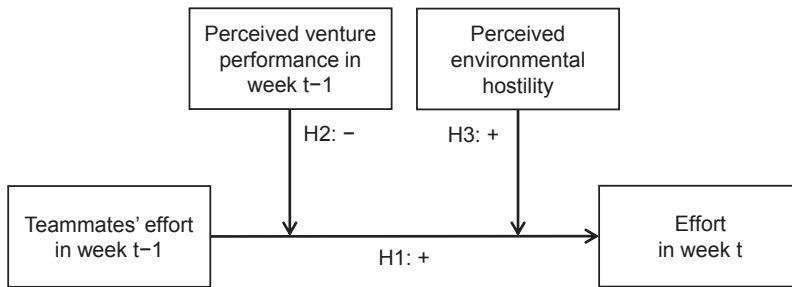


Figure 1. A model of managerial effort in new venture management teams under threat

(Bitler et al., 2005; Foo et al., 2009; Uy et al., 2015) because new ventures lack the organizational resources and routines that substantially contribute to firm success (Friedman et al., 2016; Sine et al., 2006). Thus, managers need to invest particularly high levels of effort in the form of energy, attention, and time to provide and acquire urgently needed resources (Dai et al., 2016), often under challenging conditions (Uy et al., 2015). In developing our model, we will first elaborate on our baseline hypothesis that the teammates' level of effort invested in the venture positively influences the level of effort a manager subsequently invests in the venture. We then turn to the role of perceived venture performance and environmental hostility as contingencies of this relationship.

### Social Motivation Theory and Managerial Effort in New Venture Management Teams

Social motivation theory (De Jong et al., 2014; Geen, 1991; Quigley et al., 2007) proposes that individuals engage in reciprocal behaviour in collective tasks based on two behavioural tendencies individuals display in social (team) contexts. While these behavioural patterns are fundamental and therefore explain behaviour across contexts, we expect that they are particularly prevalent in the context of management teams leading new ventures, that is, entrepreneurial teams.

First, individuals engage in social comparison processes to assess their investments relative to their peers' investment, and based on this assessment they adjust their own investments to a matching level (Weber and Hertel, 2007). As compared to TMTs of established firms, these social motivation processes are likely to play an even more important role in the context of new venture management teams. Because venture management teams are often small (Friedman et al., 2016) and 'members cooperate intensively, are interdependent, and see one another more frequently than do members of TMTs in large, established organizations' (de Jong et al., 2013, p. 1845), each member's contributions are observable to the rest of the team, and therefore likely to trigger intense social comparison processes (Breugst et al., 2015). Moreover, in the new venture context, team members are more likely to realize that the team is on the 'right track' and that their effort contributes to achieving the joint team outcome (Hüffmeier et al., 2017). Thus, new venture managers are particularly likely to compare their teammates' to their own effort and adjust their own effort accordingly.

Second, individuals perceive the behaviours displayed by their peers as norms for their own behaviour, i.e., they feel the need to comply with these standards in their group (Quigley et al., 2007; Stewart et al., 2012). Thus, a manager is likely to respond to his or her teammates' efforts by investing similar effort in the venture because he or she may feel obliged to reciprocate the teammates' behaviour (Moody, 2008). When a new venture manager's teammates invest higher levels of effort in the venture, he or she is likely to also invest higher levels of effort to match their teammates' contribution. Indeed, new venture management teams often develop informal social norms to deal with the uncertainty and novelty surrounding them (Blatt, 2009). The effort invested by teammates may become a part of these norms and serve as an orientation for the focal manager for how much effort he or she should invest. Thus, this manager is likely to feel obliged to reciprocate his or her teammates' effort. In contrast, when teammates' effort is low, the manager might consider his or her effort to be useless for the overall success of the team and hence dispensable, which decreases his or her own effort (Dirks, 1999). Therefore, we offer the following baseline hypothesis:

*Hypothesis 1:* The relationship between the level of effort a manager's teammates invest in the venture and the level of effort a manager subsequently invests in the venture is positive.

### **Boundaries of Social Motivation in Management Teams: Belongingness Theory**

While this baseline hypothesis is the expectation based on the literature, there are indications that effort will be more contagious under some conditions than others. Indeed, prior research has identified two key factors that are likely to limit the contagion of effort in new venture management teams. First, because of the highly interdependent work of new venture management team members (de Jong et al., 2013), managers' unique contributions to the venture may not be clearly discernible. The outcomes of managers' effort are less visible for the teammates, which reduces their perceived obligation to work hard and meet the expectations of others (Lount and Wilk, 2014). Second, members of new venture management teams are typically compensated via their equity stake (Breugst et al., 2015). The value of this stake, however, depends on the venture's overall future development, which is collectively shaped by the team's members (Kotha and George, 2012). That is, the size of each manager's reward depends on the overall team's effort to achieve the venture's goals. In such situations of team-based rewards, managers might reduce their effort due to the assumption that their teammates will compensate for it (Barua et al., 1995). Thus, it appears that in the particular context of new venture management teams, social motivation and effort contagion may not occur automatically.

To explore the conditions that facilitate (or hamper) the contagion of effort in new venture management teams, we draw on belongingness theory (Baumeister and Leary, 1995). This theory takes an evolutionary perspective to suggest that individuals need to 'form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships' (Baumeister and Leary, 1995, p. 497). Because of this need,

humans tend to organize in small groups in which they share labour, resources, and emotions. While belonging to small groups results in advantages in evolutionary selection in general, belongingness theory highlights that closer connections to a social entity entail 'important benefits of defending oneself and protecting one's resources against external threats' (Baumeister and Leary, 1995, p. 499), that is, threats that are *external to the social entity*. By affiliating with others in response to such an external threat, individuals can gain emotional support, especially when their teammates are in a similar situation (Kulik et al., 1996). Moreover, the individuals benefit from protection in the group (Ein-Dor et al., 2011). In the hope of jointly tackling a team-external threat (Hogg et al., 2010) and of not being isolated (Helgeson and Mickelson, 1995), the team's members tend to focus on their team and react collectively to the outside (Ellemers et al., 2002). Indeed, studies have found that individuals who are confronted with external threats perceive themselves to be more closely connected to their group (Lee et al., 2018; Spoelma and Ellis, 2017). Drawing on these insights, we theorize that a manager's perceptions of *threats external to the venture management team* influence how he or she reacts to teammates' effort levels.

To identify threats that are relevant and salient for venture management team members, we build on recent work on managerial motivation (Dewald and Bowen, 2010; Osiyevskyy and Dewald, 2015) differentiating between threats arising at the firm level, such as reduced profits, and threats arising at the level of the firm's industry, such as product replacements by new technologies. These threats have the potential to substantially reduce firm performance or even endanger firm survival. Research suggests that for new venture management teams the most salient threat at the firm level are perceptions of low venture performance, while at the industry level a hostile venture environment constitutes a major threat.

First, low perceived venture performance represents a major threat to new venture managers. For example, low venture performance can lead to substantial cuts in personal income (Ucbasaran et al., 2013), not only because the managers' compensation might be tied to performance data. Even more importantly, these managers typically derive a major part of their compensation from the value of their ownership stakes, which can substantially decline in case of low venture performance (Kotha and George, 2012). Indeed, in the new venture context, sustained low performance often leads to firm failure and can cause personal bankruptcy (Jenkins et al., 2014; Shepherd, 2003). In turn, firm failure can have negative economic, social, and emotional consequences for new venture managers (Ucbasaran et al., 2013). Therefore, low venture performance represents as a substantial threat to new venture managers.

Second, by definition, a major threat in the venture's environment is hostility, which refers to 'the degree of threat to the firm posed by the multifaceted, vigour and intensity of the competition and the downswings and upswings of the firm's principal industry' (Miller and Friesen, 1983, p. 222). For new venture managers, hostile environments represent a major challenge because these environments substantially impair managerial decision making. For example, environmental hostility has a negative impact on decision-making speed (Baum and Wally, 2003), decision rationality (Elbanna and Child, 2007), and managerial discretion (Simsek et al., 2007). Moreover, environmental hostility reduces entrepreneurial activities (Simsek et al., 2007; Verbeke and Yuan, 2013), increases the demand for investing more internal resources (Bradley et al., 2011), and

endangers firm growth and survival (Elbanna and Child, 2007). Consequently, hostile environments can lead new venture managers to experience considerable stress and pressure (Nicholls-Nixon et al., 2000). Thus, when these managers perceive environmental hostility to be high, they are likely to feel threatened concerning their own and their venture's well-being.

