

The Relationship Between Views of Learning and the Tendency to Emphasize Awe in Learning Among Students Taking Teaching Courses.

Ishikawa Katsuhio¹, Momose Koichi²

¹Osaka University, ²Yamanashigakuin University

Keywords: awe, view of learning, need for cognitive closure, need for cognition

Introduction

The aim of this study was to determine the extent to which teaching students tend to emphasize a sense of awe in pupils' learning, and how their tendency to emphasize a sense of awe in pupils' learning influences their views of learning in school education.

Awe is a transcendent moral emotion of fascination with an object or world, also referred to as the moral foundation of wisdom (Keltner et al., 2020). Keltner et al. (2003) considered two central elements of awe to be “perceived vastness” and “need for accommodation.” Subsequent research has found that feelings of awe increase socially desirable cognitive tendencies, such as being more altruistic, being able to treat others and self equally, and making fair judgements (Keltner et al., 2020).

Feeling awe toward world has also been found to activate an interest in science (Cuzzolinom, 2021). A sense of awe towards the subjects of scientific research and the scientific research activity has been found to underpin the excellence of outstanding scientists' research activities. Outstanding scientists feel a deep reverence for nature and the world and have a profound interest in nature and the origins of the world. Furthermore, it has been shown that the phenomenon of awe inducing a deep interest in science also occurs in non-scientists. Specifically, feeling a sense of awe towards nature and the world causes a sense of a knowledge gap, in that “there is a lot I don't know about the world,” and this in turn mediates a deep interest in science (McPhetres, 2019).

Do teaching students focus on a sense of awe in pupils when practicing their teaching with pupils in school? More specifically, how does the tendency to focus on feeling awe-inspiring in learning situations play a role in constructing a 'view of teaching' in school education among teaching students?

As teachers' views of teaching, the Direct Communicative and Constructivist views of teaching are indicators that have been used in various studies (OECD, 2012) and are well established and supported (OECD, 2012). The “direct-communicative view of teaching” is a view of teaching that is oriented towards “teachers transferring knowledge in a clear and structured way, explaining precise solutions, giving students clear and solvable tasks and creating a calm and focused atmosphere in the classroom” (OECD, 2012). The “constructivist view of teaching”, on the other hand, is a view of teaching that is oriented towards “teachers giving students a central role in learning activities by encouraging them to ask questions, giving them opportunities to explore ways to solve problems.” The former views students as passive, whereas the latter views students as active participants in the process of knowledge acquisition (OECD,

2012).

Thus, there is a certain degree of accumulation in the conceptual formation of views on teaching. Mechanisms through which awe promotes commitment to learning have also been demonstrated. On the other hand, no psychometric scale has been developed to measure individual differences in the importance of learners' feelings of awe in their learning. Nor has it been possible to examine how learners' views of learning are related to the importance of feeling awe in their learning. In this study, we developed a scale to measure individual differences in the importance of awe in learning situations and examine its relation to the view of learning in students of teaching course. As first step of the research, Awe in Learning Situation Scale (ALSS) was developed in this research.

In order to understand the characteristics of the Awe in Learning Situation Scale (ALSS), a scale to measure individual differences focusing on a sense of awe in learning situations, which is proposed in this paper, the relationship between ALSS, need for closure and need for cognition was examined. The following outlines need for closure and need for cognition.

Kruglanski (1989) posited a cognitive need for closure. Cognitive need for closure is defined as "the need for a firm answer to a problem and an aversion to ambiguity" (Kruglanski & Webster, 1996). People with high cognitive need for closure are considered to be cognitively impulsive and make decisions quickly from insufficient information, whereas people with low cognitive need for closure are considered to be deliberative and consider a variety of information, avoiding immediate decisions (Suzuki & Sakurai, 2003).

The first to conceptualize need for cognition as a measurable individual difference was Cohen, Stotland & Wolfe (1955). They described cognitive need as the desire to structure relevant situations together in a meaningful way; the desire to understand the world as it has been experienced. They also defined it as "the desire to understand and rationally interpret the world as it has been experienced so far". Given that this definition involves the process of obtaining information from others, such as experts, rather than the self-processing information through effort, Cacloppo & Petty (1982) emphasized the point that the input information is processed internally by the self and redefined it as "an intrinsic tendency to engage in and enjoy the information processing which need some effort."

