

Promoting and Impeding Factors Associated with Academic Performance of Japanese Dental Students

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Abstract

This study aimed to determine factors that predict academic performance from the viewpoint of motivational regulation strategies and the career selection process. The motivational regulation strategies investigated included value strategy, meaning strategy, and goal-oriented strategy.

An online questionnaire survey was performed at a private dental school located in Kanagawa Prefecture in Japan that included 147 participants. To identify the effects of the predictor variables on academic performance, multiple linear regression analysis was conducted. The main predictors of academic performance were gender and age ($\beta = 0.305$, $P < .001$; $\beta = 0.303$, $P < .001$, respectively), followed by meaning strategy ($\beta = 0.187$, $P = .04$). To compare the meaning strategy scores by four acceptance types regarding career selection, a one-way analysis of variance was performed. Regret regarding career selection showed the lowest score for meaning strategy rather than no acceptance of the dental career course they had selected.

As an educational intervention for those who experience regret in career selection, educators should assist students in finding meaning in their present career course rather than advising them to give up their unrealized dream.

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Introduction

Research indicates that motivation strategies predict dental students' academic performance (e.g., Almalki et al.¹). However, maintaining a high level of motivation for studying can be difficult. For this reason, it is important for students to adjust their motivation towards studying, which is referred to as "motivational regulation strategy."² Without a clear distinction between motivation strategy and motivational regulation strategy, these two notions are used interchangeably as a predictor of academic performance in much of the prior research. The present study focused on motivational regulation strategies. After defining this concept, we sought to determine the promoting and impeding factors of motivational regulation strategies associated with academic performance. This study defined

motivational regulation strategy as a controlling ability of one's motivational level depending on the situation and one's skills to enhance learning, based on the research by Endo and Nakaya.³

Three types of motivational regulation strategies were examined in this study: value strategy, meaning strategy, and grade-priority strategy. With regard to the value strategy, Gargallo et al.⁴ reported that the higher academic performance group showed a higher task value score compared to the lower academic performance group. Based on these findings, Hypothesis 1 was that the value strategy would be associated with better academic performance. Regarding the meaning strategy, from the perspective that the meaning strategy promotes motivation,⁵ Hypothesis 2 was that the meaning strategy would be associated with better academic performance. The grade-priority strategy would decrease interest for learning and therefore would be associated with poor academic performance.⁶ Thus, Hypothesis 3 was that the grade-priority strategy would be negatively associated with academic performance.

This study also investigated career selection as a predictor of academic performance.

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Self-decision in career selection was found to be associated with study motivation after enrollment in the University,⁷ and prior research has reported a direct relationship between motivation and academic performance (e.g., Jaber et al.).⁸ Therefore, Hypothesis 4 was that independence in career selection would be positively associated with academic performance. Furthermore, even if the selection of a career was not one's own decision and was determined by one's parent(s), accepting their decision as one's own creates clarity in the self-concept.⁹ A clear self-identity is related to meaningfulness.⁵ Based on these perspectives, Hypothesis 5 was that acceptance regarding career selection would be related to the meaning strategy.

Taken together, this study aimed to determine predictors of academic performance from the viewpoint of motivational regulation strategies and the career selection process.

Materials and methods

After obtaining ethical approval for this study from the author's institution (No. 857), an online questionnaire survey was performed at a private dental school located in Kanagawa Prefecture in Japan from June 2021 to September 2021. The questionnaire, which contained the study's purpose, written informed consent text, and scale items, was uploaded to the student's online learning management system (LMS). Through the LMS, questionnaires were returned. Written informed consent was obtained from all participants.

The questionnaire consisted of three sections: (1) motivational regulation strategies, (2) process of future career selection, and (3) demographical information. Grade point average (GPA) in the first semester of the 2021 academic year was used as an indicator of academic performance. Their GPAs were obtained from the administrative dataset of the faculty. GPAs ranged from 0–5.

