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IS TASK AUTONOMY BENEFICIAL FOR CREATIVITY? PRIOR TASK EXPERIENCE AND SELF-CONTROL AS BOUNDARY CONDITIONS

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In this study we elaborate on the autonomy–creativity relationship by identifying potential boundary conditions. Specifically, we hypothesized that when task autonomy is provided people's reactions are shaped by the level of their prior experience or skills and by whether or not they have previously worked on a task autonomously. We further hypothesized that self-control would moderate the autonomy–creativity link. The analysis of data collected from 148 individuals who completed 2 sets of creativity tasks under different task conditions revealed that task autonomy reduces creative performance when there is no prior task-relevant experience. Individuals with high self-control showed similar levels of creativity regardless of the level of task autonomy. In contrast, those with low self-control performed more creatively under a no autonomy condition than under an autonomy condition. Our findings highlight the need for considering various boundary conditions when considering changes in the effects of task autonomy on creativity.

Keywords: creativity, task autonomy, self-control, task experience, boundary conditions.

As creativity is regarded as one of the most valued attributes of modern organizations, scholars have increasingly attended to contextual factors that

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promote individuals' creative performance (Amabile & Mueller, 2008). Along with organizational characteristics such as organizational climate and supervisory practices (Eisenberger & Rhoades, 2001; Scott & Bruce, 1994; Shalley & Oldham, 1997), researchers have maintained that creativity can be enhanced by appropriate job design, and that it is particularly important to provide individuals with task autonomy or discretion (Amabile, 1996; Oldham & Cummings, 1996). With the expectation of increased motivation and creativity, organizational practices that endorse task autonomy, such as empowerment or high-performance work practices, continue to prevail and gain increasing acceptance (Wright & Boswell, 2002). However, despite the intuitive appeal, research findings regarding the effect of task autonomy on creativity have not been conclusive, resulting in findings that task autonomy has positive (Amabile, Conti, Coon, Lazenby, & Herron, 1996), negative (Shalley, 1991), and nonsignificant (Zhou, 1998) effects on creativity. The mixed findings suggest the possibility of moderating variables that influence the effect of task autonomy on creativity. Given the widespread belief in the value of autonomy in contemporary organizations, it is, therefore, important to understand the circumstances under which task autonomy becomes beneficial for, or detrimental to, creativity. In the present study, we addressed this issue by elaborating on boundary conditions that may shape the autonomy–creativity relationship.

We proposed that the effects of autonomy may change depending on the pattern of changes involved in the task conditions. Unfortunately, similar to most existing research of contextual predictors of creativity, in studies on task autonomy the tendency is to assume that work characteristics remain the same over time (Amabile et al., 1996). Given that work and organizational contexts are often characterized by fluctuations that elicit diverse responses from individuals (Ancona & Chong, 1996), it is important to understand how individuals perform differently when they experience changing levels of task autonomy. Task autonomy may produce different interpretations, thus resulting in different creative outcomes depending on the sequence and previous task experiences. For example, people who experience an autonomous task situation from the beginning of a task may react differently from those who are allowed to function autonomously after working in a nonautonomous situation. Likewise, people's reaction to a nonautonomous situation can be quite different when it is the first task presented as opposed to when the nonautonomous situation is presented after an autonomous situation.

In addition, the function of task autonomy in relation to creativity can also change according to the individual disposition. For example, Hackman and Oldham (1976) suggested that job characteristics may play different roles depending on individual characteristics, such as the person's need to grow. In the present study, we expected that an individual's self-control may moderate

the effect of task autonomy on creativity. Task autonomy confers on individuals the freedom and discretion to make work-related decisions. This task situation imposes substantial responsibility on the task performer based on the expectation pertaining to an individual's capability in decision making and his or her willingness to assume corresponding accountability (Spreitzer, 1995). Therefore, task autonomy may be welcomed in order to generate the intended benefits; however, this can occur only when individuals can control their inner selves and regulate themselves in regard to the goal by prioritizing and pacing their work efforts effectively (Carver & Scheier, 1982). Moreover, under the circumstances of changing levels of task autonomy, an individual's self-control becomes more important as a factor in making adaptations in task behavior, a quality which is also required in changing task conditions.

Thus, in summary, the purpose in this research was threefold. First, we examined the impact of *task autonomy*, defined as *the degree to which an individual is given freedom and discretion in carrying out a task* (Breaugh, 1985; Hackman, 1980), on creative performance. In doing so, we focused specifically on an individual's freedom or discretion to pace task activities (Langfred & Moye, 2004). The role of time-related task autonomy with regard to creativity is not clear and has yet to be investigated. Second, by shifting task conditions, either from autonomy to no autonomy (A-NA) or from no autonomy to autonomy (NA-A), we examined how creative performances of individuals changed over the two phases, which we reasoned may then reflect the effect of a prior task condition on subsequent creative performances. Third, we investigated whether or not individuals with different levels of self-control respond differently to task autonomy or lack of it, as well as to the changing levels of task autonomy in multiple-task phases. In line with previous studies on creativity, we operationalized *creative performance* as consisting of two distinct but related dimensions: *a number of ideas generated for a given task*, and *originality of the ideas generated* (Amabile, 1996).

