

A Longitudinal Study of the Relationship Between Contextual Motivation and Situational Motivation in a School Learning

Setting: Assessing Motivation Level and Instability

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In this study, we examine the relationship between university students' contextual motivation for learning a specific class subject and situational motivations for learning during a specific class. We focus on two aspects of motivation, namely, level and instability. A longitudinal study was conducted over one semester, with 168 students from two universities in Japan. The data of 122 students who attended classes more than nine times in the semester and participated in the survey at the situational level were analyzed. The results of hierarchical linear modeling showed that the students' contextual motivation level correlated positively with their situational motivation level. Moreover, the results of a hierarchical multiple regression analysis showed the interactive effects of the contextual motivation level and instability on the situational motivation instability were significant. The results of a simple slope analysis showed that if the contextual motivation instability was low, the higher the contextual motivation level and the greater the situational motivation instability during class would be. This finding indicates that students who maintain high and stable motivation to learn class subjects throughout the semester, tend to show an upward trend in their situational motivation during class.

Keywords: contextual motivation, situational motivation, motivation level, motivation instability, school learning

1. Introduction

1.1 Motivation Level and Instability

Motivation is an important factor that influences individuals' achievement and behavior, and many studies have been conducted to examine it in a learning setting (e.g., Deci & Ryan, 2002; Wentzel & Miele, 2016). However, prior research has mainly focused on analyzing participants' motivation level, which indicates that the higher an individual's motivation level, the more proactive their learning and the higher their academic achievement will be (e.g., Schunk & Greene, 2017). In recent years, other studies have focused on analyzing motivation instability by assessing the magnitude of fluctuations in motivation within a certain period. For example, Okada et al. (2013) measured university and junior college students' motivation for learning over one semester. In the study, the mean of these values for an individual represents the motivation level, and the standard deviation of these values for an individual represents the index of motivation instability with reference to research on the instability of self-esteem (e.g., Kernis & Waschull, 1995).

Further, several studies have researched motivation instability. Umemoto and Inagaki (2019) investigated the relationship between motivation instability and motivational regulation strategies in a learning context. Motivational regulation strategies are specific tactics used by individuals to

self-regulate their motivation during learning (e.g., Miele & Scholer, 2018). According to Umemoto and Inagaki's (2019) findings, the motivation during class stabilized through the implementation of motivational regulation strategies, as students attached value to the content of learning and became aware of their academic grades and performance. Okada et al. (2015) measured motivation instability and examined its relationship with procrastination. They found that the greater the motivation instability in learning, the more the participants were liable to procrastinate in completing their assignments. In other words, the more stable a person's motivation, the more they are able to learn proactively. Umemoto and Inagaki (2021) examined the interactive effects of the motivation level and instability during class on the use of deep-processing strategies. Deep-processing strategies are learning tactics to understand new information by linking it to existing knowledge (Murayama et al., 2013), which lead to the effective memorization of the learning content. Umemoto and Inagaki (2021) showed that even when learners had high motivation instability, they often used deep-processing strategies if their motivation level was high. Conversely, deep-processing strategies were rarely used if the motivation instability was high and the motivation level was low.

In this way, it is possible to conduct a more comprehensive study of motivation, taking into account both its level and instability. However, there are only a few studies that address motivation instability; therefore, further studies that examine the motivational process in learning settings are necessary.

1.2 Motivation in the Hierarchical Model

Using a hierarchical model could help us better understand motivation (Vallerand, 1997; Vallerand & Lalande, 2011). In this model, human motivation is divided into three levels of generality: global, contextual, and situational. The global level is the most general level of motivation and it is effectively equivalent to one's personality. This level of motivation comprises an individual's temperamental and characteristic approach to activities in general. The contextual level includes motivation with respect to context of daily life (e.g., school learning, leisure, and interpersonal relationships). Further, motivation for a specific curriculum and subject/course in an educational setting may also be positioned at the contextual level. For example, Lavigne and Vallerand (2010) analyzed individual's motivation toward a science course as contextual motivation. Finally, the situational level represents the individual's motivation with respect to engaging in a particular activity or situation.

