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# Dual Effects of Job Complexity on Proactive and Responsive Creativity: Moderating Role of Employee Ambiguity Tolerance

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**Abstract**

Departing from existing studies based on general notion of creativity, we highlight the driver or initiating force behind creative engagement in organizations. To this end, we distinguish between proactive and responsive creativity and provide a nuanced perspective on the processes underlying distinct types of employee creativity. We propose that job complexity indirectly affects proactive and responsive creativity of employees by promoting psychological empowerment and cognitive overload, respectively. The ambiguity tolerance of employees is hypothesized to moderate the indirect effects of job complexity on the two types of creativity. Data collected from 143 employee–supervisor dyads in various companies in Sweden and Korea supported most of our hypotheses. For employees with high ambiguity tolerance, job complexity exhibited a significant indirect effect on proactive creativity through psychological empowerment. For employees with low ambiguity tolerance, job complexity exerted a significant indirect

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effect on responsive creativity via cognitive overload. By revealing distinct psychological paths toward different types of creativity and identifying a boundary condition for such processes, the present study provides an ecologically valid explanation regarding creativity in organizations.

**Keywords**
job complexity, ambiguity tolerance, psychological empowerment, cognitive overload, proactive creativity, responsive creativity

Increasing appreciation for employee creativity to achieve and sustain competitive advantages in firms has given workplace creativity the status of a "holy grail" for individual and team performance in organizations (Anderson, Potočnik, & Zhou, 2014; To, Fisher, Ashkanasy, & Rowe, 2012). The consensus on the importance of creativity has motivated intensive research to identify and validate personal and contextual predictors of creativity (Shalley, Zhou, & Oldham, 2004). Creativity has been examined as a broad and unitary construct that reflects the production, conceptualization, or development of novel and useful ideas, processes, or procedures (Unsworth, 2001). However, this assumption has been increasingly contested because creativity researchers recognize the multifaceted nature of the creativity construct. Thus, creativity can range from minor adaptations to radical breakthroughs (Mumford & Gustafson, 1988), or it can be classified according to the driver or initiator and problem type (Unsworth, 2001). Different forms of creativity must be considered in developing ecologically valid explanation of creativity in organizations. This is because assuming a unitary form of creativity in employees with varied individual characteristics and performing dissimilar tasks under a diverse work context is considered unrealistic.

In this study, we acknowledge the multifaceted nature of creativity and examine its distinct forms, which reflect different drivers of creative efforts. Unlike prior studies that consider different levels (mostly novelty) of creative contribution, the present study focuses on the driver or initiating force behind creative engagement. To this end, we identify two forms of creativity, namely proactive and responsive, based on classification dimensions suggested by Unsworth (2001). Although employees can spontaneously develop new solutions on the basis of their own volition and internal drivers (thus, being proactive), others may be forced by external pressure to submit new ideas (thus, being responsive).

In contrast to previous studies that identified antecedents of creativity in general terms (George, 2007), we explore processes that concurrently predict the two distinct types of creativity. Among various contextual factors, we

attend to job complexity because job characteristics or the properties of what a person does at work are a major source of work satisfaction, task motivation, and performance (Humphrey, Nahrgang, & Morgeson, 2007; Hackman & Oldham, 1975). The concept of job complexity is significant in contemporary organizations, in which most jobs have become cognitively demanding and complex and are often transformed into knowledge-intensive work (Oldham & Hackman, 2010). Thus, understanding how complex jobs can stimulate the workplace attitudes of employees and engender different forms of creativity is critical for researchers and practitioners.

Complex jobs tend to promote psychological empowerment, which refers to intrinsic task motivation and reflects "an active rather than a passive orientation to a work role . . . an orientation in which an individual wishes and feels able to shape his or her work role and context" (Spreitzer, 1995, p. 1444). Job complexity, as a challenging stressor, can stimulate creative thoughts and persistence to derive solutions (Oldham & Cummings, 1996; Shalley, Gilson, & Blum, 2009). Thus, we expect that job complexity is likely to exhibit proactive creativity when it prompts psychological empowerment among employees.

Complex jobs can also engender opposite psychological states, such as task-related cognitive burden (cf. distraction arousal theory; Teichner, Arees, & Reilly, 1963). This outcome is attributed to individuals' limited pool of mental resources, such that complex jobs become psychologically demanding and induce workload pressure and stress, which function as a hindrance stressor (Byron, Khazanchi, & Nazarian, 2010; Lepine, Podsakoff, & Lepine, 2005). Additional responsibilities and burden from a broad range of tasks and complicated problems impel employees to experience cognitive overload, which limits their cognitive resources for task engagement (Sacramento, Fay, & West, 2013). This resource limitation may urge employees to find "nimble-witted means" to reduce their workload (Byron et al., 2010). In addition, when creativity is demanded by supervisors to address complex task-related problems, employees are forced to submit creative ideas and thus exhibit responsive creativity to fulfill minimum requirements (Xie & Johns, 1995).

Job complexity predicts both creativity types by eliciting two opposing psychological states. A critical question remains, that is, when does job complexity predicts proactive creativity by eliciting psychological empowerment or responsive creativity by inducing cognitive overload. We suggest that ambiguity tolerance is a critical trait of employees that determines their reaction to job complexity. Ambiguity tolerance reflects the emotional and cognitive functioning of individuals that determines how they perceive and interpret complex, incongruent, and multifaceted stimuli and situations (Furnham & Marks, 2013). Employees with high ambiguity tolerance are

likely to experience psychological empowerment when facing job complexity, whereas those with low ambiguity tolerance are likely to experience cognitive overload. Thus, we propose a moderated mediation model, in which ambiguity tolerance moderates the indirect effects of job complexity on proactive and responsive creativity through two psychological reactions. Our theoretical propositions are empirically validated using multisource data collected from 143 employee–supervisor dyads from various companies in Sweden and Korea.

## Conceptual Framework and Hypotheses

Creativity refers to the generation of novel and useful ideas (Amabile, Conti, Coon, Lazenby, & Herron, 1996). Although creativity has been broadly defined, scholars suggest that it is complex and "cannot be captured in a single variable" (Sternberg, 1999, p. 84). By focusing on different magnitudes of creativity, Mumford and Gustafson (1988) differentiated minor adaptations (e.g., changes in how work is performed) from radical breakthroughs (e.g., completely new products). Kaufman and Beghetto (2009) suggested the use of four C models (i.e., Big-C, little-c, mini-c, and pro-c) to distinguish decreased magnitudes or levels of creative contributions. Subsequent studies on degrees of creativity distinguished radical from incremental creativity (Gilson, Lim, D'Innocenzo, & Moye, 2012; Madjar, Greenberg, & Chen, 2011). Alternatively, Unsworth (2001) proposed distinct motivational drivers or triggers to initiate four types of creativity (responsive, expected, contributory, and proactive). She emphasized why people exhibit creativity (external demands vs. internal motivation) and what triggers their engagement (i.e., open problems to be discovered vs. closed problems presented as task requirements).

