



Investigation of the Short Grit Scale for Use in an English Writing Course in Japanese Higher Education

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Abstract

Achieving difficult goals over the long-term requires perseverance and passion, otherwise known as the non-cognitive trait grit. Grit has previously been shown to predict success outcomes beyond what is explained by cognitive traits such as IQ. In the present study, we translated the Short Grit Scale (Grit-S) from English to Japanese and adapted it for use at a Japanese university. The participants in this study were primarily first-year science-track students enrolled in a compulsory academic writing course. All students were non-native English speakers. In this course, students learn the scientific method and apply it by designing a simple experiment. The experiment provides a springboard for students to write a paper in the Introduction-Methods-Results-Discussion format. The gritty aspects of this course are 1) that it was conducted entirely in English; 2) the requirement to develop deep critical thinking skills in an education system that has traditionally focused on standardized testing and entrance examinations; 3) that for nearly every student this was the first exposure to highly structured writing in English; 4) the iterative process of drafting and revising. The Japanese translation of the Grit-S was investigated using responses from 213 participants and generated acceptable scale reliability for each factor: Consistency of Interest (Cronbach's alpha = 0.73) and Perseverance of Effort (Cronbach's alpha = 0.73). Furthermore, the responses were subjected to confirmatory factor analysis based on the two-factor model established by Duckworth and Quinn but indicated weaker fit to the model ($\chi^2 = 70.604$ $df = 19$, $RMSEA = 0.113$, $CFI = 0.86$). Based on these results the translated Grit-S has potential for application in an academic writing course in the Japanese context, but further investigation of the latent construct model is warranted.

Keywords: *grit, academic writing, scientific writing, English language learning*

1. Introduction

Grit is a latent construct that was defined by Duckworth et al. [1] as “perseverance and passion for long-term goals”. Duckworth et al. [1] developed a twelve-item tool for measuring grit based on two latent factors, Consistency of Interest and Perseverance of Effort. This tool was later refined to an eight-item version and designated as the Short Grit Scale (Grit-S) [2]. These studies showed that grit can predict success outcomes beyond what is explained by cognitive traits such as IQ.

We are currently investigating the motivational trajectory of science-track students enrolled in a compulsory academic writing course at a Japanese university, and expect that grit is a factor in our motivation model. This course's primary challenge for students is that it is conducted entirely in English and requires the rapid development of scientific critical thinking skills from students who have spent their academic life focusing on standardized testing and entrance examinations.

In the present study, we translated the Grit-S from English to Japanese and assessed its reliability and validity for use in further studies.

2. Method

2.1 Participants and procedure

Participants were first and second-year science-track students enrolled in a compulsory academic writing course at a Japanese university. All students were non-native English speakers. In this course, students learn the basics of the scientific method and apply it by designing a simple experiment. The experiment provides a springboard for students to write a paper in the Introduction-Methods-Results-Discussion (IMRD) format using English.

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The Short Grit Scale (Grit-S) [2] was translated from English to Japanese by two bilingual native Japanese speakers (Table 1). To ensure that the nature of the questions had not changed during translation, the Japanese version was back translated to English by a bilingual native Japanese speaker who was not directly involved in the study. Discrepancies were settled through discussion and consensus by the translators.

Table 1. Japanese translation of Grit-S with corresponding English version of each item

Consistency of Interest (Reverse Scored)
目標を設定することが多いが、時間が経つと異なる目標を追いかけてしまう。 I often set a goal but later choose to pursue a different one. あるアイデアやプロジェクトに短い間夢中になっていたが、時間が経つと興味を失った。 I have been obsessed with a certain idea or project for a short time but later lost interest. 数ヶ月以上の期間がかかるプロジェクトに集中することは苦手だ。 I have difficulty maintaining my focus on projects that take more than a few months to complete. 新しいアイデアやプロジェクトは、時々その前に取り組んでいたものから気をそらす。 New ideas and projects sometimes distract me from previous ones.
Perseverance of Effort
始めたことはなんでも終わらせる。 I finish whatever I begin. 失敗してもくじけない。 Setbacks don't discourage me. 私は真面目だ。 I am diligent. 私は頑張り屋だ。 I am a hard worker.

This study was approved by the university's ethics committee as part of a larger project designed to investigate the trajectory of student motivation during the academic writing course. Participation was voluntary, and students were informed that any outcomes of this investigation would not affect their grades. The Grit-S was administered during the 12th week of class (one semester = 13 weeks) and student responses were recorded on paper via multiple response forms designed by the authors. Completed multiple response sheets were digitized and the responses were extracted and converted to numerical values using the optical mark recognition software FormScanner [3]. Responses were stored separately and securely from any unique personal identification information. A total of 213 students (mean age = 18.4 ± 0.6) completed the translated Grit-S. The sample was 12% female.

2.2 Measures

Student responses to the translated Grit-S (Table 1) were collected using a 5-point Likert-type scale, translated to Japanese, ranging from 1 (*not at all like me*; 全く私らしくない) to 5 (*Very much like me*; 非常に私らしい). Statistical analysis and structural equation modeling were performed using SPSS Amos v. 25.0.0.

3. Results

Internal consistency was measured by calculating Cronbach's alpha values for the total Grit-S as well as the two subscale factors, Consistency of Interest and Perseverance of Effort (Table 2). The eight-item Grit-S and each four-item subscale displayed acceptable alpha values ranging from 0.73 to 0.77, which is in agreement with the results obtained by Duckworth and Quinn [2].



Table 2. Cronbach's alpha measure of internal consistency for Grit-S, the Consistency of Interest factor, and the Perseverance of Effort factor

N	Cronbach's alpha		
	Grit-S	Consistency of Interest	Perseverance of Effort
213	0.77	0.73	0.73

The Grit-S was previously established to fit a two-factor model using confirmatory factor analysis in which Consistency of Interest and Perseverance of Effort were first-order latent factors that load onto Grit, a second-order latent factor [2]. The analysis of responses to the translated Grit-S showed a weaker fit to the model than shown by Duckworth and Quinn [2] (Table 3). Both the RMSEA and CFI indices fall outside of the acceptable range [4].

Table 3. Fit indices for two-factor confirmatory analysis model of Grit

	χ^2	RMSEA	CFI
This study	(df = 19, N = 213) 70.604, p < 0.001	0.113 (90% CI = 0.086 – 0.142)	0.86
Duckworth & Quinn (2009)	(df = 19, N = 1554) 188.52, p < 0.001	0.076 (90% CI = 0.066 – 0.086)	0.96

4. Discussion

The goal of this study was to translate the Grit-S into Japanese and investigate its use in the context of a science-focused academic writing course at a Japanese university. We found that the responses displayed acceptable internal consistency (Cronbach's alpha > 0.70). However, when projected on the two-factor model originally proposed by Duckworth and Quinn [2] our data showed a much weaker fit to that model.

One possible explanation for the weaker fit could be related to cultural differences and perceptions towards reaching a desired goal. The original grit construct was modeled with respondents in the United States of America [1, 2], which is generally regarded as an individualistic culture. Japan however is generally regarded as a collectivist culture. A previous study using the Grit-S in the Philippines, also regarded as a collectivist culture, indicated that grit was a multidimensional construct [5], instead of the hierarchical model proposed by Duckworth and Quinn. Furthermore, Datu et al. observed that only Perseverance of Effort loaded on the higher-order grit factor [5]. In light of these findings, further investigation into the use of Grit-S in Japan warrants a deeper analysis with structured equation modeling such as exploratory factor analysis.

References

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