### **Teammates' Effort and Perceived Venture Performance**

We theorize that new venture managers' perceptions of venture performance moderate the relationship between the level of effort their teammates invest in the venture and the level of effort the managers subsequently invest in the venture. Based on belongingness theory (Baumeister and Leary, 1995), the threat of lower levels of venture performance is likely to intensify the managers' focus on their team. Thus, they are more likely to observe teammates' effort and use this observation as an indicator of how much effort they should invest themselves.

On the one hand, when the manager has a strong focus on his or her teammates due to low perceived venture performance and these teammates invest minimal effort despite the current situation, he or she is likely reluctant to invest high effort (Mulvey and Klein, 1998). That is, the manager might consider his or her effort to be largely useless because the overall success of the team is doubtful (Dirks, 1999). The manager is likely to form the impression that the teammates' low effort impedes high overall venture performance so that his or her own hard work will have little impact on achieving a positive outcome. Rather, this manager might form the opinion that there is little hope of rescuing the situation altogether given the teammates' low effort, such that his or her investment of high effort is a waste of personal resources. As a result, the manager is likely to invest little effort consistent with the rest of the team.

On the other hand, when a manager's teammates invest higher levels of effort in a situation of low perceived venture performance, he or she is likely to work harder on venture tasks because of a felt obligation toward his or her teammates (De Jong et al., 2014; Quigley et al., 2007). Because these team members feel that they are jointly responsible for their struggling venture, they tend to engage in reciprocal behaviour such that a manager adjusts his or her effort to the high levels of effort displayed by the teammates. Furthermore, as venture performance is an important outcome for managers (Cooper and Artz, 1995; Wennberg et al., 2010), they may want to improve it when they perceive it to be at low levels. When feeling highly affiliated with one's teammates, a manager is likely to realize that in this challenging situation, all team members' effort is needed to put the venture 'back on track' such that his or her teammates' contributions are an important prerequisite for improving venture performance. As individuals are more likely to exert effort for a collective task when they consider their effort to be decisive for the desired outcome (Dirks, 1999; Hüffmeier et al., 2017), the manager might think that his or her effort in combination with his or her teammates' effort will have a substantial effect on future venture performance; thus, the manager is likely to work harder as well. In sum, when perceived venture performance is low, we expect a positive association between the level of effort invested by teammates and the focal manager's investment of effort.



In contrast, when a manager perceives venture performance to be high, he or she experiences less threat. This perception of low threat is likely to reduce his or her affiliation with and focus on the team (Baumeister and Leary, 1995; Ellemers et al., 2002) because there is less need for support or protection (Ein-Dor et al., 2011; Hogg et al., 2010; Kulik et al., 1996). In such situations, the manager is less likely to behave in a reciprocal way to teammates' behaviours. For example, when the venture performs well and a manager's teammates invest substantial effort into the venture, the manager is more likely to feel that these teammates' efforts are sufficient for maintaining high performance. In turn, the manager will perceive that it does not substantially harm the venture's progress if he or she reduces his or her own effort. That is, this manager is unlikely to adjust his or her own effort levels to the effort levels of his or her teammates. Based on the above, we offer the following:

*Hypothesis 2:* The relationship between the level of effort a manager's teammates invest in the venture and the level of effort the manager subsequently invests in the venture is more positive when the manager perceives venture performance to be lower than higher.

### **Teammates' Effort and Perceived Environmental Hostility**

Similarly to low venture performance, we expect that perceived environmental hostility as a threatening environment also intensifies a new venture manager's affiliation with and focus on his or her team (Baumeister and Leary, 1995; Ellemers et al., 2002). With an increased focus on the team, the relationship between the effort invested in the venture by the teammates and the effort that the manager invests subsequently in the venture intensifies. High hostility is connected to a lack of environmental resources for the venture (Miller and Friesen, 1983) and a high need for internal resources (Bradley et al., 2011). Thus, the manager is likely to realize that teammates' lack of effort will exacerbate the new venture's resource scarcity, which is likely to make his or her efforts appear futile. That is, the manager may be less willing to invest high effort in this unfavourable situation because he or she believes that this effort will have minimal impact on generating positive outcomes (Dirks, 1999; Hüffmeier et al., 2017).

However, when teammates invest considerable effort into achieving the new venture's goals, the manager likely believes that his or her effort will help the team to jointly overcome the current threats posed by environmental hostility. That is, the manager is likely to realize that effort is particularly crucial for venture performance under hostile environmental conditions (Bradley et al., 2011; Covin and Slevin, 1989). Therefore, the effort invested by teammates towards achieving the venture's goals is likely to motivate the manager to invest higher levels of effort himself or herself as well (Hüffmeier et al., 2017; Mulvey and Klein, 1998). Further, because environmental hostility triggers the manager's focus on the team, he or she is likely to realize the need to act in concert with hard-working teammates and feel obliged to reciprocate their effort (De Jong et al., 2014; Quigley et al., 2007). These arguments based on belongingness theory suggest that effort within new venture management teams is particularly contagious under conditions of high environmental hostility.

In contrast, lower environmental hostility involves greater access to resources and therefore puts less pressure on managers to acquire sufficient resources for achieving the venture's goals (Bradley et al., 2011; Miller and Friesen, 1983; Nicholls-Nixon et al., 2000). In these benign environments, managers' decisions, activities, and actions are less impactful on venture performance than in hostile environments as the differences on outcomes between bad and good decision making are only minor (Covin and Slevin, 1989). That is, a benign environment can compensate for strategic and managerial shortcomings (Tsai et al., 1991) and enables the venture to grow and build up resources (Dess and Beard, 1984). Indeed, scholars have referred to these resource-rich environments as a tide that raises all boats (Wasserman et al., 2010). Given that benign environments pose little threat to a manager and therefore, according to belongingness theory, his or her focus on the team is reduced, we expect that there is little contagion of effort within the new venture management team. A manager might even believe that his or her teammates' effort is sufficient when hostility is low because the venture's goals can be reached even if the manager himself or herself invests limited effort. Thus, the relationship between the teammates' effort and his or her subsequent effort becomes weaker. Based on the above reasoning, we offer the following:

*Hypothesis 3:* The relationship between the level of effort a manager's teammates invest in the venture and the level of effort the manager subsequently invests in the venture is more positive when the manager perceives environmental hostility to be higher than lower.

## RESEARCH METHODS

### Sample and Procedure

Our sample consists of new venture management team members who jointly make key strategic decisions and are actively involved in the management of young firms (Klotz et al., 2014). The members of these teams enjoy a high level of discretion (Hambrick et al., 2005) and can thus decide on the level of effort that they invest in their firms which makes them an appropriate sample. To identify these new venture management teams, we drew on incubators and entrepreneurship centres in a large European metropolitan area because ventures in these facilities are usually in the early stages of development (Bøllingtoft and Ulhøi, 2005). These incubators and entrepreneurship centres had the explicit mission to support and promote technology-based ventures. We excluded sole proprietorships and partnerships as well as lifestyle businesses to ensure that the ventures in our sample are somewhat comparable in both the presence of a new venture management team and their aspirations for growth.

From the centres' and incubators' web pages, we compiled a list of 289 ventures, and when the information was available, we recorded the management team members' names. Next, we trained research assistants to make onsite visits or call the ventures to verify that this list was up to date and to recruit participating teams for the study. Out of

the original list of 289 ventures, we excluded 94 from the sample because they did not match our sampling criteria: 19 were spinoffs of larger companies, 38 were started more than six years ago (for the same age restriction, see Amason et al., 2006), and 37 were not run by a team but by individuals. Of the remaining 195 ventures, we were unable to contact 66 ventures, even after repeated inquiries. According to information from the incubator administrators, most of these firms had never fully started operations or ceased to exist. Thus, we reached out to the members of 129 venture management teams who confirmed that they were co-founders of the venture and were in charge of strategic decisions, the management of the venture, and its development. We explained the duration and the structure of the study and highlighted the importance of answering the questionnaires carefully and on time. Additionally, we promised participants detailed feedback from the study. While 65 management teams declined participation – mostly because of time constraints – 64 teams (consisting of 161 individual members) agreed to participate.