The Effects of Task Autonomy and Self-Control on Creativity

Task Autonomy and Creativity

Drawing on the job characteristics theory (Hackman & Oldham, 1976), researchers have proposed that certain types of job (e.g., complex jobs) provide employees with favorable conditions in which they can initiate novel and useful ideas (Oldham & Cummings, 1996). These task characteristics seem to increase individuals' creative performance by satisfying their critical needs, such as the need for growth (Unsworth, Wall, & Carter, 2005), thereby enhancing their intrinsic motivation for the task (Amabile, 1996). Of various task characteristics, in this study we focused specifically on task autonomy, the characteristic long regarded as one of the most important ways of improving work motivation, job satisfaction, and performance (Langfred & Moye, 2004).

With regard to creativity, scholars have theorized that freedom from external pressures promotes creativity because external control and pressure tend to reduce interest in the task itself, which is crucial for creative performance (Amabile et al., 1996). The lack of autonomy or work-related freedom may also inhibit the creative efforts of individuals by diminishing their intrinsic motivations (Deci & Ryan, 1985), as well as by lowering their perceptions of self-competency and self-determination (Zhou, 1998). According to the cognitive evaluation theory, when employees encounter external constraints or pressure is imposed on their task (thus inducing a situation of low task autonomy), they experience a shift in the locus of causality from internal to external, resulting in reduced intrinsic task motivation (Ryan & Deci, 2000). Studies of psychological empowerment in which workers' perceptions of autonomy, impact, and competence are examined have produced findings that clearly indicate that these task-related perceptions are meaningful predictors for creative performance (Spreitzer, 1995). Therefore, in this study we expected that when individuals were offered discretion over scheduling and time allocation with regard to task activities, they would perform more creatively than those without such autonomy.

Hypothesis 1: Task autonomy will be positively related to creative performance.

Shifts in Autonomy Conditions and Creativity

Although in previous studies it has been presumed that task characteristics are stable over time, sometimes these may shift substantially and cause serious challenges for, and often unexpected reactions from, individuals. Scholars have demonstrated that the method of working on prior tasks has implications for behavior and strategy adopted in subsequent tasks (Moon et al., 2004). In research on temporal dynamics in organizations it has also been suggested that employees' habitual or automatic cognitive processes are prescribed by their previous task conditions (Ancona, Okhuysen, & Perlow, 2001; Bluedorn & Denhardt, 1988). The same explanation can be applied in the creativity context and to task characteristics such as task autonomy, which may have different implications on creative performance depending on the person's prior task experience (Amabile, 1996; Choi, 2004).

In this regard, in the decision-making literature it has been suggested that the decision makers' previous exposure to a certain situation influences the framing of the present issue (Bazerman, 1998). *Framing* is conceptualized as *the decision makers' subjective mechanisms in interpreting the situation and the problem, which are determined by the actual presentation of situation, norms, habits, or personal characteristics* (Tversky & Kahneman, 1981). People tend to overreact to the violation of their existing framing. For example, when strategic decision makers are exposed to a series of opportunity scenarios, they tend to evaluate threatening stimuli as significantly more threatening compared with people who

have already been exposed to a series of threats of a similar type (Highhouse, Paese, & Leatherberry, 1996). This phenomenon, often called the *contrast effect*, is caused by *the difference between the past situations or stimuli and the present ones*, thus affecting various individual cognitive processes such as performance appraisals and perceptions of the work environment (Highhouse et al., 1996).

In this study, we expected that framing and contrast effects might take place when individuals were exposed to dramatic task condition changes. For example, when individuals experience an autonomous task condition that permits substantial discretion over the means, schedules, and procedures to complete tasks, they may develop a perception regarding the work context as being supportive and empowering. In the subsequent task situation, if the same individuals are exposed to a shift in task condition, wherein they are specifically instructed or forced to behave in a particular way, the contrast effect will set in and they will perceive the new task situation as overly constraining and controlling (negative contrast). Such violation in the existing framing will substantially undermine the individuals' intrinsic motivation, thus resulting in reduced creative performance (Amabile, 1996). In this situation, with the operation of the contrast effect, the individuals' work motivation and effort could drop significantly. As a result, their creativity will be lower than when they had been working under a condition of no autonomy at the beginning of the work task for which they had not experienced task autonomy beforehand.

On the other hand, in the opposite scenario in which individuals are first exposed to external task control, they experience positive contrast and develop highly positive situation perceptions regarding task autonomy. Being freed from external constraints, they may believe that they have greater autonomy than they actually do. Therefore, individuals who experience positive contrast may perform more creatively than those working under a condition of autonomy at the beginning of the work task.

Hypothesis 2a: Individuals will perform more creatively when they perform with autonomy, subsequent to the experience of no autonomy than when they perform with autonomy from the beginning of a task.

Hypothesis 2b: Individuals will perform less creatively when they perform with no autonomy, subsequent to the experience of autonomy than when they perform with no autonomy from the beginning of a task.