Next, it is important to mention how these three levels of motivation are related to the hierarchical model. Vallerand and Lalande (2011) argue that adjacent levels, such as contextual and situational levels, have a stronger association. For example, Guay et al. (2000) examined the relationship between contextual motivation in a school context and situational motivation toward school activities. They considered four types of motivation and found a positive correlation in motivation between levels (e.g., there was a correlation of .31 between intrinsic motivation at a contextual level and that at a situational level). Vallerand and Lalande (2011) also posited that there is a bottom-up effect from lower to higher levels (e.g., situational to contextual level), as well as a top-down effect from higher to lower levels (e.g., global to contextual level). Indeed, in a longitudinal study, Guay et al. (2003) demonstrated a positive bottom-up effect from contextual motivation (school context) to global motivation. Through a longitudinal study, Blanchard et al. (2007) examined the reciprocal associations between contextual and situational motivation during

basketball games, and found both top-down and bottom-up effects. Further, in a six-point longitudinal survey, Núñez and León (2018) investigated the top-down and bottom-up effects between global motivation (e.g., personality), contextual motivation at a university, and situational motivation in specific tasks/activities at various universities. In addition, research is being conducted in diverse fields based on Vallerand's hierarchical model (e.g., Kowal & Fortier, 2000), in which the relationships between different levels of motivation are investigated to elucidate the process of motivation.

1.3 Purpose of the Study

The hierarchical model provides an important background to understand the motivation for learning. However, past studies that implemented a hierarchical model have focused only on the motivation level and have not considered its instability. Therefore, in this study, we considered both the level and instability of motivation, and examined the relationship between contextual and situational motivations in learning. A hierarchical model posits that the lower the level of motivation (e.g., situational level), the more liable it is to change (Vallerand & Lalande, 2011). For example, Ikuta (2009) measured situational motivation for tasks that were performed three times and showed that situational motivation was liable to change, supporting the hierarchical model's hypothesis. In our study, we explored the two types of motivation that are believed to be more liable to fluctuate—contextual and situational motivation.

We defined university students' motivation for learning a specific class subject during one semester as "contextual motivation," and their motivation for learning during a specific class on the subject as "situational motivation." Moreover, with reference to Okada et al. (2013), and Umemoto and Inagaki (2019), we measured motivation longitudinally, at multiple time points and designated their intra-individual mean values as "motivation level," and designated their intra-individual standard deviation values as "motivation instability." With reference to Tanaka (2014), who showed that there was a positive relationship between contextual motivation for a foreign language class and situational motivation for activities during class, in our study, it was also possible to predict that there would be a positive relationship between contextual motivation and situational motivation. In other words, if the motivation for a specific class subject was high, the motivation for learning during class would be likely to rise to a high level. Moreover, although no prior studies have investigated the relationship between contextual motivation instability and situational motivation instability, a positive relationship can be assumed to exist between the two, similar to motivation level. In other words, for students whose motivation for a specific class subject is liable to fluctuate, their motivation for learning during class will also fluctuate.

With reference to Umemoto and Inagaki (2021), this study assumed the interaction between the contextual motivation level and instability. In other words, the effect of contextual motivation level on situational motivation is thought to be moderated by contextual motivation instability. With reference to studies on self-esteem instability (e.g., Kernis et al., 1991), it appears that if the contextual motivation level is high and instability is low, proactive learning during class is likely to accelerate. In other words, students whose motivation for class subjects is high and stable throughout the semester are regarded as experiencing a high level of situational motivation during class, with low instability. However, if the contextual motivation level is low and instability is low, proactive learning during class is unlikely to accelerate. In other words, students whose motivation toward class subjects is low and stable throughout the semester are believed to have a low level of

situational motivation during class and high instability. If the instability of contextual motivation is high, it appears that no relationship exists between the contextual motivation level and situational motivation.