In Figure 2, we illustrate the data collection process. We collected data from May to December 2011. In a first step, we conducted interviews with all new venture managers to understand their venture’s business model and the team’s background. Starting in the subsequent week, each management team member received weekly e-mail invitations (each Friday) to participate in a short online survey for 26 consecutive weeks. The period of 26 weeks – half a year – is consistent with other studies on new venture management teams (Bøllingtoft and Ulhøi, 2005; Dai et al., 2016; Seidel et al., 2016). We chose weekly intervals because this unit captures new venture managers’ ‘week-to-week thinking’ about key challenges in their venture (Leonard and Swap, 2000, p. 81). For example, Bitler et al. (2005) asked new venture managers to recall the amount of effort they had invested in their venture within a week.

In addition to the weekly questionnaires, we invited all participants to fill out a more detailed online questionnaire to capture their perceptions of environmental hostility and

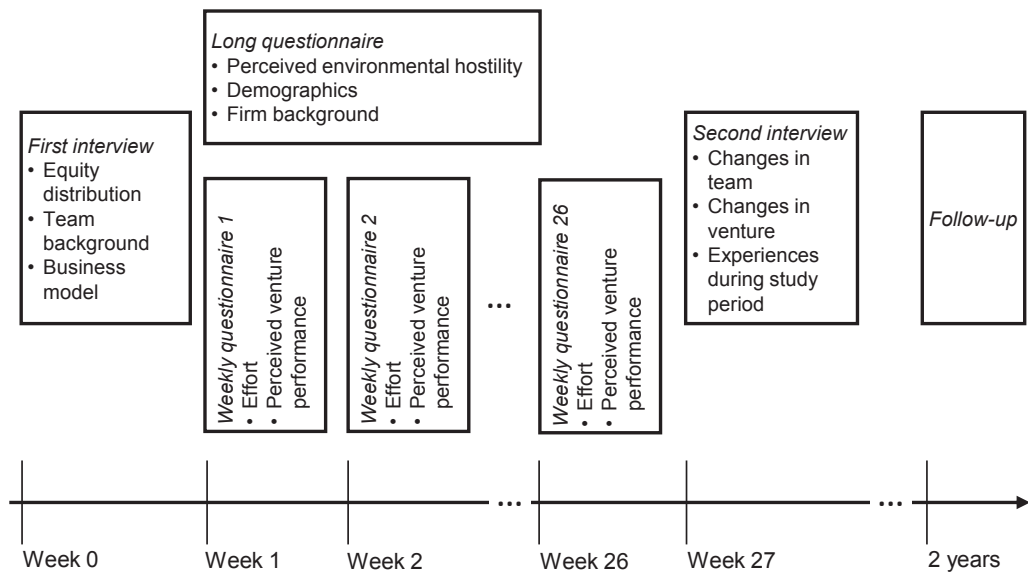


Figure 2. Simplified chart of the data collection process

collect demographic information (see descriptions below) at the beginning of our study. In our final sample, we only included participants who filled out this long questionnaire; otherwise, we would lack important data about the participants and their ventures. Because of the importance of the detailed questionnaire, we sent out two reminders to non-respondents one and two weeks after the initial invitation. This data collection resulted in 112 questionnaire responses from 59 management teams, representing a response rate of 46 per cent regarding the 129 teams contacted.

Moreover, we focus on the relationship of the effort invested by a manager's teammates and his or her subsequent effort invested in the venture. Therefore, for each participant's weekly effort score, we computed the corresponding average of his or her teammates' effort scores (in case of two-person management teams, this score was the remaining teammate's effort score in the respective week). We lagged the teammates' effort score by one week (week  $t - 1$ ) to match it with the focal manager's effort score in the subsequent week (week  $t$ ). If none of the focal manager's teammates provided an effort score in week  $t - 1$ , we had to exclude the manager for this specific week  $t$  because they lacked the corresponding score in the teammates' effort in the previous week. Finally, because we also wanted to control for a manager's own effort in the previous week (week  $t - 1$ ), we only included team members who provided responses to at least two weekly questionnaires in a row, but we included any two-week sequence out of the 26 weeks of our study period. These two requirements for testing our model led to the exclusion of nine additional participants from eight teams who did not provide answers to two consecutive weekly questionnaires and/or who lacked data from all other teammates. Thus, the final sample includes 1,197 usable observations from 103 new venture managers nested in 51 teams. On average, we included 12 sequences of answers to the weekly questionnaires per individual.

Our participants were 32.08 years old on average ( $SD = 8.36$ ), 9 per cent were female, 11 per cent had a PhD, 69 per cent had a university degree below the Ph.D. level, 4 per cent finished vocational education, and 12 per cent had a high school degree (the rest chose the 'other' category). The new venture managers had a broad range of educational backgrounds: 45 per cent had a background in engineering, 20 per cent in business, 11 per cent in natural and life sciences, 8 per cent in design, 7 per cent in information systems, 3 per cent in law, and 7 per cent chose the 'other' category. The average team size was 2.53 ( $SD = 0.73$ ), consistent with prior work on new venture management teams (e.g., Friedman et al., 2016). On average, the ventures were 2.55 years old ( $SD = 2.60$ ) and had 3.84 full-time employees ( $SD = 11.76$ ), excluding the management team. The ventures operated in different industries, such as information technology, software development, or e-commerce (45 per cent); services (43 per cent); life, material, or natural sciences (4 per cent); and others (8 per cent).

## Measures and Variables

*Dependent variable.* The dependent variable is a *new venture management team member's level of effort in week  $t$* . Consistent with the definition of effort as the expenditure of resources (Yeo and Neal, 2004), we asked participants to what extent they had devoted resources, such as energy, attention, and time (resources typically mentioned with respect to effort in new

venture contexts; Bitler et al., 2005; Foo et al., 2009), to executing venture tasks within that specific week. Using a single-item measure, we asked participants for an overall rating of their effort on a seven-point Likert-type scale with the anchors 'not at all' and 'very much'. The use of single-item measures in studies relying on multiple measurements is consistent with previous research trying to reduce participants' time burden (e.g., Hunter and Wu, 2016; de Jong et al., 2007). Indeed, Foo et al.'s study (2009) also used single-item measures to capture (two different types of) managerial effort invested in new ventures.

*Independent variable.* Our independent variable is the *level of effort that the manager's teammates invested in the venture in week  $t - 1$* . To measure this variable, we relied on the team members' answers about how much effort they had invested and computed the average score of effort that each individual's teammates invested in each week. In case of only two respondents per team in a week (which was always the case in two-member teams), we used the remaining teammate's effort score in this week. For 853 data points, we relied on one teammate's assessment of his or her effort invested in the respective week; for 285 data points, we relied on two teammates' assessments, for 29 data points on three teammates' assessments; and for 30 data points we relied on four teammates' assessments of their effort. From this measure, we created a lagged variable to explain our dependent variable measured in week  $t$  by the teammates' effort in week  $t - 1$ . As we treated all questionnaires confidentially, the participants had no opportunity to check the amount of effort reported by their teammate(s). Thus, each team member gave his or her assessment of effort independent of his or her teammate(s).

*Moderating variables.* To capture a new venture manager's *perceived venture performance in week  $t - 1$* , we asked the participants to rate their overall satisfaction with their venture's performance (Cooper and Artz, 1995) in each respective week of our study period ('How satisfied have you been with your venture's performance this week?') on a seven-point Likert-type scale with the anchors 'not at all satisfied' and 'very much satisfied'. Again, we used a single item to reduce participants' time burden as they were requested to participate in 26 questionnaires week after week. Wanous et al. (1997) showed in a meta-analysis that a single-item measure of job satisfaction was valid compared to established multiple-item scales, arguing that single-item measures can be acceptable when the construct is sufficiently narrow and clear to respondents. Perceived venture performance is a clear construct for new venture managers. Indeed, single-item measures have already been applied to measure a new venture manager's perception of venture performance (e.g., Gruber, 2007; Sonfield et al., 2001). We created a lagged variable to capture the manager's perceived venture performance in the week before his or her assessment of effort, i.e., venture performance in week  $t - 1$ .