Motivational regulation strategy was assessed with three subscales. The Value Strategy subscale included 5 items. Three items were derived from the Intrinsic Value subscale of the Motivation Scale by Ogawauchi and Ryu,¹⁰ and 2 items were from the Task Value subscale of the Task Motivation Scale by Ichimura et al.¹¹ A sample item is "Understanding the learning content is important for me." Cronbach's alpha

was 0.881. The Meaning Strategy subscale consisted of 3 items derived from the Sense of Coherence Scales by Oobuchi.¹² An example item is "I have a clear goal in my life." Cronbach's alpha was 0.600. The Grade-Priority Strategy subscale consisted of 3 items. Two items were taken from the Goal Orientation of Classroom Scale by Miki and Yamauchi,¹³ and the other item was developed for this study. A sample item is "A test score is more important than a way of studying." Cronbach's alpha was 0.619. All items were responded to using a 5-point Likert-type scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*.

To assess future career selection, two subscales were used. Three items were used to measure "independence in career selection" derived from the Career Selection Process Scale by Honda and Ochiai.¹⁴ Items were responded to using 5-point Likert-type scale. An example item is "I decided to enter dental school of my own free will." Cronbach's alpha was 0.898. One item was employed to measure "acceptance type regarding career selection." This item was based on Ochiai et al.,⁹ and participants were asked to choose one of five options indicating their acceptance of a career course in dentistry: "as I had wished," "regret due to the unrealized career course," "acceptance of the present career course," and "no acceptance of the present career course."

Participants were also asked to provide demographic information on their gender, age, and academic year.

This study used IBM SPSS 22.0 software to perform all the statistical analysis. Correlation analysis was performed to explicate bivariate associations among the variables. To identify the effects of the predictor variables on GPA, multiple linear regression analysis was conducted. To compare the meaning strategy scores by acceptance type regarding career selection, a one-way analysis of variance (ANOVA) was performed.

Results

The participants were first- and fourth-year dental students as of 2021 at Kanagawa Dental University of Japan. Out of 200 students, 176 responded to the survey (response rate 88%). Of these, 25 participants were excluded from the analyses because they were

international students, and four Japanese participants were excluded due to insufficient responses. The final sample consisted of 147 Japanese students. Descriptive statistics indicated participants were aged between 18 and 36 years with a mean age of 22.4 (SD = 3.93 years), and slightly less than two-thirds were male (n = 87, 59.2%). There were 74 (50.3%) first year students and 73 (49.7%) fourth year students.

To test the relationships among the variables employed in this study, correlation analysis was conducted. The results are provided in Table 1. Age and female gender positively correlated with GPA (r = 0.256, P = .002; r = 0.256, P = .002, respectively). Value strategy and meaning strategy scores were positively related to GPA (r = 0.213, P = .01; r = 0.287, P = .001, respectively). Grade-priority strategy and independence in career selection were statistically not associated with GPA (r = 0.111, P = .19; r = 0.148, P = .08, respectively).

Variable	Mean	SD	1	2	3	4	5	6
1 GPA	2.702	.99	1					
2 Age (years)	22.44	3.93	0.256**	1				
3 Gender			0.256**	-0.243	1			
4 Value strategy	4.008	.80	0.213*	-0.206	0.342**	1		
5 Meaning strategy	3.533	.81	0.287**	-0.092	0.296**	0.473**	1	
6 Independence in career selection	4.072	1.01	0.148	-0.089	0.213*	0.598**	0.516**	1
7 Grade-priority strategy	2.979	.81	0.111	0.218*	-0.020	0.065	-0.089	0.120

Table 1. Means, standard deviations, and correlations among variables.
 Note. GPA = grade point average; Gender (female = 1, male = 0). *P < .05. **P < .01.

Predictor variable	β	95% CI
Age	0.303***	[-2.53, 0.26]
Gender	0.305***	[0.03, 0.12]
Meaning strategy	0.187*	[0.27, 0.93]
Grade-priority strategy	0.080	[-0.09, 0.28]
Value strategy	0.056	[-0.15, 0.29]
R ²	0.234**	

Table 2. Results of multiple regression analysis predicting GPA.
 Note. GPA = grade point average; Gender (female = 1, male = 0); CI = confidence interval. *P < .05. **P < .01. ***P < .001.

