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Relationship of personality traits with degree of subjective learning and satisfaction in different class formats among Japanese university students

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Abstract
In the wake of the COVID-19 pandemic and the subsequent shift to online instruction, many universities have been exploring hybrid approaches that leverage the benefits of both face-to-face and online learning. In this study, we examined the relationship of personality traits with degree of subjective learning and satisfaction in different class formats among Japanese university students. The results revealed that loneliness and extraversion were associated with evaluations of face-to-face classes, while self-control, anxiety about conversations with classmates, and anxiety about speaking and giving presentations were associated with evaluations of real-time interactive classes. Computer anxiety and anxiety about speaking and giving presentations were related to evaluations of on-demand classes. These findings suggest that the different personality traits of university students may influence their degree of subjective learning and satisfaction depending on the class format.

Keywords Personality traits · Class satisfaction · Online classes · Face-to-face classes

Introduction

In the wake of the COVID-19 pandemic and the subsequent shift to online instruction, many universities have been exploring formats that leverage the advantages of both face-to-face and online learning. Given the distinct strengths and weaknesses of both approaches, it is important to analyze them and identify desirable combinations that enhance learning outcomes and student satisfaction (Hrastinski, 2019). Previous research has found that personality traits are associated with the degree of learning and commitment to classwork, including loneliness (Morin, 2020; Rotenberg & Morrison, 1993), extraversion (Brown et al., 1996), self-control (Azevedo, 2005), social anxiety (Woodrow, 2006), and computer anxiety (Loyd & Gressard, 1984). Tovmasyan et al. (2023) investigated the impact of personality traits on student satisfaction with blended learning. These studies suggest that students' evaluations of classes may differ based on students' personality traits. These investigations independently examined face-to-face instruction, online instruction, and blended learning, but few studies have directly investigated whether the relationship between personality traits and class evaluations varies depending on the class format.

Therefore, this study investigated the relationship of loneliness, extraversion, self-control, social anxiety, and computer anxiety in university students with the degree of subjective learning and satisfaction in different class formats. Four class formats were considered: (1) task-based classes (classes involving specific tasks assigned by instructors without video content), (2) on-demand classes (classes structured around the distribution of recorded videos or

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voiceover slides), (3) real-time interactive classes (live classes conducted online using platforms such as Zoom), and (4) traditional face-to-face classes (conventional classes where students attend in-person on campus)[1].

Methods

Participants were 175 Japanese university students (97 men, 73 women, 5 other/no response; M_{age} =19.30, SD = 0.94, 6 no response) who were recruited through a web-based educational support system targeted at class attendees. They were asked to complete an online questionnaire, which consisted of several sections (see Online Resource 1 for scale items). First, participants were asked whether they had participated in each type of class, then, they were asked to evaluate each type of class they had participated in. The degree of subjective learning in each class format was measured using a 16-item scale created by the authors of this paper, which was based on the eight abilities specified in the curriculum policy of the participants' university. Next, satisfaction with each class format was measured using a single item. Participants were asked to indicate the extent to which they were satisfied overall, using a 5-point scale. Next, loneliness was measured using the Japanese version of the Revised UCLA Loneliness Scale (Russell et al., 1980; translated by Moroi, 1991). Extraversion was measured using the extraversion subscale of the Short Form of the Big Five Scale (Namikawa et al., 2012). Self-control was measured using the Japanese version of the Brief Self-Control Scale (Tangney et al., 2004; translated by Ozaki et al., 2016). Social anxiety was measured using the following subscales of the Social Anxiety Scale by Social Situations (Mohri & Tanno, 2001): the Anxiety Toward Superiors Scale, the Anxiety Toward Unfamiliar Peers Scale, the Anxiety about conversation Scale, and the Presentation/Speaking Anxiety Scale. Computer Anxiety was measured using the Operation Anxiety subscale of the Computer Anxiety Scale (Hirata, 1990).

Results

The data form all 175 participants were analyzed. Table 1 shows the mean, standard deviation, Cronbach's alpha coefficient for each score, and correlation coefficients between evaluation scores for each class format and scores for each personality trait (see Online Resource 2 for the Number of

[1] (1) task-based classes, (2) on-demand classes, and (3) real-time interactive classes were entirely conducted online, while (4) traditional face-to-face classes was conducted in person, with some materials distribution and assignment submissions occurring partially online.