While we were interested in capturing the manager's perceptions of venture performance, we also wanted to provide some evidence that our participants could accurately assess venture performance. However, for many new ventures, comparable objective performance indicators are rarely available or applicable (Chandler and Hanks, 1993). Thus, two years after the study period (this interval has been suggested as being meaningful for a follow-up investigation on young ventures' performance; West, 2007), we tried to contact our participants for information on venture survival. Out of the 51 ventures in

our sample, 43 were still in business, and one was acquired by a larger company but was still active. Seven ventures had experienced venture failure and been dissolved. We ran *t*-tests to compare perceived venture performance between those team members whose venture was still active after two years and those who had experienced venture failure in this time. The team members from the ventures surviving the next two years were significantly more satisfied with their venture's performance than those whose ventures failed,  $t(1195) = 6.88$ ,  $p < 0.001$ . Thus, the participants' perceptions of venture performance were connected to objective venture outcomes, which provides some evidence for the validity of this measure. However, we also point out that when it comes to new venture managers making an additional effort (or not) based on venture performance, these investments are based on perceptions of venture performance rather than objective venture performance.

We captured individuals' *perceptions of environmental hostility* using a six-item scale developed by Green et al. (2008) and translated into the participants' national language using a back-and-forth procedure (see Brislin, 1970). The scale captures 'precarious industry settings, intense competition, harsh, overwhelming business climates, and the relative lack of exploitable opportunities' (Covin and Slevin, 1989, p. 75) connected to high levels of hostility. An example of an item is 'The failure rate of firms in my industry is high'. The Cronbach's alpha of the scale was 0.73, which indicates that the scale is sufficiently reliable (Hair et al., 2006). Perceptions of environmental hostility have been conceptualized as being rather stable in previous research covering timespans from one year (Nicholls-Nixon et al., 2000) to five years (Miller, 1987). Therefore, we did not expect the individuals' perceptions to change over the study period and captured them once at the beginning of the study with the detailed questionnaire. Consequently, each participant has one value for perceived environmental hostility, which we included at Level 2 in our analysis (see description below).

*Control variables.* Consistent with previous research focusing on the intra-personal change of effort over time (Uy et al., 2015), we controlled for the managers' effort at the time interval directly before the measurement of our dependent variable. That is, we controlled for the *manager's level of effort in week  $t - 1$*  in explaining the level of effort in week  $t$ . We again created a lagged variable from our dependent variable, managerial effort in week  $t$ . By controlling for the manager's past effort, we also control for the prior relationships between the teammates' and the individual's effort as well as other potentially unobserved factors (Wooldridge, 2010).

Furthermore, following previous work on effort in a new venture context, we controlled for the participants' *gender* (Foo et al., 2009; Uy et al., 2015), *age* (Bitler et al., 2005), *entrepreneurial self-efficacy* (Kickul et al., 2009), and *equity stake* (Bitler et al., 2005) at the individual level of analysis (i.e., Level 2). Gender was entered as a dummy variable in the analyses, with 0 denoting male and 1 denoting female. The participants were asked to indicate their year of birth in the questionnaire, which we used to compute their age in years. Entrepreneurial self-efficacy denotes 'the degree to which people perceive themselves as having the ability to successfully perform the various roles and tasks of entrepreneurship' (Hmieleski and Baron, 2008, p. 57) and might impact new venture managers' effort and performance assessments (Cassar and Friedman, 2009; Hmieleski

and Baron, 2008). To capture entrepreneurial self-efficacy, the long questionnaire included a 10-item scale (Kickul et al., 2009) that asks new venture managers to rate their confidence to perform ten different entrepreneurial tasks.<sup>2</sup> The Cronbach's Alpha was 0.91, which indicates a high level of reliability (Hair et al., 2006). As the new venture managers' ownership might impact the level of effort they invest in the venture (Bitler et al., 2005) and as the equity distribution in new venture management teams can impact team and venture outcomes (Breugst et al., 2015), we also controlled for the participants' equity stake. Because we considered questions of equity distribution as a sensitive topic, we asked the managers about their equity split in the interviews that we conducted before the start of the study period. There were no inconsistencies in answers across the members of each team.

At the level of the management team/venture (Level 3), we controlled for *team age*, *team size*, and *industry* in which the venture was active. First, because the time that teams have worked together in the past has an impact on individuals' behavior in the team (Gardner et al., 2012), we controlled for the number of years that the venture management team had spent working together (which is correlated but not identical with venture age,  $r = 0.81$ ,  $p < 0.001$ . The pattern of results does not change if venture age is included). Second, we controlled for team size because it has been related to motivation in social contexts (Liden et al., 2004). Finally, because patterns of collaboration in new venture management teams might differ in product-based and service-based ventures (Ucbasaran et al., 2003) and because perceptions of environmental hostility likely reflect industry-based differences (Miller and Friesen, 1983), we controlled for the venture's industry using a dummy variable (we coded ventures active in product-based industries as 0, and those in service-based industries as 1).

## Data Analysis

Although our data capture 26 consecutive weeks, we do not assume that our variables consistently grow or decline as a function of time. Our model assumes that a venture management team member's effort in week  $t$  is influenced by his or her teammates' effort in week  $t - 1$  independently of the overall passage of time. For this type of analysis, Schonfeld and Rindskopf (2007) recommend using a hierarchical linear modelling (HLM) approach and predicting the dependent variable at time  $t$  from the independent variable at time  $t - 1$ . Hierarchical linear models account for nested data structures (i.e., observations are nested within individuals and individuals are nested within teams). We used the `xtmixed` command in Stata 14 (Rabe-Hesketh and Skrondal, 2012) for our analyses. This approach allows for the separation of variance components for each level – in the case of our study, the repeated measures (Level 1), the individuals (Level 2), and the teams/ventures (Level 3). Following the recommendations by Hofmann and Gavin (1998) and based on our focus on within-person parameters, we person-mean centred (i.e., group-mean centred) all variables at Level 1, and we grand-mean centred all variables at Levels 2 and 3.

Based on an unconditional model predicting the managers' effort at week  $t$ , we first examined the distribution of variance over the levels: 55 per cent of the variance was at Level 1 (i.e., within the individual between the different time points), 41 per cent was

at Level 2 (i.e., between individuals), and 4 per cent was at Level 3 (i.e., between teams). These results indicate that the use of a multilevel approach was appropriate (we also verified that the results remained unchanged in a two-level model capturing only Levels 1 and 2).

## RESULTS

### Descriptive Statistics

Table I presents the descriptive statistics and correlations of the variables included in the study. To provide correlations across levels, we assigned to each Level 1 entry (weekly measures) the respective manager's Level 2 value and their team's/venture's Level 3 value. There is a significant and positive correlation between venture performance and subsequent effort ( $r = 0.23$ ,  $p < 0.001$ ) and a non-significant relationship between hostility and managerial effort ( $r = -0.05$ ,  $p = 0.11$ ). Thus, the correlations do not suggest a systematic relationship between threats and managerial effort; managers do not seem to invest systematically more (or less) effort if threats increase. As teams might work together more intensely under threat reducing the variability in managerial effort, we test if the variance in managerial effort depends on the level of threat. We run F-tests for very low, low, high, and very high levels (relying on quartiles) of both perceived venture performance ( $F(1,1195) = 3.18$ ,  $p = 0.07$ ) and perceived environmental hostility ( $F(1,1195) = 1.98$ ,  $p = 0.16$ ) which were not significant.<sup>3</sup> Thus, threats do not appear to systematically influence the level or the variability of managerial effort. Before running our hypotheses tests, we calculate variance inflation factors (VIFs) based on an ordinary least squares regression. All VIFs (highest VIF = 1.53) were below the suggested cut-off of 10 (Hair et al., 2006), indicating that multicollinearity is unlikely to be problem for our analyses.

