Contents lists available at ScienceDirect

# System

journal homepage: www.elsevier.com/locate/system

# Having a single language interest autonomously predicts L2 achievement: Addressing the predictive validity of L2 grit

# Abdullah Alamer<sup>a,b,\*</sup>

<sup>a</sup> King Faisal University, Saudi Arabia

<sup>b</sup> Imam Mohammad Ibn Saud Islamic University (IMSIU), Saudi Arabia

# ARTICLE INFO

Keywords: Autonomous single language interest (ASLI) Consistency of interest (CI) Self-determination theory (SDT) Language achievement Partial least squares structural equation modeling (PLS-SEM) Exploratory structural equation modelling (ESEM)

#### ABSTRACT

The present study aims to evaluate the role of 'autonomous single language interest' (ASLI) and assess its applicability and predictive validity for subsequent language achievement. ASLI, a refined version of 'consistency of interest' (CI) from grit, postulates that language students who have one autonomous language interest during their study (e.g., during the university setting) would achieve the language more successfully than those who have multiple language-unrelated interests/projects besides their language study. To evaluate this construct, 235 undergraduate English students were tracked over roughly one academic year. The validation of the single language interest (SLI) construct was achieved using exploratory structural equation modeling (ESEM). The analyses indicated a reliable and valid scale of SLI. The predictive moderated model offered unique information about how SLI is related to L2 achievement after one academic year. The effects of SLI on L2 achievement are positive when students have SLI in an autonomous manner; hence the name ASLI, but negative when students' have SLI in a controlled manner (e.g., with internal/external pressure). The effects hold constant while controlling for students' initial language achievement. Conceptual and educational implications are discussed.

# 1. Introduction

Learning a second language (L2) entails a long-term interest and commitment. Research indicates that understanding students' interest in learning the language is fruitful (Alamer & Alrabai, 2022; Alamer & Marsh, 2022; Chen, Lake, & Padilla, 2021; Dörnyei & Ushioda, 2021; Elahi Shrivan & Alamer, 2022; Elahi Shirvan, Taherian, & Yazdanmehr, 2021; Noels, Lascano, & Saumure, 2019). Consistency of interest (CI), a major construct in grit (Duckworth, Peterson, Matthews, & Kelly, 2007), reflects individuals' stable interests in the long-term perspective despite challenges and setbacks. Duckworth and Quinn (2009) maintain that students with high levels of CI (as well as the perseverance of effort) attain greater achievement in education. However, research findings in the L2 domain reveal weak or even negative predictive power of CI for language-related outcomes (more to say in the literature review). This is rather puzzling; why having high levels of stable interests (i.e., CI) do not predict language achievement? Even more, why does CI *negatively* predict scores in language learning outcomes when it is hypothesised to be a positive factor? According to L2 grit literature (e.g., Alamer, 2021b; Elahi Shirvan, Taherian, Shahnama, & Yazdanmehr, 2021; Oxford & Khajavy, 2021; Elahi Shirvan, Taherian, &

King Faisal University, Saudi Arabia.

E-mail address: alamer.aaa@gmail.com.

https://doi.org/10.1016/j.system.2022.102850

Received 12 November 2021; Received in revised form 23 May 2022; Accepted 15 June 2022 Available online 23 June 2022 0346-251X/ $\odot$  2022 Elsevier Ltd. All rights reserved.







Abbreviations: ASLI, autonomous single language interest; SLI, single language interest; CI, consistency of interest; ESEM, exploratory structural equation modelling; PLS-SEM, partial least squares structural equation modeling; SDT, self-determination theory.

Yazdanmehr, 2021; Wang, Shirvan, & Taherian, 2021) language students with high levels in CI can have interests that are *language-unrelated* in addition to their interest in the language study. These language-unrelated interests may consume students' time and energy necessary to learn the language. As such, specifying the *number* of interests students hold while studying the language does not seem to be pronounced in the construct of CI. Moreover, it might be legitimate to consider how L2 students formulate their interest in language study. That is, students may have different perspectives about their interest in the learning depending upon the extent to which their interest (or passion) is internalised; whether the interest in the language is *autonomous* or *controlled* by external pressure (Alamer, 2021a, 2022a; Joe, Hiver, & Al-Hoorie, 2017; Sudina, Brown, et al., 2020; Elahi Shirvan, Taherian, Shahnama, et al., 2021). Previous students have shown the key, but different, role *autonomous* and *controlled* motivation play in mediating and moderating the effects of psychological factors on achievement (e.g., Alamer, 2021a, 2022a; Alamer & Almulhim, 2021; Alamer & Lee, 2019, 2021). From this quick observation (which will be expanded in a later section), one may reflect on two aspects to address concerns around the CI: (i) the number of interests language students have while studying the language and (ii) the way in which the interest is internalised.

Taking these two points together, the paper introduces the construct, 'autonomous single language interest' (ASLI), as a refined version of CI, which postulates that students who narrow the scope of their interests/projects to be only around language study in an autonomous manner are likely to achieve the language. This paper examines how having an ASLI relates to language achievement over time and attempts to answer two research questions:

RQ1: How reliable and valid is the ASLI scale in measuring students' focus on studying the L2? RQ2: Can ASLI predict L2 students' subsequent achievement?