The Role of Self-Control

Self-control is defined as *the deliberate management of the self, enabling individuals to regulate and alter their inner responses in appropriate ways* (Muraven, Tice, & Baumeister, 1998). Researchers have shown that self-control is positively related to task performance, interpersonal relationships, and well-being (Latham & Locke, 1991; Tangney, Baumeister, & Boone, 2004).

In this study, we expected that self-control would moderate the effect of task autonomy on creativity. Task autonomy imposes critical task-related decisions on the performer, a situation that requires a great deal of self-regulation. Langfred and Moye (2004) showed that individuals performing tasks with autonomy tend to be cognitively distracted because they need to consider and plan for the completion of both immediate and subsequent tasks, which may then result in a decrease in the competence of the performance. Given that creative performance requires a large amount of cognitive resources (Runco, 2004), cognitive distractions or burdens imposed by task autonomy may prevent individuals from producing creative outcomes. In this context, individuals with high self-control are able to direct their attention to task completion by generating their own incentives and organizing priorities for successful task implementation (Kanfer & Kanfer, 1991). Thus, individuals with high self-control are likely to be less affected by distractions or ambiguities accompanying task autonomy; at the same time, they are likely to maintain their task motivation and concentrate on task completion (Latham & Locke, 1991). On the contrary, the creative performance of those with low self-control will be negatively affected by task autonomy because of their inability to manage motivation and distractions under such circumstances. Therefore, when individuals need to make decisions related to tasks, such as allocating time to different parts of the task and prioritizing different tasks, we expected those with high self-control to perform better and more creatively than their low self-control counterparts.

In a nonautonomous task situation, self-control may not be a meaningful moderator of the relationship between task autonomy and creativity because the situation is deemed clear enough, and individuals simply need to follow specific directions to perform the task. Under the no autonomy situation, individuals do not need to activate their self-control to achieve the goal. For example, with a series of clear task instructions that need to be followed within a specific, yet insufficient, amount of time to complete the given task, individuals do not have to prioritize or allocate time strategically to different parts of the task.

Hypothesis 3: Self-control will moderate the relationship between task autonomy and creativity, such that in the autonomy condition individuals with high self-control will exhibit greater creativity than will those with low self-control; in the no autonomy condition, there will be no significant differences between the two groups.

We further proposed that individuals with high dispositional self-control are less affected by the shift in the situation or the task condition because they are adept at maintaining their motivation regardless of external conditions, and they tend to persevere despite situational ambiguities, frustrations, and delayed gratifications (Tangney et al., 2004). In previous studies regarding the interaction between personality and task characteristics, it has been shown that those most

affected by task characteristics include people who are most responsive to situational cues (Grant, 2008). Compared with high self-control individuals, low self-control individuals' task motivation and efforts to accomplish goals are more prone to be shaped by external conditions. For this reason, we expected that shifting task conditions (e.g., from autonomy to no autonomy) would be more likely to generate greater variance in creative performance for low self-control individuals; this is in contrast to high self-control individuals who might exhibit relatively stable levels of performance regardless of the task condition.

Hypothesis 4: The creativity of individuals with low self-control will be more strongly affected by shifting task conditions than will the creativity of those with high self-control.

Method

Participants

We recruited 150 students in a university in South Korea to participate in this study. In the recruitment material we offered participants opportunities to assess their creativity through a popular creativity test with a gift certificate equivalent to US$5 to be awarded to all the students who completed the test. During the recruitment, it was made explicit that all tests would be conducted in English, including a pretest online survey. About a week before taking the creativity test, all the participants were invited to complete the online survey, which included demographic information and a self-control scale. Participants' email addresses were collected during the online survey, to check who actually participated in the study sessions and to match responses from the online survey with creativity scores. Two of the participants failed to complete this online survey; thus the final analysis sample included data from 148 test participants. The final sample consisted of 61.5% males and 38.5% females. Participants were from various majors, including business administration, economics, and industrial engineering. The mean age was 24.1 years (SD = 3.2). Students in their senior year made up the largest portion (35%) of the sample. The majority of the participants were Korean (66.2%), followed by Chinese (14.2%), and various other nationalities (19.6%). During the conduct of the actual creativity test, the participants were randomly assigned to 1 of 2 groups, each of which was exposed to different sequences of task conditions. These two groups did not differ significantly in terms of age, gender, and the year level in the university (all, $\chi^2 > .05$).

Measures

We used the Torrance Test of Creative Thinking – Figural Forms (TTCT–F; Torrance, 1998) to measure participants' creativity. We selected the figural form of the TTCT in order to reduce potential confounding from language and

cultural backgrounds associated with the verbal forms of creative tests. Among the criteria for the evaluation of creativity, we adopted two dimensions: fluency (the number of figures generated) and originality (the statistical rarity of the generated figures). Fluency and originality have been widely used as measures of creativity in previous experimental studies (e.g., Goncalo & Staw, 2006) and these two dimensions of creativity have been validated as distinct latent factors of the TTCT (Kim, 2006). Two independent and trained raters were employed to evaluate the fluency and originality of the completed TTCT–F based on the streamlined rating guidelines. The interrater agreement computed by the Spearman-Brown formula was .95 for Form A fluency scores, .91 for Form A originality scores, .67 for Form B fluency scores, and .85 for Form B originality scores. Thus, we averaged the creativity ratings of two coders.

