

Chapter #13

WHAT IS THE RELATIONSHIP BETWEEN CREATIVITY AND BOREDOM?

Yusuke Yamazaki

Graduate School of International Management, International University of Japan, Japan

ABSTRACT

The connection between creativity and boredom has received attention from researchers but with contradictory findings on whether boredom has a positive or negative influence on creative outcomes. To examine this issue, this study investigated how the state of boredom affects creative performance, assessing four dimensions of creativity: fluency, flexibility, originality, and elaboration. There were 25 participants, half of whom completed a boredom task before completing a creativity task. The results suggested that the influence of boredom on creativity varied depending on the dimension of creativity. The study highlights the importance of specifying dimensions of creativity and suggests that taking on tedious tasks may help individuals achieve more creative performance.

Keywords: creativity, boredom, dimensions of creativity, Japan, university students.

1. INTRODUCTION

Creativity is essential for working and living in the 21st century (Donovan, Green, & Mason, 2014; Rotherham & Willingham, 2010; World Economic Forum, 2020). Moreover, creativity plays an important role not only in fostering innovation in the workplace (Zhou & Hoever, 2014) but also in making improvements in daily activities (Tanggaard, 2013). These notions confirm the importance of creativity in making something new, useful, and accessible for our society. It is crucial to continue exploring various influential factors that influence creativity.

Since the 1950s, creativity has been studied in various fields such as psychology (Amabile, Brasade, Mueller, & Staw, 2005; Gasper, 2004; Guilford, 1950; Hennessey & Amabile, 2010; Hoseinifar et al., 2011; Tang, Toyama, Nagamine, Miwa, & Aikawa, 2018; Vodanovich & Watt, 2016), education (Kaufmann, 2003; Plucker, Beghetto, & Dow, 2004), and management (Gilson & Shalley, 2004; Madjar & Shalley, 2008; Zhou & Hoever, 2014; Winchester & Medeiros, 2023). Although the definition and fundamental notion of creativity have diverged across several fields, multiple definitions of creativity have converged on two criteria: novelty and task-appropriateness (Cropley, 2011; Hennessey & Amabile, 2010). Novelty, the most common element in the definition of creativity, is associated with the concept of originality (Kaufmann, 2003). Appropriateness is described as the utilitarian characteristic of creative work, based on usefulness in addressing specific tasks (Mayer, 1999).

Several studies reported important findings about the psychological factors of creativity, including motivation (Amabile, 1985), personality traits (Hoseinifar et al., 2011), emotion (Gasper, 2004; Gasper & Middlewood, 2014; Harris, 2000; Mann & Cadman, 2014), and environments (Adams, 1968; Amabile, 1982; Baer, 1998; Khatena, 1971, 1973;

Lamontagne, Keegel, Louie, Ostry, & Landsbergis, 2007). Among these factors, the present study focused on a particular emotion: boredom.

Over recent years, boredom has been much studied in the area of psychology (Chin, Markey, Bhargava, Kassam, & Loewenstein, 2017). Boredom is considered a psychological and affective state related to monotonous and repetitive work (Eastwood, Frischen, Fenske, & Smilek, 2012; O'Hanlon, 1981), challenging tasks (Chin et al., 2017), settings without meaning (Fahlman, Mercer, Gaskovski, Eastwood, & Eastwood, 2009), and low stimulation (O'Hanlon, 1981). People experience boredom ubiquitously and frequently in daily life (Bench & Lench, 2013; Elpidorou, 2018). Being bored may be unpleasant (Loukidou, Loan-Clarke, & Daniels, 2009) because people tend to think that it is better to do something than to have nothing to do. Furthermore, boredom also occurs when people are disengaged at work (Loukidou et al., 2009; Schaufeli & Salanova, 2014). Typically, boredom is viewed as a hallmark of unproductivity. Indeed, boredom has been linked to a range of negative consequences (Fahlman et al., 2009). These include unsustained attention (Eastwood et al., 2012), an increased number of mistakes (O'Hanlon, 1981), low motivation for study (Mann & Robinson, 2009), poor performance (Schaufeli & Salanova, 2014), and technological addiction (Zhang, Li, & Yu, 2022).

Yet, there is a contrasting view that boredom might lead to a moment of inspiration. Even though boredom has a negative influence on mental activities, several researchers have suggested that the state of boredom may facilitate creativity (e.g., Burkus, 2014; Carroll, Parker, & Inkson, 2010; Harris, 2000).