2. Method

2.1 Survey Procedure and Participants

A longitudinal survey was conducted over one semester (from September 2019 to January 2020) with 168 university students from two universities in Japan. We analyzed the data of 122 students who attended classes more than nine times in the semester (which is the standard for calculating contextual motivation) and participated in the survey at the situational level (mean age: 20.06 years, standard deviation: 1.35; University A: 58, University B: 64; men: 59, women: 61, no answer: 2; 1st year: 33, 2nd year: 39, 3rd year: 28, 4th year: 20, unknown: 2).

At University A, two classes, Class X and Class Y, were targeted. Class X was a psychology-related class available to all students, while class Y was a psychology-related class available only to students in the second year of college or above. Students who wished to obtain a teaching license took these classes. At University B, one class was targeted—a 1st year general liberal arts course in psychology. All classes were conducted primarily in a lecture format. In the present study, the data of the three classes were analyzed together in order to generalize the results and to ensure sufficient sample size.

It was explicitly stated on the top sheet of the questionnaire that “There are no correct or incorrect answers,” “If you do not want to answer any question, there is no need to do so,” and so forth. All participants were given a description of the research study and provided written informed consent for their participation. The participants were informed that there were no negative consequences to withdrawing from the study at any point. Participants did not receive any reward for participating.

2.2 Survey Content

2.2.1 Contextual Level

This survey was conducted in every class of a specific subject during the semester. To measure contextual motivation, the item “Please tell us about your learning motivation in this subject” was developed with reference to Okada et al. (2013), and Umemoto and Inagaki (2019). Answers for this item were scored on a 7-point scale (1 = “very low” to 7 = “very high”). In the contextual-level survey, since only a few students attended all classes during the semester, we used the data of students who attended nine classes or more. Since many universities require an attendance rate of 66% or higher during the semester to acquire credits, nine classes or more was set as the standard, including one cancelation of each class. The mean of these values represents the individual’s “contextual motivation level,” and the standard deviation of these values represents their “contextual motivation instability.”

2.2.2 Situational Level

This survey was conducted in a specific class during the semester: in the 8th lesson of Class X and the 10th lesson of Class Y at University A, as well as the 13th lesson of the class at University B.

Situational motivation level was measured by one item with reference to Umemoto and Inagaki (2019). The respondents were instructed to score their learning motivation during class at seven

different time points. Answers were scored on a 7-point scale (1 = “very low” to 7 = “very high”). The seven time points were the following: the beginning of the class (T1), 15 min later (T2), 30 min later (T3), 45 min later (T4), 60 min later (T5), 75 min later (T6), and at the end of the class (T7). The standard deviation of these values represents the individual’s “situational motivation instability.”

3. Results

3.1 Descriptive Statistics

Table 1 lists the mean values and standard deviations for each variable. Since we assumed that there would be changes in contextual motivation levels during the semester, the α coefficient, which showed internal consistency, was not calculated for these levels, as was done by Okada et al. (2013), and Umemoto and Inagaki (2019). Table 1 presents the results of the correlation analysis. The contextual motivation level was positively related to the situational motivation level at each time point and instability. The respondents’ contextual motivation instability was negatively related to situational motivation level at each time point. However, there was no relationship between the contextual motivation instability and the situational motivation instability.