Basing on the work of Unsworth (2001), the present study focuses on proactive and responsive creativity, which are the most clearly distinguishable types with the least conceptual overlap.[1] *Proactive creativity* occurs when individuals actively and voluntarily search for opportunities and generate ideas to address the problems they discover, thus offering suggestions for further improvement even without a specific problem to solve at hand. By contrast, *responsive creativity* occurs when individuals submit ideas as a response to the requirements of a situation and as a reactive effort to address a specified and presented problem. For instance, a sales person exhibits proactive creativity when he spontaneously suggests innovative ideas for designing a new product or for immediately improving service delivery after careful observation of complex responses of customers. On the contrary, a factory worker shows responsive creativity when he submits weekly suggestions to

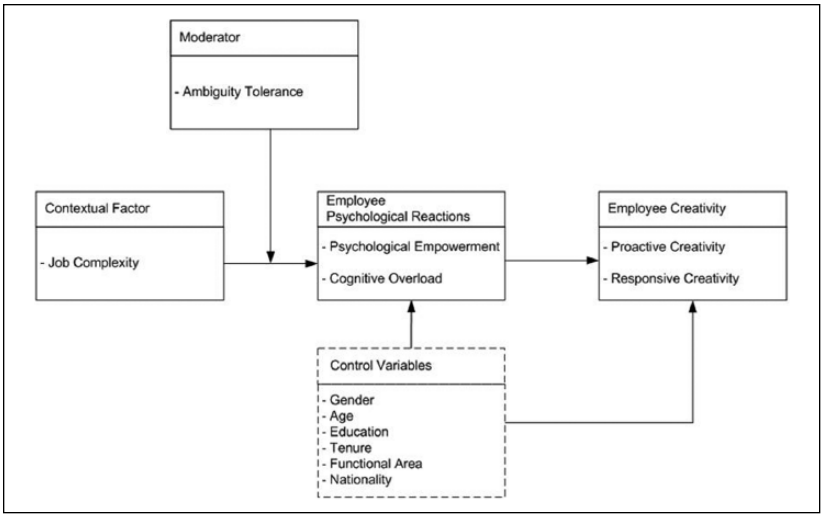


**Figure 1.** Theoretical framework predicting employee creativity.

reduce defects during the manufacturing process as required by the employer. However, the same person engages in proactive creativity if he spontaneously identifies ways to reduce the waste of raw materials even without any external requirement or expectation.

The two types of creativity differentiate whether employees are externally directed to submit ideas or internally motivated to initiate voluntary creative endeavors. This distinction is important because spontaneous extra-role behavior and compulsory in-role behavior exert disparate consequences on employee morale and performance (Fox, Spector, Goh, Bruursema, & Kessler, 2012). Elaborate understanding of functions related to various creativity types can provide sophisticated directions for managers to promote appropriate forms of employee creativity. The present study empirically validates the two creativity types in work settings and elucidates the process by which employees engage in such distinct creative efforts. As summarized in Figure 1, we examine the moderating role of ambiguity tolerance in the relationship between job complexity and the two creativity types mediated by distinct psychological states.

## *Job Complexity and Different Types of Creativity*

Based on job characteristics theory (Hackman & Oldham, 1975), job design has been recognized as a critical predictor of employee creativity (Shalley

et al., 2004). Job complexity reflects "the extent to which a job entails autonomy or less routines and the extent to which it allows for decision latitude" (Shalley et al., 2009, p. 493). Complex jobs are expected to enhance the excitement and intrinsic interest of individuals toward work activities, motivate them to perform effectively, and stimulate creative efforts (Oldham & Cummings, 1996; Wright & Cordery, 1999). Challenging and engaging tasks offer opportunities to use high-level skills and make significant choices; such tasks urge employees to proactively pursue ways to improve their work and explore new possibilities (Grant & Parker, 2009). Thus, employees go beyond their formal responsibilities and spontaneously engage in proactive processes to determine innovative solutions and opportunities for generating and applying novel ideas.

However, consistent with distraction arousal theory (Teichner et al., 1963), the role of job complexity toward creativity can be quite opposite. Complex jobs may impose substantial information-processing demands and psychological pressure on employees, thus depleting their cognitive resources and capacity to pursue creative solutions (Lepine et al., 2005). Despite the absence of intrinsic motivation and reduced cognitive slack, employees may still formulate creative solutions because highly complex jobs tend to present problems requiring critical solutions and a certain level of creativity (Shalley et al., 2009). Hence, even when experiencing stress from complex jobs, employees may still engage in creative behavior but in a passive and responsive manner (Scott & Bruce, 1994; Unsworth, Wall, & Carter, 2005). This phenomenon is prevalent in contemporary educational and organizational contexts and compels students and employees to generate creative ideas to attain decent grades and performance evaluations, regardless of internal task motivation (Choi, Sung, & Cho, 2014). The resulting creativity is externally driven by a compulsory reaction to comply with social and task demands and is often against the own volition of performers (To et al., 2012). Thus, employees may exhibit responsive creativity under high job complexity by passively responding to task demands and offering solutions to given problems. In summary, we hypothesize that job complexity predicts both types of creativity.

**Hypothesis 1:** Job complexity is positively related to proactive creativity.
**Hypothesis 2:** Job complexity is positively related to responsive creativity.

## *Mediating Roles of Psychological Empowerment and Cognitive Overload*

The dual creative outcomes of job complexity may be accounted for by differential psychological reactions of employees toward the job. Job characteristics theory suggests that job-design factors contribute to work outcomes by

influencing critical psychological states (Hackman & Oldham, 1975). Similarly, we propose that job complexity enhances proactive creativity by generating psychological empowerment and promotes responsive creativity by inducing cognitive overload.

Psychological empowerment refers to intrinsic task motivation that reflects a sense of control and an active orientation to the task (Spreitzer, 1995; Thomas & Velthouse, 1990).

Complex jobs offer opportunities to work on challenging and meaningful activities, thereby allowing employees to experience self-efficacy, a feeling of achievement, and a sense of autonomy and impact, which enhance psychological empowerment (Gagne, Senecal, & Koestner, 1997; Seibert, Wang, & Courtright, 2011). Psychologically empowered employees tend to "expend effort based on interest, curiosity, and a desire to learn . . . [which] enhance creativity by increasing positive affect, cognitive flexibility, risk taking, and persistence" (Grant & Berry, 2011, p. 73). Thus, psychological empowerment compels employees to willingly take risks, explore new cognitive pathways, and focus on the job for long periods (Oldham & Cummings, 1996).