The TTCT–F consists of two comparable but nonidentical sets of creative tasks (Form A and Form B). Both sets contain three subtasks: picture construction, picture completion, and lines and circles activities. First, in the picture construction participants are provided with a stimulus (a teardrop in Form A and a jellybean in Form B), and asked to draw any picture or object that included the stimulus as a part of it. Second, in the picture completion task participants were presented with 10 incomplete figures in both Form A and Form B, and were asked to sketch some interesting objects or pictures using the figures. In the final task, Form A contained the lines activity for which participants were required to draw as many objects or pictures as possible using 30 pairs of two parallel lines. In this last part of the TTCT–F, Form B contained the circles activity, in which participants were instructed to draw as many objects as possible using 36 circles.

The tasks were administered in accordance with the instruction provided by the TTCT–F operation manual (Torrance, 1998), with two modifications for the purpose of this study: The time given for each subtask was shortened from 10 to 6 minutes in an attempt to make the activity challenging to college students, and to introduce the need for time management, and the test operator explicitly mentioned that the participants were being tested on creativity, and encouraged them to think and draw as creatively as possible. With these instructions, all participants were exposed to the same creativity goal condition (Shalley, 1991).

Self-control. We used the 13-item measure developed by Tangney et al. (2004), which is rated on a 5-point scale ranging from (1) *not at all* to (5) *very much*, to measure self-control. The internal reliability of the scale in the present sample was .78. This scale includes items such as “People would say that I have strong self-discipline”, “I am able to work effectively toward long-term goals”, “I have trouble concentrating” (reverse coded), and “I often act without thinking through all the alternatives” (reverse coded).

Procedure

Participants were recruited through an advertisement posted at several locations on campus. Individuals who were interested in the study contacted the experimenters via email, and the experimenters then provided them with a website link to the online survey. The experimenters also informed them of the available dates and locations of the study. Interested individuals signed up for a session that they could attend. Each session was conducted in a group of between 9 and 15 participants. Once all participants who signed up for session arrived, the experimenter gave a general introduction to the task, and then provided specific instructions to manipulate task condition and sequence of the condition.

Autonomy Manipulation. All participants completed the two subsets of the TTCT–F, completing Form A first and then Form B. They were randomly assigned to 1 of 2 experimental groups. The first group completed Form A with task autonomy, then Form B with no autonomy. The second group completed Form A with no autonomy, then Form B with autonomy. Of the 148 participants, 71 were assigned to the first group (autonomy then no autonomy condition or the A-NA condition), and 77 to the second group (no autonomy then autonomy condition or the NA-A condition).

In the autonomy condition, the test operator stated the total amount of time (i.e., 18 minutes) allocated to the subset, which was composed of three subtasks. Thus, the autonomy condition allowed the participants to engage in the three tasks freely as they liked and to move back and forth across the subtasks, which also imposed the demand for time allocation and prioritization of the three tasks.

In the no autonomy condition, the test operator provided specific instructions for completing the three tasks in the given subset (Form A or Form B). In this condition, the participants were instructed to spend six minutes on each task. Even when they finished the given task ahead of time, they were not allowed to proceed to the next task until the assigned six minutes had passed. After the first six minutes, the test operator instructed the participants to move to the next task, even when they were still working on the first task. In the same way, as soon as the second six minutes had passed, the participants were instructed to move to the last task. Thus, the participants in the no autonomy condition spent the same total of 18 minutes to finish the three creativity tasks as did those in the autonomy condition. However, they were denied discretion on how to schedule and pace their task activities, because their task procedure was tightly controlled by the test operator's specific directions.

Results

Correlations among the study variables across the two sequences of task conditions can be seen in Table 1. We first conducted a 2 (sequence of task

conditions: autonomous condition first vs. nonautonomous condition first) × 2 (task type: Form A vs. Form B) × 2 (scoring type: fluency vs. originality) repeated measures multivariate analysis of variance (MANOVA), in which sequence of task conditions was the between-subject factor and task type and scoring type were within-subject factors. The main effect of the sequence of task conditions was significant, $F(1, 146) = 13.10$, $p < .001$. Both main effects of task type, $F(1, 146) = 60.43$, $p < .001$, and scoring type, $F(1, 146) = 420.03$, $p < .001$, were significant. Furthermore, all two-way interactions were significant, between the sequence of task conditions and task type, $F(1, 146) = 5.71$, $p < .05$, between the sequence of task conditions and scoring type, $F(1, 146) = 9.67$, $p < .01$, and between the task type and scoring type, $F(1, 146) = 12.84$, $p < .001$. A three-way interaction was not significant. Thus, we conducted more specific analyses, treating fluency and originality dimensions as separate dependent variables.

