Why seeking feedback from diverse sources may not be sufficient for stimulating creativity: The role of performance dynamism and creative time pressure

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ABSTRACT
We explore how the impact of seeking feedback from different sources (i.e., feedback source variety) on employee creativity is shaped by perceptions of the work environment. Specifically, we argue that two contextual factors, namely, performance dynamism (Study 1) and creative time pressure (Study 2), moderate the relationship between feedback source variety and creativity such that under conditions of high performance dynamism and low creative time pressure, individuals benefit from diverse feedback information. In Study 1 (N = 1031), the results showed that under conditions of high performance dynamism, the relationship between feedback source variety and self-reported creativity was nonlinear, with employee creativity exponentially increasing as a function of feedback source variety. Similarly, in Study 2 (N = 181), we found that under conditions of low creative time pressure, the relationship between feedback source variety and employee creativity was nonlinear, with supervisor-rated creative performance exponentially increasing at higher levels of feedback source variety. Such results highlight that the relationship between feedback source variety and creative performance is affected by the perceptions of the work environment in which feedback is sought.

Keywords: creativity, feedback source variety, feedback-seeking, creative time pressure, performance dynamism, diversity

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Abstract

We explore how the impact of seeking feedback from different sources (i.e., feedback source variety) on employee creativity is shaped by perceptions of the work environment. Specifically, we argue that two contextual factors, namely, performance dynamism (Study 1) and creative time pressure (Study 2), moderate the relationship between feedback source variety and creativity such that under conditions of high performance dynamism and low creative time pressure, individuals benefit from diverse feedback information. In Study 1 (N = 1031), the results showed that under conditions of high performance dynamism, the relationship between feedback source variety and self-reported creativity was nonlinear, with employee creativity exponentially increasing as a function of feedback source variety. Similarly, in Study 2 (N = 181), we found that under conditions of low creative time pressure, the relationship between feedback source variety and employee creativity was nonlinear, with supervisor-rated creative performance exponentially increasing at higher levels of feedback source variety. Such results highlight that the relationship between feedback source variety and creative performance is affected by the perceptions of the work environment in which feedback is sought.

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The notion that obtaining external feedback about one's ideas is essential for increasing creativity is deeply rooted in many organizational domains. For instance, entrepreneurs are encouraged to 'get out of the building' to check with prospective customers about whether their business model will hold in the real world; R&D departments invite people from outside the company to gather initial reactions towards their new product prototypes; and academics attend conferences to obtain feedback on their studies. By gaining diverse viewpoints from others on one's ideas and cognitively processing and integrating these viewpoints with their own, individuals should be able to increase their creative performance (Dokko, Kane, & Tortoriello, 2013; Madjar, 2005; Mumford & Gustafson, 1988). In support of this view, De Stobbeleir, Ashford, and Buyens (2011) showed that proactively seeking feedback from a variety of feedback sources enhanced creative performance.

An implicit assumption of research on feedback source variety is that once feedback-seekers have sought feedback, they will also utilize the obtained feedback. This involves appropriately weighing, combining and integrating the available feedback information into a cognitive structure for subsequent creative performance (De Dreu, Baas, & Nijstad, 2008; Li, Maggitti, Smith, Tesluk, & Katila, 2013). Utilizing feedback information is necessary for feedback to yield positive outcomes. Although scholars have identified a wide range of individual and contextual antecedents of feedback-seeking behavior (for overviews, see Anseel, Beatty, Shen, Lievens, & Sackett, 2015; Ashford, De Stobbeleir, & Nujella, 2016), few studies have explored how context may impact job outcomes after feedback has been sought. This shortcoming is important because an employee's immediate work environment and his/her perceptions of the context in which feedback is sought has been suggested to be

one of the main reasons that seeking feedback sometimes does not have its intended positive outcomes (Ashford, Blatt, & VandeWalle, 2003; Ashford & Northcraft, 2003; Levy, Albright, Cawley, & Williams, 1995).

In this study, we therefore expand the research on a variety of feedback-seeking sources by examining how specific characteristics of the immediate work environment influence the relationship between feedback source variety and creative performance. Drawing on the motivation-opportunity-ability theories of behavior (Blumberg & Pringle, 1982) as an overarching framework, our central argument is that a feedback-seeking context will determine whether individuals have the motivation and opportunity to benefit from feedback information to enhance their creative performance. For example, it might be the case that employees seek feedback from a variety of sources, but contextual factors hinder them from allocating attention to the received information. In such cases, whether employees seek feedback from a diverse range of sources will be less important because the resulting information is less likely to be used for improving creative performance.

In line with the framework, we focus on two elements of individuals' immediate work environment that may moderate the feedback source variety-creativity relationship: performance dynamism (Study 1), defined as the perceived rate of change of the performance standards (cf. Dill, 1958; Murphy, 1989), and experienced creative time pressure (Study 2), defined as the extent to which employees feel they have insufficient time to develop creative ideas at work (Baer & Oldham, 2006). We argue that a work environment that induces motivation (triggered by performance dynamism) and opportunity (affected by creative time pressure) is most instrumental in channeling employees' search for diverse feedback information into creative performance. Accordingly, we predict a positive relationship between feedback source variety and creativity, but only when employees perceive relatively high levels of performance dynamism (Study 1) or experience relatively low levels of creative

time pressure (Study 2). Furthermore, building on insights in the creativity literature pointing to the creative synergy of combining new information (e.g., Taggar, 2001), we hypothesize that these positive relationships will show an exponential trend.

The contributions of our research are twofold. First, our study identifies and empirically tests performance dynamism and experienced creative time pressure as two relevant boundary conditions that qualify the positive relationship between feedback source variety and creativity. In doing so, this study answers calls in the feedback-seeking literature to go beyond the study of contextual antecedents of feedback-seeking behavior and instead focus on contextual moderators in the relationship between feedback seeking and behavioral outcomes (Anseel et al., 2015; Ashford et al., 2016). Addressing such 'second generation' questions is integral to understanding when seeking feedback from diverse sources is beneficial for enhancing individual creative performance. Second, we extend the contemporary conception that there is a linear relationship between the use of diverse feedback sources and creativity. Specifically, we test our argument that under the right circumstances, creativity is based on a multiplicative relationship between feedback source variety and work environmental factors. When feedback source variety increases, employees have increasingly more possibilities to combine and integrate information, knowledge, and viewpoints, which, under the right work environmental conditions, is likely to lead to a nonlinear increase in creativity (Nijstad, De Dreu, Rietzschel, & Baas, 2010; Zhou, 2008).

Seeking Feedback from a Variety of Sources and Employee Creativity

Employee creativity is defined as the development of ideas that are both novel and useful for the organization (Amabile, 1988). Creative ideas may range from incremental developments, which typically involve slight changes in the organization's existing practices, to radical creative ideas, which tend to be associated with more substantive changes to the organization's existing practices (Madjar, Greenberg, & Chen, 2011; Mumford & Gustafson,

1988; Sijbom, Janssen, & Van Yperen, 2015). Additionally, creativity is not a work outcome that is exclusively reserved for typical creative occupations such as engineers or R&D professionals. In fact, employees in almost all occupations at any level of the organization might exhibit some level of creativity by providing ideas for improving the organization's existing practices or their immediate tasks (Shalley, Gilson, & Blum, 2000). Furthermore, creativity is, in part, a social process (Amabile, 1988; Perry-Smith & Shalley, 2003; Woodman, Sawyer, & Griffin, 1993). By interacting with others, employees' ideas can be refined, expanded, and eventually implemented.