Psychologically empowered employees exert additional effort and engage in proactive behavior beyond minimum task requirements (Wat & Shaffer, 2005). In addition, these employees are cognitively flexible, unconstrained by existing rules and procedures, and show a proactive orientation to a task (Thomas & Velthouse, 1990). These characteristics confer employees to proactively explore new possibilities and identify novel solutions (Shalley et al., 2009). This proactive approach to creativity is adopted because psychological empowerment encourages curiosity and learning among employees, extends the breadth and range of available information, and fosters confidence in pursuing new pathways and exploring unfamiliar domains (Seibert et al., 2011). Thus, we hypothesize the following:

**Hypothesis 3:** Psychological empowerment mediates the relationship between job complexity and proactive creativity.

Previous studies discovered that "incumbents find that high-complexity work both engages and overwhelms them" (Humphrey et al., 2007, p. 1335). Complex jobs require large amounts of cognitive processing capacity and ability (Haerem & Rau, 2007). As working memory is limited, overabundance of information and inability or difficulty to process information can result in cognitive overload and restrict high-level reasoning and problem-solving capacity of individuals (Paas, Renkl, & Sweller, 2004). High demands for information processing and problem solving incurred by complex jobs can be a critical source of tension and anxiety (Hart & Staveland, 1988; Xie

& Johns, 1995). This context leads to a psychologically taxing situation, which depletes available energy and cognitive capacity (Bakker, Schaufeli, Leiter, & Taris, 2008; Hallowell, 2005). Stress from overwhelming cognitive burden urges employees to intentionally direct their limited resources to work areas, as emphasized in their given role and by the manager, to prevent resource loss and achieve task requirements (Gorgievsky & Hobfoll, 2008). In this circumstance, employees are likely to invest their limited resources to complete the minimum task requirement (Parker & Kulik, 1995). Thus, when employees experience cognitive overload, they may become avoidance oriented and behave passively by fulfilling the minimum level of problem solving required by the task (Bakker et al., 2008; Hallowell, 2005).

**Hypothesis 4:** Cognitive overload mediates the relationship between job complexity and responsive creativity.

### *Moderated Mediation: Ambiguity Tolerance as Moderator*

Job complexity enhances both proactive and responsive creativity because it can elicit different psychological reactions. A critical issue is to understand why some employees exhibit proactive creativity, whereas other personnel show responsive creativity when encountering complex jobs. To address this issue, we review the related literature on stress, which posits that "responses to stressors vary as a function of individual differences that influence the way individuals appraise and cope with stressors" (Lepine et al., 2005, p. 764). Similarly, studies on job characteristics theory suggest that individual reactions to job-design properties vary depending on individual differences, such as growth-need strength (Hackman & Oldham, 1975).

In this study, we identify ambiguity tolerance as a critical boundary condition because it shapes individuals' sense making of ambiguous and complex situations. Ambiguity tolerance is a core individual disposition that influences spontaneous psychological reactions of people toward ill-defined and cognitively demanding work situations (Merrotsy, 2013). As such, this characteristic determines "the way an individual (or group) perceives and processes information about ambiguous situations or stimuli when confronted by an array of unfamiliar, complex, or incongruent clues" (Furnham & Ribchester, 1995, p. 179). Thus, we propose that ambiguity tolerance channels individual interpretation of complex task situations into disparate directions and provides a plausible explanation to varied psychological reactions to the same complex job. Ambiguity tolerance is also highly relevant in the current research context because it is a core driver of creativity (Furnham & Marks, 2013).

Individuals with high ambiguity tolerance perceive complex task situations as interesting and desirable, whereas those with low ambiguity tolerance appraise the same situation as threatening and stressful (Furnham & Ribchester, 1995). Compared with employees with low ambiguity tolerance, those with high tolerance are more likely to conceive job complexity as a positive challenge for personal growth and therefore enjoy opportunities (Lazarus & Folkman, 1984; Lepine et al., 2005). As such, employees with high ambiguity tolerance are likely to be psychologically empowered and develop intrinsic and active task orientation toward complex jobs, leading to spontaneous idea generation and problem solving. Thus, high ambiguity tolerance accentuates the role of psychological empowerment in mediating the effect of job complexity on proactive creativity. By contrast, employees with low ambiguity tolerance are likely to perceive complex and ambiguous tasks as a source of discomfort and stress, and thus develop passive coping styles (Furnham & Marks, 2013). These employees find job complexity as a cognitively overloading or exhausting situation, and therefore passively engage in creative efforts only when clear instructions and demands for creativity are present. The intervening role of cognitive overload in job complexity and responsive creativity should be intensified for employees with low ambiguity tolerance. Overall, we propose the following moderated mediation hypotheses:

**Hypothesis 5:** Ambiguity tolerance positively moderates the mediated relationship between job complexity and proactive creativity through psychological empowerment, such that the mediated relationship is stronger for individuals with higher ambiguity tolerance.

**Hypothesis 6:** Ambiguity tolerance negatively moderates the mediated relationship between job complexity and responsive creativity through cognitive overload, such that the mediated relationship is stronger for individuals with lower ambiguity tolerance.

## Method

### *Sample and Procedures*

Considering the critical role of ambiguity tolerance in our moderated mediation model, we collected data from multiple countries with different levels of uncertainty avoidance, which has been often used in the literature interchangeably with ambiguity tolerance (Furnham & Marks, 2013). We sampled full-time employees from business organizations in Sweden and Korea; the subject countries ranked relatively high and low, respectively, in uncertainty

avoidance of cultural values (Hofstede, 2001). Questionnaires were distributed to participants of executive education programs in Sweden and Korea. The participating managers and executives were instructed to complete the leader survey, pass the member survey to one of their followers, and return the completed questionnaires in post-stamped, addressed envelopes. Over a 2-week period, completed questionnaires were returned from 151 leaders and 187 members. We excluded the questionnaires with incomplete responses (eight leaders and 32 members) and clearly unreliable patterns of responses such as offering the same rating throughout several sections of the questionnaire (seven from members). In addition, we excluded five members without matching leader evaluation data. The screening procedures yielded a final sample of 143 dyadic pairs of employees and their supervisors (response rate = 71.5%). This analysis sample included 87 pairs from Swedish companies and 56 pairs from Korean companies. The participants performed various functions, including general management (35.7%), sales (16.8%), research and development (R&D; 25.2%), and production (22.4%). Males comprised of 53.8% of the employee sample with an average age of 34.0 years ($SD$ = 10.30) and an average organizational tenure of 6.5 years ($SD$ = 9.28). The education levels of the employees are as follows: high school (11.9%), 2-year college degree (10.5%), bachelor's degree (56.5%), and graduate degree (21.0%). The supervisor sample included 71.3% males with an average age of 40.6 years ($SD$ = 9.06) and an average organizational tenure of 9.1 years ($SD$ = 7.55). Detailed descriptions of the samples from the two countries are presented in Table 1.

## Measures

The participating employees reported the predictors and moderating variable, whereas their supervisors rated the two types of creativity. All constructs were assessed using multiitem measures with a 7-point Likert-type scale (1 = *strongly disagree*, 7 = *strongly agree*). The scales included were prepared in English, translated into Swedish and Korean, and then translated back into English to check for validity of the translated items (Brislin, 1981).

*Job complexity.* We adopted items from the Work Design Questionnaire (Morgeson & Humphrey, 2006) to assess job complexity. The scale included the following four items ($\alpha$ = .78): (a) "The tasks on the job are simple and uncomplicated" (reverse coded), (b) "The job requires me to simultaneously keep track of more than one thing," (c) "The job involves solving problems with no obvious correct answer," and (d) "The job comprises relatively uncomplicated tasks" (reverse coded).