Table 1. *Means, Standard Deviations, and Intercorrelations Among Study Variables*[a]

Variable	1	2	3	4	5
1. Self-control		.18	.09	.20	.06
2. Fluency in A	-.17		.49***	.87***	.33**
3. Originality in A	-.14	.55***		.44***	.73***
4. Fluency in B	-.14	.78***	.43***		.35**
5. Originality in B	-.14	.45***	.78**	.38**	

Notes: [a] $N = 148$. Intercorrelations among the variables for the autonomous – nonautonomous (A-NA) condition are above the diagonal, and those for the nonautonomous – autonomous condition are below the diagonal.
** $p < .01$, *** $p < .001$.

The Effects of Task Autonomy on Creativity

To test Hypothesis 1, each participant's creativity scores (fluency and originality scores in Forms A and B) were submitted to two 2 (sequence of task conditions: autonomous condition first vs. nonautonomous condition first) × 2 (task type: Form A vs. Form B) repeated measures analysis of variance (ANOVA), using the sequence of task conditions as a between-subjects factor and the task type as a within-subjects factor. For both fluency and originality scores, we found a significant main effect of the task type, $F(1, 146) = 58.81$, $p < .001$ (fluency), and $F(1, 146) = 43.68$, $p < .001$ (originality), showing that participants performed more creatively in their second engagement than in the first. However, this main effect of task type was qualified by the significant sequence of task conditions × task type interaction, $F(1, 146) = 5.26$, $p < .05$ (fluency), and $F(1, 146) = 4.26$, $p < .05$ (originality). Tests of simple main effects revealed that in the second task (Form B), individuals in the autonomous condition performed more creatively than those in the nonautonomous condition (fluency: $M = 20.79$, $SD = 8.23$, and $M = 17.84$, $SD = 8.36$, respectively, $t(146) = 2.24$, $p < .05$; originality: $M = 12.77$,

SD = 5.42, and *M* = 11.06, *SD* = 5.05, respectively, $t(146) = 2.04$, $p < .05$). In the case of Form A creativity scores, participants in the autonomous condition scored as *less* creative than those in the nonautonomous condition (fluency: *M* = 10.92, *SD* = 5.49, and *M* = 16.49, *SD* = 5.50, respectively, $t(146) = 6.28$, $p < .001$; originality: *M* = 6.94, *SD* = 5.49, and *M* = 11.12, *SD* = 4.34, respectively, $t(146) = 3.79$, $p < .001$). Thus, Hypothesis 1 was supported only by the Form B scores.

The Effects of Shifts in Autonomy Conditions on Creativity

We probed the significant sequence of task conditions × task type interaction further to test Hypotheses 2a and 2b. In Hypothesis 2a, I proposed that the individuals' creativity would be lower when they experienced the no autonomy condition following the autonomy condition, as compared with those experiencing the no autonomy condition at the beginning of the test. As can be seen in Figure 1, individuals who experienced the no autonomy condition subsequent to the autonomy condition did not exhibit any meaningful differences compared with those who experienced the no autonomy condition in the first trial (fluency: *M* = 17.84 and 17.75, respectively, $t(146) = -.08$, *ns*; originality: *M* = 11.06 and 11.12, respectively, $t(146) = .09$, *ns*). Thus, Hypothesis 2a was not supported.

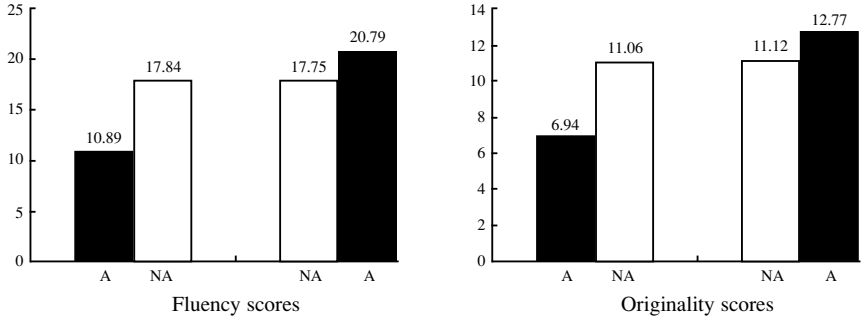


Figure 1. *The Patterns of Mean Scores for Repeated Engagement of Creativity Test Sets*[a]*.*
Notes: [a] A = autonomous condition, NA = nonautonomous condition.

In Hypothesis 2b we proposed that the individuals' creativity would be higher when they experienced autonomy following a no autonomy condition compared with the phase when they experienced autonomy from the beginning of the task. The results supported this hypothesis, such that individuals exposed to autonomy in the second trial performed more creatively than those exposed to task autonomy in the first trial (fluency: *M* = 20.79 and 10.89, respectively, $t(146) = -7.33$, $p < .001$; originality: *M* = 12.77 and 6.94, respectively, $t(146) = -6.77$, $p < .001$).