The idea that creativity is a social process that occurs within the entire organization, and sometimes even exceeding the organization's boundaries, has also sparked research into the main drivers of employee creativity. One central driver of employee creativity identified in previous research is seeking feedback from a variety of sources, which has been shown to yield exposure to divergent views, knowledge and information (Zhou, 2008). Rather than seeking feedback from the same source, proactively seeking feedback from different sources may provide more unique information, which is likely to be an important source of creativity (De Stobbeleir et al., 2011; Perry-Smith, 2006).

Feedback Source Variety

Acknowledging that feedback is one of the most accepted and applied interventions to stimulate employee learning, motivation, and performance (Anseel et al., 2015; Ashford et al., 2003), researchers have begun to examine the impact of different sources (e.g., supervisors, coworkers, and peers) from which employees may receive feedback concerning their creative performance (e.g., George & Zhou, 2001; Zhou, 1998). By proactively seeking feedback, employees may receive crucial information for their creative ideas at the time they need it, making feedback-seeking behavior a valuable resource for employees to manage their own creative performance (e.g., De Stobbeleir et al., 2011).

Employees may seek feedback from different groups of individuals (feedback sources), both within (e.g., supervisors, coworkers, peers in other departments) and outside (e.g., family, customers, friends) their immediate work context (Madjar, 2005; Perry-Smith & Shalley, 2003). According to Perry-Smith and Shalley's (2003) social perspective on creativity, differences in cognitive perspectives and approaches tend to be greater between different feedback sources than within the same feedback source. Thus, the variety of sources from which employees seek feedback may be indicative of the breadth or quality of their network (see, for instance Sosa, 2011). Building on De Stobbeleir et al. (2011), we therefore define *feedback source variety* as the diversity of contact for which individuals proactively search, which is distinct from the *amount* or *frequency* of contact[1]. For example, employees who only seek feedback from their coworkers may receive less diverse information than employees who seek feedback from their coworkers, peers in other departments, and supervisors. Thus, feedback source variety describes employees' use of other various referents from which they seek feedback (cf. Harrison & Klein, 2007).

The Feedback Source Variety-Creativity Relationship

Feedback information acquired through a variety of feedback contacts may yield a sizeable amount of new information. This amount of information, in turn, may enable employees to perceive new connections between different viewpoints to elaborate upon richer mental schemes and to approach problems from different angles (Amabile, 1983; Milliken, Bartel, & Kurtzberg, 2003). Information from different sources enhances creativity because it forces employees to combine differing viewpoints in a unique way or reformulate existing knowledge and information, which may lead to new perspectives (Madjar, 2005; Perry-Smith, 2006). Moreover, researchers have suggested that a particular set of cognitive operations—"conceptual combination and reorganization"—often spurs creative idea generation (e.g., Reiter-Palmon & Illies, 2004). Importantly, one of the defining features of creative work—

namely, the recombination of diverse knowledge into creative ideas—implies that with any new piece of information, a multiplicative series of new combinations is possible. This potentially exponential effect of building on diverse perspectives has been one of the fundamental insights in the creativity literature, spurring, for instance, brainstorming techniques to generate a stream of new ideas (Osborn, 1957; Paulus, 2000). Quinn, Anderson, and Finkelstein (1996) eloquently summarized this mechanism:

> A network's potential benefits grow exponentially as the nodes it can successfully interconnect expand numerically. …. If two people exchange knowledge with each other, both gain information and experience linear growth. But if both then share their new knowledge with others – each of whom feeds back questions, amplifications, and modifications – the benefits become exponential (p. 75).

In line with this rationale, previous studies in the creativity domain have shown that, under favorable conditions, employees are able to fully benefit from new information leading to exponential increases in creativity (e.g., Taggar, 2001; Tierney, Farmer, & Graen, 1999). Accordingly, we expect that under the right environmental conditions, an increase in feedback source variety could lead to an exponential increase in creativity through the growing number of creative (re)combinations allowed by each piece of newly acquired information.

However, these environmental conditions may not always be ideal. Researchers have emphasized the importance of taking the work environment into account because this environment may create less than optimal circumstances in which employees may benefit from feedback information (Ashford et al., 2003; Ashford & Northcraft, 2003; Levy et al., 1995). This implies that seeking feedback from diverse sources is often not enough to ensure high levels of creative performance in the work environment.

Moderating Role of Work Environment Perceptions

Using motivation-opportunity-ability theories (Blumberg & Pringle, 1982) as a meta-

theoretical lens for considering contextual moderators, we argue that for employees to fully benefit from diverse feedback information, it is important for them to experience a work environment that supports their motivation and opportunity to use this feedback. Current work environments are characterized by constantly shifting roles, tasks, and projects, which changes both the meaning of performance in organizations and the experience of work that needs to be performed in shorter amounts of time (e.g., Grant & Parker, 2009). Put differently, employees may experience performance dynamism and creative time pressure in their work environment. In line with these contemporary issues, we examine the perceptions of performance dynamism and experienced creative time pressure as moderating factors. These factors stemming from employees' work environment are likely to impact the degree to which employees are motivated and have opportunities to fully benefit from feedback.

Specifically, we argue that changing performance standards (i.e., performance dynamism) facilitate employees' motivation to process and integrate feedback information because individuals need to place priority on that information in order to succeed. Changing performance standards thus encourage employees to be cognitively alert and allocate attention to the available informational cues in their environment. Furthermore, low levels of experienced creative time pressure may allow employees to devote attention to feedback information, which subsequently enhances the opportunity to process and integrate diverse feedback information. Put differently, increases in diverse feedback information will exponentially enhance creative performance when the work environment provides individuals with the optimal conditions to benefit from feedback. In the remainder of this paper, we explain why and how performance dynamism and experienced creative time pressure are expected to affect the feedback source variety-creativity relationship.

Performance Dynamism as a Contextual Contingency Factor

In rapidly changing work environments, what could be considered good performance

today may not meet the demands of tomorrow (Ashford & Northcraft, 2003). To comply with market changes and customer demands, organizations may improve and adjust their performance expectations. As a result, the performance standards for employees may be subject to change as well, which we refer to as performance dynamism. Drawing on insights from Kahneman's (1973) theory of attention, which suggests that situational cues determine the allocation of attention, we argue that changing rather than stable performance standards are likely to direct employees' allocation of attention to feedback information and consequently affect the feedback source variety-creativity relationship. That is, changes in performance requirements may trigger vigilance about how to meet performance standards and thus the increased seeking and processing of feedback.