# 2. Literature review

# 2.1. Consistency of interests; inconsistency of findings

It is logical to think that not all interests have equal value during language study. Diligent L2 students are expected to focus on achieving the language during their language journey. This is because successful language learning tends to develop among passionate language students (Alamer, 2021b; Alamer & Alrabai, 2022; Alamer & Marsh, 2022; Chen, Vallerand, & Padilla, 2021; Elahi Shirvan, Taherian, Shahnama, et al., 2021; Oxford & Khajavy, 2021; Sudina, Vernon, et al., 2020; Teimouri, Plonsky, & Tabachnick, 2020; Wang et al., 2021). Sticking to a language interest for relatively a long period is particularly pronounced in research investigating the concept of CI, which belongs to the 'L2 grit' theory (Alamer, 2021b; Sudina, Brown, et al., 2020; Wu, 2003). CI is defined as trait-level consistency of passion for long-term goals in the face of challenges and obstacles (Duckworth & Quinn, 2009). The relationship between CI and learning outcomes is still under exploration in the L2 research but it has already received challenges, such as lack of construct validity and weak predictive power (Alamer, 2021b; Chen, Lake, & Padilla, 2021; Elahi Shrivan & Alamer, 2022; Khajavy, MacIntyre, & Hariri, 2020; Sudina, Brown, et al., 2020). Interestingly, research in L2 shows that CI is either unrelated or negatively related to learning outcomes. For instance, Teimouri et al. (2020) have shown that general domain CI did not correlate with L2 students' scores in grammar, speaking, laboratory, GPA, and self-report about English levels. Nor did the domain-specific CI correlate with any of the above-mentioned outcomes. Similarly, Khajavy et al. (2020) indicated that CI was a weak predictor of L2 proficiency among Iranian L2 university students. A hierarchical regression analysis was carried out by Lee (2020) to assess the robustness of CI (along with other variables) for EFL learners' willingness to communicate in an L2. The researcher found that CI was not predictive of the outcome among the three L2 cohorts involved in the study (i.e., middle school, high school, and university students), with small  $\beta$ values ranging from -0.01 to -0.06 in three groups. Elahi Shrivan and Alamer (2022) have recently applied structural equation modeling to assess the extent to which L2 grit constructs mediate the effect of basic psychological needs of autonomy, competence, and relatedness on English achievement. Their results revealed that, in contrast to PE, CI failed to function as a mediator and did not exhibit a significant direct effect on achievement. Their finding of the direct and mediating effects of CI was invariant across the genders. Other studies have even shown that CI was negatively and significantly associated with language achievement. For example, Sudina, Brown, et al. (2020) investigated the predictive validity of grit constructs for ESL and EFL contexts and showed that CI was negatively and moderately linked with L2 achievement in the ESL context ( $\beta = -0.45$ , p < .01) and was unrelated to achievement among EFL learners  $(\beta = -0.07, p > .05).$ 

A recent study by Alamer (2021b) has shed some light on the reason why CI does not lead to higher achievement. The author employed a longitudinal study showing that initial endorsement of CI weakly predicted an increase in subsequent language performance ( $\beta = -0.06$ , p > .05). Although this contradicts the hypothesised predictive power of CI, the research showed that maintaining CI over time was key to understanding how initial CI led to an increase in L2 performance, later on. That is, language students who express an early interest in their studies but do not attain mastery, later on, can possibly be explained by the idea that some students may have transferred their interest in learning the language to another project or even lost interest entirely (Alamer, 2021b). At the definition level, CI has also received some criticism, for example from semantic, intensity, and positivity vs. negativity perspectives (e.g., Oxford & Khajavy, 2021).

These are important observations because CI is supposed to be an important factor that relates to success in different life domains, including L2 learning (Duckworth, 2016). Although researchers tend to neglect the weak prediction of CI for language outcomes, the study of Khajavy et al. (2020) is one of those explained why CI may present weak prediction in the L2 context. The researchers indicate that general-domain measurement of CI may be problematic for explaining L2 achievement. This is because language students may be interested in different subjects in the university and be less interested in others. Thus, general CI might not be able to explain the variance in L2 achievement sufficiently. The findings of these studies justify the assessment of a more specific representation of CI. ASLI

may be perceived as a refined version of CI because CI does not specify the *number* of interests individuals can have while studying the language. For example, Duckworth (2016) indicates that some students may have interests in more than one thing and conceive studying in the university as merely one of them. In contrast, ASLI indicates that learning (the language) is the sole interest while being involved the language learning before pursuing other goals. Hence, the number of interests that the language students have is the first aspect that differentiates ASLI from CI. This specificity offers new extensions to CI by postulating that learning the language should be the *only* project students have during their language study. This, however, does not imply that students should ignore life obligations such as family matters. Rather, students should have a balance between their learning interest and life duty in an autonomous perspective (which will be explained below).

## 2.2. Autonomous SLI

Accounting for the single interest in studying the language is necessary to expand on our exploration of the SLI but not sufficient for full understanding. This is because students with a single language interest are inherently passionate individuals; hence, they are likely to have different outlooks regarding their interest in the L2. In L2 grit literature, studies often assess the extent to which grit constructs and autonomous motivation are correlated with L2 outcomes. Although CI consistently shows a weak association with the outcomes (as explained earlier), autonomous motivation appears to be positively correlated (Chen, Lake, & Padilla, 2021; Elahi Shirvan, Taherian, Shahnama, et al., 2021; Lee, 2020; Sudina, Brown, et al., 2020; Wei, Gao, & Wang, 2019). Thus, one may postulate that students who autonomously formulate their interest should attain and acquire the language. Because autonomous motivation is rooted in the literature on self-determination theory (SDT), I cover this concept in this section. SDT explains that some students may pursue language study because it is inherently enjoyable; their desire stems from within and is driven by strong interest. This outlook is called an intrinsic orientation. Other students may study the language because they perceive it as having value, regardless of whether they enjoy working towards achieving the goal. This outlook is called *identified orientation*. The intrinsic and identified orientations jointly constitute the construct autonomous motivation/outlook (Ryan & Deci, 2000, 2020). In contrast to autonomous motivation, some students may be motivated by external and social pressures, for example, pressure to avoid shame and/or satisfy familial expectations. This type of motivation is called *introjected orientation*. Other students may study the language due to completely external factors, for example, to get a better job and/or to avoid negative consequences. This type of motivation is called an external orientation. The introjected and external orientations form the more general construct of controlled motivation/outlook.