Our analyses show that the relationship between task autonomy and creative performance is not as simple as has been depicted in earlier literature (Shalley,

Zhou, & Oldham, 2004). As shown above, task autonomy may reduce creativity if individuals do not have prior experience of performing the task. The patterns depicted in Figure 1 suggest the possibility that, as compared with the no autonomy condition characterized by specific directions, those in the autonomy condition may suffer from wide variations in performance levels depending on prior experience and readiness. These findings underscore the need for considering the boundary conditions for achieving positive effects of task autonomy on individual creativity.

The Role of Self-Control as a Moderator

In Hypothesis 3, we predicted that individuals with high self-control would show greater creativity when given task autonomy in the first trial (Form A) because they would be able to organize their task activities toward the goal and allocate cognitive resources in an adaptive manner. To test this hypothesis, we conducted two hierarchical regression analyses with fluency and originality scores in Form A as the dependent variables. Specifically, we introduced the two main effect terms (i.e., task condition and self-control) in Step 1, and their interaction (task condition × self-control) in Step 2. As can be seen in Table 2, the interaction between task condition and self-control was a significant predictor of both fluency and originality.

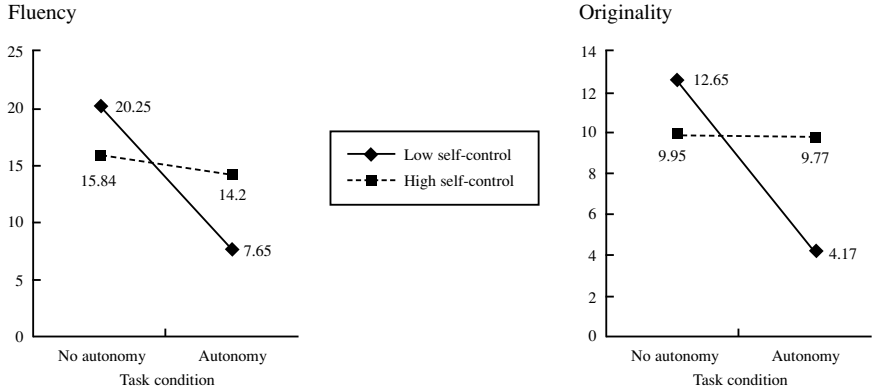
Table 2. *Regression Results*[a]

		Fluency in Form A			Originality in Form A		
Step	Variable	β	R^2	ΔR^2	β	R^2	ΔR^2
1	Task condition[b]	-.45***			-.41***		
	Self-control	.04	.21***	.21***	.07	.18***	.18***
2	Task condition × Self-control	.16*	.24***	.03*	.18*	.22***	.04*

Notes: [a] $N = 148$. [b] Autonomous condition was coded 1, while nonautonomous condition was coded 0. * $p < .05$; *** $p < .001$.

As can be seen in Figure 2, in the first trial (Form A), participants with high self-control benefited from task autonomy, thus showing better performance than did their low self-control counterparts under the autonomy condition. This provides support for Hypothesis 3 ($t(69) = -2.07$, $p < .05$ for fluency and $t(69) = -2.54$, $p < .05$ for originality). In contrast, low self-control individuals benefited from the no autonomy condition and performed more creatively than did the high self-control individuals, although the differences were not significant ($t(75) = 1.29$, *ns* for fluency, and $t(75) = .57$, *ns* for originality). This was a result we did not expect. In addition, the graph in Figure 2 suggests interesting opposing dynamics between high and low self-control individuals: (a) those with high self-control

showed that they are less affected by the two different task conditions, indicating strong self-regulation and relative insensitivity to external situations; on the other hand, (b) those with low self-control showed dramatic differences in their creative performance levels in the two task conditions, indicating responsiveness to external control. This contrast is discussed in the next section.



(a) Interaction effect of task condition × self-control on fluency scores in Form A

(b) Interaction effect of task condition × self-control on originality scores in Form A

Figure 2. *Interaction Between Task Condition and Self-Control.*

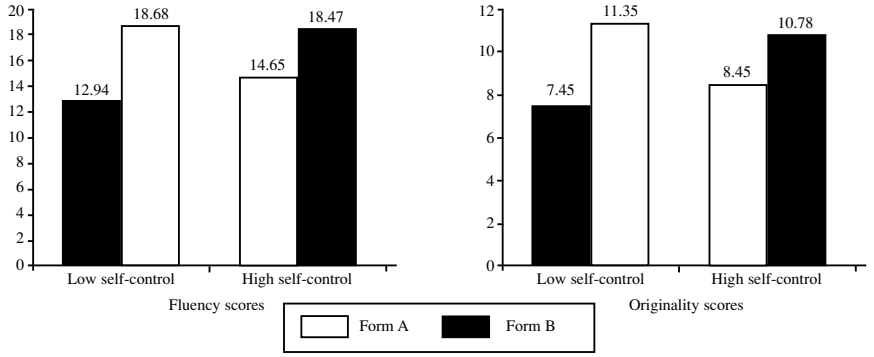


Figure 3. *Mean Creativity Scores across Participants' Level of Self-Control.*

In Hypothesis 4, we proposed that the creative performance of individuals with low self-control would be affected more strongly by shifts in task conditions, regardless of whether participants started in the autonomy or no autonomy condition. We conducted two 2 (self-control: high vs. low) × 2 (task type: Form