Under conditions of high performance dynamism, the criteria on which employees' performance will be evaluated can vary (cf. Dess & Beard, 1984). Such variability will prompt employees to pay closer attention to informational cues in the environment to make sense of the situation and reduce feelings of uncertainty (cf. Weick, 1995). Earlier research showed that uncertainty is positively related to information use (Blandin & Brown, 1977). Likewise, Zhou (2008) has shown that the use of feedback information reduces the uncertainty associated with the changing nature of work. Accordingly, enhanced attentional focus, instigated by changing performance standards, is likely to enhance employees noticing, comparing, and using feedback information, which is conducive to creative performance. Additionally, the uncertainty triggered by relatively high levels of performance dynamism is likely to elicit enhanced levels of activation and arousal among employees (e.g., Stranks, 2005), which is instrumental for the effective processing of feedback information (e.g., Gardner & Cummings, 1988). The activation of cognitive resources allows employees to allocate attention to feedback information, which helps them to interpret and integrate diverse feedback information. Finally, when arousal increases, selectivity also increases (Kahneman,

1973), allowing employees to scan feedback information more carefully on usefulness and meaning, thereby selecting valuable information and rejecting irrelevant information. In sum, under conditions of high performance dynamism, increases in the feedback source variety will lead to increases in creativity.

In contrast, with low levels of performance dynamism, the standards are relative stable over time, and employees know the criteria on which their performance and work will be evaluated (cf. Dess & Beard, 1984). Because the employees know how to perform their tasks to meet the performance standards, there is little need to intensely scan the environment for cues and information to make sense of the situation. A relatively limited allocation of attention to situational cues may place an upper limit on employees' inclination to notice, compare, and use feedback information. Furthermore, low performance dynamism is characterized by routine and predictable situations. Because routine situations do not demand one's full attention, they tend to diminish individuals' allocated attentional capacity (Kahneman, 1973). That is, low performance dynamism may cause a state of low arousal (cf. Gardner & Cummings, 1988), which deactivates the cognitive resources allocated to process information. Under such circumstances, employees do not have additional cognitive resources available to take on the difficult tasks of recombining and integrating diverse feedback viewpoints. Thus, under such conditions, no additional increase in creativity is expected from increasing the diversity of feedback sources.

Accordingly, we expect that only under conditions of relatively high performance dynamism will increases in feedback source variety be associated with exponential increases in employees' creative performance. We formulated the following hypothesis:

> *Hypothesis 1. Performance dynamism moderates the relationship between feedback source variety and creativity. The positive relationship between feedback source variety and creativity is stronger at higher levels of feedback source variety, but only*

when performance dynamism is high rather than low.

Experienced Creative Time Pressure as a Contextual Contingency Factor

We advance experienced creative time pressure as a second relevant contextual contingency factor to affect the multiplicative benefits of feedback source variety. Because dealing with stressors consumes cognitive resources (Baumeister, Bratslavsky, Muraven, & Tice, 1998), we propose that experienced creative time pressure hampers employees' creative performance. When employees devote some of their limited pool of cognitive resources to manage experienced creative time pressure, they have fewer cognitive resources available for other tasks. Amabile et al. (2002) showed that individuals under time pressure are less likely to engage in creative cognitive processing than individuals without time pressure. Additionally, optimally benefiting from a variety of feedback perspectives requires that employees have ample time available to explore the different insights articulated by feedback sources, conceptually combine these different perspectives and integrate it into their reconfigured ideas. Such cognitive elaboration of diverse feedback information requires sufficient time for processing feedback (Anseel, Lievens, & Schollaert, 2009). For instance, in the context of multisource feedback, managers are typically confronted with diverging feedback from multiple sources. Research has shown that feedback workshops that allow for time and support to process feedback, are an important precondition for performance improvement (Seifert, Yukl, & McDonald, 2003; Smither, London, Flautt, Vargas, & Kucine, 2003).

Thus, given that creative time pressure drastically limits the potential use of available cognitive resources (Baumeister et al., 1998; De Dreu, Nijstad, & van Knippenberg, 2008), it is likely to affect the effectiveness of processing feedback information and, consequently, creativity-related cognitive processes (Amabile et al., 2002; Gilliland & Schmitt, 1993; Janis,

1983). In the worst case, this means that employees seeking feedback from diverse sources will only be able to pay attention to a similar amount of feedback sources as their counterparts who sought feedback from a few sources. Hence, under conditions of high creative time pressure, increases in feedback source variety will not lead to increases in creativity.

In contrast, under conditions of low creative time pressure, employees have sufficient time to combine and integrate the different viewpoints. Under these conditions, cognitive processes such as remote associations, divergent thinking, and cognitive flexibility are less likely to be constrained (e.g., Amabile et al., 2002). Thus, when employees have sufficient time to access and process the available amount of information and generate alternative ideas, they have the opportunity to optimally benefit from diverse feedback information, and this should lead to an exponential relationship between feedback source variety and creative performance. Accordingly, we hypothesize the following:

> *Hypothesis 2. Creative time pressure moderates the relationship between feedback source variety and creativity. The positive relationship between feedback source variety and creativity is stronger at higher levels of feedback source variety, but only when creative time pressure is low rather than high.*

In sum, these two hypotheses aim to test the central argument of this study that the relationship between feedback source variety and creative performance is dependent on contextual factors that modulate the employee's motivation and opportunity to benefit from feedback information. In Study 1, we will test the first hypothesis by using the data on the basis of which De Stobbeleir et al. (2011) found initial support for a linear relationship between feedback source variety and creative performance. The original study of De Stobbeleir et al. (2011) was part of a larger ongoing research project executed in a consulting context that has yielded additional data since the project previously reported, which offers us

a unique opportunity to test our hypothesis and refine earlier findings. Next, in Study 2, we will test Hypothesis 2 in the context of caretakers in a public hospital in Belgium.

Study 1

Method

Organizational context, sample, and procedure. Data were collected using online questionnaires as part of a larger research project. The sample consisted of 1044 employees from seven consulting firms in Belgium, each employing between 300 and 800 employees. Of the 1044 employees that provided complete responses to the survey, 409 were female (39%) and 635 were male (61%). Ten percent of the employees were 25 years of age or younger, 39% were between 26 and 34 years of age, 33% were between 35 and 44 years of age, 14% were between 45 and 54 years of age, and 4% were 55 years or older. Sixty-seven percent worked full-time. The tenure was as follows: less than 2 years (32.1%), 2 to 5 years (19.2%), 6 to 10 years (22.3%), 11 to 15 years (8.2%), 16 to 20 years (7.1%), and more than 20 years (11.1%). The education was distributed as follows: High school (15.3%), bachelor's degree (44.2%), and master's degree (40.5%). Due to (a small number of) missing values, our analytical results are based on data from 1031 employees. In a consulting context, it makes sense that standards change regularly because people work for different clients and with different managers and project teams, making it a suitable context to test our hypothesis on the moderating role of performance dynamism.

Measures

Feedback source variety. We used the Herfindahl index to measure feedback source variety. This index captures the distribution of a person's feedback seeking across different feedback sources. To create this index, we first assessed the extent to which individuals requested feedback from four different sources: supervisors, coworkers, other organizational sources (e.g., peers in other departments), and extra-organizational sources (e.g., peers in

other organizations). Using scales ranging from 1 (never) to 5 (very frequently), the respondents indicated the extent to which the statements corresponded to their own behavior. Sample items include "In a typical month, how frequently do you directly ask your superior for comments on something you had done (e.g., a report or presentation)?" and "In a typical month, how frequently do you directly ask your superior 'How am I doing?'" (each question was repeated for each of the feedback sources).