SDT motivational orientations have been well established and informed the language learning process in different contexts. For instance, it is often reported that controlled motivation is unrelated or negatively related to linguistic outcomes such as engagement (McEown, Noels, & Chaffee, 2014; McEown, Noels, & Saumure, 2014; Noels, Clément, & Pelletier, 1999), self-evaluation of L2 competency (Noels et al., 2019), confidence in learning (Alamer & Almulhim, 2021) teacher assessment (Oga-Baldwin & Nakata, 2017), learning in an online environment (Alamer & Al Khateeb, 2021) attainment of vocabulary (Alamer, 2022a), and actual achievement (Alamer, 2021b; Alamer & Lee, 2019; Pae, 2008). Conversely, autonomous motivation is usually correlated with these linguistic outcomes. These findings inform the present study and justify conceptualising autonomous and controlled outlook as moderators in the association between single language interest and L2 achievement. Based on these studies, it can be postulated that students who autonomously internalised their SLI are likely to progress more optimally than those whose language interest is controlled by external/inner circumstances (e.g., inner and external pressure). In the present investigation, motivational outlooks are operationalised as moderators in the analysis to examine the extent to which the type of the outlook affects (and possible changes) the direction of the effects of SLI on achievement.

# 3. Methods

# 3.1. Participants

The present study's sample consisted of 235 male and female Saudi L2 undergraduate English students, all of whom were enrolled in the Department of English at a public university in Saudi Arabia at the time of the study. Their ages ranged from 18 to 19. The students were in their foundation year and were invited to participate at three points during the year. To enter the foundation year, students are required to take a placement test (explained later). Those who passed the test were admitted to the programme, and those who scored high (more than 90% correct answers) were allowed to skip the foundation year and proceed to the department. Only students who had recently started their foundation year were invited to participate in this study. It is believed that these students' English proficiency levels were relatively similar and that they had plans to improve their language skills (hence, students with high proficiency levels were excluded). Participants were informed that participation in the study was voluntary and they were contacted at three points in time. Time 1, 2, and 3 data collection were conducted at the beginning of the semester, after 12 weeks (around the end of the first semester), and after around 27 weeks (near the end of the foundation year), respectively. Only those who participated in Times 1 through 3 were included in the analysis. This resulted in the removal of 91 participants, and thus, 144 cases were retained in the analysis. An online questionnaire was administered (via Google Forms). Those who were unwilling to participate in the research were simply asked to refrain from filling out the questionnaire. The university review board approved the study and granted the researcher permission to collect data from the students.

# 3.2.1. Single language interest (SLI) scale

A new scale was developed to assess the extent to which students maintain a clear focus on their language learning over time and ascertain whether they have not multiple goals in mind while achieving the learning goal. The SLI scale has six items in a yes/no format. Three items are negatively worded. The scale was subjected to face validity before the main study was conducted by two experts in the language learning domain who checked the appropriateness of the scale items. The initial scale was based on a 5-point Likert scale ranging from (strongly disagree) to (strongly agree). However, an expert has suggested that for the SLI scale to be operationalised properly the yes/no dichotomy should be used to avoid middle answers. In this way, participants who responded yes to the positively worded items should have clear SLI, while those who select 'no' have no SLI during language study. The same logic goes for the negatively worded items. Also, some modifications in wording were made based on their comments and the six items were retained in the questionnaire. An example of a questionnaire item that assesses SLI is as follows: 'Mastering the language is the only interest I have during my university study'. SLI data collection was conducted at Times 1 and 2 only.

# 3.2.2. Autonomous and controlled outlook

An autonomous and controlled outlook was assessed using SDT-L2 scale (Alamer, 2022a; further validated in; Alamer, 2021a). The scale consists of 12 items and has six items for each construct (autonomous motivation and controlled motivation) in a 5-point Likert-type format (see Appendix for full scale items). The following question precedes the items: 'Why are you learning English?' Participants were asked to indicate the extent to which they agreed with each item. Example items for autonomous and controlled outlook, respectively, are 'because I enjoy learning English' and 'because I want to pass the exams'. This scale was administered at Time 2 only.