Table 1. Mean, standard deviation of each variable, and results of correlation analysis ($N=122$)

	Mean	SD	1	2	3	4	5	6	7	8	9
1 CM level	5.81	0.76									
2 CM instability	0.55	0.25	-.48 ***								
3 SM level T1	4.43	1.2	.30 ***	-.20 *							
4 SM level T2	4.57	1.05	.33 ***	-.27 **	.64 ***						
5 SM level T3	4.81	0.94	.40 ***	-.28 **	.38 ***	.60 ***					
6 SM level T4	4.78	1.02	.41 ***	-.36 ***	.19 *	.41 ***	.57 ***				
7 SM level T5	4.75	1.04	.46 ***	-.41 ***	.14	.32 ***	.49 ***	.72 ***			
8 SM level T6	4.72	1.05	.41 ***	-.24 **	.20 *	.30 ***	.44 ***	.59 ***	.77 ***		
9 SM level T7	4.72	1.08	.17	-.06	.11	.23 *	.27 **	.30 ***	.37 ***	.56 ***	
10 SM instability	0.68	0.35	.20 *	.04	-.07	-.05	.10	.19 *	.11	.02	-.10

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

Note: CM refers to contextual motivation, and SM refers to situational motivation.

3.2 Hierarchical Linear Modeling

With the data used in this study, situational motivation level at multiple time points was nested within the individual. Therefore, to investigate the relationship between contextual motivation and the situational motivation level, we conducted an analysis using hierarchical linear modeling (HLM). This procedure made it possible to examine the relationship between contextual motivation and the situational motivation level more accurately than by using multiple regression analysis. We used R software’s (ver. 3.6.1) lmerTest package for the analysis. We began by investigating the null model in which no explanatory variables were input. The intraclass correlation coefficient (ICC) was 0.39, which implies that 39% of the dispersion of situational motivation level can be explained by between-person variation.

Next, we implemented a model using the contextual motivation level and instability as explanatory variables and situational motivation level as a criterion variable (Model 1). The contextual motivation level and instability were centralized, with the overall mean. As the control

variable, University (Universities A and B were dummy coded as 1 and 0, respectively) was input to the models, and the following model was devised:

Level 1 (Within-person)

$$\text{Situational motivation level}_{ij} = \beta_{0j} + r_{ij}$$

Level 2 (Between-person)

$$\beta_{0j} = r_{00} + r_{01} \times \text{University}_j + r_{02} \times \text{Contextual motivation level}_j + r_{03} \times \text{Contextual motivation instability}_j + u_{0j}$$

γ_{00} shows the effects of intercepts, and r_{ij} and u_{0j} show the random effects of Level 1 and Level 2, respectively. Suffix i shows the time point, and j represents the individual. The parameters were estimated using the maximum-likelihood method.

We then investigated a model in which the interaction between the contextual motivation level and instability was input (Model 2). The following model was created:

Level 1 (Within-person)

$$\text{Level of situational motivation}_{ij} = \beta_{0j} + r_{ij}$$

Level 2 (Between-person)

$$\beta_{0j} = r_{00} + r_{01} \times \text{University}_j + r_{02} \times \text{Contextual motivation level}_j + r_{03} \times \text{Contextual motivation instability}_j + r_{04} \times \text{Interaction of contextual motivation level and instability}_j + u_{0j}$$

Table 2 presents the results of this analysis. In Model 1, there was a positive relationship between contextual motivation level and situational motivation level. In Model 2, although contextual motivation level showed a positive relationship with situational motivation level, the interactive effects of contextual motivation level and instability were not significant. In view of their Akaike's Information Criterion values, Model 1 appeared to be better than Model 2; therefore, for the situational motivation level, there were no effects of interaction between the contextual motivation level and instability.

Table 2. Results of hierarchical linear modeling with situational motivation level as the criterion variable

	Model 1			Model 2		
	Coefficient	95%CI	SE	Coefficient	95%CI	SE
Fixed effects						
Intercept (γ_{00})	4.789 ***	[4.638 , 4.940]	0.077	4.807 ***	[4.648 , 4.966]	0.081
University (γ_{01})	-0.221	[-0.442 , 0.000]	0.113	-0.219	[-0.439 , 0.002]	0.113
Contextual motivation level (γ_{02})	0.409 ***	[0.246 , 0.572]	0.083	0.415 ***	[0.252 , 0.579]	0.083
Cotextual motivation instability (γ_{03})	-0.412	[-0.911 , 0.088]	0.255	-0.457	[-0.970 , 0.057]	0.262
Interaction of level and instability (γ_{04})				0.212	[-0.370 , 0.794]	0.297
Random effects						
Intercept (Var (u_{0j}))	0.280			0.278		
Error (Var (r_{ij}))	0.684			0.684		
AIC	2275.377			2276.869		