A vs. Form B) repeated measures ANOVAs, using self-control as a between-subject factor and task type as a within-subject factor. Participants' self-control was median split (M = 3.20, SD = .52) to construct the first factor. As can be seen in Figure 3, creativity scores of the participants whose self-control was lower than the sample mean fluctuated more in response to the shifts in the task conditions than that of those whose self-control was higher than the sample mean. However, the interactions between the dichotomized self-control and task type were marginally significant only for originality scores, $F(1, 146) = 2.63$, $p < .10$, and were nonsignificant for fluency scores, $F(1, 146) = 2.18$, $p > .10$. Thus, Hypothesis 4 was only partially supported by our data.

Discussion

Our goal was to offer a more elaborate understanding of the role of task autonomy in enhancing individual creativity. Focusing on the scheduling and pacing dimension of the work design, such as assigning time to subtasks and deciding the order of subtasks (Breaugh, 1985; Hackman & Oldham, 1976), we examined the impact of task autonomy on creativity. Drawing on findings gained in prior studies (Amabile, 1996; Plucker & Renzulli, 1999), we expected that discretion over task implementation would increase creativity. We further proposed that the autonomy-creativity relationship would be affected by an additional situational characteristic (i.e., the shift in task conditions) as well as by a person's disposition (self-control) that might change his/her reactions to task autonomy. Based on individuals who took creativity tasks under shifting conditions, my findings provided valuable insights regarding the implications of task autonomy in promoting (or harming) creativity. Likewise, our findings indicate important boundary conditions of the autonomy-creativity link.

Contrary to our prediction, task autonomy in terms of pacing the work activities reduced creativity in the first trial of the creativity test (Form A) rather than increasing it. The positive effect of autonomy emerged only in the second trial (Form B) when participants had prior exposure to the task. Although these results seem counterintuitive, they are, in a sense, consistent with findings gained in previous studies which have indicated the presence of potential moderators on the relationship between task autonomy and work outcomes (Hackman & Oldham, 1976; Langfred & Moye, 2004). Overall, our analysis suggests that researchers and practitioners must consider boundary conditions that completely change the role of autonomy for creativity, such as the individuals' prior task experience and self-control.

Prior Task Experience and Creativity

In previous studies on creativity researchers have highlighted the importance of domain-relevant skills or self-efficacy related to tasks at hand (Rietzschel,

Nijstad, & Stroebe, 2007; Tierney & Farmer, 2002). Our findings in the present study contribute to this literature by showing that individuals need relevant work experience or skills in order to accrue benefit from task autonomy. As depicted in Figure 1, individuals who are provided with task autonomy at the onset of task performance showed substantially lower levels of creativity than did those who received specific directions for time allocation. This negative effect of task autonomy disappeared in the second trial when individuals had gained some prior experience with the same set of tasks through Form A. As some of the participants stated, they were not familiar with the figural tasks presented in TTCT-F and had inhibitions about the task at the beginning of their test. Thus, provision of autonomy as a means to make task-related decisions may not be conducive to creativity when individuals are not familiar with the task.

In addition to the insight that prior task experience is a critical factor for one to benefit from task autonomy, our results also showed that it is critical to provide clear and specific instructions regarding the task in order to elicit creative performance from novices. The creativity literature tends to encourage open management practices, such as freedom, empowerment, and supportive leadership, all of which highlight the importance of broad and unspecified goals, as well as instructions and feedback (e.g., Amabile et al., 1996; Zhou, 1998). Close monitoring based on very specific guidelines with tight deadlines is also regarded as controlling and thus is thought to suffocate individual creativity (Moon et al., 2004). The present findings, however, imply that such controlling practices can be beneficial for creativity when the performers are not equipped with relevant experience or skills. Perhaps, when people feel ambiguous about the task and do not know what to do, specific directions may be framed as being benevolent and helpful in clarifying the ambiguous situation, rather than controlling it. Thus, task autonomy might be a double-edged sword that has both positive and negative implications for individual creativity. Further studies are needed to investigate the threshold level of domain-relevant skills or experience that allow individuals to benefit from empowerment or task autonomy.

In the flow of tasks from Form A followed by Form B used in this study, it is possible that the first engagement with the task (Form A) functioned as a period in which relevant skill acquisition or training occurred (Eisenberger, Haskins, & Gambleton, 1999). With this framing, our findings suggest that, even for highly complicated and unstructured tasks that require substantial creativity for successful completion, it is critical that highly structured and controlled training sessions characterized by clear and specific guidelines and practice opportunities are offered at the beginning of a job assignment before individuals engage in the task with full autonomy (Basadur, Graen, & Green, 1982; Eisenberger et al., 1999). In our sample, participants exhibited the highest level of creativity when they experienced highly controlled practice condition (no autonomy in Form A),

followed by the empowered task situation (autonomy in Form B). However, any speculation that this process may occur invariably, should be further validated with field samples.