Harris (2000) investigated various aspects of boredom, including its perceived benefits, in a mixed-methods study. Perceived benefits of boredom were analyzed with a qualitative approach by asking 170 university students to write their perceptions and thoughts. Results indicated three benefits including the opportunity for thought and reflection, the opportunity to try something new, and creativity—so that 80 % of them may have the experience of something creative at times when they feel bored. Accordingly, one can infer that boredom is relevant to creativity.

In addition, Raffaelli et al. (2023) examined the conscious minds of creative individuals during idle time with two studies. The first study with the experimental approach explored the ongoing consciousness of 81 adults by instructing them to speak out loud their thoughts for 10 minutes. The results showed that participants with high originality scores with the divergent thinking task experienced less boredom, recorded more word counts while speaking, and had more flexible and smooth transitions between thoughts. The second study indicated that those who described themselves as highly creative also experienced less boredom during the COVID-19 pandemic. These results may indicate that creative individuals tend to be more engaged even when the task is less captivating.

In the area of management, Carroll et al. (2010) conducted a qualitative study using a sample of 26 senior managers in order to capture aspects of boredom through leadership development programs. They found that the experiences of boredom “certainly appear to provoke ideas of challenge in the minds of individuals” (Carroll et al., 2010, p. 1038). Their findings suggest that boredom can lead to activities that produce “meaning, interest and engagement” (Carroll et al., 2010, p. 1038), indicating that boredom serves to provide cognitive variation and information for generating creativity. Although the research of Burkus (2014) was conceptual rather than experimental, he argued that boredom might increase the creativity of an individual's work in organizations. His study implied the importance of new projects or programs to leverage boredom to help organizational workers enhance creativity (Burkus, 2014).

There are studies that suggest that boredom has a positive influence on creativity. The study of Mann and Cadman (2014) presented a positive relationship between the two constructs. Their research design consisted of two studies. The study assigned participants to a control group and an experimental group that experienced boredom by writing down telephone numbers. The first study involved 80 participants from a community church: 40 in a control group and 40 in an experimental group that experienced boredom by writing down telephone numbers for 15 minutes. Both groups were required to do a creative task by listing as many different items as possible. Two raters evaluated the quality of the items as creative performance. Results of the first study revealed a significant difference between the groups in terms of the number of writing items and an insignificant difference in terms of the quality rating of the items. Subsequently, the second study had a sample of 90 participants, 30 in a control group, 30 in the first experimental group who were required to write down telephone numbers, and 30 in the second experimental group who were instructed to read them. The second study applied the same creative task and assessment methods. Results demonstrated a significant difference among the three groups with regard to the number of writing items for the creative task as well as the rates of quality ratings. Post hoc tests revealed that the control group significantly differed from the two experimental groups in terms of the number of writing items and the rates of quality ratings.

Gaspar and Middlewood (2014) found that participants 105 university students who were induced to be bored or elated engaged in more associative thought on the association task than participants who were induced to be relaxed or distressed. This suggests that the dimension of boredom vs. elation is important for creative performance. Gaspar and Middlewood (2014) discussed that elation facilitates sensation seeking for the expansion of one's repertoires, while boredom also promotes sensation seeking for finding something interesting to do. Thus, their study seems to support a positive relationship between creativity and boredom. In contrast, the study of Haager, Kuhbandner, and Pekrun (2018) showed that boredom undermined creative performance. The study found that boredom induced by repeated tasks can impede the fluency of idea generation. With the inconsistency in empirical results, further investigation of the relationship between creativity and boredom is needed.

Based on the study of Guilford (1967), creativity can be categorized into convergent and divergent creativity. Divergent creativity is associated with generating multiple ideas for a given problem, which can be subdivided into four dimensions: fluency, flexibility, originality, and elaboration. The current study examined whether there is a positive relationship between creativity and boredom with regard to the four dimensions: fluency, flexibility, originality, and elaboration. It is estimated that a level of higher boredom leads to a higher score on the assessment of the creativity test, and a lower level of boredom leads to a lower score. Thus, this study examined the following hypothesis:

H1: Boredom leads to a greater number of responses on the creativity test.

H2: Boredom leads to more flexible responses on the creativity test.

H3: Boredom leads to more original responses on the creativity test.

H4: Boredom leads to more elaborated responses on the creativity test.