*** $p < .001$

3.3 Hierarchical Multiple Regression Analysis

To investigate the relationship between contextual motivation and situational motivation instability, we performed a hierarchical multiple regression analysis that used the situational motivation instability as the criterion variable (Table 3). In Step 1, the analysis was conducted using University as a control variable. In Step 2, the main effects of the contextual motivation level and instability were input to the model. In Step 3, the interaction between the contextual motivation level and instability was input to the model.

Table 3. Results of hierarchical multiple regression analysis with situational motivation instability as the criterion variable

	<i>b</i>	95%CI	<i>SE</i>
<u>Step 1</u>			
University	0.071	[-0.054 , 0.196]	0.063
$R^2=.011$			
<u>Step 2</u>			
University	0.070	[-0.054 , 0.193]	0.062
Contextual motivation level	0.131 **	[0.040 , 0.222]	0.046
Contextual motivation instability	0.225	[-0.054 , 0.504]	0.141
$R^2=.075 *$			
$\Delta R^2=.064 *$			
<u>Step 3</u>			
University	0.065	[-0.056 , 0.186]	0.061
Contextual motivation level	0.119 **	[0.030 , 0.209]	0.045
Contextual motivation instability	0.306 *	[0.024 , 0.588]	0.142
Interaction of level and instability	-0.380 *	[-0.699 , -0.060]	0.161
$R^2=.116 **$			
$\Delta R^2=.042 *$			

* $p < .05$, ** $p < .01$

The results of our analysis showed that the increment in the coefficient of determination from Steps 1 to 2 was significant ($\Delta R^2 = .064, p < .05$). The increment of the coefficient of determination from Steps 2 to 3 was also significant ($\Delta R^2 = .042, p < .05$). In Step 3, the contextual motivation level and instability each showed a positive relationship with the situational motivation instability. The interaction of contextual motivation level and instability was also significant in Step 3.

We then performed a simple slope analysis. We calculated the value of the partial regression coefficient that was applied to the scores of the contextual motivation level when the score of contextual motivation instability was the mean ± 1 standard deviation (Figure 1). The results showed that if contextual motivation instability was high, the values of situational motivation instability did not change even if the contextual motivation level changes ($b = 0.024, SE = 0.064, n.s.$). If contextual motivation instability was low, the higher the contextual motivation level would be and the higher the value of situational motivation instability would be as well ($b = 0.215, SE = 0.058, p < .001$).

Table 4 summarizes the results of this study on the relationship between contextual motivation

and situational motivation.

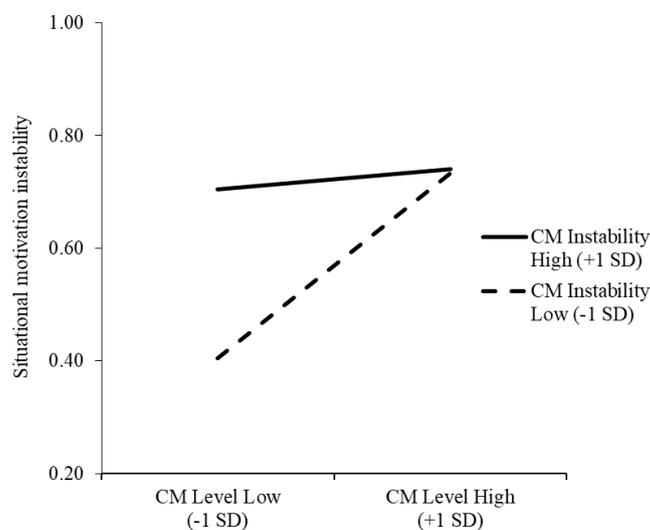


Figure 1. Results of the simple slope analysis of the interaction of the level of contextual motivation and instability. CM refers to contextual motivation.