Method

Participants and procedure

Sixty-seven university students (48 males, mean age 19.90 years) were asked to complete an online questionnaire in a pedagogy class at University A. Respondents were students taking a teaching course at University A. A QR code was projected through a projector and respondents read the QR code from their smartphones and proceeded to answer via a web form. Prior to responding, it was explained to the respondents that they were free to decide whether or not to respond, that they were free to stop responding at any time, and that they would be deemed to have agreed to respond with their answer.

Measure

Awe in Learning Situation Scale (ALSS)

Interviews were conducted with psychologists specializing in moral psychology. First, the psychologist was asked to give a five-minute talk in which he or she was asked to “recall and talk about a situation in which you felt most strongly awe in the learning subject or the author of the work during the study.” The psychologist was then asked to “Briefly describe the importance of learners feeling awe during their learning.” The psychologist had 10 minutes to type what they came up with into the computer. The descriptions of awe during learning were formatted into brief statements and used as items on the Awe in Learning Situation Scale (ALSS) for the quantitative survey.

Eight items from the above interviews were used for the measurement. Specifically, "Study is meaningless unless it is accompanied by the experience of being fascinated by the wisdom of the ancients," "Study is meaningless unless it is accompanied by the experience of being fascinated by the fascination of the object of Study is meaningless if it is not accompanied by a profound transformation in the learner before and after the Study is meaningless if it is not accompanied by the excitement of learning," "Study is meaningless unless learners have a deep sense of the meaning of learning," "It is more important to explore alternative ideas It is more important to explore alternative ideas and theories than to believe what is taught," "Everyone is good at what they do and not good at what they do not do, so the learner It is more important to ask questions and study for oneself than to learn what is prescribed." Responses were asked using the five-question method, ranging from 1 disagree to 5 agree.

Need for Closure Scale (NCL)

The Japanese version of Webster & Kruglanski's (1994) Cognitive Completion Needs Scale (NCL-J) (Suzuki & Sakurai, 2003) was used. Suzuki and Sakurai (2003) created a Japanese version of the Webster & Kruglanski (1994), using 20 items of three factors: decisiveness (8 items), preference for order (7 items) and preference for predictability (5 items). In order to reduce the burden on respondents in this study, three items with high factor loadings were selected from each factor, and responses were responded for a total of nine items. Responses were asked using a five-point scale ranging from '1 not applicable' to '5 applicable'. Scale scores were calculated so that the higher the score, the higher the need for cognitive completion.

Need for Cognition (NCO)

Based on the NCO developed by Cacioppo & Petty (1982), Kamiyama & Fujiwara (1991) developed a Japanese version of the NCO. As a result, a one-factor, 15-item scale was developed. In this study, five items with high factor loadings were selected for the survey to reduce the burden on respondents. Responses were asked using a five-factor scale ranging from '1 not applicable' to '5 applicable'.

View of Learning (VL)

The scale of VL developed by Shimizu and Yamamoto (2019) was used. Shimizu and Yamamoto (2019) was developed based on the items of OECD (2012). Shimizu and Yamamoto (2019) conducted a survey on

university students in teaching course who had experienced teaching practice in elementary schools, confirmed the factor structure and selected scale items through factor analysis. Shimizu and Yamamoto (2019) obtained two factors and eight items: constructivist view of learning (five items) and direct transferist view of learning (three items). In this study, the eight items of Shimizu and Yamamoto (2019) were used. Responses were asked using a five-factor method, ranging from '1 not apply' to '5 apply'.

Results

Factor analysis of Awe in Learning Status Scale (ALSS)

Diagonal SMC, MAP, parallel analysis and SMC parallel analysis were conducted to determine the number of factors in the ALSS, and all methods suggested a two-factor solution; a principal component analysis (Promax rotation) with two factors specified yielded the factor pattern in Table 1. A two-factor solution was adopted because none of the items showed a principal component loading of more than .40 on one factor and none of the items showed a loading of more than .40 on two factors. The first factor included "Study is meaningless without the experience of being fascinated by the wisdom of the ancients," "Study is meaningless if it is not accompanied by the experience of being captivated by the fascination of the subject matter being studied". And the first factor was labeled "Fascinated." The second factor included items such as "Study is meaningless if it is not accompanied by the experience of being captivated by the fascination of the subject matter being studied", and was therefore named "Fascinated". The second factor included items such as "Study is meaningless unless the learner has a deep sense of the meaning of learning," and "It is more important to explore other ideas and theories than to believe what is taught", so it was named "Learner-central."