**Table 1.** Sample Characteristics.

| | Employees | | | Supervisors | | |
|---|---|---|---|---|---|---|
| Demographic information | Whole sample ($n$ = 143) | Swedish ($n$ = 87) | Korean ($n$ = 56) | Whole sample ($n$ = 143) | Swedish ($n$ = 87) | Korean ($n$ = 56) |
| Gender (%; female) | 46.2 | 44.8 | 48.2 | 28.7 | 34.5 | 19.6 |
| Age | 34.0 ($SD$ = 10.30) | 37.5 ($SD$ = 11.41) | 28.5($SD$ = 4.46) | 40.6 ($SD$ = 9.06) | 43.7 ($SD$ = 8.67) | 35.9($SD$ = 7.52) |
| Organizational tenure | 6.5 ($SD$ = 9.28) | 9.4 ($SD$ = 10.81) | 2.0 ($SD$ = 2.31) | 9.1 ($SD$ = 7.55) | 11.7 ($SD$ = 7.34) | 5.2 ($SD$ = 6.11) |
| Functional area | | | | | | |
| General management (%) | 35.7 | 24.2 | 53.6 | 35.7 | 24.2 | 53.6 |
| Sales (%) | 16.8 | 19.5 | 12.5 | 16.8 | 19.5 | 12.5 |
| R&D (%) | 25.2 | 28.7 | 19.6 | 25.2 | 28.7 | 19.6 |
| Production (%) | 22.4 | 27.6 | 14.3 | 22.4 | 27.6 | 14.3 |
| Education | | | | | | |
| High school (%) | 11.9 | 14.9 | 7.1 | 7.7 | 10.3 | 3.6 |
| 2-year college degree (%) | 10.5 | 12.6 | 7.1 | 10.5 | 12.6 | 7.1 |
| Bachelor's degree (%) | 56.5 | 51.7 | 64.3 | 52.4 | 48.3 | 58.9 |
| Graduate degree (%) | 21.0 | 20.7 | 21.4 | 29.4 | 28.7 | 30.4 |

*Psychological empowerment.* Drawing on Spreitzer's scale (1995), we used an eight-item scale (α = .80) to assess the four subdimensions of psychological empowerment: (a) significance ("The work I do is meaningful to me" and "The work I do is very important to me"), (b) efficacy ("I am confident about my ability to do my job" and "I have mastered the skills necessary for my job"), (c) autonomy ("I have considerable opportunity for independence and freedom in how I do my job" and "I can decide on my own how to go about doing my work"), and (d) impact ("I have significant influence over what happens in my department" and "I have a great deal of control over what happens in my department").

*Cognitive overload.* Adopting items from the Task Load Index developed by Hart and Staveland (1988), we measured cognitive overload by using the following three items (α = .82): (a) "My job is mentally demanding," (b) "The pace of my job is hurried and rushed," and (c) "I have to work hard to accomplish my level of performance."

*Ambiguity tolerance.* Adopting items from Furnham and Ribchester (1995), we measured ambiguity tolerance by using a four-item scale (α = .88): (a) "I really dislike instances when a person does not give straight answers about himself or herself," (b) "I am bothered when I do not know how strangers react to me," (c) "I get very anxious if I am uncertain about the responsibilities of a job," and (d) "I feel very uncomfortable in a decision-making situation in which there is not enough information to solve the problem" (all items were reverse coded).

*Proactive and responsive creativity.* Extant empirical studies that differentiate creativity types have focused on the magnitude of creative contributions, such as incremental versus radical creativity (Gilson et al., 2012; Madjar et al., 2011). Although Unsworth (2001) suggested a conceptual typology for proactive and responsive creativity, this typology has yet to be empirically validated. The lack of existing measures requires us to thoroughly review previous discussions on proactive and responsive creativity, and examine existing measures of creativity, and develop 20 potential items for proactive and responsive creativity. We then employed the Q-sort procedure, a quantitative tool for examining opinions and assessments (Brown, 1986). Ten experts, including professors and doctoral students of organizational behavior, participated in the current Q-sort. On the basis of our theoretical account, the experts classified the 20 items into the two categories of creativity. Only 10 items were unanimously categorized by the experts and thus retained for the current study.

*Proactive creativity* was assessed using a five-item scale (α = .92) rated by the supervisors. The scale included the following items: "This employee (a) suggests new ways of performing work in a proactive manner, (b) makes substantial voluntary and creative contributions in his or her work, (c) is a good source of unexpected creative solutions, (d) suggests creative ideas in an independent and proactive manner, and (e) suggests useful ideas and solutions even without a specific problem to solve." Supervisors also rated *responsive creativity* by using the following five-item scale (α = .86): "This employee (a) exerts acceptable creative efforts but rarely exceeds requirements, (b) comes up with creative solutions with guidance, (c) suggests creative solutions only when told to do so, (d) responds properly to the requirements of creative effort, and (e) suggest new ideas and solutions when presented with a specific problem to solve."

*Control variables.* Considering the implications of demographic variables for employee creative behavior (Chen, Farh, Campbell-Bush, & Wu, 2013; De Stobbeleir, Ashford, & Buyens, 2011; Zhang & Bartol, 2010), we controlled for the effects of gender (0 = *male*, 1 = *female*), age (in years), tenure (in years), and education (1 = *less than high school*, 2 = *high school*, 3 = *2-year college*, 4 = *bachelor's degree*, 5 = *graduate degree*). Given the significance of job type or job requirement for creativity (Shalley et al., 2009; Unsworth et al., 2005), the functional area of employees (1 = *general management*, 2 = *sales*, 3 = *production*, 4 = *R&D*) was also controlled for in our analysis. Considering that the cognitive style, corresponding attitudes, and behavior of employees are affected by cultural and national contexts (Hofstede, 2001), we also controlled for the effects of nationality (0 = *Korean*, 1 = *Swedish*).

## Analytic Strategy

The current research framework suggests differentiated indirect effects of job complexity on various types of employee creativity as moderated by their ambiguity tolerance levels. To test this moderated mediation model, we adopted the procedure suggested by Edwards and Lambert (2007). This approach tests moderated mediation by using the following three steps. First, we estimated the effects of the independent variable (job complexity) and the mediating variables (psychological empowerment and cognitive overload) on the dependent variables (proactive and responsive creativity). This first step is equivalent to the tests of the first four hypotheses in the present study. Second, we tested if the moderator (ambiguity tolerance) affects the relationship between the independent variable (job complexity) and mediating variables (psychological empowerment and cognitive overload). Third, we

verified whether the indirect effects of the independent variable (job complexity) on the dependent variables (proactive and responsive creativity) through each mediator (psychological empowerment or cognitive overload) vary contingent on high and low levels of the moderator (ambiguity tolerance).

Hierarchical multiple regression analyses were used for the first and second step estimates. We mean centered all predictor variables before calculating the cross-product terms to minimize any potential problems of multicollinearity among main effect variables and their interaction terms (Aiken & West, 1991; Katrichis, 1993). The variance inflation factors were below 2 for all variables in the current analysis, indicating that multicollinearity is not a serious threat. For the third step, we tested the significance of the indirect effects of job complexity on proactive and responsive creativity at high and low levels of ambiguity tolerance by bootstrapping 1,000 samples to obtain bias-corrected confidence intervals (CIs; Preacher, Rucker, & Hayes, 2007).