Next, the following formula was used to calculate the Herfindahl index: $1 - \sum M_i^2$, where M_i is the "market share" of a person's feedback seeking that is allocated to the *i*th source of that search (i.e., supervisor, coworkers, other organizational sources, extra-organizational sources). The result is an index that ranges from 0 to 0.75, with high scores representing greater breadth, meaning that individuals tap into different feedback sources.

Creative performance. The employees' creative performance was assessed by using Janssen's (2000, 2001) three-item idea generation subscale of innovative work behavior. Using a scale ranging from 1 (*never*) to 5 (*always*), the respondents provided self-reports on how characteristic each of the following work behavior items is for them: "Creating new ideas for improvements"; "Searching out new working methods, techniques, or instruments"; and "Generating original solutions to problems" (Cronbach's $\alpha = .92$).

Performance dynamism. To measure performance dynamism, we used three items from the environmental dynamism scale that tapped into the rate of change (cf. Dill, 1958; Jansen, van den Bosch, & Volberda, 2006). To capture employees' perceptions about the internal change of performance standards rather than external change, we adjusted the items. Using a scale ranging from 1 (*totally disagree*) to 5 (*totally agree*), the respondents answered the following items: "Standards for performance are constantly changing around here", "How people evaluate performance seems to vary over time around here", and "Good performance yesterday in this organization has little correlation with good performance today" (Cronbach's

α = .74).

Control variables. Given the potential to confound the hypothesized relations, we controlled for age (1= 25 years or younger; 2= 26-34 years; 3 = 35-44 years; 5 = 45-54 years; and 6 = 55 years or older), gender (0 = male; 1 = female), tenure (1 = Less than 2 years; 2 = 2 to 5 years; 3 = 6 to 10 years; 4 = 11 to 15 years; 5 = 16 to 20 years; 6 = More than 20 years), hierarchical position (9 levels), and type of contract (0 = fulltime; 1 = part-time) (e.g., Ashford, 1986; De Stobbeleir et al., 2011; Zhou, 2003).

Data Considerations and Analytical Plan

Although we rely on self-report measures, our data contained information about group membership (i.e., same supervisor), which may partially shape the measurements of individual employees. Because employees are nested within supervisors, we calculated the ICC1 value to identify statistical modeling issues related to a possible violation of the 'independence of measurements' assumption (Bliese, 2000). The ICC1 value was low (ICC1 = 0.079), meaning that the nested data structure does not lead to a violation of the independence of measurements assumption. As a consequence, we relied primarily on an ordinary (moderated) hierarchical regression analysis to predict the employees' creative performance. However, to make sure our results also hold when the nested data structure was accounted for, we also analyzed a multilevel model with employees nested within supervisors. This multilevel model was estimated in MPlus 7.11 (Muthén & Muthén, 2012) using a Bayesian estimator (see Table 1).

To test the hypothesized quadratic-by-linear (Feedback source variety^2 × Performance dynamism) interaction between feedback source variety ***(X)*** and performance dynamism ***(Z)*** on the dependent variable of creative performance ***(Y)***, the following equation was estimated: $\boldsymbol{Y} = b_1\boldsymbol{X} + b_2\boldsymbol{X}^2 + b_3\boldsymbol{Z} + b_4\boldsymbol{XZ} + b_5\boldsymbol{X}^2\boldsymbol{Z} + c_0$ (cf. Aiken & West, 1991; Cohen, Cohen, West, & Aiken, 2003). After mean centering the independent variables (Aiken & West, 1991), we

entered them into the regression analysis in five consecutive hierarchical steps. In the first step, the control variables were entered. In the second step, the main effect variables of feedback source variety ***(X)*** and performance dynamism ***(Z)*** were entered jointly. In the third step, the linear interaction between feedback source variety and performance dynamism ***(XZ)*** was entered. In the fourth and fifth steps, the quadratic feedback source variety term ($\boldsymbol{X}^2$) and the quadratic-by-linear interaction term ($\boldsymbol{X}^2\boldsymbol{Z}$) were entered, respectively. We also tested our results without control variables, and the effect of the quadratic-by-linear interaction was unchanged.

Results

The means, standard deviations, and correlation coefficients for all variables are shown in Table 1. Feedback source variety was positively related to creative performance (r = .09, p < .01), and the sign of this bivariate relationship (i.e., positive) is consistent with earlier research findings (cf. Perry-Smith, 2006) and is in line with De Stobbeleir et al.'s (2011) findings. Performance dynamism was unrelated to creative performance (r = -.02, *n.s.*). Furthermore, the results show statistically significant bivariate relationships between gender (r = .23, p < .001), tenure (r = -.08, p < .05), hierarchical position (r = .08, p < .05), and type of contract (r = -.19, p < .001) on the one hand and creative performance on the other hand. We did not find a statistically significant bivariate relationship between age (r = .04, *n.s.*) and creative performance.

Table 2 presents the results of a moderated hierarchical regression analysis. To test our curvilinear moderation hypothesis, we are primarily interested in the estimate and the significance of the quadratic-by-linear interaction (Feedback source variety^2 × Performance dynamism), which is shown in step 5. The coefficient associated with the quadratic-by-linear interaction term was statistically significant (β = 0.10, p < .05). The ΔR^2 associated with this particular interaction term was also statistically significant (ΔR^2 = .004, $\Delta F(1, 1020)$ = 4.29, p

< .05); thus, Hypothesis 1 was supported. Note that in addition to the (moderated) hierarchical regression model, the multilevel model also confirmed the significance of this quadratic-by-linear interaction term. Inspection of the interaction plot (see Figure 1) revealed that when performance dynamism is low, there was no significant relationship between feedback source variety and creative performance. When performance dynamism is high, the relationship between feedback source variety and creativity followed the expected exponential function, whereby the positive relationship becomes stronger with increases in feedback source variety.

We further analyzed the quadratic-by-linear interaction by evaluating simple slopes. Following Aiken and West (1991), we estimated simple slopes at three different levels of feedback source variety: low (one standard deviation below the mean score), intermediate (at the mean score), and high (one standard deviation above the mean score). As indicated in Figure 1, the results showed that when performance dynamism was low, the simple slope of the line was significantly different from zero at low levels of feedback source variety (b = 3.35, SE_b = 1.68, β = 0.08, p = .046) but were nonsignificant for intermediate (b = 1.04, SE_b = 2.34, β = 0.03, *n.s.*) and high levels (b = -1.27, SE_b = 3.83, β = -0.03, *n.s.*) of feedback source variety, respectively.

When performance dynamism was high, the simple slope of the regression curve had a borderline significant and positive value for low levels of feedback source variety (b = 3.03, SE_b = 1.58, β = 0.08, p = .056) and had significant and positive values for intermediate (b = 5.70, SE_b = 2.28, β = 0.14, p = .013) and high (b = 8.37, SE_b = 3.48, β = 0.21, p = .016) levels of feedback source variety, respectively. These results provide further support for Hypothesis 1 such that under conditions of high performance dynamism, the positive association between feedback source variety and creative performance becomes stronger at higher levels of feedback source variety. Note that we also found an overall positive linear relationship between feedback source variety and creativity (see Step 2; b = 2.85, SE_b = 1.20, β = 0.07, p =

.017).