Table 1 Factor patter of Awe in Learning Situation Scale (ALSS)

Item	Factor		h2
	1	2	
Study is meaningless without the experience of being fascinated by the wisdom of the ancients	.94	-.16	.79
Study is meaningless if it is not accompanied by the experience of being captivated by the fascination of the subject matter being studied.	.89	-.05	.77
Study is meaningless unless a profound transformation occurs in the learner before and after the study	.82	.10	.74
Study is meaningless if it is not accompanied by the excitement of learning	.71	.11	.58
Study is meaningless unless the learner has a deep sense of the meaning of learning	-.04	.82	.65
It is more important to explore other ideas and theories than to believe what is taught	-.08	.80	.60
Everyone is good at what they do and not good at what they do not do, so the learner should decide what they want to learn.	.02	.77	.60
It is more important to ask questions and study by oneself than to memorize what is prescribed.	.31	.47	.43
Factor Contribution	3.33	2.67	
α	.86	.73	
ω	.91	.84	

Note. Factor 1 was labeled "Fascinated," and factor 2 was labeled "Lerner-central."

Factor analysis of Need for Closure Scale (NCL)

Diagonal SMC, MAP, parallel analysis and SMC parallel analysis were conducted to determine the number of factors in the NLC, and all methods suggested a three-factor solution. When a principal component analysis (Promax rotation) was performed specifying three factors, two items were detected that showed loadings of .40 or higher on several items. These two items were excluded from the analysis and the principal component analysis (Promax rotation) was performed again, yielding the factor pattern in Table 2. As none of the items showed a principal component loading of .40 or more on one factor and none of the items showed a loading of .40 or more on two more factors, the factor pattern in Table 2 was adopted. The first factor consisted of two items, "I always have a hard time making decisions," and "I don't think I am decisive", and was therefore the first factor was named "Decisiveness". Factor 2 consisted of items such as "I think a regular life suits my nature," and "I think I have a neat and tidy life" and factor 2 was labeled "Preference for regularity." Factor 3 consisted of two items as "I think it is interesting to jump into a new situation not knowing what will happen," "I get excited when I am in a situation where I don't know what is going to happen" and the factor was labeled "Preference of irregularity."

Table 2 Factor pattern of Need for Closure Scale (NCL)

Item	Factor			h2
	1	2	3	
I always have a hard time making decisions	.94	.12	.10	.88
I don't think I am decisive	.94	-.11	-.06	.91
I think a regular life suits my nature	.14	.88	-.02	.80
I think I have a neat and tidy life	-.21	.70	.15	.60
I think life is more meaningful when I live on a schedule	.03	.69	-.15	.46
I think it is interesting to jump into a new situation not knowing what will happen	.00	-.09	.87	.73
I get excited when I am in a situation where I don't know what is going to happen	.05	.02	.84	.70
Factor Contribution	1.86	1.81	1.59	
α	.87	.63	.62	
ω	.94	.82	.83	

Note. Factor 1 was labeled "Decisiveness," factor 2 was labeled "Preference for regularity" and "Preference for irregularity."

Factor analysis of Need for Cognition (NCO)

Diagonal SMC, MAP, parallel analysis and SMC parallel analysis were conducted to determine the number of factors in the NLC, and diagonal SMC, MAP and parallel analysis proposed a one-factor solution, while SMC parallel analysis proposed a three-factor solution. However, the solution did not converge or an unsuitable solution was generated for factors 2 and 3. It was therefore decided to adopt a one-factor structure (Table 3). The obtained principal component loadings were all above .40, so there were no problems.

Table 3 Factor pattern of Need for Cognition (NCO)

Item	Factor		h2
	1		
I prefer difficult tasks that require me to use my brain rather than tasks that require me to think too much	.80		.64
Often set goals that require a lot of thinking to accomplish.	.71		.50
Are not very interested in learning new ways of thinking	.62		.38
Finds it especially satisfying to think hard and accomplish important tasks that require a lot of intellectual effort	.55		.30
Thinks more than necessary about the task	.42		.18
Factor Contribution	2.00		
α	.61		
ω	.77		

Factor analysis View of Learning (VL)

Diagonal SMC, MAP, parallel analysis and SMC parallel analysis were conducted to determine the number of factors in the NLC, and a two-factor solution was proposed for diagonal SMC, a one-factor solution for MAP and parallel analysis. Factor analysis by maximum likelihood method (Promax rotation) with one and two factors specified. The factor contribution of the first factor was 3.982 for the one-factor structure and 4.024 for the two-factor structure. The factor structure with higher explanatory power was adopted and the two-factor solution was adopted (Table 4). First factor contained the item as "As a teacher, my role is to help students explore questions," "It is important for students to think for themselves before the teacher provides answers and solutions," the factor was labeled "Constructivist view of learning." Second factor contained two items as "A good teacher shows the right way to solve problems," "Quiet classrooms are desirable for effective learning," second factor was labeled "Direct-transfer view of learning."