## Results

The scales for proactive and responsive creativity were developed in the present study. Thus, we conducted an explorative factor analysis (EFA) using the principal components analysis, which is appropriate for testing formative models (Judge & Zapata, 2015). This analysis showed that all items in the two creativity scales were highly comparable in their factor loadings. For the five proactive creativity items, the factor loadings on the corresponding factor ranged between .82 and .87 with cross-loadings ranging between −.19 and −.11. For the five responsive creativity items, the factor loadings on the corresponding factor ranged between .76 and .82 with cross-loadings ranging between −.20 and −.03. Overall, the two creativity factors were clearly identified, and the item with the lowest factor loading did not exhibit a substantial cross-loading in both scales, thereby exhibiting the discriminant and convergent validity of the two scales.

We then tested the empirical distinctiveness of all measures by factor analyzing the 19 items that comprise the four scales rated by the employees and the 10 items that comprise the two creativity scales rated by the supervisors (Price, Choi, & Vinokur, 2002). A four-factor model of the four scales rated by employees indicated good fit with the data, $\chi^2(df = 128) = 158.57$, $p = .04$; comparative fit index (CFI) = .98; root mean square error of approximation (RMSEA) = .041, and performed better than any alternative three-, two-, and single-factor models (all $p < .001$). A two-factor model for proactive and responsive creativity also presented good fit, $\chi^2(df = 32) = 52.54$, $p = .02$; CFI

= .98; RMSEA = .067, and provided a significantly better fit to the data than the alternative single-factor model ($p < .001$).[2]Overall, the results of the confirmatory factor analysis demonstrate the empirical distinctiveness of the scales used. Table 2 shows the descriptive statistics of and the correlations among all study variables.

## Hypothesis Testing

*Main effects.* In Hypotheses 1 and 2, we posit that job complexity is significantly associated with the proactive and responsive creativity of employees. As reported in Model 2 of Table 4, job complexity was significantly related to proactive creativity ($\beta = .29$, $p < .01$). Thus, Hypothesis 1 was confirmed. By contrast, job complexity did not significantly predict responsive creativity. Thus, Hypothesis 2 was rejected (Model 6, Table 4).

*Mediating effects.* Hypotheses 3 and 4 posit that psychological empowerment and cognitive overload mediate the effects of job complexity on proactive and responsive creativity, respectively. Job complexity was significantly related to both psychological empowerment ($\beta = .34$, $p < .001$; Model 2, Table 3) and cognitive overload ($\beta = .31$, $p < .01$; Model 5, Table 3). Psychological empowerment, in turn, significantly predicted proactive creativity ($\beta = .24$, $p < .01$; Model 3, Table 4), whereas cognitive overload predicted responsive creativity ($\beta = .17$, $p < .05$; Model 7, Table 4). Following recent recommendations (MacKinnon, Fairchild, & Fritz, 2007), we further validated our mediation hypotheses by product-of-coefficient approach in which the statistical significance of the indirect effects was tested using a bootstrapping procedure. The procedure supported the indirect effect of job complexity on proactive creativity through psychological empowerment (point estimate = 0.06, 95% CI = [0.02, 0.13]). The indirect effect of job complexity on responsive creativity via cognitive overload was also significant (point estimate = 0.07, 95% CI = [0.02, 0.15]). Thus, the present data supported Hypotheses 3 and 4.

*Moderated mediation effects.* Hypotheses 5 and 6 suggest that ambiguity tolerance moderates the indirect effects of job complexity on proactive and responsive creativity via psychological empowerment and cognitive overload. Drawing on Edwards and Lambert (2007), we first tested if ambiguity tolerance moderates the relationships between job complexity and psychological reactions. As reported in Model 3 of Table 3, ambiguity tolerance exhibited significant interaction with job complexity in predicting psychological empowerment ($\beta = .23$, $p < .01$). We conducted a simple slope analysis to

**Table 2.** Means, Standard Deviations, and Correlations Among Study Variables.

| Variables | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Gender (female) | 0.46 | 0.50 | — | | | | | | | | | | | | | |
| 2. Age | 33.97 | 10.30 | .13 | — | | | | | | | | | | | | |
| 3. Education | 3.87 | 0.88 | .08 | −.01 | — | | | | | | | | | | | |
| 4. Tenure | 6.49 | 9.28 | .12 | .86** | −.16 | — | | | | | | | | | | |
| 5. Sales | 0.12 | 0.33 | .01 | −.14 | −.28** | −.12 | — | | | | | | | | | |
| 6. Production | 0.17 | 0.38 | −.08 | −.10 | −.10 | −.06 | −.17* | — | | | | | | | | |
| 7. R&D | 0.21 | 0.41 | −.17* | .19* | .25** | −.01 | −.19* | −.23** | — | | | | | | | |
| 8. Nationality (Swedish) | 0.61 | 0.49 | −.03 | .43* | −.12 | .39** | .29** | .36** | .24** | — | | | | | | |
| 9. Job complexity | 4.25 | 0.99 | .04 | .37** | .09 | .33** | .12 | −.48** | .28** | .10 | — | | | | | |
| 10. Ambiguity tolerance | 3.24 | 1.03 | −.14 | .06 | .15 | −.01 | .03 | .09 | .16 | .21* | −.06 | — | | | | |
| 11. Psychological empowerment | 4.00 | 0.74 | .10 | .06 | .10 | .06 | .15 | .03 | .03 | .08 | .26** | .24** | — | | | |
| 12. Cognitive overload | 3.76 | 1.14 | −.01 | −.12 | −.08 | −.05 | −.01 | −.33** | −.11 | −.44** | .25** | −.46** | −.14 | — | | |
| 13. Proactive creativity | 3.98 | 1.03 | −.02 | .27** | .36** | .21* | −.03 | −.22** | .13 | .08 | .39** | .25** | .31** | −.13 | — | |
| 14. Responsive creativity | 3.41 | 0.91 | −.13 | −.39** | −.05 | −.44** | .27** | −.14 | −.03 | −.31** | −.08 | −.30** | −.33** | .27** | −.29** | — |

*Note.* Unit of analysis is individual ($N = 143$).
*$p < .05$. **$p < .01$.