Discussion Study 1

The results of Study 1 provide initial support for the idea that context should be taken into account when studying the effects of seeking diverse feedback information on creativity. The positive linear relationship found by De Stobbeleir et al. (2011) was replicated but qualified by performance dynamism, with high levels of performance dynamism exponentially strengthening the relationship between feedback source variety and creative performance. However, this study has some limitations. First, we used self-report single-source data, which entails a risk that common method variance may inflate direct relationships. While common method variance is unlikely to account for interaction effects (Evans, 1985; Siemsen, Roth, & Oliveira, 2010), we conducted an additional study with leader-rated creative performance as a dependent variable. Second, although the consulting context was suitable for testing the role of performance dynamism, it also entails a context in which creativity may be a prerequisite. To test the effects of time pressure as a boundary condition, we conducted Study 2 in a context in which creativity and creative problem-solving are less crucial for the job.

Study 2

Method

Organizational context, sample, and procedure. Data were collected in a large public hospital in Belgium. The sample for this study consisted of 186 supervisor-employee dyads. All employees included in the sample were caretakers, that is, nurses and employees who facilitated medical examinations by taking care of the patients' transport within the hospital. Although caretakers may not appear a creative occupation and creativity at work is often not a formal part of the caretakers' job description, creativity is essential and occurs daily in interactions between the patient and caretaker (Fasnacht, 2003; Levine, 1997). For

example, caretakers can display creativity by making suggestions to improve work schedules, install new healthcare interventions, adjust procedures for specific patients (including patients' transport within the hospital), or improve the transfer of patient information from one caretaker to another.

After obtaining the approval of the director responsible for these caretakers, we distributed paper-and-pencil surveys to the employees. The employees put their responses in an envelope and submitted the completed survey to a letter box that was put in place for the purpose of the study. In total, 448 employees were invited to participate in the study. Two hundred twenty-three employees returned their envelopes in the letter box (49.8%). A meta-analytic estimate of published response rates shows that for this type of sample and data collection strategy, 50% is the mean response rate (Anseel, Lievens, Schollaert, & Choragwicka, 2010). Due to missing data in some data records, we had to eliminate 37 data records. Additionally, five employees were eventually found not to fit in the 'caretaker category' (i.e., night watchman, project managers) and were excluded from further analyses. Hence, the final sample consisted of 181 employees (40.4%). Self-ratings were obtained for all independent variables. Supervisors (N = 23) provided ratings of employees' creative performance. Each participating supervisor evaluated an average of 7.87 employees (SD = 3.68). Of the 181 employees that provided complete responses to the survey, 157 were female (86.7%). The mean age within our sample was 38.17 years (SD = 10.58), the average company tenure was 13.07 years (SD = 11.22), and the average number of years of higher education was 2.92 years (SD = 1.36).

Measures

Feedback source variety. We measured the feedback source variety with a social network measure used by Baer (2010). This measure distinguishes more categories of sources than the measure used in Study 1 and thus better reflected the variety of feedback sources

from which employees can seek feedback. Employees first responded to a name generator question (e.g., Rodan & Galunic, 2004): "Looking back on the past year, with whom have you sought feedback on your ideas about work?". The respondents were allowed to list up to 25 feedback contacts. Next, following Baer (2010), the participants were asked to indicate the job category describing each contact they listed. The job categories were adapted to fit the research context. Specifically, we asked the participants to indicate the job category of each contact using 13 categories in cases of internal contact (1 = *chief physician*, 2 = *treating physician*, 3 = *head nurse*, 4 = *colleague/team member*, 5 = *patient*, 6 = *nursing board member*, 7 = *employee in a middle management function*, 8 = *personnel department member*, 9 = *IT*, 10 = *financial department member*, 11 = *maintenance service member*, 12 = *training manager*, 13 = *union representative member*) and seven categories for contacts located outside the organization (14 = *family*, 15 = *friend*, 16 = *colleague from other organization*, 17 = *contact from a professional organization*, 18 = *government agency member*, 19 = *contact from employee organization*, 20 = *training institute contact*) (Smith, Collins, & Clark, 2005). These 20 categories were ultimately sufficient to assign a job category for every contact mentioned by the respondents. We asked the respondents about their contact's job category because past research has shown that the type of variety particularly relevant for creative performance includes differences in terms of background, areas of specialization, and work responsibilities (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Woodman et al., 1993).

To establish a measure of feedback source variety, we also followed Baer (2010) and calculated Blau's (1977) index of heterogeneity based on the categories assigned to each contact: Heterogeneity = $1 - \sum p_i^2$, where p_i is the proportion of contacts in the *i*th job category (e.g., colleague, family).

Experienced creative time pressure. We measured experienced creative time pressure using the five-item scale of Baer and Oldham (2006). The items were rated on a scale

that ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). Example items included "Thinking of new ideas takes time I do not have" and "I do not have much time for thinking up wild ideas; I am too busy just getting my job done" (Cronbach's $\alpha = .85$).

Creative performance. We measured creative performance using the 13-item scale of George and Zhou (2001). On a seven-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), the supervisors assessed each employee's creative performance. While we acknowledge their limitations, supervisor ratings are widely used and accepted in the creativity and innovation literature as a criterion measure because they also have high practical relevance (e.g., Zhou & Shalley, 2003). Example items include "This employee comes up with creative solutions to problems" and "This employee suggests new ways of performing work tasks" (Cronbach's $\alpha = .97$).

Control variables. To reduce the likelihood that other variables confound the relations examined in this research, we measured the employees' age (in years), gender (0 = male, 1 = female), tenure (in years), and number of years of higher education as potential control variables (Mumford & Gustafson, 1988; Unsworth, Wall, & Carter, 2005). Additionally, the total number of feedback contacts mentioned by an employee in the social network measure (with possible values ranging between 1 and 25) was measured as a potential control variable. Finally, need for cognition was included as a potential control variable because previous research showed that the need for cognition directly influences the amount of effort devoted to cognitive elaboration (Cacioppo, Petty, Feinstein, & Jarvis, 1996), which is an important aspect of the creativity process. Furthermore, research showed that the need for cognition is associated with individual creativity (Dollinger, 2003; Wu, Parker, & de Jong, 2014). We measured the need for cognition (Cronbach's $\alpha = .84$) with a 15-item validated Dutch translation of the scale (Pieters, Verplanken, & Modde, 1987). The items were rated on a scale that ranged from 1 (*strongly disagree*) to 7 (*strongly agree*).

Data Considerations and Analytical Plan

Because supervisors rated the creative performance of their employees, the information on creative performance exhibits a nested data structure. To identify statistical modeling issues related to a possible violation of the 'independence of measurements' assumption, we calculated the ICC1 value. The ICC1 was low (ICC1 = 0.002), indicating that the non-independence of measurements due to evaluation by a common supervisor is not an issue of concern. Nevertheless, similar to Study 1, we relied on an ordinary (moderated) regression analysis, supplemented by a multilevel analysis of the final prediction model identified in our (moderated) regression analysis. This supplementary analysis (see Table 4) is also beneficial in that a Bayesian estimator does not suffer from 'statistical underpowering' due to a relatively small sample size as used in our second study (Van de Schoot et al., 2014). To test the hypothesized quadratic-by-linear (Feedback source variety^2 × Experienced creative time pressure) interaction on the dependent variable of creative performance, we used the same analytical procedure as in Study 1. We also tested our results without control variables, and the effect of the quadratic-by-linear interaction was unchanged.