Table 4 Factor patter of View of Learning (VL)

Item	Factor		h2
	1	2	
As a teacher, my role is to help students explore questions.	.94	-.16	.82
It is important for students to think for themselves before the teacher provides answers and solutions.	.90	-.13	.76
Children learn best when they discover solutions to their own problems.	.84	-.12	.66
Children's statements in class do not always have to be correct.	.74	.05	.57
It is important to teach knowledge in class because acquisition of knowledge is important in learning.	.73	.24	.71
The process of thinking and reasoning is more important than specific curriculum content	.64	.16	.49
A good teacher shows the right way to solve problems	.17	.68	.56
Quiet classrooms are desirable for effective learning	-.19	.51	.24
Factor contribution	4.02	1.25	
α	.91	.47	
ω	.92	.52	

Note. Factor 1 was labeled "Constructivist view of learning" and factor 2 was labeled "Direct-transfer view of learning."

Relation Constructivist view of learning in VL and other study variables

The relationship between the tendency to emphasize awe-inspiring feelings in learning and the need for closure and the need for cognition was examined. Specifically, multiple regression analysis was conducted with ALSS as the response variable and NCL / NOC as the explanatory variables. In addition, a multiple regression analysis was conducted with Constructivist view of learning in VL as the response variable and with NCL, NCO and ALSS as explanatory variables. The results of the analysis showed that the stronger the irregularity in NCL, the stronger the Learner-central in ALSS. Furthermore, the Constructivist view of learning was prompted with higher scores of Learner-central in ALSS (Figure 1).

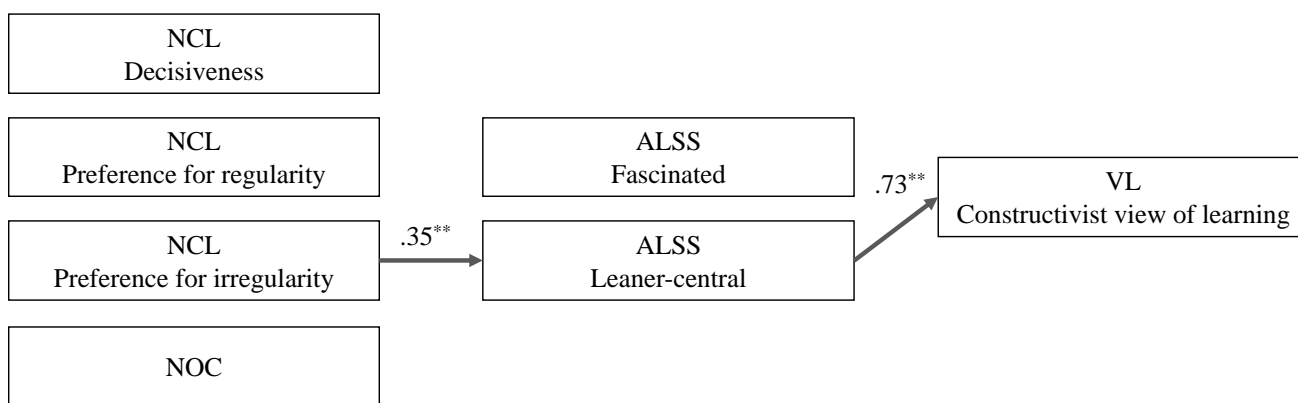


Figure 1 Multiple regression modeling with ASLL as response variables and with NCL / NCO as explanatory variables

Relation Direct-transfer view of learning in VL and other study variables

The impact of NCL/NCO/ALSS on VL was examined. Specifically, multiple regression analysis was performed with ALSS as the objective variable and NCL/NOC as the explanatory variable. In addition, multiple regression analysis was performed with VL as the objective variable and NCL/NCO/ALSS as explanatory variables. The results showed that the Constructivist view of learning in VL increased in conjunction with a higher Learner-central in ALSS ($\beta=.73$). The Direct-transfer view of learning in VL ($\beta=.36$) increased in tandem with higher NCO (Figure2).