Table 1 Mean, standard deviation, Cronbach's alpha coefficient for each score, and correlation coefficients between evaluation scores for each class format and scores for each personality trait (N = 175)

	M	SD	α	Loneliness	Extraversion	Self-control	Anxiety toward superiors	Anxiety toward unfamiliar peers	Anxiety about conversation	Presentation/ Speaking anxiety	Computer anxiety
Subjective learning score											
Task-based classes (n = 100)	3.19	1.04	0.959	−0.300**	0.252*	0.292**	−0.203*	−0.267**	−0.269**	−0.326**	−0.104
On-demand classes (n = 170)	3.41	0.73	0.913	−0.177*	0.117	0.170*	−0.060	−0.127	−0.143	−0.226**	−0.062
Real-time interactive classes (n = 170)	3.62	0.79	0.943	−0.249**	0.250**	0.230**	−0.108	−0.190*	−0.168*	−0.231**	−0.187*
Face-to-face classes (n = 155)	3.76	0.79	0.949	−0.264**	0.265**	0.073	−0.033	−0.079	−0.021	−0.104	−0.080
Satisfaction score											
Task-based classes (n = 100)	3.56	1.40		−0.156*	0.038	0.075	0.054	−0.029	−0.083	−0.017	0.028
On-demand classes (n = 170)	4.32	0.89		−0.093	−0.008	0.054	0.137	0.074	0.031	0.108	0.013
Real-time interactive classes (n = 170)	4.22	0.98		−0.027	0.033	0.205**	0.053	−0.013	−0.030	0.000	0.048
Face-to-face classes (n = 155)	4.38	0.93		−0.195**	0.134	−0.135	0.112	0.079	0.102	0.110	−0.095
M				2.06	3.24	3.04	2.76	2.93	3.13	3.39	2.18
SD				0.49	0.91	0.64	0.90	0.95	1.07	1.06	0.75
α				0.892	0.851	0.820	0.862	0.933	0.931	0.958	0.779

Note. M = mean; SD = standard deviation; α = Cronbach's Alpha. **p < .01; *p < .05

participants who participated in each combination of class formats).

We conducted a path analysis using the maximum likelihood method[2]. The results are shown in Fig. 1. We assumed paths from each of the eight personality traits to the degree of subjective learning and satisfaction in each class format, and assumed a path from the degree of subjective learning to satisfaction within the same class format. Additionally, we assumed covariance among the eight personality traits, covariance among the error variables for the degree of subjective learning, and covariance among the error variables for satisfaction. The analysis revealed fit indices for the model as $\chi^2(6)=4.57$, $p=.600$, CFI = 1.000, GFI = 0.996, AGFI = 0.924, and RMSEA = 0.000, suggesting a high level of fit.