Results

The means, standard deviations, and correlation coefficients for all variables are shown in Table 3. The experienced creative time pressure was negatively related to creative performance (r = -.18, p < .05), and the sign of this bivariate relationship (i.e., negative) is consistent with earlier research findings (Baer & Oldham, 2006). The need for cognition was positively related to creative performance (r = .17, p < .05), and the sign of this bivariate relationship (i.e., positive) is consistent with earlier research findings (Dollinger, 2003; Wu et al., 2014).

Table 4 presents the results of a moderated hierarchical regression analysis. To test our curvilinear moderation hypothesis, we are primarily interested in the estimate and the

significance of the quadratic-by-linear interaction (Feedback source variety^2 × Experienced creative time pressure), which is shown in step 5. The coefficient associated with the quadratic-by-linear interaction term was statistically significant (β = -0.25, $p < .05$). The ΔR^2 associated with this particular interaction term was also statistically significant ($\Delta R^2 = 0.03$, $F(1, 169) = 5.24$, $p < .05$); thus, Hypothesis 2 was supported. Note that the multilevel model shown in Table 4 also attested to the significance of this quadratic-by-linear interaction.

We further analyzed the quadratic-by-linear interaction by evaluating simple slopes. Following Aiken and West (1991), we estimated simple slopes at three different levels of feedback source variety: low (one standard deviation below the mean score), intermediate (at the mean score), and high (one standard deviation above the mean score). As indicated in Figure 2, the results showed that when employees experienced high creative time pressure, the simple slopes of the line were not significantly different from zero at low ($b = 0.91$, $SE_b = 0.56$, β = 0.24, *n.s.*), intermediate ($b = 0.63$, $SE_b = 0.40$, β = 0.16, *n.s.*), and high levels ($b = 0.34$, $SE_b = 0.83$, β = 0.09, *n.s.*) of feedback source variety, respectively. When employees experienced low creative time pressure, the simple slope of the regression curve had a marginal significant negative value for low levels of feedback source variety ($b = -1.29$, $SE_b = 0.73$, β = -0.34, $p = .080$), a value not significantly different from zero for intermediate levels of feedback source variety ($b = 0.58$, $SE_b = 0.46$, β = 0.15, *n.s.*), and a significant and positive value for high levels of feedback source variety ($b = 2.45$, $SE_b = 1.05$, β = 0.64, $p = .021$). Together, these simple slope tests provide further support for Hypothesis 2 such that under conditions of low creative time pressure, the relationship between feedback source variety and creative performance increases exponentially. Specifically, employees exhibited greater creative performance at higher levels of feedback source variety when the creative time pressure was low. Unexpectedly, a marginal significant negative relationship was found for low levels of feedback source variety when the creative time pressure was low.

Discussion Study 2

The results of Study 2 provide further support for the idea that context is important in studying the feedback source variety-creativity relationship. Specifically, our results suggest that low experienced creative time pressure provides employees with the opportunity to use feedback information, leading to an exponential increase in supervisor-rated creativity. A limitation of Study 2 might be the network generator question that we used to determine the sources from which respondents actively sought feedback to improve their ideas. Although this type of information is fruitful for better understanding whether diverse feedback-seeking leads to information benefits (Anderson, 2008), this network generator question does not provide us with information about the exact nature of the feedback that respondents received. To better understand the type of feedback information that respondents received from the different sources they approached, future research should examine the content, quality, and level of constructiveness of the feedback information as well as how respondents reacted to and processed the received information.

General Discussion

Seeking feedback information from different sources has been shown to be beneficial for creativity and workplace innovation (De Stobbeleir et al., 2011; Dokko et al., 2013; Madjar, 2005). These positive findings, however, are currently not integrated with theoretical models in the larger feedback domain that have suggested that seeking feedback will result in positive outcomes only if individuals have the motivation and opportunity to use it (e.g., Anseel et al., 2015; Ashford et al., 2016). In the current study, we set out to test the basic idea that, when seeking feedback, the effect of feedback source variety on creativity should be dependent on an employee's motivation and opportunity to thoroughly process the feedback. To this end, we conducted two studies testing whether performance dynamism on the one hand and creative time pressure on the other hand moderated the previously demonstrated

main effect between feedback source variety and creativity (De Stobbeleir et al., 2011). In Study 1, we found that the association between feedback source variety and creativity increases exponentially when performance dynamism was high rather than low. In Study 2, we found a similar exponential association between feedback source variety and creativity for employees experiencing low rather than high levels of creative time pressure. For both studies, we found that the strength of the positive relationship increases as feedback source variety increases, whereby relatively high levels of creativity can be achieved under high levels of feedback source variety. Together, our findings provide a more fine-grained and contingent understanding of the relationship between feedback source variety and creativity.

Theoretical Contributions

Our study makes several theoretical contributions. First, our study suggests that employees' experience of the work environment may drive their inclination to process and integrate feedback information. Although we know that the depth of processing by the feedback seeker is essential for its effects on performance (e.g., Anseel et al., 2009), feedback-seeking studies have focused little on testing the conditions of the immediate work environment under which feedback seeking may lead to performance improvement. By showing that creative performance is enhanced only when feedback seekers are contextually instigated to process and integrate feedback information, our study highlights the importance of the work environment in benefitting from the feedback that was sought.

Second, by showing that insufficient time to process feedback information negates the effect of feedback information on performance, our study adds to the literature on time pressure as a crucial contextual contingency factor for performance outcomes (cf. Amabile et al., 1996; De Dreu, 2003). Our study is also one of the first to test the effects of creative time pressure in the feedback-seeking domain. Our results suggest that the effectiveness of feedback seeking is contingent upon the time employees have to reflect on diverging

perspectives and accommodate them in their adapted mental models.

Third, by adopting an interactional perspective on creativity (Woodman et al., 1993), this study contributes to the creativity literature by highlighting how behavioral factors (feedback-seeking behavior) on the one hand and contextual contingency factors on the other hand simultaneously contribute to creativity. In line with earlier research on feedback-seeking and creativity, we found that high feedback source variety is positively related to creativity (De Stobbeleir et al., 2011), albeit in a more complex (i.e., exponential) way and under specific conditions. Importantly, we extend previous work by demonstrating that these facilitating moderating factors may optimally unleash the creative potential of diverse feedback, resulting in stronger increases of creativity with increases in feedback source variety.

Notwithstanding these nonlinear results, in Study 2, we found (marginal) evidence that under conditions of low creative time pressure, relatively high levels of creativity can also be achieved when employees seek feedback from only a few sources. While this remains speculative, the findings from experimental social psychology may offer suggestions for this unexpected pattern of results. For instance, the findings from the 'dual pathway to creativity model' (Nijstad et al., 2010) showed that individuals have different strategies for attaining creativity. To develop creative ideas, employees may use a flexible processing style in which they combine different viewpoints. However, some employees may also generate creative ideas through a systematic and effortful in-depth exploration of only a few viewpoints (Nijstad et al., 2010). Such a systematic processing style may ultimately lead to creativity through cognitive persistence. However, this processing style is resource demanding and may only lead to enhanced creativity when employees have sufficient time to process the limited number of viewpoints (cf. Roskes, Elliot, Nijstad, & De Dreu, 2013). Future research may focus on further testing this theoretical perspective in a field setting.