### Hypotheses Testing

Table II presents the models explaining a new venture manager's effort in week  $t$ . In Model 1, we only include the control variables, in Model 2, we add the teammates' effort in week  $t - 1$ , and in Model 3 we add the main effects – perceived venture performance and perceived environmental hostility. In Models 4 and 5, we individually include the interaction between the teammates' effort in week  $t - 1$  and perceived venture performance as well as the interaction between the teammates' effort in week  $t - 1$  and perceived environmental hostility, respectively. Finally, in Model 6 we present the full model. The statistics for the model fit ( $-2 \log$  likelihood and Akaike's information criterion) as well as incremental  $\chi^2$ -test suggest that the model fit improves with the inclusion of additional predictors and that the full model is the best.

In our first hypothesis, we postulated that the relationship between the level of effort a manager's teammates invest in the venture and the level of effort a manager subsequently invests in the venture is positive. Table II reveals that in all models, the teammates' effort in week  $t - 1$  is not significantly related to the manager's effort invested in the subsequent week. Thus, Hypothesis 1 is not supported.



Table 1. Means, standard deviations, and correlations between focal variables

	<i>M</i>	<i>SD</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Effort in week <i>t</i>	5.46	1.57											
(2) Teammates' effort in week <i>t</i> - 1	5.45	1.37	0.17***										
(3) Perceived venture performance in week <i>t</i> - 1	5.59	1.21	0.23***	0.06*									
(4) Perceived environmental hostility <sup>a</sup>	3.75	1.05	-0.05	0.01	-0.03								
(5) Effort in week <i>t</i> - 1	5.46	1.55	0.55***	0.19***	0.33***	-0.04							
(6) Gender <sup>a,b</sup>	0.08	0.27	0.05†	-0.00	0.10***	0.06*	0.03						
(7) Age <sup>a</sup>	31.75	8.34	-0.13***	-0.14***	-0.08***	0.22***	-0.15***	0.02					
(8) Entrepreneurial self-efficacy	5.47	0.90	0.17***	-0.02	0.21***	-0.06*	0.18***	-0.11***	-0.10***				
(9) Equity stake <sup>a</sup>	0.40	0.15	-0.03	0.01	-0.12***	0.28***	-0.03	-0.04	0.27***	0.19***			
(10) Team age <sup>a</sup>	3.07	2.33	0.05†	0.06*	-0.01	0.09***	0.04	0.10***	0.39***	-0.20***	0.15***		
(11) Team size <sup>a</sup>	2.77	0.83	0.05†	0.06*	0.07**	-0.15***	0.06*	-0.13***	-0.37***	0.02	-0.49***	-0.29***	
(12) Industry <sup>a,c</sup>	0.49	0.50	-0.09***	-0.12***	0.14***	0.06*	-0.09***	0.10***	0.05†	0.06*	-0.03	-0.14***	0.08***

<sup>a</sup>Notes: *N* = 1,197 observations nested in 103 new venture managers nested in 51 teams.

*M* = mean; *SD* = standard deviation.

<sup>b</sup>These variables were measured at the individual or team level of analysis (Levels 2 and 3, respectively) and assigned down to the level of the weekly measures for computing the correlations.

<sup>c</sup>0 = male, 1 = female.

<sup>\*</sup>0 = product-based ventures, 1 = service-based ventures.

\*\*\**p* < 0.001; \*\**p* < 0.01; \**p* < 0.05.

Table II. Hierarchical linear model to predict a new venture manager's effort in week  $t$ 

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	4.07*** (1.04)	4.07*** (1.04)	4.16*** (1.04)	4.19*** (1.04)	4.16*** (1.04)	4.19*** (1.04)
Gender <sup>a</sup>	0.35 (0.38)	0.35 (0.38)	0.32 (0.39)	0.33 (0.38)	0.32 (0.39)	0.33 (0.38)
Age	-0.02 <sup>†</sup> (0.01)	-0.02 <sup>†</sup> (0.01)	-0.03 <sup>†</sup> (0.01)	-0.03 <sup>†</sup> (0.01)	-0.03 <sup>†</sup> (0.01)	-0.03 <sup>†</sup> (0.01)
Entrepreneurial self-efficacy	0.38** (0.12)	0.38** (0.12)	0.38** (0.12)	0.38** (0.12)	0.38** (0.12)	0.38** (0.12)
Equity stake	-0.21 (0.72)	-0.21 (0.72)	-0.31 (0.73)	-0.32 (0.73)	-0.31 (0.73)	-0.32 (0.73)
Team age	0.08 <sup>†</sup> (0.05)	0.08 <sup>†</sup> (0.05)	0.09 <sup>†</sup> (0.05)	0.09 <sup>†</sup> (0.05)	0.09 <sup>†</sup> (0.05)	0.09 <sup>†</sup> (0.05)
Team size	0.02 (0.16)	0.02 (0.16)	0.02 (0.15)	0.02 (0.15)	0.02 (0.15)	0.02 (0.15)
Industry <sup>b</sup>	-0.21 (0.22)	-0.21 (0.22)	-0.22 (0.22)	-0.22 (0.22)	-0.22 (0.22)	-0.22 (0.22)
Effort in week $t - 1$	0.14*** (0.03)	0.13*** (0.03)	0.14*** (0.03)	0.14*** (0.03)	0.14*** (0.03)	0.14*** (0.03)
Teammates' effort in week $t - 1$	0.03 (0.03)	0.03 (0.03)	0.04 (0.03)	0.04 (0.03)	0.04 (0.03)	0.04 (0.03)
Perceived venture performance in week $t - 1$			-0.03 (0.04)	-0.03 (0.04)	-0.03 (0.04)	-0.03 (0.04)
Perceived environmental hostility			0.09 (0.10)	0.09 (0.10)	0.09 (0.10)	0.09 (0.10)

Table II. Continued

	(1)	(2)	(3)	(4)	(5)	(6)
Teammates' effort in week $t - 1 \times$ performance in week $t - 1$				-0.09** (0.04)		-0.09* (0.04)
Teammates' effort in week $t - 1 \times$ hostility					0.07* (0.03)	0.07* (0.03)
Model fit	$\chi^2$ (8) = 35.67, p < 0.001; LL = -1973.53; AIC = 3971.06	$\chi^2$ (9) = 36.84, p < 0.001; LL = -1972.96; AIC = 3971.92	$\chi^2$ (11) = 38.20, p < 0.001; LL = -1972.33; AIC = 3974.65	$\chi^2$ (12) = 45.09, p < 0.001; LL = -1969.02; AIC = 3970.04	$\chi^2$ (12) = 44.03, p < 0.001; LL = -1969.48; AIC = 3970.96	$\chi^2$ (13) = 50.24, p < 0.001; LL = -1966.42; AIC = 3966.85
Incremental $\chi^2$ -test		Compared to (1): $\chi^2$ (1) = 1.17, p = 0.28	Compared to (2): $\chi^2$ (2) = 1.36, p = 0.51	Compared to (3): $\chi^2$ (1) = 6.89, p < 0.01	Compared to (3): $\chi^2$ (1) = 5.83, p < 0.05	Compared to (3): $\chi^2$ (2) = 12.04, p < 0.01

Notes: N = 1,197 observations (Level 1) nested in 103 new venture managers (Level 2) nested in 51 teams (Level 3).

Unstandardized estimates are reported, and robust standard errors are in parentheses.

<sup>a</sup>0 = male, 1 = female.

<sup>b</sup>0 = product-based ventures, 1 = service-based ventures.

\*\*\*p < 0.001; \*\*p < 0.01; \*p < 0.05; †p < 0.10.

Hypothesis 2 postulates that the relationship between the level of effort a manager's teammates invest in the venture and the level of effort the manager subsequently invests in the venture is more positive when the manager perceives venture performance to be lower than higher. Model 6 in Table II shows that the interaction term is significant and negative ( $b = -0.09$ ,  $p < 0.05$ ). Thus, a 1-unit increase in perceived venture performance is associated with a 0.09 decrease in the slope of effort invested in the venture by the teammates on the manager's subsequent effort. To better understand the nature of the interaction, we plot it in Figure 3. The x-axis represents the entire range of values of the teammates' effort in the previous week (negative values are due to group-mean centring) and the y-axis represents the focal manager's effort in the subsequent week. We plot lines for low (dashed line; one standard deviation below the group mean) and high (solid line; one standard deviation above the group mean) levels of perceived venture performance. The slope of the relationship between the teammates' effort and the focal manager's own effort is positive for low levels of perceived venture performance (simple slope at one SD below the group mean = 0.12,  $p < 0.01$ ). For high levels of venture performance, the slope is not significant (simple slope at one SD above the group mean =  $-0.04$ ,  $p = 0.39$ ). This pattern provides support for Hypothesis 2.