**Table 3.** Results of Hierarchical Regression Analyses Predicting Employee Psychological Responses ($N$ = 143).

| | Psychological empowerment | | | Cognitive overload | | |
|---|---|---|---|---|---|---|
| Predictors | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
| Gender (female) | .11 | .11 | .15 | −.04 | −.03 | −.09 |
| Age | −.04 | −.07 | −.07 | −.09 | −.12 | −.10 |
| Education | .19 | .16 | .08 | −.10 | −.14 | −.04 |
| Tenure | .26 | .18 | .17 | .20 | .13 | .11 |
| Sales | .38** | .33** | .33** | .10 | .06 | .07 |
| Production | .26* | .39** | .39** | −.14 | −.02 | .01 |
| R&D | .20 | .14 | .14 | .03 | −.02 | .01 |
| Nationality (Swedish) | −.23 | −.24 | −.28* | −.48*** | −.49*** | −.42*** |
| Job complexity (JobComp) | | .34*** | .39*** | | .31** | .27** |
| Ambiguity tolerance (AmbTol) | | | .18* | | | −.36*** |
| JobComp × AmbTol | | | .23** | | | −.20** |
| $R^2$ | .10 | .17 | .26 | .26 | .32 | .50 |
| $\Delta R^2$ | | .07** | .09*** | | .06** | .18*** |

*Note.* Standardized beta coefficients are shown.
*$p$ < .05. **$p$ < .01. ***$p$ < .001.

further probe this significant interaction (Aiken & West, 1991). The two regression lines shown in Plot A of Figure 2 demonstrated that the effect of job complexity on psychological empowerment was positive for employees with high ambiguity tolerance ($b$ = 1.12, $p$ < .001) but insignificant for those with low ambiguity tolerance ($b$ = .17, ns). In addition, ambiguity tolerance exhibited a significant negative interaction with job complexity in predicting cognitive overload ($\beta = -.20$, $p < .01$; Model 6, Table 3). Plot B of Figure 2 confirms that the effect of job complexity on cognitive overload was significant and positive for employees with low ambiguity tolerance ($b$ = 1.17, $p$ < .001) but insignificant for those with high ambiguity tolerance ($b$ = .19, ns).

We further verified if the indirect effects of job complexity change at different levels of ambiguity tolerance (Edwards & Lambert, 2007; Preacher et al., 2007). Table 5 summarizes the results of the bootstrapping analysis, including all control variables as covariates. The conditional indirect effect of job complexity on proactive creativity through psychological empowerment was stronger and significant for employees with high ambiguity tolerance (point estimate = 0.16, 95% CI = [0.05, 0.34]) but insignificant for those with

**Table 4.** Results of Hierarchical Regression Analyses Predicting Employee Creativity ($N$ = 143).

| | Proactive creativity | | | | Responsive creativity | | | |
|---|---|---|---|---|---|---|---|---|
| Predictors | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 |
| Gender (female) | −.11 | −.11 | −.13 | −.12 | −.09 | −.09 | −.09 | −.06 |
| Age | .15 | .12 | .14 | .10 | .11 | .11 | .13 | .13 |
| Education | .41*** | .38*** | .34*** | .32*** | −.05 | −.05 | −.03 | .01 |
| Tenure | .09 | .03 | −.02 | .03 | −.31* | −.31 | −.33* | −.30* |
| Sales | .03 | −.01 | −.09 | −.08 | .40*** | .40*** | .39*** | .55*** |
| Production | −.22* | −.11 | −.20 | −.20 | .10 | .09 | .09 | .26** |
| R&D | −.10 | −.14 | −.18 | −.18 | .15 | .15 | .15 | .21* |
| Nationality (Swedish) | .12 | .11 | .17 | .07 | −.43** | −.43** | −.34* | −.48*** |
| Job complexity (JobComp) | | .29** | .21* | .24* | | −.02 | −.07 | .18* |
| Ambiguity tolerance (AmbTol) | | | | .09 | | | | −.24** |
| JobComp × AmbTol | | | | −.05 | | | | .20** |
| Psychological empowerment | | | .24** | .20* | | | | −.40*** |
| Cognitive overload | | | | −.15 | | | .17* | .02 |
| $R^2$ | .25 | .30 | .35 | .38 | .33 | .33 | .35 | .54 |
| $\Delta R^2$ | | .05** | .05** | .03 | | .00 | .02* | .19*** |

*Note.* Standardized beta coefficients are shown.
*$p$ < .05. **$p$ < .01. ***$p$ < .001.

low ambiguity tolerance (point estimate = 0.04, 95% CI = [−0.01, 0.12]), which confirmed Hypothesis 5. Bootstrapping analysis also demonstrated that the indirect effect of job complexity on responsive creativity through cognitive overload was positive and significant for employees with low ambiguity tolerance (point estimate = 0.08, 95% CI = [0.01, 0.16]) but not for those with high ambiguity tolerance (point estimate = 0.01, 95% CI = [−0.03, 0.07]), which supported Hypothesis 6.

## *Post Hoc Analysis*

We performed three sets of post hoc analysis to check the robustness of our findings. First, we checked the possibility of curvilinear effects of job complexity on psychological reactions and creativity, as suggested and reported

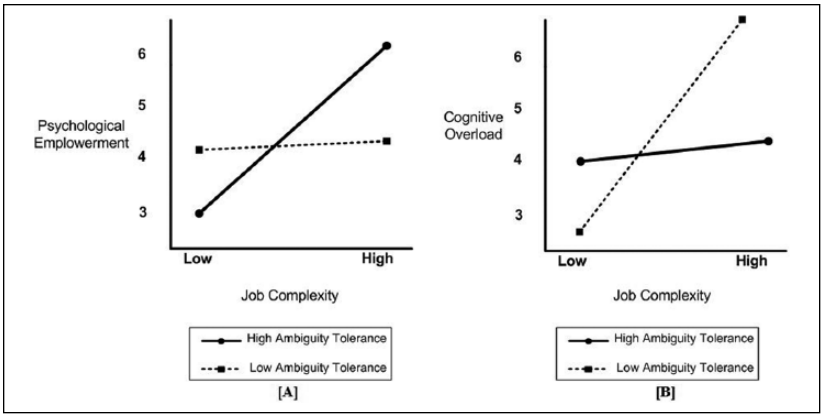


**Figure 2.** Interaction between job complexity and ambiguity tolerance in predicting psychological empowerment and cognitive overload of employees.

in prior studies (Byron et al., 2010). The results indicated that the quadratic term of job complexity was not significantly related to any of the psychological reactions and creativity measures (all $p > .10$). Thus, job complexity in the current data exerted only linear effects on other study variables.

Second, considering that the cognitive style, corresponding attitudes, and behavior of employees are affected by cultural and national contexts, we collected data from two countries to increase the generalizability of our research findings. Nevertheless, the research design also raises the possibility that the current sample is a mixture of two separate empirical patterns. Thus, we proceeded to check if the examined relationships are significantly different across the two samples (from Sweden and Korea). We tested the significance of nationality as a moderator of the regression coefficients included in the current analyses and found that the positive effects of job complexity on psychological empowerment and cognitive overload were slightly weaker among Swedish employees ($\beta$ for the interaction between complexity and nationality $= -.15$ and $-.12$, respectively, both $p < .10$) than among Koreans. By contrast, the link between job complexity and responsive creativity was stronger for the Swedish sample ($\beta$ for the interaction term $= .18$, $p < .05$) than for the Korean sample. These patterns indicate that compared with Korean employees, the psychological reactions of Swedish employees to job complexity were slightly weaker but tended to exhibit more responsive creativity. Despite differences in regression coefficients, our follow-up subgroup analysis suggested that the overall relational patterns remained the same in the two subsamples. This observation assured the robustness of the findings from the overall sample.