Practical Implications

For practitioners, our results suggest that it is beneficial for organizations to provide employees with sufficient time to process feedback information. While organizations may have a general bias for action, processing feedback is important for creative performance. To reduce creative time pressure, organizations might consider using feedback workshops, in which employees are encouraged to reflect on diverse feedback. These workshops may also be used to provide employees with training on techniques and strategies on how to incorporate feedback. Managers may encourage employees to actively cultivate relationships with potential feedback sources both within and outside divisional and organizational boundaries ("get out of the building") and also provide employees with sufficient time to process feedback obtained from these relationships. A recent meta-analysis on feedback-seeking (Anseel et al., 2015) suggests that managers may increase feedback-seeking behavior of followers by building supportive feedback environments (e.g., Steelman, Levy, & Snell, 2004) and developing high-quality exchange relationships with their followers (e.g., Chen, Lam, & Zhong, 2007).

We are cautious regarding our recommendations for performance standards. Although our results suggest positive effects for high performance dynamism, we would not go so far as to suggest that organizations should rapidly change performance standards. However, the underlying rationale, namely, increased vigilance and attention to performance standards, may inspire organizations to reorganize their performance management processes. By using 'nudging' principles (e.g., reminders, visual pointers, support) (Thaler & Sunstein, 2008), organizations may increase processing opportunities for feedback information.

Limitations and Future Research

Despite the strengths of our research, our study also has several limitations. First, although we theorized that performance dynamism and creative time pressure are both factors

that affect the employees' capacity to benefit from feedback information, we did not directly assess the cognitive processes through which feedback source variety enhances creative performance. Additionally, the cross-sectional design of our studies does not allow us to determine the direction of causality (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Future research using a longitudinal design is needed to demonstrate the direction of causality between feedback source variety and creative performance. Next, the effect sizes for our quadratic-by-linear interaction were rather small in magnitude, especially in Study 1. This potential concern, however, should be considered in light of the fact that even small effects can still be meaningful and consequential, particularly if they are reliable, recurring, and accumulate over time (Abelson, 1985; Aguinis, Beaty, Boik, & Pierce, 2005). Furthermore, although we found support for the notion that performance dynamism and experienced creative time pressure are factors that affect employees' motivation and opportunity to benefit from feedback information, respectively, neither factor was considered in the same study nor was tested as a three-way interaction. Additionally, although our findings suggest that high levels of performance dynamism are beneficial for employees' motivation, rapidly changing performance standards may also lead to threat-rigidity effects (Staw, Sandelands, & Dutton, 1981). Future research may therefore explore optimal levels of change in performance standards for performance increments.

Finally, we build on the notion that increases in feedback source variety will, in general, lead to positive outcomes—that is, enhanced creative performance. However, seeking feedback from a variety of sources may also be confusing, or the amount of received feedback information may lead to cognitive overload, which may result in lower rather than higher idea quality. In their meta-analysis, Kluger and DeNisi (1996) found that in one-third of the cases, feedback interventions had negative effects on performance. Similarly, in a recent meta-analysis of feedback-seeking behavior, Anseel and colleagues (2015) found variable effects of

feedback-seeking behavior on performance. Future research may thus investigate when and why feedback seeking from a variety of sources may lead to lower idea quality. Additionally, given that feedback information may disparage one's ideas and creative endeavors, future research may investigate the conditions under which seeking feedback from various sources may also have negative effects (e.g., stress or demoralization) for individuals.

Conclusion

Our study breaks new ground in the creativity literature by qualifying the notion that seeking feedback from a variety of sources is a preferential avenue for increasing creativity. That is, under conditions of high performance dynamism (Study 1) and low creative time pressure (Study 2), the variety of employees' feedback seeking was exponentially related to creative performance. Our findings highlight the importance of taking into account the context in which feedback seeking occurs to gain an integral understanding of when seeking feedback from a variety of sources is (not) beneficial for enhancing creative performance.

Footnote

[1] An increase in the number of feedback contacts does not automatically imply an increase in feedback source variety. For example, ten feedback contacts from the same source (e.g., peers) indicates relative low feedback source variety, whereas ten feedback contacts from ten different sources (e.g., peers, family, supervisor, etc.) indicates relatively high feedback source variety.

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Table 1
Means, Standard Deviations, and Correlations (Study 1)

Variable	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
1. Age	2.62	0.98							
2. Gender	-	-	.16***						
3. Tenure	2.72	1.66	.60***	.09**					
4. Hierarchical position	1.61	1.36	.16***	.07*	.12***				
5. Type of contract	-	-	.24***	-.31***	.26***	-.05			
6. Feedback source variety	0.73	0.02	.05	.08**	.05	.06	-.05		
7. Performance dynamism	2.73	0.72	.07*	-.05	.09**	.04	.05	.02	
8. Creative performance	3.38	0.76	.04	.23***	-.08*	.08*	-.19***	.09**	-.02

Note: $N = 1031$. * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 2

Results of Hierarchical Regression Analyses (Study 1)

	Ordinary hierarchical regression model using the OLS estimator				Multilevel model estimated using a Bayesian estimator
Variables	β	t	ΔR^2	ΔF	
Step 1			0.083	18.55***	
Age	0.11	2.81**			0.11**
Gender	0.18	5.47***			0.17***
Tenure	-0.13	-3.50***			-0.13**
Hierarchical position	0.06	2.00*			0.05
Type of contract	-0.12	-3.64***			-0.13***
Step 2			0.005	2.87	
Feedback source variety	0.07	2.39*			0.08*
Performance dynamism	-0.01	-0.24			-0.04
Step 3			0.000	0.06	
Feedback source variety × Performance dynamism	-0.01	-0.25			0.06
Step 4			0.000	0.39	
Feedback source variety^2	0.03	0.63			0.00
Step 5			0.004	4.29*	
Feedback source variety^2 × Performance dynamism	0.10	2.07*			0.10*

Note. N = 1031. OLS = Ordinary Least Squares. Standardized regression coefficients are reported for the step indicated. R^2 and F for the full model are 0.09 and 10.37***, respectively

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

Table 3

Means, Standard Deviations, and Correlations (Study 2)

Variable	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1. Age	38.17	10.58								
2. Gender	-	-	.07							
3. Tenure	13.07	11.22	.78***	.10						
4. Education	2.93	1.36	.01	-.14*	.09					
5. Number of feedback contacts	8.69	5.14	-.14	-.02	-.06	.05				
6. Need for cognition	4.62	0.69	-.16*	-.22**	-.15*	.13	.05			
7. Feedback source variety	0.47	0.22	.09	-.03	.07	.02	.20**	.05		
8. Experienced creative time pressure	3.54	1.13	.11	.09	.13	-.23**	-.03	-.33***	-.04	
9. Creative performance	3.12	0.86	-.11	.02	-.04	.10	.12	.17*	.15*	-.18*

N = 181. * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 4

Results of Hierarchical Regression Analyses (Study 2)

	Ordinary hierarchical regression model using the OLS estimator				Multilevel model estimated using a Bayesian estimator
Variables	β	t	ΔR^2	ΔF	
Step 1			0.06	1.90†	
Age	-0.17	-1.41			-0.17
Gender	0.07	0.89			0.05
Tenure	0.11	0.94			0.13
Education	0.07	0.94			0.05
Number of feedback contacts	0.09	1.18			0.05
Need for cognition	0.16	2.13*			0.13
Step 2			0.03	2.80†	
Feedback source variety	0.13	1.77†			0.15
Experienced creative time pressure	-0.12	-1.53			0.02
Step 3			0.01	1.35	
Feedback source variety × Experienced creative time pressure	0.09	1.16			0.01
Step 4			0.01	0.93	
Feedback source variety^2	0.08	0.97			0.13
Step 5			0.03	5.24*	
Feedback source variety^2 × Experienced creative time pressure	-0.25	-2.29*			-0.24*

Note. N = 181. OLS = Ordinary Least Squares. Standardized regression coefficients are reported for the step indicated. R^2 and F for the full model are 0.13 and 2.30*, respectively

† $p < .10$; * $p < .05$.