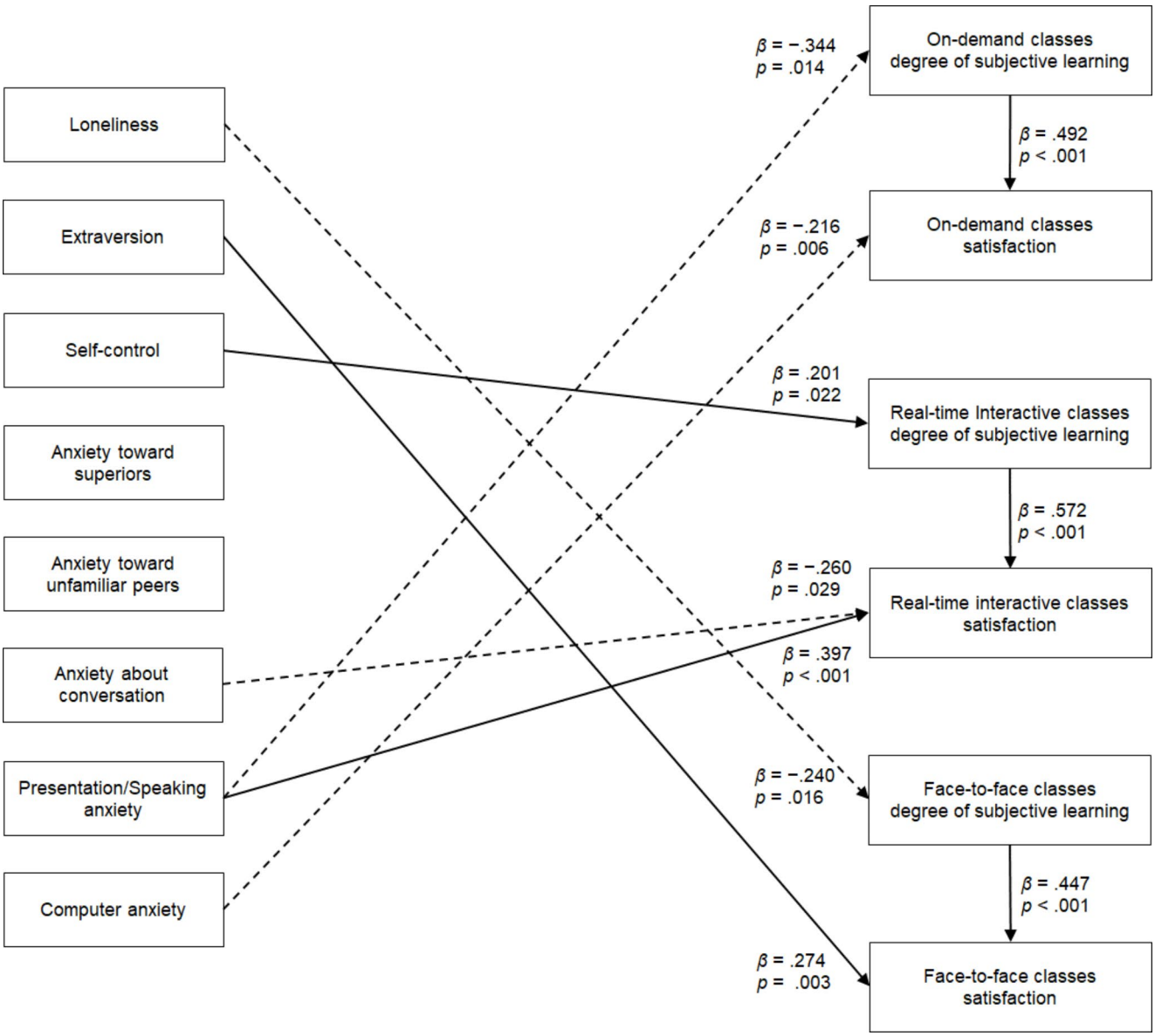

Fig. 1 Relationship of Personality Traits with Degree of Subjective Learning and Satisfaction by Class Format. Note: Only significant paths are shown. Numbers represent standardized coefficients, with solid lines indicating positive paths and dashed lines indicating negative paths. Error variables and covariance representations are omitted for simplicity

[2] To ensure an appropriate sample size for path analysis, we excluded task-based data and utilized responses from 150 participants (80 men, 65 women, and 5 others/no response; M_{age} = 19.21, SD = 0.84, with 5 non-responses) who answered questions about the on-demand, real-time interactive, and face-to-face class settings. This exclusion was performed because the number of participants in task-based classes was relatively small. This approach was adopted to facilitate path analysis in our study.

Discussion

The results of this study suggest that the different personality traits of university students may impact their degree of subjective learning and satisfaction depending on the class format. The path analysis results were consistent with previous research (e.g., Azevedo, 2005; Brown et al., 1996; Loyd & Gressard, 1984; Morin, 2020; Rotenberg & Morrison, 1993; Woodrow, 2006). Furthermore, this study demonstrated that personality traits associated with class evaluations vary depending on the class format. The findings of this study indicate that loneliness influences the degree of subjective learning and extraversion influences satisfaction in face-to-face classes but not in online formats. Additionally, self-control might have a particularly significant impact in real-time interactive classes compared with on-demand or face-to-face formats. Although anxiety about conversations with classmates and anxiety about speaking and giving presentations influenced evaluations of online classes but not face-to-face classes. These findings contribute further insights to the existing body of research on the relationship between personality traits and class evaluations, which have previously been investigated separately for different instructional formats (e.g., Tovmasyan et al., 2023). The future prospects of this study include the need for a detailed examination of the mechanisms through which personality traits influence class evaluations. Finally, in all class formats, the degree of subjective learning was associated with increased satisfaction. This suggests that addressing barriers to learning, including feelings of loneliness, difficulties with self-control, and anxiety might lead to greater satisfaction.

As a limitation of this study, it should be noted that other factors such as class subjects, instructors, and class size were not controlled for. Considering that there may be factors beyond personality traits that influence class evaluations, further investigation is needed to investigate including factors such as class content, instructors, and the number of students.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s12144-023-05514-z.

Authors' contribution MY, GT, YS, MF, and TT conceived and designed the study and collected the data. MY performed the statistical analyses and wrote first draft of the manuscript. MY, GT YS, MF, and TT contributed to the manuscript and approved the final draft.

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Data, materials and/or code availability The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval The study was approved by the Research Ethics Committee of the College of Commerce, Nihon University (Approval Number: R2-001). All methods were performed in accordance with the relevant guidelines and regulations.

Informed consent Informed consent was obtained from all individual participants included in the study.

Competing interests The authors have no competing interests to declare that are relevant to the content of this article.

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