#### 3.2.3. Second language performance

Students' English performance data were collected at two time points (Time 1 and Time 3). The first measure of English performance was students' placement test scores. The university placement test consists of questions focused on vocabulary knowledge. The university adopted this measure because it 'is particularly useful for placement and diagnostic purposes' (Schmitt, 2010, p. 198). The maximum score was 30 and students who get less than 10 were not accepted and had to choose another major of study within the university. Students' L2 performance at Time 3 was measured using a test administered at the end of the foundation year. The test measures students' reading competency, academic writing, and vocabulary knowledge. The test had a total score of 30, with 10 marks for each skill. The three skills were taken from the 'Unlock' English language course developed by The University of Cambridge. 'Unlock' is constructed following the Common European Framework of Reference for languages (CEFR) and each level in the series targeted a particular CEFR level (e.g., Level 1 targeted A1, and Level 2 targeted A2). 'Unlock' comes with a test bank that teachers can use to examine their students and reliably evaluate their progress (see Appendix for example items). Students in the foundation year studied Level 1 and 2. For example, the reading test can be a passage that is followed by 10 close-ended questions. In the writing test, students may be required to re-order seven sentences into a five-sentence paragraph that starts with a topic sentence, then has supporting sentences, and ends with a concluding sentence. Therefore, there are two unnecessary sentences. In the vocabulary section, students may be required to match words with their definitions and choose the words that fit the blanks in the sentences. The actual test students took was not possible to include here because it is proprietary to the university, but similar test items have been provided in Appendix. The participants were asked if they were willing to allow the researcher to collect their scores for the research purpose. All students agreed to allow the researcher to use their marks. Note that this measure is a single item measure; thus, reliability and factorial validity cannot be tested. Nonetheless, content validity is established by explaining the content of the measure and providing examples in the appendix.

# 3.3. The analyses

To assess the validity and reliability of the SLI construct as well as the other constructs involved in the present study, exploratory factor analysis (EFA) and exploratory structural equation modelling (ESEM) were used. EFA was employed exclusively for SLI to derive the initial factor solution. Based on the EFA results, the whole set of constructs were interested into the ESEM to assess the measurement model and determine the factorial validity and composite reliability of the constructs. ESEM has the same objective of CFA, but it differs in that it takes the measurement model's flexibility into account. Specifically, because subscale items are not always perfect representative of their constructs and can share certain communality with other constructs which is theoretically justified and supported (Alamer, 2022b; Shao, Elahi Shrivan & Alamer, 2022). As such, an important feature of ESEM is that it allows cross-loadings to be freely estimated. Even small cross-loadings should not be discarded because if they are not estimated, they will result in inflated factor correlations that distort the evaluation of their discriminant validity (see Alamer & Marsh, 2022 for greater details about ESEM and Shao, Elahi Shrivan & Alamer, 2022 for discussion about factor correlations matter). In both EFA and ESEM the diagonally weighted least squares estimator was used because the data contains binary variables.

In the ESEM analysis, goodness-of-fit indices were used to evaluate the appropriateness of the model. The comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardised root mean square residual (SRMR) were computed. Hu and Bentler (1999) suggest that CFI and TLI values that are equal to 0.90 or above 0.95 are indicative of an acceptable and good model fit, respectively. On the other hand, the RMSEA value should be equal to or lower than 0.06 to be indicative of a good model fit, and the value of SRMR should be close to or lower than 0.08 to show adequate fit. The EFA and ESEM analyses were

conducted using JASP 0.16 software (JASP Team, 2022) and Mplus 8.1 (Muthén & Muthén, 1998-2017).

After obtaining the factor structures of the constructs, a longitudinal structural model was used to assess the predictive power of SLI on L2 performance over time, considering the moderation effects of autonomous and controlled outlooks. The structural model was examined using the partial least squares structural equation modeling (PLS-SEM) method. PLS-SEM is an alternative type of SEM analysis within the widely used covariance-based structural equation modeling (CB-SEM). According to Hair, Hult, Ringle, and Sarstedt (2017), PLS-SEM is a variance-based approach within the SEM framework that is recommended in exploratory research, where the goal of the analysis is to explain the variance in the outcome variable(s). This method is preferable when no solid theoretical grounding has been established in the literature for the tested model (Hair et al., 2017). Moreover, PLS-SEM is more relevant when prediction is the min objective of the applied study and when the data departs from the normal distribution. For these reasons, the researcher utilised PLS-SEM to assess the structural model, using SmartPLS 3 software (Ringle, Wende, & Becker, 2015).

The assessment of the PLS-SEM model differs from CB-SEM (e.g., the ESEM assessment) because it focuses on explaining the variance in the dependent variables, while CB-SEM focuses on estimating the covariance matrix for a sample dataset. Three important measures were evaluated in the structural model through PLS-SEM (Hair, Risher, Sarstedt, & Ringle, 2019). First, the coefficient of determination ( $R^2$ ), which reflects the amount of explained variance in the dependent variable, is considered. Following the L2 field-specific benchmarks suggested by Hair and Alamer (2022),  $R^2$  values of 0.06, 0.16, and 0.36 are indicative of small, medium, and strong explanatory power, respectively. Second, the blindfolding procedure for assessing the predictive relevance ( $Q^2$  value) was assessed. This test systematically resamples the data and then deletes and predicts every data point of the dependent variable's indicators. The model has predictive relevance if the  $Q^2$  value is higher than zero (Hair et al., 2017). However, the  $Q^2$  value fluctuates depending on the complexity of the model relationships (Shmueli, Ray, Velasquez Estrada, & Chatla, 2016). In addition, PLS<sub>predict</sub> was used in the present study. It is uses training and holdout samples to generate and evaluate predictions from the PLS model against a linear regression model (LM) (Hair et al., 2019). The PLS model has prediction power if it offers lower prediction errors (i.e., in RMSE and or MAE) than the LM model does. Additionally, SRMR is reported for readers to determine the adequacy of the PLS structural model. Note that SRMR cut-off values suggested from the CB-SEM should be only used as rough descriptive guidelines (Hair et al., 2017).