**Table 5.** Bootstrapped Moderated Mediation Analysis.

| Independent variable | Moderator | Mediator | Dependent variable | Moderator level | Conditional indirect effect | Product of coefficients | | | Bootstrapping bias-corrected 95% CI | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | *SE* | *Z* | *P* | Lower | Upper |
| Job complexity | Ambiguity tolerance | Psychological empowerment | Proactive creativity | High (*M* + 1*SD*) | **.16** | 0.07 | 2.39 | <.05 | 0.05 | 0.34 |
| | | | | Medium | **.10** | 0.04 | 2.34 | <.05 | 0.03 | 0.21 |
| | | | | Low (*M* − 1*SD*) | .04 | 0.03 | 1.11 | *ns* | −0.01 | 0.12 |
| | | Cognitive overload | Responsive creativity | High (*M* + 1*SD*) | .01 | 0.02 | 0.44 | *ns* | −0.03 | 0.07 |
| | | | | Medium | **.04** | 0.03 | 1.75 | <.10 | 0.01 | 0.11 |
| | | | | Low (*M* − 1*SD*) | **.08** | 0.04 | 2.02 | <.05 | 0.01 | 0.16 |
| Post hoc analysis | | | | | | | | | | |
| Job complexity | Ambiguity tolerance | Psychological empowerment | Responsive creativity | High (*M* + 1*SD*) | **−.24** | 0.06 | 3.66 | <.001 | −0.38 | −0.13 |
| | | | | Medium | **−.15** | 0.04 | 3.35 | <.001 | −0.25 | −0.07 |
| | | | | Low (*M* − 1*SD*) | −.05 | 0.05 | 1.15 | *ns* | −0.16 | 0.03 |
| | | Cognitive overload | Proactive creativity | High (*M* + 1*SD*) | −.02 | 0.03 | 0.46 | *ns* | −0.10 | 0.04 |
| | | | | Medium | **−.07** | 0.04 | 1.80 | <.10 | −0.15 | −0.01 |
| | | | | Low (*M* − 1*SD*) | **−.12** | 0.06 | 2.01 | <.05 | −0.25 | −0.02 |

*Note*. Bootstrap sample size = 1,000. Coefficients in bold indicate significant mediation. CI = confidence interval; *ns* = not significant.

Third, we hypothesized separate pathways from psychological empowerment and cognitive overload to proactive and responsive creativity, respectively. However, the psychological reactions may possibly predict both types of creativity. Thus, we tested the significance of these alternative pathways. As reported in the lower half of Table 5, job complexity exerted a significant negative indirect effect on responsive creativity through psychological empowerment when ambiguity tolerance was high (point estimate = −0.24, 95% CI = [−0.38, −0.13]), but not when it was low (point estimate = −0.05, 95% CI = −[0.16, 0.03]). Similarly, job complexity exhibited a significant negative indirect effect on proactive creativity through cognitive overload when ambiguity tolerance was low (point estimate = −0.12, 95% CI = [−0.25, −0.02]), but not when it was high (point estimate = −0.02, 95% CI = [−0.10, 0.04]). The post hoc analysis indicated that the two mediating psychological responses manifested significant implications for both types of creativity.

## Discussion

The present study highlights the need for distinguishing proactive from responsive forms of creativity on the basis of different psychological and individual predictors. Consistent with our theoretical propositions, the current analysis of dyadic data from the two countries indicated that job complexity engenders proactive and responsive creativity through distinct psychological reactions differentially activated by ambiguity tolerance. In the following sections, we discuss the implications of the study and consider its limitations along with the directions for further research.

### *Implications for Theory and Research*

Acknowledging the limitation of a unitary approach to creativity as a general and broad construct, scholars highlighted the need to study different creativity types (Madjar et al., 2011; Shalley et al., 2004). This analysis is important to develop an ecologically valid explanation of creativity in organizations. As scholars recognized the multifaceted nature of creativity, they often focused on the magnitude of creative contribution, which ranges from minor adaptations to radical breakthroughs (Mumford & Gustafson, 1988). This distinction assimilates the common differences between incremental versus radical innovation or exploitation versus exploration (Gilson et al., 2012; Sternberg, 1999).

In contrast to previous studies that consider different magnitudes of creative contribution, we focus on the driver or initiating force underlying the creativity. Although the conceptual distinction between proactive and

responsive creativity has been proposed in the literature (Kaufmann, 2004; Unsworth, 2001), it is yet to be empirically validated. The current study presents an initial empirical investigation on the distinction between proactive and responsive creativity, which further enriches the literature on organizational creativity. The two ways of identifying types of creativity (i.e., radical vs. incremental and proactive vs. responsive) are related but not redundant because they involve different stages of creativity. That is, the former deals with the nature of the resulting outcome, whereas the latter addresses the motivational or initiating force. These different creativity types can be related to one another (e.g., sequential, complementary, competing) and offer intriguing theoretical and practical ramifications.

In this study, we theoretically and empirically investigated the possibility of the emergence of different creativity types from the same task design that can instigate different psychological states among employees. By providing psychological empowerment and accompanying active task orientation, job complexity may stimulate cognitive flexibility and persistence among employees and enable them to proactively engage in creative behavior (Shalley et al., 2009). Job complexity, as the core work stressor, also instigates strain, such as cognitive overload, which leads to a reactive and passive work behavior, such as responsive creativity (Lepine et al., 2005).

An intriguing direction to improve the current study is to broaden the concept of job complexity by integrating social, political, and relational elements of work which are overlooked but considered critical components of job design (Humphrey et al., 2007). These relational/social factors can form or sometimes constrain the effect of the workers' own interpretation of their task (Grant & Parker, 2009). This possibility requires broader conceptualization of job design in highly team-oriented contexts with increasing task interdependence in current organizations (Humphrey et al., 2007). Thus, future studies should examine how proactive and responsive creativity are predicted by job complexity and other job-design factors, which reflect task properties and socio-political relations, to provide non-redundant accounts of a job beyond its motivational characteristics.

Finally, the analysis demonstrates that employee ambiguity tolerance is a critical contingency for channeling the indirect effects of job complexity to the two creativity types. Individuals do not respond to challenging stressors in a similar manner (Lepine et al., 2005). As such, employees with high ambiguity tolerance experience psychological empowerment from job complexity, whereas those with low ambiguity tolerance interpret job complexity as cognitive overload (Figure 2). The moderated mediation analysis reveals the formation of distinct paths from job complexity toward proactive and responsive creativity at different ambiguity tolerance levels. To be consistent

but also expand the basic tenet of trait-activation theory (Frese, Garst, & Fay, 2007), the current results imply that the same situation activates different psychological and behavioral reactions among individuals according to their personal dispositions. The multitude of trait-activation patterns within similar contexts should further enrich the theoretical account of person–situation interactions in organizations.

## *Implications for Practice*

The present findings offer critical implications for practicing managers. Similar to how incremental and radical innovations serve different organizational goals (Gilson et al., 2012; Madjar et al., 2011), the value of proactive and responsive creativity may differ depending on the task and social milieu (e.g., task goal, performance strategy, and social surroundings of focal employees). For example, proactive creativity is preferred when the person or work unit operates in an uncertain task environment to determine adaptive solutions for unstructured problems (Sung & Choi, 2012). By contrast, responsive creativity may be preferred by teams that operate under relatively stable conditions for the reliable implementation of routine procedures. In this work environment, proactive creativity can distract the team and destabilize coordinated efforts.