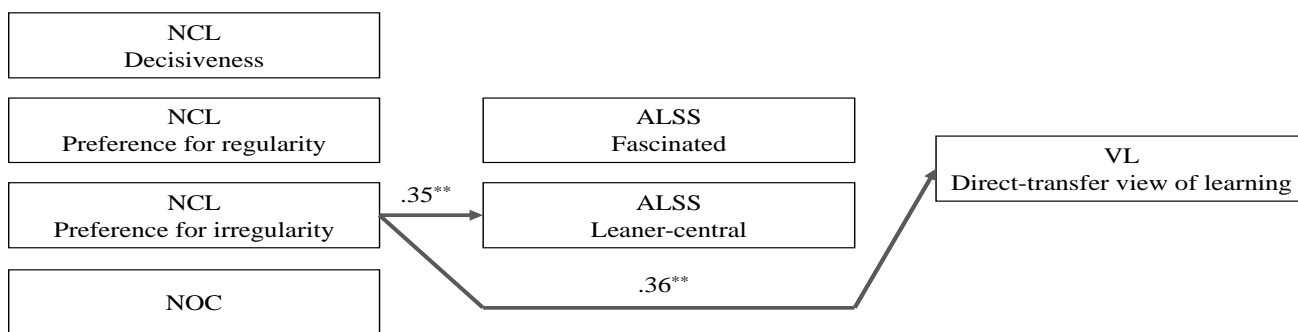


Figure 2 Multiple regression modeling with VL as response variables and with NCL / NCO / ALSS as explanatory variables

Discussion

The present study investigated that whether the extend to which student on teaching courses focus on awe in learning situation were related with need for closure and need for cognition, and how focusing on awe in learning situation influenced the views of learning in pupils.

A qualitative study was first conducted to construct psychometric scale measuring the importance of the feeling of awe in learning situations. Interviews with psychologists specializing in moral psychology yielded eight scale items. A quantitative study was conducted with university students studying for a teaching degree, and two factors were found. First, the factor "Fascinated" was extracted, which emphasized being fascinated by the subject of study and previous research. Secondly, the factor 'Learner-central' was extracted, which emphasized the importance of learning being deeply related to the learner's awareness of the problem.

The relationship between need for closure and need for cognition for awe in learning situations was examined, and a positive association was found between "Preference for irregularity" in need for closure and "Learner-central" in awe in learning situations. In other words, the more students wanted to experience new things in learning process, the more they emphasised that learning was deeply related to the learner's awareness of the problem. On the other hand, neither need for closure nor the need for cognition was associated with "Fascinated". In contrast to the results of the study, which indicated that outstanding researchers feel a strong sense of awe towards their research activities and the subject of their research (Cuzzolinom, 2021), the teaching students tended to consider that learner-central learning should take place when their need for cognition were high, but they did not necessarily focus on a transcendent sense of awe in learning situation.

The study then examined how the desire for cognitive completion, the need for cognition and the tendency to emphasise a sense of awe in learning situations are related to the view of learning. First, the view of learning was divided into two aspects: the 'constructivist view of learning', which emphasises learners thinking for themselves, and the 'direct-transfer view of learning', which emphasises teachers showing students how to solve problems. The "Constructivist view of learning" emphasises the importance of learners thinking for themselves, while the "Direct-transfer view of learning" emphasises the importance of teachers showing students how to solve problems. The results of the regression analysis showed a positive influence of "Learner-centre" on the "Constructivist view of learning" and a positive influence of "Direct-transfer view of learning" on the "Direct-transfer view of learning". Direct-transfer view of learning" was positively influenced by "Preference for irregularity". In other words, it was the desire "to learn based on one's own interests" that promoted the constructivist view of learning and the cognitive desire "to learn new things" that promoted the transfer view of learning among students taking a teaching course.

Why "preference for irregularity" in NCL promoted "Direct-transfer view of learning" in VL ? At first glance, this association seems contradictory. This is because learning new things is perceived as contradictory to the one-way transfer of knowledge from the teacher. On the other hand, being guided in learning new things by a teacher who is more experienced than the learner can be a useful learning strategy.

In other words, the one-way transfer of knowledge from the teacher is not an experience that undermines the independence of learning for teaching students, but is seen as an important learning strategy for understanding new units that are difficult to learn on their own.