In Hypothesis 3, we propose that the relationship between the level of effort a manager's teammates invest in the venture and the level of effort the manager subsequently invests in the venture is more positive when the manager perceives environmental hostility to be higher than lower. Because environmental hostility is a Level 2 variable, we compute a cross-level interaction, which is significant and positive ( $\gamma = 0.07$ ,  $p < 0.05$ ; Model 6). That is, a 1-unit increase in environmental hostility leads to a 0.07 unit increase in the slope of effort invested in the venture by the teammates on the manager's subsequent effort. We provide a plot of this interaction in Figure 4, in which the x-axis again represents the entire range of values of the teammates' effort in week  $t - 1$ , and the y-axis represents the focal manager's effort in the subsequent week  $t$ . The dashed

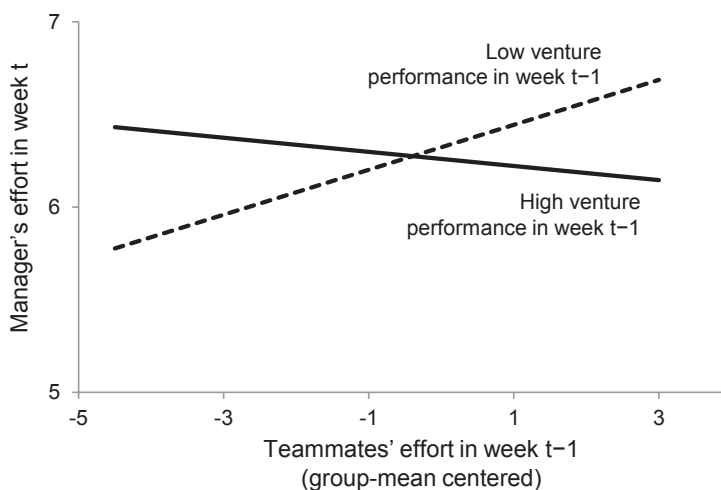


Figure 3. Moderating effect of a new venture manager's perceived venture performance in week  $t - 1$  on the relationship between teammates' effort in week  $t - 1$  and the new venture manager's effort in week  $t$

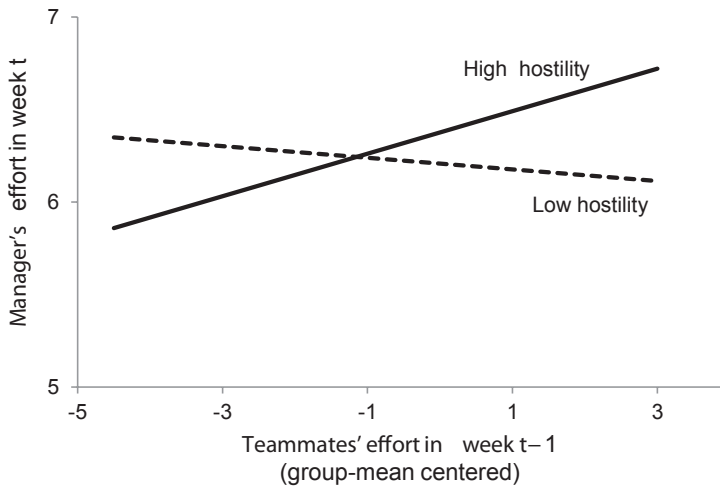


Figure 4. Moderating effect of a new venture manager's perceived environmental hostility on the relationship between teammates' effort in week  $t - 1$  and the new venture manager's effort in week  $t$

line represents low levels of perceived environmental hostility (one standard deviation below the grand mean) and the solid line represents high levels of perceived environmental hostility (one standard deviation above the grand mean). The slope of the relationship between teammates' previous effort and the focal individual's own effort is significant and positive for high levels of hostility (simple slope at one SD above the grand mean = 0.11,  $p < 0.05$ ). For low hostility the slope is not significant (simple slope at one SD below the grand mean =  $-0.03$ ,  $p = 0.49$ ). These findings provide support for Hypothesis 3.

### Supplementary Analyses

We followed Selya et al. (2012) and calculated the effect sizes of the two interaction effects by comparing the models including one interaction (i.e., Models 4 and 5) to the model that only includes the moderators' main effects (Model 3). The  $f^2$  values, i.e., 'the ratio of systematic variance accounted for by the moderator relative to unexplained variance in the criterion' (Aguinis et al., 2005, p. 96), were small (both  $f^2$ s = 0.01). However, these small values are consistent with a review of articles including interactions published in leading management journals reporting a median effect size of  $f^2 = 0.002$  (Aguinis et al., 2005). Thus, the effect sizes reported in these articles are typically even smaller than those in our study.

We also tested if perceived venture performance shapes the manager's effort on a longer time horizon. Thus, we rely on perceptions of venture performance captured in week  $t - 2$  as well as in week  $t - 3$  as moderators in supplementary analyses. The interaction between the teammates' effort and perceived venture performance is not significant in either case. (The interactions between the teammates' effort and perceived environmental hostility are significant in the model including venture performance from week  $t - 2$ , but not for performance from week  $t - 3$ .)

Additionally, we also conducted several robustness checks. First, we controlled for the new venture managers' human capital because human capital influences individuals' career options and, thus, the managers' opportunities outside of their current venture (Unger et al., 2011). Thus, we include measures of entrepreneurial experience (numbers of ventures founded prior to the current one), level of education (dummy for university degree yes or no), work experience (number of years of professional experience), as well as industry experience (number of years working in the venture's industry). None of these variables has a significant effect on the manager's effort and all results are fully consistent with our original findings. Second, we also tested for a potential nonlinear, i.e., quadratic effect of the teammates' effort in week  $t - 1$  (Backes-Gellner et al., 2015). The squared teammates' effort was not significant and its inclusion did not change the original results. Finally, we checked if the simultaneous experience of the two potential threats, i.e., low perceived venture performance and high perceived environmental hostility, jointly moderate the relationship between the effort teammates invest in their new venture and the manager's subsequent effort by including a three-way interaction between the teammates' effort in week  $t - 1$ , perceived venture performance in week  $t - 1$ , and perceived environmental hostility. The three-way interaction was not significant and the overall results remained unchanged.

## DISCUSSION

The results of our study suggest that the effort teammates invest in their new venture plays an important role in triggering a focal manager's effort. However, challenging the implicit assumptions of social motivation theory, we find that effort is not automatically transmitted in new venture management teams. Rather, the contagion of managerial effort is contingent on the focal manager's perceived levels of threat stemming from low venture performance and high environmental hostility. These findings have a number of theoretical and empirical implications for research on management teams, performance feedback, and effort in the new venture context.

### Implications for Theory

Research on motivation in management teams (for a review, see Wowak et al., 2017) has mainly focused on the role of incentives (Chng et al., 2012; Devers et al., 2008; Kocabiykoğlu and Popescu, 2007) and only recently started to acknowledge the importance of social motivation and social comparison processes for understanding the effort managers invest in their firms (Fredrickson et al., 2010; Ridge et al., 2015, 2017). However, while social motivation theory suggests that effort is contagious in management teams (De Jong et al., 2014; Geen, 1991; Quigley et al., 2007), our findings suggest that contagion does not happen automatically and we do not find support for Hypothesis 1 (i.e., our study does not show a direct relationship between a manager's effort and the effort of his or her teammates). Thus, our study identifies conditions that limit the applicability of social motivation theory and implies the relevance of specific triggers allowing for a contagion of effort. Specifically, consistent with belongingness theory (Baumeister and Leary, 1995), effort appears to be only contagious in the presence of threats emerging

from low venture performance and environmental hostility, but not in the absence of these threats. Put differently, threats seem to be a necessary condition for the application of social motivation theory in the top management team context. These findings extend first insights illustrating the complexity of social motivation within TMTs. While Ridge et al. (2017) find that social comparison processes trigger TMT turnover depending on a complex interplay between incentive structures and CEO salary, we highlight the importance of threats external to the TMT as moderators of the relationship between the teammates' effort and the focal manager's subsequent effort. Thus, our study allows us to identify clear contingencies of social motivation theory in the TMT context.