Self-Control, Task Autonomy, and Creativity

Although self-control is a critical factor in predicting individuals' attitude, motivation, and subsequent outcomes (Latham & Locke, 1991), the role of self-control in predicting creativity has not yet drawn much attention. This is partly because of the lack of scholarly attention to the impact of deadlines and time management in available creativity literature (Shalley, Zhou, & Oldham, 2004). Our analysis revealed an interaction we had not predicted between self-control and task autonomy in predicting creativity. We found that creativity of high self-control individuals was almost identical in different task conditions, whereas creativity of low self-control individuals varied significantly depending on task conditions. People with high self-control seemed capable of maintaining their motivation and organizing their task efforts effectively even when they encountered ambiguous and unfamiliar tasks, thus achieving a great deal of stability across situations. This is consistent with prior findings that self-control is related to reliable performance in varying situations (e.g., Tangney et al., 2004).

In contrast, individuals with low self-control seemed to change their behavior in accordance with the demands of the situation. Because of such sensitivity towards the situational characteristics, they exhibited substantially less creativity under the autonomy condition and greater creativity under the no autonomy condition as compared with their high self-control counterparts. Therefore, in certain circumstances, low self-control can be a positive individual trait that can increase creativity and other task performance because individuals with low self-control are more responsive to situational cues. As Grant (2008) pointed out, the individuals who are most influenced by a situation are those with traits that are most responsive to the cues provided by the context.

Apparently, the same managerial interventions for promoting creativity may generate larger effects for low self-control individuals when these interventions provide clear and specific directions for performance. That this may be so is in line with the finding of Choi et al. (2009) that situational support for creativity substantially enhances creative performance of individuals with low creative ability, whereas those with high creative ability are relatively unresponsive to the same situational support. Similarly, perhaps owing to their strong self-regulation and accompanying stability of behavior regardless of job and situational characteristics, individuals with high self-control may fail to benefit fully from situational support. The caveat of the present study is consistent with contingency theories of leadership that endorse the effectiveness of different leadership behaviors (e.g., directing, supporting, and coaching) depending on the

followers' personalities and abilities. Further studies are necessary to investigate if individuals do perform more creatively when the organization, the leader, and the task provide a work environment that is congruent with their personality, values, and competences.

Study Limitations and Conclusion

Our study has several limitations. First, the findings may have limited generalizability because of the use of a student sample largely taken from an Asian population. In future studies the interactions between shifting task conditions, self-control, and creativity should be examined in other cultures using samples from business organizations. Second, we relied on two experimental conditions (autonomy then no autonomy, and no autonomy then autonomy), which introduced confounding in interpreting the results from the second trial because of the learning effects of the first trial. However, with the different patterns of increase in creativity scores between the first and second engagements (i.e., Forms A and B), familiarization cannot account for the effects observed in the present study. Thus, in further studies the present design may be expanded by including control groups (e.g., autonomy or no autonomy in both trials) to provide a fuller picture of the dynamics involving shifting task conditions. Third, our creativity task lasted only 18 minutes, with 6 minutes allowed for each subtask in the no autonomy condition. The relatively short duration of the task may have been insufficient to induce in our participants a sense of freedom and discretion over the task activities. Future researchers may employ a task with longer duration that could enhance the experimental realism. Finally, the present findings were based on creativity assessed in figural tasks using the TTCT-F, which may, or may not, be replicated with other types of tasks based on verbal or quantitative skills.

Despite these limitations, in the present study there are both practical and theoretical implications. Practically, managers or educators may choose to conduct task-related training sessions using specific and detailed instructions before individuals are required to work creatively in performing unfamiliar tasks. In addition, practitioners can be aware that individuals respond very differently to the same task conditions or work context depending on their dispositions. Therefore, it is critical to make every effort to design a task environment that matches employee dispositions in order to enhance their creativity.

Theoretically speaking, our results highlight the need for considering potential boundary conditions that shape the effects of task characteristics on creative performance. Specifically, our results showed that the nature and the strength of the autonomy-creativity link depends on boundary conditions, such as prior task experience, shifts in task conditions, and self-control. The intended benefit of task autonomy on creativity is realized only when individuals have

acquired necessary skills and experience, and when they have high self-control. In addition, the effects of autonomy also depend on the sequence of task performance conditions. Additional studies should be conducted to clarify further the dynamic interactions between these contingency factors and task autonomy. Moreover, it would be fruitful to identify theoretically and empirically the underlying cognitive and psychological mechanisms that drive these contingent effects, which may include acquired expertise (Simonton, 2000), domain-relevant skills (Basadur et al., 1982; Rietzschel et al., 2007), and creative self-efficacy (Choi, 2004; Tierney & Farmer, 2002). Given the prevailing beliefs regarding the benefit of empowerment and autonomy-enhancing work practices (Spreitzer, 1995; Wright & Boswell, 2002), further exploration of the organizational and individual characteristics that shape the effects of task autonomy on creativity is an urgent and important research topic for future study.

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