The reliability of the variables was tested using Cronbach's alpha (*a*) and composite reliability (CR). CR is seen as more advantageous because it accounts for model parameters and their measurement errors, and thus it considers the items' different loadings (Kline, 2016). In exploratory research, values between 0.60 and 0.70 for Cronbach's alpha and CR are acceptable (Hair et al., 2017). The effect size in the Pearson correlation was interpreted according to Plonsky and Oswald's (2014) guidelines: correlation coefficients that are close to 0.25, 0.40, and 0.60 are indicative of small, medium, and large effect sizes, respectively. Similarly, the effect sizes of beta ( $\beta$ ) values were interpreted according to Cohen et al.'s (2011) guidelines: values in the range of 0–0.1, 0.1–0.3, and 0.3–0.5, and those >0.5 are indicative of weak, modest, moderate, and strong effect sizes, respectively.

# 4. Results

#### 4.1. Preliminary analyses

Descriptive statistics, reliability estimates, and bivariate correlations for the present study's variables are shown in Table 1. Overall, the results of the variables' reliability tests indicated acceptable to good reliability levels. An examination of the data distribution has been carried out by assessing the skewness and kurtosis values using the +2/-2 guideline (Hair et al., 2017). Outliers are extreme values that depart from the rest of the dataset. Multivariate outliers were tested using the Mahalanobis  $D^2$  measure. Any case that has a  $D^2$  value that deviates substantially from the rest of the dataset at p < .001 should be considered for removal (Collier, 2020). Two cases fell outside the acceptable level and were removed from the data, based on an empirical justification. Table 1 shows the correlational matrix based on Spearman's rho ( $\rho$ ) of the study variables.

# 4.1.1. Exploratory factor analysis of SLI scale

An EFA analysis was employed for SLI to obtain the scale's initial factorial structure. Because the data of SLI is binary in nature (i.e., 0/1), the diagonally weighted least squares estimator with eigenvalue value above 1 guideline was used (see Fig. 1). As shown in

Table 1			
Descriptive Statistics and Zero-Order Correlations	(Spearman's rho)	for the	Variables.

	1	2	3	4	5	6
1. Achievement T1	_					
2. Achievement T3	.18	-				
3. Autonomous outlook T2	.11	.23	-			
4. Controlled outlook T2	20	22	16	-		
5. SLI T1	15	10	.18	.04	-	
6. SLI T2	04	.25*	.23	05	.51***	-
Mean	16.95	22.62	4.28	1.60	3.21	4.08
SD	4.53	6.16	.77	.91	1.10	1.06
( <i>α</i> )/CR	-	-	.80/.82	.77/.79	.70/.72	.68/.71

Note. \*p < .05, \*\*p < .01, \*\*\*p < .001.



Fig. 1. Scree plot based on eigenvalue.

#### Table 2

The Results of the EFA Analysis of SLI using diagonally weighted least squares estimator.

Chi-squared test				
	Value	df		р
	40.14	9		<.01
Item			Factor 1	Uniqueness
Positively-worded items SLI1: Mastering th university study.	e language is the only inte	erest I have during my	.62	.62
SLI2: Studying the lang university study.	guage is the only project I	am working on during my	.29	.83
SLI3: I am not involved in any long-term projects/goals other than learning the language during my university study. <i>Negatively-worded items</i>		.80	.36	
SLI neg1: Studying the language is one of the projects I am working on during my university study.		32	.79	
SLI neg2: I have develo university study.	oped new interests besides	the language during my	60	.62
SLI neg3: Studying the university study.	language is not the only i	nterest I have during my	59	.67
Note. The Promax rota	tion method was used.			
Factor characteristics				
	SumSq. Loadings	Proportion var.		Cumulative%
Factor 1	1.75	0.30		.30

Table 2, the model provided meaningful and acceptable results as indicated by the nonsignificant  $\chi^2$  reflected value. The expected positively and negatively worded SLI items have emerged in the analysis. However, it appeared that the item 'SLI neg1', which states 'Learning English is one of the goals I am currently working on' loaded weakly on its factor >0.30. However, this item has been retained because removing it impacts the validity and meaning of the construct.

#### 4.1.2. The measurement model of the Study's constructs using ESEM

After deriving the initial SLI factorial structure, the entire set of variables was entered into one complete measurement model using ESEM. The diagonally weighted least squares estimator was used in the ESEM because ASLI items are binary. In the ESEM model, the items could be freely estimated and cross-loaded onto the single language interest, autonomous outlook, and controlled outlook. The ESEM model provided a good fit to the data ( $\chi^2 = 100.56$ , p = .08, df = 82, SRMR = 0.07, RMSEA = 0.04, RMSEA 90% CI: [0.00, 0.06], CFI = 0.98, TLI = 0.97). The details of the factor loadings and factor correlation can be seen in Table 3. As anticipated, although the items were allowed to cross-load on all factors, these cross-loadings were mostly nonsignificant and generally lower in magnitude than on the corresponding items, though some exceptions are noticed. These cross-loadings are expected because indicators are not always perfectly representative of their factors but can share variance with others (Alamer & Marsh, 2022; Shao, Elahi Shrivan & Alamer, 2022). Based on these results, convergent validity was established by showing that the corresponding items were more strongly loaded on their factors than the cross-loaded ones. Discriminate validity was also established by showing that cross-loaded items were loaded weakly on the non-corresponding factors, albeit with a few exceptions. It is important to note that the scores of negatively worded

# A. Alamer

Table 3
The results of the ESEM analysis.