Future issues and directions are discussed. First, the scale on awe in learning situations developed in this study was a trait-level, propensity-level scale. In other words, it was not a scale describing the emotional state of awe during learning. Therefore, the present study did not measure situated awe. There is a need to develop a psychometric scale to measure situated awe that is applicable to learning situations. Previous studies have shown that feeling awe towards the learning object is likely to induce long-term, sustained learning behaviour (McPhetres, 2019). Previous studies have appropriated common measures of awe, such as the SAS (Sawasda & Nomura, 2022) and AWE (Yaden et al., 2018), when measuring awe in learning situations. However, the SAS and AWE may not describe the experience of awe when exposed to excellent previous research in the social sciences and humanities, and may not verbalise the experience of awe when exposed to excellent previous research in the social sciences and humanities. Research on what awe-inspiring experiences correspond to learning in universities, not only in the research area, is also a work in progress.

Second, it is necessary to conduct a survey of students who are not studying for a teaching degree. The research population for this study consisted mainly of students undertaking teaching courses who were aiming to become teachers of health and physical education and social studies. Students who are studying for a teaching degree are likely to be characterised by a deep adjustment to schooling and a positive perception of schooling. Teaching students may be interested in the activity of teaching itself, but they do not necessarily have experience of being fascinated by the subject and methods of learning and science. It is necessary to broaden the scope of the subject and explore the inner nature of awe in learning.

Third, the research paradigm needs to be transformed into a paradigm that involves awe in learning situations. Students taking teaching courses need to obtain a large number of credits and pass the teacher recruitment examinations. As a result, there is a possibility that learning is heavily weighted towards knowledge input. There is no inherent contradiction between passing a paper test and being fascinated by the subject of study and freely designing one's own learning. However, for students undertaking teaching courses, the two may be perceived as contradictory and the emphasis may be on learning to pass a paper test, with little experience of awe-inspiring learning. It is important to repeatedly allow students to experience freedom from these constraints before conducting another survey.

Reference

- Cacioppo, J. T. & Petty, R. E. 1982. The need for cognition. *Journal of Personality and Social Psychology*, 42, 116-131.
- Cohen, A. R., Stotland, E., & Wolfe, D. M. 1955. An experimental investigation of need for cognition. *Journal of Abnormal and Social Psychology*, 51, 291-294.
- Cuzzolinom M. P. 2021. "The Awe is In the Process": The nature and impact of professional scientists' experiences of awe. *Science Education*, 105(4), 1-26.

- Kamiyama, T., & Fujihara, T. 1991. A basic study of the Need for Cognition Scale. *Research in social psychology*, 6(3), 184-192.
- Keltner, D., & Haidt, J. 2003. Approaching awe, a moral, spiritual, and aesthetic emotion. *Cognition and Emotion*, 17(2), 297-314.
- Keltner, D. & Piff, P. K. 2020. Self-Transcendent Awe as a Moral Grounding of Wisdom. *Psychological Inquiry*, 31(2), 160-163.
- Kruglanski, A. W. 1989. *Lay epistemics and human knowledge: Cognitive and motivational bases*. New York: Plenum.
- Kruglanski, A. W., & Webster, D. M. 1996 Motivated closing of the mind: "Seizing" and "freezing." *Psychological Review*, 103, 263-283.
- McPhetres, J. 2019. Oh, the things you don't know: awe promotes awareness of knowledge gaps and science interest. *Cognition and Emotion*, 33(8), 1599-1615.
- OECD. 2012. *Creating Effective Teaching and Learning Environments: First results from TALIS*. AKASHI-SHOTEN.
- Sawada, K., & Nomura, M. (2022). Developing and validating the Japanese version of the situational awe scale (sas-j). *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues*. Advance online publication.
- Shimizu, Y., & Yamamoto, H. 2019. 教育実習のエンゲージメントと教授・学習の関連. *Japan journal of educational technology*, 43, 57-60.
- Suzuki, M., & Sakurai, S. 2003. The construction, reliability and validity of a Japanese Need for Closure Scale. *The Japanese Journal of Psychology*, 74(3), 270-275.
- Yaden, D. B., Scott Barry Kaufman, Elizabeth Hyde, Alice Chirico, Andrea Gaggioli, Jia Wei Zhang & Dacher Keltner. 2018. The development of the Awe Experience Scale (AWE-S): A multifactorial measure for a complex emotion, *The Journal of Positive Psychology*.
- Webster, D. M, & Kruglanski, A. W. 1994. Individual differences in need for cognitive closure. *Journal of Personality and Social Psychology*, 67, 1049-1062.