Once the desired creativity type is specified, managers can initiate interventions to channel the creative efforts of employees toward a specified direction. Our analysis indicates that inducing psychological empowerment among employees, such as perceptions of significance, autonomy, competence, and impact, can effectively promote the voluntary search for opportunities and solutions to new problems. By contrast, when responsive creativity is preferred, managers can intentionally reduce slack or additional resources, so that employees are fully occupied with their tasks. Managers can also clearly establish the norms related to employee creativity and voice; as such, unsolicited suggestions or challenges regarding existing task processes are unwelcome, and employees are required to concentrate on problems identified by their managers.

Finally, managers should recruit or promote employees with different levels of ambiguity tolerance depending on the favorable creativity type. When proactive creativity is desirable, managers should recruit or train employees to equip them with sufficient skills and abilities for performing complex jobs and properly dealing with cognitive challenges; without training, employees will interpret a challenging situation as a threat and a source of strain (Elsbach & Hargadon, 2006; Xie & Johns, 1995). Ambidextrous managers can implement efficient division of labor depending on individual differences, such

that certain employees exhibit proactive creativity to actively explore new possibilities, whereas others reactively deal with specific problems encountered during routine performance. The former instigates exploratory learning and knowledge creation, whereas the latter facilitates creative knowledge transfer by discovering alternative ways to redesign existing procedure, specify problems, and search for better solution (cf. knowledge creation theory, Nonaka & Krogh, 2009). To this end, organizations may offer leadership training and development programs to help managers decide regarding the preferred types of creativity in a timely manner; consequently, managers would be capable to initiate interventions by allocating resources, selecting right people, and guiding creative efforts to the right direction, contingent on the situational needs and organizational goals.

## *Study Limitations and Directions for Future Research*

The present findings should be cautiously interpreted by considering several limitations. First, the causal directions among the constructs may not be definite because all study variables were simultaneously collected. Future studies should adopt a longitudinal or field-experimental research design. Second, we constructed scales to measure the two creativity types that are yet to be empirically investigated. Additional empirical efforts are necessary to validate the new scale through comparison with existing creativity scales in various settings. Third, the current sample comprises dyadic pairs of employees and their supervisors. Considering that leader behavior, group climate, and interactive dynamics among members are strong drivers of member creativity (Anderson et al., 2014), we propose that the emergence of proactive and responsive creativity should be investigated in the context of groups.

Fourth, although we controlled for the job type, the characteristics of the current participants with moderate levels of creativity may have affected the observed patterns. Future studies should validate the current findings by using diverse samples of individuals performing engineering or even artistic tasks, such as those involved in design, advertisement, or entertainment, who are characterized by varied levels of proactive and responsive creativity. The present data also show the high correlations among employee education, R&D, and job complexity, all of which would likely entail proactive forms of creativity. Thus, future studies should examine the cognitive capacities or talents of employees and the task styles expected in specific job functions, such as in R&D, in relation to the emergence of different forms of creativity (Haerem & Rau, 2007).

Finally, the present data indicate that Swedish employees are more tolerant than Korean employees to ambiguous situations and are less prone to

exhibit cognitive overload and psychological empowerment when encountering job complexity; as such, Swedish employees are more psychologically stable or less reactive to job context. These findings demonstrate that the cognitive styles, attitudes, and behavior of employees are considerably affected by cultural and national contexts. Future studies should explore the possibility that various cultural values differentially affect the formation of intermediate psychological states and types of creativity.

Despite these limitations, the present study responds to the calls for a nuanced perspective on creativity-inducing processes (George, 2007) and expands the emerging efforts to distinguish among conceptually different types of creativity (Madjar et al., 2011). Given the inceptive nature of various creativity typologies, particularly the proactive versus responsive creativity types, further conceptual and empirical endeavors should identify their unique nomological networks and boundary contingencies. In the present study, we regarded psychological empowerment and cognitive overload as critical intervening psychological states. Nevertheless, other constructs, such as positive or negative moods, cognitive flexibility, and personal initiative (Elsbach & Hargadon, 2006), can provide additional plausible mechanisms that account for the effects of job-design factors on various creativity types.

In addition, although we proposed ambiguity tolerance as a moderator, it can be considered as a mediator based on the assumption that ambiguity tolerance is changeable across situations and trainable instead of being a trait-like individual disposition. In this respect, future research should examine job-related or job-specific ambiguity tolerance of employees to provide sophisticated understanding of distinct cognitive orientations, job-complexity interpretation, and resulting patterns of employee creativity. Complex jobs with high uncertainty impose psychological and cognitive loads, thereby instigating people to avoid ambiguity and resort to established modes of performance instead of staying open to new possibilities and being proactive to creative opportunities (cf. flow theory; Czikszentmihalyi, 1990). In this regard, future research could further examine the intervening role of ambiguity tolerance in predicting creativity.

Future studies should investigate the potential moderating effects of personal characteristics, such as growth-need strength, promotion focus, and openness to experience, in addition to ambiguity tolerance; these characteristics may allow individuals to persevere or thrive under challenging tasks (Sacramento et al., 2013; Shalley et al., 2009). In addition, future research may examine the moderating effects of diverse situational contingencies, such as leader behavior, environmental turbulence, and reward contingencies, in the job complexity–creativity relationship (Anderson et al., 2014). The potential main and moderating functions of various task and social

contextual factors may reveal new insights to advance our understanding of the emergence of diverse forms of creativity in organizations.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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## Notes

1. Unsworth (2001) identified distinct motivational drivers or triggers that initiate four types of creativity (i.e., responsive, expected, contributory, and proactive) by highlighting why people exhibit creativity (external demands vs. internal motivation) and what triggers their engagement (i.e., open problems to be discovered vs. closed problems presented as task requirements). A closed problem is a task requirement and specified by the task and context, whereas an open problem is identified by people who search for and discover problems. Responsive creativity can be observed when the driver of creativity is external and a specific problem to be solved is presented (e.g., creativity test). By contrast, expected creativity can be found when the driver is external, but the problem itself is open (e.g., quality circles and total quality management). Contributory creativity is internally driven or self-determined, but based on a clearly formulated problem (e.g., helping others to solve a specific problem not directly related to own task). Proactive creativity is self-determined efforts for actively searching for opportunities and solutions to new, unspecified problems (e.g., volunteered new suggestions without any expectations or requests). Among the four types of creativity, we focus on proactive and responsive creativity, which are the most clearly distinguishable types.
2. The present data showed a significant negative correlation between ambiguity tolerance and responsive creativity ($r = -.30$, $p < .01$). Given the significant correlation and conceptual relatedness between ambiguity tolerance and responsive creativity, we conducted a follow-up exploratory factor analysis. For the four ambiguity tolerance items, the factor loadings on the corresponding factor ranged between .72 and .83 with cross-loadings ranging between −.19 and −.03. For the five responsive creativity items, the factor loadings on the corresponding factor ranged between .70 and .84 with cross-loadings ranging between −.29 and −.04. Thus, ambiguity tolerance and responsive creativity were clearly identified as separate factors and did not show substantial cross-loadings.

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