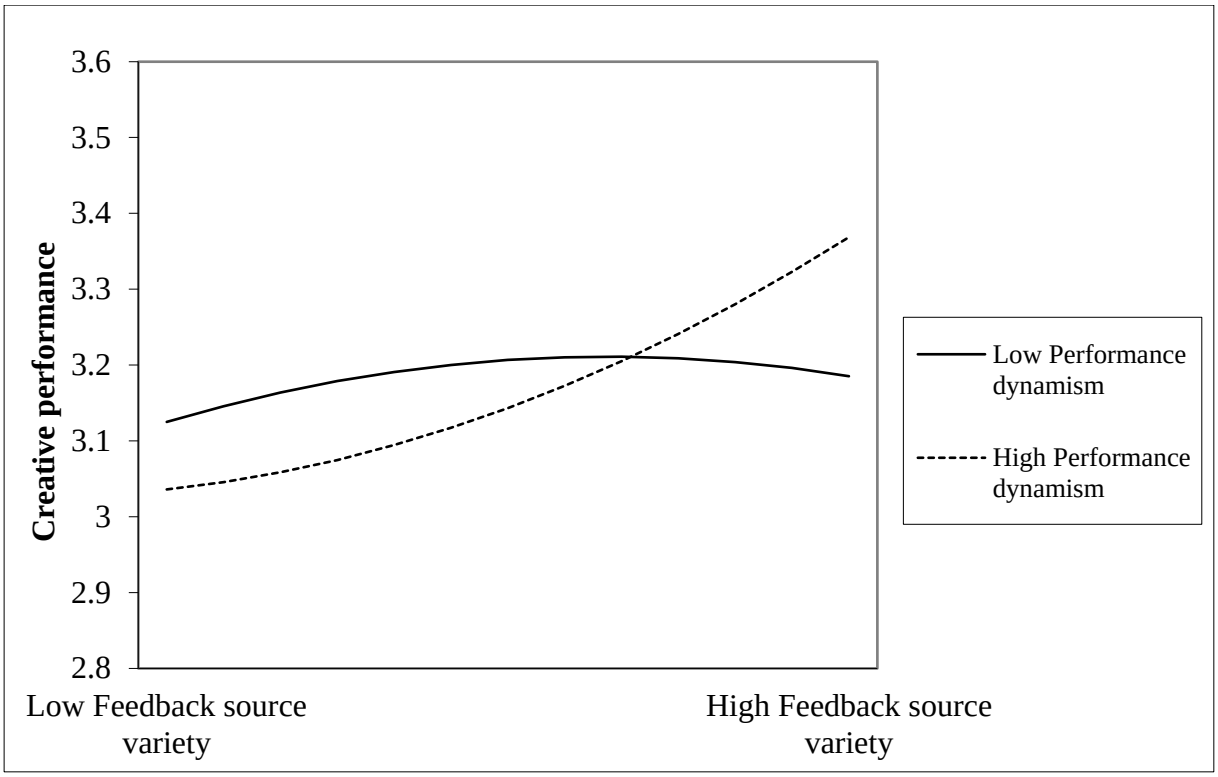

Figure 1. Quadratic-by-linear interaction of feedback source variety and performance dynamism on creative performance.

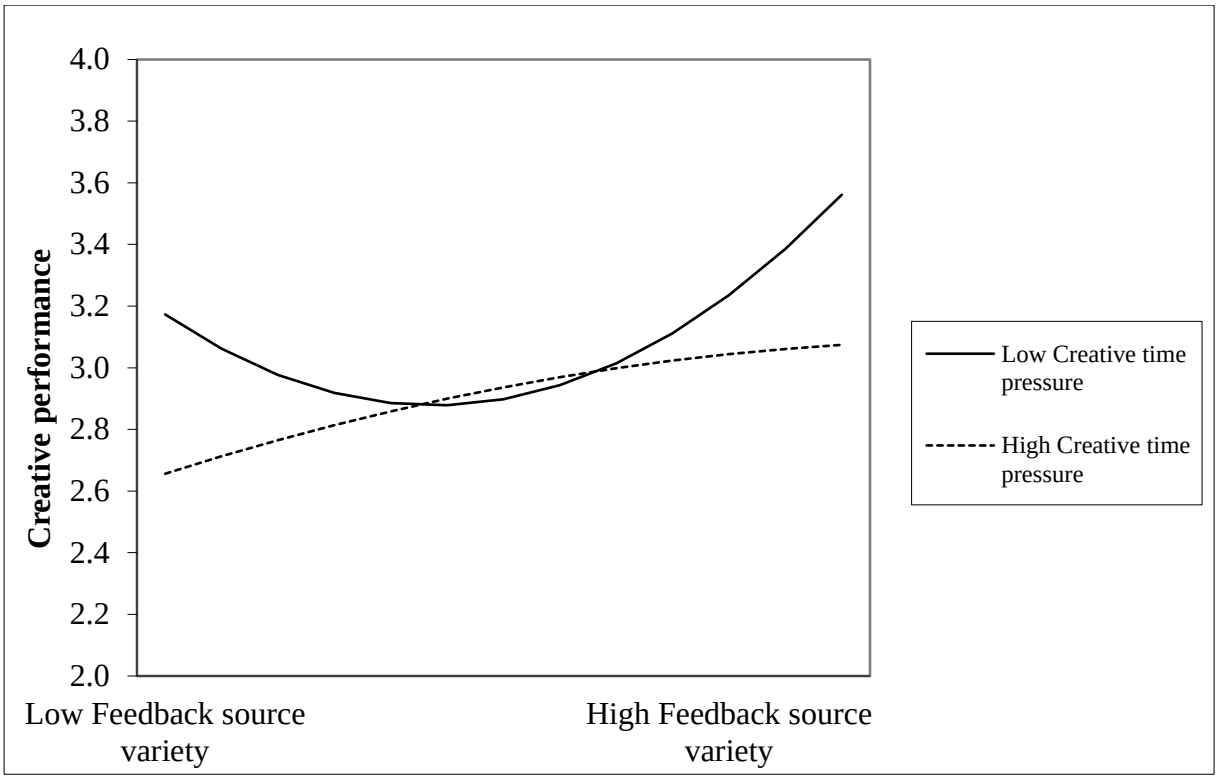

Figure 2. Quadratic-by-linear interaction of feedback source variety and experienced creative time pressure on creative performance.