Factor loadings		
Factor	Indicator	β
Factor 1 (Autonomous outlook)	Autonomous1	.52
	Autonomous2	.43
	Autonomous3	.57
	Autonomous4	.54
	Autonomous5	.57
	Autonomous6	.43
	Controlled1	.04
	Controlled2	.02
	Controlled3	.18
	Controlled4	.08
	Controlled5	34
	Controlled6	58
	SLI1	.10
	SLI2	.24
	SLI3	.12
	SLI neg1	16
	SLI neg2	22
	SLI neg3	26
Factor 2 (Controlled outlook)	Controlled1	.90
	Controlled2	.42
	Controlled3	.66
	Controlled4	.50
	Controlled5	.24
	Controlled6	.51
	Autonomous1	.01
	Autonomous2	.02
	Autonomous3	.04
	Autonomous4	11
	Autonomous5	22
	Autonomous6	.17
	SLI1	.24
	SLI2	.08
	SLI3	.22
	SLI neg1	.06
	SLI neg2	05
	SLI neg3	.20
Factor 3 (SLI)	SLI1	.42
	SLI2	.28
	SLI3	.31
	SLI neg1	40
	SLI neg2	32
	SLI neg3	47
	Autonomous1	.01
	Autonomous2	.05
	Autonomous3	.07
	Autonomous4	.28
	Autonomous5	.18
	Autonomous6	.03
	Controlled1	.26
	Controlled2	03
	Controlled3	.28
	Controlled4	.28
	Controlled5	.21
	Controlled6	.24
<i>Note.</i> The bolded values are significant at $p < 1$	.05. SLI = single language interest.	

			r
Autonomous outlook	$\leftrightarrow$	Controlled outlook	.06
Autonomous outlook	$\leftrightarrow$	SLI	.10
Controlled outlook	$\leftrightarrow$	SLI	.02

*Note*. SLI = single language interest.

items have been reversed in the subsequent analyses to represent focused-goal learning only.

## 4.2. The predictive moderated model

After establishing the reliability and validity of the study's constructs, the assessment of the predictive validity of single language interest for later performance of L2 was taken. Fig. 2 shows the results of the longitudinal moderation model of single language interest for delayed achievement. To account for the type of single language interest students have, the model considered the moderation role of autonomous outlook and controlled outlook at Time 2 in the relationship between single language interest at Times 1 and 2 and L2 performance at Time 3. To obtain more reliable results, L2 performance at Time 1 has been controlled for (covariate). The global assessment showed that model seems to be fitted the data adequately (SRMR = 0.06, SRMR Hi 95% CI = 0.08). The explanatory power was also acceptable ( $R^2 = 0.21$ ), which can be considered medium in size. However, the predictive relevance was relatively low ( $Q^2 = 0.02$ ). This is not surprising, given that only two exogenous variables were involved in the model. Nonetheless, the structural model showed good out-of-sample prediction power through the PLS<sub>predict</sub> analysis as the prediction error i.e., the RMSE was lower in the PLS model (5.01) than in the LM model (RMSE = 5.07).

Turning to the evaluation of specific path parameters in the model, it was observed that SLI at Time 1 did not predict achievement at Time 3 directly ( $\beta = -0.03$ , CI 95%: [-0.17, 0.22], p > .05), while SLI at Time 2 significantly predicted achievement at Time 3 ( $\beta = 0.22$ , CI 95%: [0.12, 0.36], p < .05). Although SLI at Time 1 did not affect achievement at Time 3, the indirect effect through single language interest at Time 2 was significant ( $\beta = 0.13$ , CI 95%: [0.04, 0.32], p < .05). The size of these paths, nonetheless, was not large. More importantly, the results related to the moderated effects of autonomous and controlled outlook illustrated interesting findings. Specifically, the results show that autonomous outlook positively moderated the relationship between single language interest at Time 1 ( $\beta = 0.39$ , CI 95% [0.29, 0.47], p < .05). A similar moderation impact was also found in the relationship between single language interest at Time 2 and L2 achievement at Time 3 ( $\beta = 0.36$ , CI 95% [0.27, 0.48], p < .05). In contrast,



Fig. 2. The structural moderated model linking SLI at times 1 and 2 to L2 achievement at Time 3.

Note. The dashed lines indicate a nonsignificant effect; Italic and grey values are the 95% confidence interval. SLI = single language interest.



**Fig. 3.** A slope analysis of the moderating effect of autonomous outlook at Time 2 in the relationship between SLI at Time 1 and L2 achievement at Time 3.

Note. SLI = single language interest.

controlled outlook operated as a negative moderator in the relationship between single language interest at Time 1 and L2 achievement at Time 3 ( $\beta = -0.57$ , CI 95% [-0.49, -0.65], p < .05). However, controlled outlook at Time 2 failed to moderate the effect between single language interest at Time 2 and L2 achievement at Time 3 ( $\beta = -0.18$ , CI 95% [-0.10, 0.24], p > .05). The results of the model provided a more stringent test of the moderating role of autonomous and controlled outlook after accounting for prior variance in L2 achievement.