Table 4. Summary of the results of the relationship between contextual motivation and situational motivation

Contextual motivation	Situational motivation	
	Level	Instability
Level High & Instability High	High	High
Level High & Instability Low	High	High
Level Low & Instability High	Low	High
Level Low & Instability low	Low	Low

3.4 Changes in Situational Motivation Level During Class

Figure 2 shows the changes in situational motivation level during class in the four groups. Using the median of the contextual motivation level (5.90) and the median of contextual motivation instability (0.54) as the criteria, we combined their high and low values and formed four groups. The first group comprised 19 participants, whose contextual motivation level and instability were both high (HH). The second group comprised 43 participants, whose contextual motivation level was high and instability was low (HL). The third group comprised 43 participants, whose contextual motivation level was low and instability was high (LH). The fourth group comprised 17 participants, whose contextual motivation level and instability were both low (LL). The results of hierarchical multiple regression analysis showed that participants in the HH, HL, and LH groups experienced significant changes in situational motivation level during class, whereas the changes were small in the participants in the LL group. Those in the HL group, in particular, showed upward changes in their situational motivation level during class and had high situational motivation level overall. We can see that they maintained a relatively high situational motivation level, even by the end of the

class (T7).

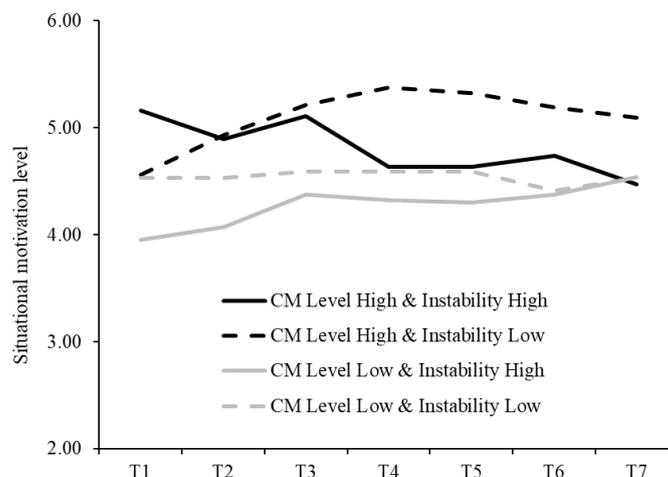


Figure 2. Changes in situational motivation level during class in the four groups that were formed based on contextual motivation level and instability

4. Discussion

4.1 Relationship Between Contextual Motivation and Situational Motivation

First, we investigated the relationship between contextual motivation and situational motivation level. As expected, a positive relationship was found between the contextual motivation level and situational motivation level. In other words, students who had high motivation for class subjects throughout the semester carried out their studies with high motivation, including during class. This result matches the findings of Tanaka (2014), whose research reported a positive relationship between the motivation for an English language class and that for learning activities during class. Conversely, contrary to our expectations, we found no effects of interaction between the contextual motivation level and instability on situational motivation level. In other words, in terms of the relationship between the contextual motivation level and the situational motivation level, no effects of mediation of contextual motivation instability could be seen. This finding signifies that, even though an individual’s motivation for class subjects was not stable throughout the semester, if it was high on average, they could engage in learning with high motivation even during class. In other words, even if teachers convey the fun of the class subject as well as the significance of learning it, and see students’ motivation improve, their main goal should be to ensure that students maintain high average motivation throughout the semester.