2. METHOD

2.1. Participants and Sampling Procedure

Initially, there were 26 participants in the main study, but one participant was eliminated from the analysis due to erroneous instruction during the experiment. Therefore, data from 25 participants were used for the analysis. Participants were university students

in Japan, recruited from their acquaintance with the author or the course Biological Foundations of Mind and Behavior. The experiment was conducted across 4 weeks from November to December 2021. The whole experiment was conducted in Japanese and, all participants had sufficient language ability to follow the instructions. Each participant was assigned to an experimental or a control group with a randomization procedure.

2.2. Material

The boredom task was created with reference to the experiment by Mann and Cadman (2014) and was consistent with the cognitive aspect of boredom discussed by Eastwood et al. (2012) in terms of the repetition of simple tasks. The participants in the experimental group were presented with an online document that contained a list of phone numbers and were asked to write down the number on paper for 10 minutes. The phone numbers were randomly generated by the author. The file contained 210 phone numbers, with 14 numbers on each page.

Creativity was measured by the S-A creativity test. The S-A creativity test was developed based on Guilford's theory (1967) on divergent thinking for Japanese participants. S-A Creativity test was used in numerous studies on creativity in Japan. For example, Ishiguro et al. (2022) found associations between divergent thinking, creative achievements, and perception of own creativity. In addition, the S-A creativity test has been used to examine creativity at biological and physiological levels (Nobukawa et al., 2020; Takeuchi et al., 2010). The test asks participants to write down responses in three domains: (1) possible uses of an item (e.g., list possible usages of newspapers); (2) desire for a particular item (e.g., what kind of bag would you wish to exist?); and (3) possible consequences of novel circumstances that are unlikely to happen (e.g., what would be the consequences if everyone could fly without mechanical aid?). The current study used only the third part of the S-A creativity, the Consequences test, due to the possibility of mitigating boredom as the participants engage with the test. The present study selected the Consequences test because responses tend to obtain high rating scores (Hass & Beaty, 2018).

The questions and instructions of the S-A creativity test were shared with the participants with a laptop computer (Apple, MacBook Pro 13). The author and participants communicated online using Zoom (ver. 5.8.4) during the experiment.

2.3. Procedure

The author set up the online link for the experiment with Zoom and sent the link to each participant. Each session of the experiment had only one participant.

At the beginning of the session, an overview of the experiment was provided to the participant, and they were asked to prepare their pen and paper. Participants in the experimental group worked on the boredom task for 10 minutes. They received a file containing a list of telephone numbers via email. The file was created by power point and each slide contained 14 telephone numbers and there were 15 slides in total. The author and participants turned off the camera and microphone function on Zoom throughout the boredom task. To prevent instilling motivation in transcribing numbers, the remaining time for the boredom task was hidden from the participants. Participants were asked to write down as many telephone numbers as they could. When 10 minutes had passed, the author instructed participants to put down the pen. After completing the boredom task, the author asked the participants to write the degree of boredom they felt during the task on paper on a 5-point Likert scale (1 = Not boring at all, 5 = Extremely boring).

Participants in both the experimental and control groups performed the S-A creativity test. The content of the Consequences test was displayed on the author's computer screen and shared via Zoom. While briefing, the experimenter showed the example of the question and the subsequent answers. Participants were asked to write down a list of consequences in each scenario. They were instructed to produce as many consequences as possible for each prompt. Participants were informed that they were free to write outlandish answers. They were informed that their points would not be deducted from whatever they wrote as an answer. Before moving on to the real questions, the participants engaged in one practice question for 2 minutes ("What would happen if there is no clock in the world?"). After the practice question, participants were reminded of the overall instruction of the Consequences test. There were two questions ("What would happen if paper disappeared from the world?" and "What would happen if humans no longer needed food to live?"), and participants were given 5 minutes to answer both questions. The author and participants turned off the camera and microphone during the S-A creativity test. Upon finishing the creativity test, all participants were asked to take photographs of all of their responses including telephone numbers, the degree of boredom felt during the boredom task, and answers for the S-A creativity test, and send the images to the author via e-mail.

2.4. Evaluation of the Creativity Task

Based on Guilford (1967), four criteria were introduced to evaluate divergent creativity: fluency, flexibility, originality, and elaboration. Fluency was defined as the number of answers. Flexibility was considered as the ability to provide answers from a variety of perspectives. Originality was defined as the rarity of the responses relative to all participants' responses. Lastly, elaboration was considered to be the ability to generate detailed ideas.

To evaluate creativity, the present study consulted a third party to ensure the objectivity of the assessment. Creativity was evaluated by Success Bell, an institution specializing in psychological assessment. After completing the experiment, the author transcribed the list of consequences written by each participant to a corresponding segment in a test sheet. The test sheets were sent to Success Bell through the mail. Later, CSV files containing the assessment of creativity were sent from Success Bell.