A simple slope analysis of the moderating role of autonomous outlook at Time 2 in the relationship between single language interest at Time 1 and L2 achievement at Time 3 is provided in Fig. 3. As shown, autonomous outlook at Time 2 significantly changed the direction of the effect of single language interest at Time 1 on L2 achievement at Time 3 so that it *becomes significantly positive*. That is, when students autonomously formulate their single language interest, single language interest significantly and positively predicts L2 achievement (see the blue line in Fig. 3). On the other hand, when students formulate their single language interest less autonomously, the impact of single language interest on L2 achievement *becomes significantly negative* (see the red line in Fig. 3). Similar moderating effect patterns were observed in the relationship between single language interest at Time 2 and L2 performance at Time 3 (see Fig. 4). Thus, both moderation results substantiate the role of the motivational outlook in determining the effect of single language interest on L2 achievement.

In contrast, the moderating effect of controlled outlook in the relationship between single language interest at Time 1 and achievement at Time 3 was quite pronounced but negative in direction. As shown, controlled outlook at Time 2 significantly changed the direction of the effect of single language interest at Time 1 on L2 achievement at Time 3 so that it *becomes negative*. This is reflected by the blue line in Fig. 5. In contrast, the red line indicates that decreased levels in controlled outlook changes the effect of single language interest at Time 1 to *positive*. Nevertheless, as shown in Fig. 6, the moderating effect of controlled outlook in the relationship between single language interest at Time 2 and achievement at Time 3 was trivial.



Fig. 4. A slope analysis of the moderating effect of autonomous outlook at Time 2 in the relationship between SLI at Time 2 and L2 achievement at Time 3.

Note. SLI = single language interest.





Note. SLI = single language interest.



Fig. 6. A slope analysis of the moderating effect of controlled outlook at Time 2 in the relationship between SLI at Time 2 and L2 achievement at Time 3.

*Note.* SLI = single language interest.

#### 5. Discussion

The present study's primary objective was to extend our understanding of the role of CI on language achievement by adjusting the conceptualisation of 'interest', and evaluate a refined representation which, we hope, addresses some of the issues about the mixed findings of the predictive power of CI for language outcomes (Alamer, 2021b; Teimouri et al., 2020; Elahi Shrivan & Alamer, 2022; Elahi Shrivan, Taherian, Shahnama, et al., 2021; Sudina, Brown, et al., 2020). Building on the concept of CI (Duckworth & Quinn, 2009), ASLI postulated that having one autonomous language interest during language study can be relevant to students' success in the long term. We have considered two major aspects while addressing the construct of CI: the *quantity* of interests (Khajavy et al., 2020; Oxford & Khajavy, 2021) as well as the *internalisation* of the interest (Ryan & Deci, 2020). It is hypothesised that the more autonomously single language interest is formulated the more predictive validity it has in predicting future achievement. The examination begun with the EFA, which offered the expected information about the factorial structure of the constructs. The construct validity was further examined using ESEM, in which all constructs were entered into a comprehensive measurement model. Although ESEM allows various items to freely load onto all factors (Alamer, 2022b; Alamer & Marsh, 2022), the single language interest (as well as other) items each loaded strongly onto their presumed factor, though few exceptions were observed. Therefore, the single language interest (SLI) scale's validity (convergent and discriminant) was appropriately evaluated, and the analyses yielded satisfactory results.

The results of the predictive validity of the SLI showed that initial endorsement of single language interest predicted achievement after one academic year indirectly. That is, students who sustain their single interest over time and did not turn over are those who achieve linguistically. Therefore, the findings suggest that some students may report that their study of the language is a single interest at early stages, but they may change their mind later on (possibly giving up or have developed new interests beside studying the language). Without following the participants over time, we would not be able to capture the dynamism of interest (Dörnyei & Ushioda, 2021). This finding agrees with those reported in Alamer (2021b) who also examined CI through time and come to a similar conclusion. The findings also support the dynamic perspective of interest and achievement over time as Alamer and Alrabai (2022) have recently established.

An important and critical observation that emerged from the predictive (longitudinal) moderated model is related to the role the internalisation of interest played in shaping the predictive power of the single language interest. In particular, it appears that the more autonomously (and less controlled) single language interest is formed among the students, the positive *and direct* role it plays on L2 achievement; however, when the single interest is conceived in a controlled (and less autonomously) manner, it functions in an opposite direction in predicting L2 achievement. Hence, understanding the psychological process students go through when endorsing their single language interest seems to be crucial. The present study support previous studies (e.g., Alamer & Lee, 2021; Elahi Shirvan, Taherian, Shahnama, et al., 2021) that illustrated the key role autonomous motivation play in the relation between the predictors and language-related outcomes. That is, SLI alone may be sufficient to account for achievement in the language but the way in which students formulate their interest in the language matters equally. The interaction effects of the motivational outlook have provided unique information in explaining the link between the SLI and achievement which should be relevant to research in grit and CI in particular.

# 5.1. Educational implications

Our findings highlight the role of single language interest in predicting language learning proficiency after a whole academic year.

However, the findings indicated that initial formulation of the single interest in the language does not predict the achievement directly but only indirectly through maintaining this single language interest. This finding is theoretically and empirically consistent with the construct definition. As such, teachers should regularly check the levels of students' interest in learning the L2 over the language course/program. This is because not all students sustain their interest in the language learning (Alamer, 2021b) and some may even have multiple language-unrelated interests at the same time. Teachers may discuss with their students that considering language learning as a sole project while they are in the language course/program can be helpful to proceed successfully toward mastery. Students may also benefit from these findings by understanding that some students may show a clear focus on the language study early in the program but then become distracted by other projects or even lose interest in learning the language. Therefore, students should evaluate the strength and the quality of their interest in the language from time to time. A recent study (Alamer & Alrabai, 2022) has also suggested a dynamic effect between language interest and achievement over time; thus, students and teachers may benefit from being aware of such reciprocal relation.