In addition to these theoretical insights, our results also have important empirical implications for research on social motivation processes within TMTs. In the past, research on motivation and contagion in teams has mostly been conducted in experimental settings, often using student samples working on tasks of little importance to them and without high emotional involvement (for notable exceptions, see De Jong et al., 2014; Hüffmeier et al., 2017; Liden et al., 2004; Lount and Wilk, 2014). For example, drawing on a sample of student teams, Barsade (2002) found that positive emotional contagion within the teams increased task performance and cooperation, and decreased conflict. However, given the limited emotional involvement, it is questionable whether these results also apply to 'real' managerial teams in which the team members' emotional 'base level' should already be quite high (Cardon et al., 2005) and therefore emotional contagion might be less likely to occur. Indeed, although it does not directly measure emotions, our field study using a sample of new venture management teams suggests that processes of contagion (in our case effort contagion) are contingent on the team's 'real' context represented by the firm (perceived venture performance) and the industry (perceived environmental hostility). Because these complex contingencies cannot be identified using student teams and are difficult to manipulate adequately in experimental settings, we encourage future research on social motivation to study 'real' managerial teams. Studying real management teams appears to be a prerequisite for a greater understanding of the conditions under which effort (and potentially emotions) is contagious within TMTs and organizations.

Furthermore, our study might inform work on emotion regulation in contagion processes. Specifically, work on emotion regulation argues that stressors or threats can be within or outside of the control of an individual and that emotion regulation is more functional in case of uncontrollable stressors (Troy and Mauss, 2011; Troy et al., 2013). Our focus on threats external to the team (in line with belongingness theory; Baumeister and Leary, 1995) implies that new venture managers have limited ability to control their situation. While we did not capture emotion regulation explicitly, our findings are consistent with this argument and suggest that under external threat, new venture managers redirect their attention to their teammates and focus on the effort invested by them. Therefore, in contrast to studies indicating that some forms of emotion regulation might be dysfunctional for new venture outcomes under low venture performance (De Cock et al., 2019), we echo other studies (Troy and Mauss, 2011; Troy et al., 2013) emphasizing potential benefits. Thus, it appears to be a fruitful avenue for future research to study the interplay of motivation, emotion, and contagion processes in new venture management teams.

Our study also adds to the scholarly conversation on how feedback arising from poor firm performance influences the firm and its managers (Lounsbury and Beckman, 2015). Prior research assumes that managers generally wish to improve their firms' performance and, thus, are motivated to implement radical strategic changes (Greve, 1998), invest substantially in innovation activities (Latham and Braun, 2009), and engage intensively in boundary spanning (Klueter and Monteiro, 2017) if required to achieve the firm's goals. Thus, lower levels of firm performance are likely to trigger higher levels of activity and managerial effort. In contrast, insights from entrepreneurship research seem to suggest the opposite – namely, that higher levels of venture performance increase effort (Uy et al., 2015), and that new venture managers facing low venture performance tend to stop investing effort (Wennberg et al., 2010). By showing that venture performance is an important contingency factor of the social motivation processes within the management team, we illustrate that these prior studies focusing on the direct effect of firm performance on managerial effort may not have sufficiently captured the complexity and multiplicity of this relationship, thus yielding conflicting findings. Future research on performance feedback and managerial motivation can yield additional new insights by considering potential contingent effects related to team-external threats such as prior performance and environmental hostility.

Indeed, we find that under conditions of low venture performance managerial effort is only high if the teammates have also invested high levels of effort in the venture. While this pattern is consistent with Audia and Greve's (2006) finding that firms with limited resources shy away from making long-term investments for future growth as compared to firms with more resources, their study relied on a risk-taking explanation in which firms with limited resources reduce their risk-taking in reaction to low performance. However, this research, as well as other work on performance feedback (e.g., Eggers and Kaul, 2018; Kim et al., 2015), has largely ignored the social processes arising within the management team when venture performance is perceived to be low. Our study suggests that these social processes in the form of motivational contagion are likely to influence the level of effort invested (Chen and Miller, 2007; Klueter and Monteiro, 2017) by the entire TMT to tackle low venture performance. Thus, the findings of our study illustrate a potential micro-level explanation underlying organizational reactions to performance feedback (Eggers and Kaul, 2018; Greve, 1998).

Moreover, the management literature has intensively studied the role of firm environments in shaping strategic decision making and action (Baum and Wally, 2003; Simsek et al., 2007; Verbeke and Yuan, 2013), and we add to this literature by discovering a novel way in which environmental hostility influences management team processes. Previous studies have found that the effects of TMT composition and processes on organizational strategy and outcomes are contingent on environmental characteristics, such as national culture (e.g., Cogin et al., 2018), environmental competitiveness (e.g., Easley et al., 2014), or environmental uncertainty (e.g., Heavey et al., 2009). For example, a recent study by Dai et al. (2016) found that environmental dynamism moderates the impact of management team transactive memory systems on firm strategic orientation and (subsequent) performance. However, scholars have also argued that the firm's environment could shape team composition or processes in the first place (Bromiley and Rau, 2016). Indeed, our study demonstrates that perceptions of environmental hostility



directly shape management team processes regarding effort contagion. That is, we offer a theoretical explanation how the environment shapes key team processes which can, in turn, impact firm outcomes (e.g., Chen et al., 2005; Clark and Maggitti, 2012). Following the call by Bromiley and Rau (2016, p. 198) to ‘pay attention to the interconnected structure’ between firm environment and management team, our study suggests that ignoring such potential effects can result in problems of unacknowledged endogeneity in TMT research.

We also contribute to the entrepreneurship literature by offering a theoretical explanation of how effort develops within new venture management teams (i.e., entrepreneurial teams). Prior work has focused on the individual new venture manager and found that perceptions of venture progress positively and directly trigger his or her effort (Uy et al., 2015). Based on the uncertainty of the entrepreneurial task, the authors argue that progress markers are infrequent and difficult to identify, such that progress perceptions ‘may be taken as a signal that the goal is attainable and as such they [the new venture managers] could remain motivated to carry on’ (p. 378). While prior studies have revealed interesting insights into solo new venture managers and entrepreneurs, they cannot explain how effort develops within ventures managed by teams. Since new venture management teams are prevalent (Klotz et al., 2014) and social interactions are a key characteristic of entrepreneurial activity (Grégoire et al., 2011), the investigation of new venture management team processes is an important and growing area of entrepreneurship and management research (Klotz et al., 2014). Indeed, the effort invested by one new venture manager is often not sufficient to manage and grow a new venture (Parker, 2009); new venture managers need to collaborate in teams to combine their individual resources (Klotz et al., 2014). In such a team setting, we illustrate that poor venture performance (reflecting a lack of progress) shapes the relationship between the teammates’ effort and the effort a manager invests subsequently in the venture. Therefore, a theoretical implication is that effort development within new venture management and entrepreneurial teams cannot be fully understood without considering how the manager perceives performance/progress within his or her specific team context. More generally, these results also support the claim that a cross-level perspective is of critical importance for theorizing on entrepreneurial cognition and motivation (Grégoire et al., 2011).

From a broader perspective, our study can also be understood through the lens of Kurt Lewin’s classic field theory (Lewin, 1946). The theory suggests that human behaviour is a function of the person and his or her environment. Importantly, person and environment are seen as ‘mutually dependent’ and represent in their interplay the person’s ‘life space’ or ‘field’ (Lewin, 1946, p. 792). This life space is dynamic because depending on their current situation, individuals’ perceptions of their environment change. Thus, the way individuals react to one specific experience depends on the entire set of experiences that they make in their life space at one point in time (for a review, see Burnes and Cooke, 2013). Our theorizing is consistent with the idea to approach the life space holistically as our study represents several relevant areas of an individual’s life space. Specifically, we combine the social environment in terms of the teammates’ effort, the firm environment in terms of venture performance, as well as the industry environment in terms of hostility. Moreover, we take into account the dynamic nature of the individuals’ life space by capturing their weekly perceptions and behaviours. Future research following the tradition

of field theory could develop an even richer representation of the managerial life space, for example by including dimensions such as the role of new venture employees, firm structure, or environmental dynamism, and focus on the interplay of these areas.