We then examined the relationship between contextual motivation and situational motivation instability. Our results showed the effects of the interaction between the contextual motivation level and instability. As expected, if contextual motivation instability was high, then the situational motivation instability during class was high as well, regardless of its level. In other words, students whose motivation to learn the pertinent class subject is liable to fluctuate are also likely to exhibit fluctuations in their motivation for learning during class, thereby making it difficult for them to learn with stable motivation. For these students, we suspect that their motivation for learning in general, such as learning in other classes and out-of-class learning, is liable to fluctuate. As shown in Figure 2, particularly for students whose instability and level of contextual motivation are both

high, we can see that, although their situational motivation at the start of a class is extremely high, as the class progresses, their motivation trends downward. For example, Umemoto and Inagaki (2019) showed that situational motivation is stabilized by using motivational regulation strategies during class. Therefore, it may be possible to stabilize students' situational motivation at a high level by teaching motivational regulation strategies and encouraging their use during class.

Conversely, our findings regarding the relationship between contextual motivation level and situational motivation instability when contextual motivation instability was low were not what we had expected. First, we found that when the instability and level of contextual motivation were both low, the instability of situational motivation was low as well. As shown in Figure 2, in this case, the situational motivation was stable and relatively low. In other words, individuals may have become passive toward the content of class, and not actively reacting to it by themselves. Students whose motivation for a class subject remained stable and low throughout the semester are thought to be unable to hold any interest in the content of learning even during class, which is unlikely to increase their motivation. Next, if contextual motivation instability is low and the contextual motivation level is high, then the instability of situational motivation is high. As shown in Figure 2, the situational motivation during class trends upward in this case, while a relatively high motivation level was maintained even by the end of a class. In other words, it appears that since these individuals have a high and stable motivation to study class subjects, they also actively tackled them during class, perceived that the material was fun as well as important, and continued to see their motivation increase even further. In this regard, Umemoto and Inagaki (2019) showed that if the fluctuation of motivation during class is large, the level of motivation will be higher, and the use of deep-processing strategies will be more frequent. In other words, increments in situational motivation during class when the situational motivation level is sufficiently high are believed to lead to effective processing and understanding of the learning content. Students whose motivation for a class subject remains stable and high throughout the semester have the potential for their motivation to continue to rise during class and to learn proactively. These results suggest that stabilizing contextual motivation at a high level plays an important role in encouraging active learning during class.

In this study, we explored the motivational process in greater detail compared with conventional studies by identifying motivation from two perspectives: level and instability. Our findings suggest that it is necessary to support students' learning by stabilizing motivation, and not merely to increase it. It is challenging for school teachers to keep students motivated throughout the semester and in class. Therefore, clarifying the process of change in motivation through longitudinal research is considered an essential research theme.

4.2 Present Limitations and Future Challenges

This study had certain limitations. Because of the small sample size of this study, one must be cautious when attempting to generalize its results. Moreover, we were unable to identify the predictors of motivation instability. Umemoto and Inagaki (2019) showed that motivational regulation strategies suppress the situational motivation instability during class; however, the predictors of contextual motivation instability have not yet been identified. Therefore, detailed investigations are needed to examine the factors that promote or inhibit the instability of motivation. It is also important to further investigate how the level and instability of contextual and situational motivation are related to the motivational consequences (e.g., learning behaviors). In this study,

we measured contextual motivation longitudinally at multiple time points and calculated their mean value to examine the correlation with other variables based on between-person variability. However, it is also important to examine the relationship between motivation, predictors of motivation, and motivational consequences based on within-person variability through a longitudinal survey as previously done by Goetz et al. (2016) as well as Tanaka and Murayama (2014) to reveal the complex learning process within individuals. Moreover, we were unable to examine the different types of motivation. Motivation may be intrinsic (e.g., “because the learning content was interesting”) and extrinsic (e.g., “the learning content will be of use in the future,” and “because I do not want to be scolded by the people around me”) (Deci & Ryan, 2002). Going forward, there is a need to discriminate between these types of motivation, measure them, and examine the relationship between their levels and their instability.

5. References

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