2.5. Statistical Design

The experiment was conducted with a between-participants design. The independent variable was boredom experience, and the dependent variable was creative performance. To analyze the effect of boredom on creativity, an independent *t*-test was used to calculate the mean frequency of the number of answers given as well as to examine the mean scores of flexibility, originality, and elaboration.

3. RESULTS

Table 1 provides the overall mean, standard deviation, *t*-value, and significance for each criterion of creativity in each group. The mean score of boredom felt during the boredom task in the experimental group was 2.41.

The independent-samples *t*-test showed no significant difference in fluency, $p = .09$; flexibility, $p = .18$; and originality, $p = .45$. For elaboration, the results of the independent-samples *t*-test illustrated that the difference in the detail of the ideas between the two groups was significant, $p = .03$. The findings demonstrated that the experimental group produced more elaborate responses than the control group.

Table 1.
Relation of Boredom to Creativity Elements of Fluency, Flexibility, Originality, and Elaboration in the Experimental and Control Group.

Creativity		Experimental	Control	<i>t</i>
	<i>N</i>	12	13	
Fluency	Mean	15.08	12.31	1.85
	<i>SD</i>	4.42	3.01	
Flexibility	Mean	10.00	8.85	1.40
	<i>SD</i>	2.34	1.77	
Originality	Mean	3.92	3.31	0.78
	<i>SD</i>	1.98	1.93	
Elaboration	Mean	14.08	11.15	2.37*
	<i>SD</i>	3.50	2.58	

**p* < .05.

4. DISCUSSION

4.1. General Discussion

The current study used an experimental design to examine whether a state of boredom affects creativity. The method used to induce boredom was the telephone writing task, and the person's creativity was measured with a part of the S-A creativity test asking about the consequences of an improbable event. Creativity was examined in four dimensions: fluency, flexibility, originality, and elaboration. Hypothesis 1 predicted that the experimental group would generate a greater number of responses on the creativity test than the control group. Hypothesis 2 stated that the experimental group would generate more flexible responses on the creativity test than the control group. Hypothesis 3 predicted that the experimental group would provide more original responses on the creativity test than the control group. Hypothesis 4 stated that the experimental group would provide more elaborate responses on the creativity test than the control group.

The results revealed that the difference in the number of responses between the two groups was not significant. Therefore, Hypothesis 1 was not supported. Next, the results demonstrated that the categories of responses between the two groups were not significant. Thus, Hypothesis 2 was not supported. The difference in points given to rare responses was not significant between the two groups. Hence, Hypothesis 3 was not supported. Furthermore, the results of the independent-samples *t*-test illustrated that the difference in the detail of the ideas between the two groups was significant. The finding demonstrated that the experimental group produced significantly more elaborate responses than the control group. Hypothesis 4 was accepted.

Overall, the results indicated the dismissal of fluency, flexibility, and originality, and acceptance of elaboration. This implied that boredom promotes more detailed responses in the creativity test. Accordingly, boredom's influence on creativity varied by each dimension of creativity. This notion indicates the need to further investigate those relationships, particularly the aspect of elaboration due to the acceptance of the relationship. Also, the present study might support a premise derived from past literature that the relationship between creativity and boredom is inconsistent. That is, some dimensions of creativity may be facilitated by boredom, while others may not. It will be important to specify which dimensions of creativity to investigate boredom's effect on creativity.

4.2. Comparison with Previous Studies

The results did not observe the effect of boredom on creativity in terms of fluency. This tendency contradicts the findings of past research. In part of the study of Mann and Cadman (2014) using a creativity task, the number of answers obtained was significantly greater when a higher level of boredom was experienced. On the other hand, the current study is aligned with the results of Haager et al. (2018), which demonstrated a decrease in fluency performance as more boredom was induced.