To identify the effects of the predictor variables on GPA, multiple linear regression analysis was conducted. The predictor variables included age, gender, meaning strategy, grade-priority strategy, and value strategy. The results are provided in Table 2. The main predictors of GPA were gender and age ($\beta = 0.305$, P < .001; $\beta = 0.303$, P < .001, respectively), followed by meaning strategy ($\beta = 0.187$, P = .04). The regression equation accounted for 24% of the variance in GPA. Value strategy and grade-priority strategy were not significant predictors of GPA (P = .55; P = .32, respectively).

Meaning strategy scores were compared by acceptance type using a one-way ANOVA (Table 3). The results showed that there were significant differences among the types of acceptance (F[3,138] = 5.541, P = .001). Post hoc comparisons using Tukey's test indicated that scores for "as I had wished" were significantly higher than scores for "regret due to the unrealized career course" and "acceptance of the present career course" (P = .003; P = .01, respectively), whereas no significant differences were found between "as I had wished" and "no acceptance of the present career course" (P = .74).

	As I had wished (n = 48)	Regret regarding the present career course (n = 18)	Acceptance of the present career course (n = 72)	No acceptance of the present career course (n = 4)	F-statistic P-value Tukey
Meaning strategy					5.541 P = .001 As I had wished > Regret + Acceptance
M	3.875	3.111	3.426	3.250	
SD	0.68	0.89	0.78	1.13	
95% CI	[3.68, 4.07]	[2.67, 3.55]	[3.24, 3.61]	[1.44, 5.06]	

Table 3. Analysis of variance on group comparisons of acceptance type regarding career selection. Note. CI = confidence interval.

Discussion

To identify factors associated with academic performance, regression analysis revealed that the value strategy was not a significant predictor, therefore Hypothesis 1 was not supported. The meaning strategy was a significant positive predictor of academic

performance, therefore Hypothesis 2 was supported. Prior research has investigated each strategy's relationship to academic performance but not simultaneously in the same study. Thus, the present study provides new information on the above two strategies by clarifying that the meaning strategy is a stronger predictor of academic performance in dental students than the value strategy, and is a significant predictor compared to using the value strategy as a motivation regulation strategy to affect academic performance. The meaning strategy involves having a clear goal for one's life and future identity, which as a goal may be a stronger motivator for learning course content than the value strategy in which an understanding of course content in and of itself would be the motivation.

Hypothesis 3 was that the grade-priority strategy would be negatively associated with academic performance, which was not supported. The present study clarified that this strategy may not always reduce a student's academic performance, in particular, dental students attending a private dental school in Japan.

With regard to independence in career selection and academic performance, it was hypothesized that there would be a positive relationship between the two (Hypothesis 4). This hypothesis was not supported, which is inconsistent with a prior study of Japanese university students showing that self-decision in career selection was associated with higher academic performance.¹⁵ Thus, independence in career selection may not necessarily enhance academic performance in Japanese dental students.

Hypothesis 5 was that acceptance regarding career selection would be related to the meaning strategy. This hypothesis was supported. The lowest score for the meaning strategy was with regard to regret and the highest was for as I had wished. Interestingly, however, no acceptance of the present career course did not show a significant difference with as I had wished regarding career selection. In other words, those who indicated nonacceptance of the career course were just as likely to use the meaning strategy as those students who felt the career they selected was what they had wished for. Yamada and Miyashita's¹⁶ review of studies about the course selection process support this result: regardless of their nonacceptance of or

dissatisfaction with the career course, some students find meaning for their future career and they adapt to the demands of the coursework, while other students do not find meaning as a motivation and may withdraw from their program of study.

As a limitation of this study, the alpha coefficients of the Value Strategy and Meaning Strategy subscales were relatively low. Future studies are needed that use more reliable measures of these constructs, which can be done by increasing the number of items that represent the construct being measured.

Conclusions

Other than gender and age, the only non-demographic predictor of academic performance was the meaning strategy as a motivational regulation strategy. This study clarified that those who experience regret due to an unrealized career course had the lowest meaning strategy score. As an educational intervention for those students having feelings of regret in their current career selection, educators can assist them in imagining a future career as a dentist acquired from the present dental coursework rather than advising them to give up their unrealized dream. If they could recognize some meaning by this imagination from the viewpoint of their whole life, they may be better able to see the benefit of the coursework and the career they selected.

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Declaration of Interest

The author has no conflicts of interest to declare.

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