### **Implications for Practice**

Our study illustrates to management team members that their own effort can have substantial effects on the efforts other team members are willing to invest. In particular when they feel threatened by the perception of low performance or hostile environments, management team members should be aware that any extra effort invested seems to pay twice; first, through benefitting the firm and helping to achieve desired outcomes (Bitler et al., 2005; Foo et al., 2009; Uy et al., 2015) and second, through the contagion of other team members who are willing to invest higher levels of effort in response. However, in the absence of threat, the relationship between the teammates' effort and subsequent managerial effort is not significant. Therefore, teams need to be careful when their venture performs well or they operate in less hostile environments because the team's investment of greater effort is unlikely to trigger subsequent managerial effort. In these contexts, it seems recommendable that managers consider the facilitation of effort contagion by creating a stronger focus on the team and the members' achievements, for example, by introducing regular progress reports and meetings. These measures might help ensure that teammates keep investing high effort in the venture and keep inspiring each other to maintain high effort levels in the venture.

### **Limitations and Future Research**

We based our study on self-reported measures of managerial effort. Although studies have found that self-reports yield similar results as reports from supervisors and colleagues (Goffin and Gellatly, 2001), an alternative approach could be to take a more perceptual perspective by capturing a focal team member's effort as assessed by his or her teammates. Moreover, a more objective perspective could be to record the actual number of hours that management team members invest in the venture (see Staats et al., 2012). However, given the irregular working schedules and locations of new venture managers, this would have substantially interfered with the participants' daily lives. Further, additional hours invested do not necessarily reflect additional effort since managers (as all people) can use time unproductively; indeed, extra-long working hours have been associated with a decrease in output and loss in productivity due to fatigue (Collewet and Sauermann, 2017) and a lack of recovery (Pencavel, 2016). While observing the team members and their working styles, such as their information processing (Breugst et al., 2018) and professionalism (Preller et al., 2018), would have been ideal, our more general measure capturing the investment of multiple resources (attention, time, energy), at multiple points in time, somewhat alleviates concerns over such biases in the current study.

Second, we focus on one important, but also specific type of teams, namely new venture management teams. These teams are often rather small (Friedman et al., 2016) and work in a highly interdependent way (de Jong et al., 2013). Under these conditions, the teammates' effort is observable to the team members. However, in different team contexts, such as

Table III. A cross-disciplinary research agenda for studying effort in (top) management and work teams

<i>Management discipline</i>	<i>Potential topics/perspectives/constructs</i>	<i>Potential research questions</i>
Organizational behaviour	Leadership style, team processes, team emergent states	<p>To what extent does the CEO's leadership style influence effort contagion within the team?</p> <p>How does shared leadership in management teams influence effort contagion?</p> <p>How do team processes (e.g., conflict) or emergent states (e.g., trust, team confidence) influence the contagion of effort between team members?</p> <p>How do contagion of effort and other team processes interact to explain individual and team outcomes?</p> <p>To what extent is emotional contagion in management teams influenced by threats?</p> <p>How does emotion regulation shape contagion processes in management teams?</p>
Human resource management	Incentive schemes, interventions, high performance work practices	<p>How do incentive schemes (intrinsic/extrinsic, short-term/ long-term) influence effort contagion in management and work teams?</p> <p>How can interventions trigger a positive 'effort contagion spiral' in work teams?</p> <p>What human resources practices are under what conditions most effective in triggering effort contagion within work teams?</p>
Strategy	Resource dependency theory, resources based view	<p>How does effort contagion within top management teams influence strategic decision making, resource management, and firm performance?</p> <p>How do the resources available to managers influence effort and effort contagion within top management teams?</p>
Organization theory	Performance feedback, organizational culture, organizational structure, routines	<p>How do performance feedback and the firm environment jointly shape the relationship between effort contagion and firm outcomes?</p> <p>To what extent do organizational culture and structure influence effort contagion within management teams?</p> <p>How do routines trigger or counteract the development of effort and effort contagion within work teams and management teams?</p>

larger teams or virtual teams, individuals might have difficulties evaluating their teammates' effort. Moreover, the members of new venture management teams enjoy high discretion (Hambrick et al., 2005) with few (if any) monitoring mechanisms, such as venture boards (Garg, 2013). Future research is needed to replicate our findings in additional team settings.

Third, belongingness theory focuses on threats outside of a collective and postulates that these external threats shift individuals' attention to the collective (Baumeister and Leary, 1995). However, threats internal to the team, such as overwhelming workload, lack of skill, team conflict, and lack of trust, can also shape motivational processes. Interestingly, while these internal threats can also lead to a focus on the team in terms of surveillant teammates (Lau and Cobb, 2010), they might also lead to avoidance behaviour and withdrawal from the team (Choi, 2009; Giebels and Janssen, 2005). Future research can explore the impact of internal threats on effort contagion in new venture management teams. Furthermore, we acknowledge that new venture management teams might experience other external threats, such as changes in legislation (Wood et al., 2016) and natural disasters (Harries et al., 2018). While these external threats could also trigger the team members' focus on their team consistent with belongingness theory, they occur less frequently and based on specific, one-time events. In contrast, the fluctuating perceptions of threats stemming from the firm itself allowed our study to analyse the contagion of effort over time. To explore how threats from major and singular events such as disasters influence social motivation within managerial teams, we encourage future research potentially relying on field experiments.

Beyond addressing these limitations, there are additional future research opportunities for studying effort in a management team setting from different disciplinary perspectives including, for example, organizational behaviour, human resource management, strategy, and organization theory. We offer an overview of these disciplines, potential topics, theories and constructs they suggest, as well as potential research questions in Table III. We hope to inspire future research on effort and its contagion within different contexts.

## **CONCLUSION**

The results of our study indicate that managerial effort has an important social component. Teammates' efforts can be contagious if new venture managers are confronted with threats stemming from low perceived venture performance or high perceived environmental hostility. With diminishing threat, managerial effort seems to be less and even not contagious in new venture management teams. These results emphasize the interdependencies between social, organizational, and industry environments in explaining managerial effort, and they provide important insights into the boundary conditions of social motivation theory within organizational contexts.

## **ACKNOWLEDGEMENTS**

The authors want to thank Florian Bernlochner, Philipp Rathgeber, and Anna Roth for their help in collecting the data. Moreover, the authors would like to thank the editor, Igor Filatotchev, and the anonymous reviewers for their constructive feedback. The first author appreciates support by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG, BR 3889/2-1).

## NOTES

- [1] While a low level of venture performance is a threat internal to the venture, it is still a threat surrounding the new venture management team and thus external to the team. This notion is fully consistent with belongingness theory (Baumeister and Leary, 1995) that highlights the importance of threats from outside of the team, such as time pressure (Kelly and Loving, 2004) or being evaluated for its performance (Spoelma and Ellis, 2017) in contrast to internal threats, such as conflicts (Chen et al., 2011) or lack of trust (Mayer and Mussweiler, 2011).
- [2] Beyond measuring entrepreneurial self-efficacy at the individual level, this measure also allowed us to check if the members of one team possess similar skills and feel able to work on the same tasks. These similarities in abilities could contribute to the perception that team members can fill in for each other, that is, that managers can compensate lower levels of effort invested by their teammates. For each team, we computed the team members' interrater agreement in terms of the  $r_{WG(j)}$  per task specified in the entrepreneurial self-efficacy scale. Traditionally, the cut-off point of  $r_{WG(j)} \geq 0.7$  indicates that raters (or team members) agree in their assessments (LeBreton and Senter, 2008). For the entrepreneurial self-efficacy scale, team members' agreement was sufficiently high for all tasks, but for the task 'Write a formal business plan' ( $r_{WG(j)} = 0.50$ ). As our teams were management teams (that is, working on later stages of the entrepreneurial journey in which they did not focus on writing a business plans), these patterns suggest that the team members' efforts can be seen as interchangeable to some extent. Thus, new venture management team members are likely to believe that they could make up for their teammates' lack of effort.
- [3] We also check if the variance composition of managerial effort across levels is contingent on the threats perceived by the managers. Thus, we compare the variance composition of managerial effort for very low, low, high, and very levels of both perceived venture performance and perceived environmental hostility. We do not find a systematic pattern for the two different threats.

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