With regard to flexibility, originality, and elaboration, little research has analyzed those dimensions in the context of boredom. Without the factor of boredom, flexibility was used as a criterion of creativity in studies by Iwasaki (1971) and Yamaoka and Yukawa (2016). Some studies dealt with the topic of creativity using the criteria of flexibility (Iwasaki, 1971; Yamaoka & Yukawa, 2016), originality (Raffaelli et al., 2023), and elaboration (Suryandari, Rokhmaniyah, & Wahyudi, 2021). Yamaoka and Yukawa (2016) examined whether mind-wandering enhances creative problem-solving ability. Sixty-two undergraduate students participated in their study, and students were assigned into groups with and without mind-wandering sessions before the creativity test. The creativity test was evaluated by several criteria including flexibility. Results showed that participants who engaged in mind-wandering more frequently obtained a higher score on creativity tests in terms of flexibility. Raffaelli et al. (2023) investigated the internal thoughts of creative individuals during the unstructured resting period. One of their studies monitored the participants' thoughts by letting them speak their thoughts for 10 minutes. The results found that those with high originality with the divergent thinking task perceived less boredom, spoke more words, and had more loosely associative thoughts. Suryandari et al. (2021) investigated how a scientific reading-based project could facilitate creative thinking skills among elementary school students. Their findings observed a tendency to develop more detailed ideas in essays after participation in the scientific reading-based project. The influence of boredom on other dimensions of creativity such as flexibility and elaboration need further examination.

4.3. Limitation

The major limitation of this study concerns participants' boredom experience. The participants in the experimental group may not have felt much boredom during the telephone writing as the author expected. The average level of boredom felt during the telephone writing task was 2.41. There are several possible explanations as to why participants only experienced lower levels of boredom. First, the author did not monitor participants during the telephone writing task. Both the author and the participants turned off the camera to ensure less distraction while writing telephone numbers. However, since there was no supervision from the author, participants may have found autonomy during the writing task. Second, the author did not specify the details of the writing process such as the pace of writing and the number of telephone numbers per paper. The lack of instructions in these elements could also provide some degree of freedom during the telephone writing task. Furthermore, the telephone writing task could not induce much boredom in participants because writing down telephone numbers was not an activity they typically do in real life. It is possible that participants experienced more boredom if the task to induce boredom emulates a real-life situation such as asking them to wait or listening to an esoteric talk before the creativity test.

Another limitation of this study is the lack of information regarding participants. The present study did not gather data about the participants such as their age, SES, gender, level of creativity, and other variables. Including these variables in the analysis can be crucial to

identify the central effect and exclude the possibility of the other confounding effects of these variables. Furthermore, the present study could not report the psychometric characteristics of the S-A creativity test such as validity and reliability. The lack of measurement of these psychometric properties may affect the interpretation of the results.

4.4. Implications

The current study offers both methodological and practical implications. A methodological implication, as mentioned above, is to focus on dimensions of creativity. In the current study, the qualitative sides of creativity were examined from three components: flexibility, originality, and elaboration. Since those dimensions used in this study were derived from a single concept of creativity introduced by Guilford (1967), similar results were expected across the three components. The findings of this study, however, differed between the three components, demonstrating that boredom only had a significant effect on elaboration, with an insignificant influence on flexibility and originality. Examining the elements comprising creativity seems to be essential. Thus, it is crucial to specify which component of creativity is analyzed. For fluency, although the effect was not observed, the experimental group did report more answers than the control group. Future research can incorporate different types of creative tests or demographics to further clarify the effect of boredom on creativity in terms of fluency.

The study also provides practical implications related to feelings of boredom in the workplace and education sector. Boredom has been viewed as a negative emotion by the public and is often associated with counterproductivity. However, boredom may have some benefits in itself. Embracing a sense of boredom at work or school could be worthwhile. For individuals attempting to resolve an issue or propose a creative solution, the results of the present study indicate that taking on a tedious task may help them achieve more creative performance.

5. CONCLUSION

The present study used an experimental design to investigate whether boredom affects creativity. There were discrepancies among creativity research with regard to whether boredom affects creativity or not (Mann & Cadman, 2014; Haager et al., 2018). Among the four dimensions of creativity, this study indicated that a state of boredom may bring positive influences on elaboration. However, the effect of boredom was not observed in the dimensions of fluency, flexibility, and originality. This discrepancy suggests that it is important to consider the elements of creativity for the study of creativity. Future research into boredom and creativity should focus on the internal elements of creativity and establish how boredom affects each element differently.

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What is the Relationship Between Creativity and Boredom?

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Y. Yamazaki

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AUTHOR INFORMATION

Full name: Yusuke Yamazaki

Institutional affiliation: Graduate School of International Management, International University of Japan

Institutional address: 777 Kokusaicho, Minamiuonuma, Niigata 949-7248

Email address: yusukeyz@iuj.ac.jp

Short biographical sketch: Yusuke Yamazaki is a graduate student at the Graduate School of International Management at the International University of Japan. He earned his B.A. in Liberal Arts from International Christian University. During the undergraduate studies, he pursued to study psychology.