Students who prioritise language learning as their sole long-term interest during their study, upon which they focus their energy, are more likely to achieve proficiency. Moreover, when students' interest is autonomous, they are more likely to see the positive consequences of their sustained interest. Conversely, when students endorse controlled language interest, their interest may not produce desirable language-relevant outcomes. Thus, students should reflect thoughtfully on why they have long-term language interest (Alamer & Marsh, 2022). Our hope is that students would have interest in the language autonomously—that is, with a sense of personal involvement and volition, and with control and ownership regarding learning the language (McEown, Noels, & Saumure, 2014). Teachers can assist students in endorsing this outlook by using autonomy-supportive teaching strategies. For example, teachers can offer choices regarding language topics, encourage exploration, and take on learners' perspective to ascertain what students need to learn. In addition, having teachers provide a clear structure and sensible feedback will encourage students to set one healthy long-term language goal. Furthermore, according to the dualistic model of passion in L2 domain (Alamer & Marsh, 2022), students could have their language passion harmoniously. This can be the case when "the activity is generally integrated with one's self-structure, and is in harmony with the other elements of the individual's life" (p. 7). Therefore, students should strive to achieve the L2 but should also fulfil life obligations (e.g., filial duty) autonomously to achieve a balanced language learning journey. Conversely, when students' passion is categorised as obsessive, conflict and negative feelings might be the results (Chen, Vallerand, & Padilla, 2021).

#### 5.2. Limitations and conclusion

The present study has some limitations. First, it relied exclusively on self-reported questionnaires to obtain information about ASLI. Future studies should examine this concept qualitatively, for example using interviews, to shed light on aspects that were unrevealing in this quantitative study. For instance, researchers may assess how students feel and think when they set their long-term language goal, what inspired them, and what learning strategies they employed while working on that goal. Second, the SLI scale provided satisfactory results regarding construct validity. However, it would have been better if similar constructs such as CI were included to examine the relationships thoroughly. Thus, we encourage researchers to SLI scale to replicate and validate its application. Third, the longitudinal moderation model provided medium explanatory power. Although this is acceptable given that only two variables were set as exogenous variables in the model, future research should examine different model specifications and include relevant IDs variables in the model while considering the established guidelines in the field (e.g., Shao, Elahi Shirvan, & Alamer, 2022).

Overall, the findings of the present study introduced the ASLI construct (as a refined version of CI) to the language learning domain, along with a new scale for assessing students' single interest in studying the L2 (the SLI scale). The SLI scale showed reliable and valid results and was subsequently assessed for its predictive validity for future achievement. The longitudinal moderation model indicated that single language interest was only indirectly linked with achievement via means of sustain endorsement of the interest. Hence, it is not tenable to assess the predictive relevance of SLI through cross-sectional data, but only longitudinal data should be examined to estimate valid results. Moreover, the moderation effects of autonomous outlook and controlled outlook yielded unique information in the association between single language interest and L2 achievement. Thus, understanding students' motivational profiles appear to be critical in determining the effects of SLI on subsequent achievement. In sum, this study can be said to be a contribution in addressing the predictive issues of CI from grit theory by illustrating how having a single long-term language interest benefits students and helping them achieve L2 proficiency.

# Declaration of competing interest

The author declares no conflict of interest involved.

# Appendix

Examples of the reading, writing, and vocabulary tests representing students' achievement.

# READING

- 1 Read the factsheet and match the main ideas (A–D) to the paragraphs where they were mentioned (1–4). 1 mark for each correct answer.
  - A What to do if you are hurt by a man-of-war.
  - B Portuguese men-of-war mainly swim in warm water.
  - C Touching these creatures can be very upsetting.
  - D Portuguese men-of-war stay together in large groups.
- 1 If you should ever go swimming in one of the world's warmer oceans, it might be a good idea to first check that there are no Portuguese men-of-war in the area. These creatures look like jellyfish, but are in fact colonies of tiny creatures working together. They are usually found in groups, each of which can contain over a 1,000 men-of-war.
- 2 Men-of-war prefer warm waters such as the tropical and subtropical parts of the Pacific and Indian oceans, which are rich sources of food. They float wherever the wind or the currents in the sea take them. Because of this, menof-war have also been found in colder areas, such as the coasts of Scotland, Wales and Ireland.
- 3 So, why would you want to avoid swimming near these creatures? Their tentacles. Although men-of-war float on the surface, their tentacles can find prey 10 metres under the water and in some cases they can reach up to 50 metres. Each of these tentacles is covered with poisonous venom that the carnivorous man-of-war uses to paralyze fish and other small sea creatures. The sting is rarely fatal for humans, but it is extremely painful. Imagine the worst pain you have ever experienced and multiply that by ten. You are not even close. And even when they are dead, these creatures can still give you a nasty sting.
- 4 If you should be unlucky enough to be stung by one of these creatures, vinegar should never be used. It could cause severe bleeding. The best thing to do is to remove any parts of the tentacles that may be stuck to your skin, being careful not to touch them with your fingers. You should then apply salt water (not fresh water, as this will make the sting worse). You can further ease the pain by soaking the affected area in hot water for 15–20 minutes.
- 2 Look at the words in bold in the questions below. Which paragraph (1–4) of the factsheet should you look at to find the answer? 1 mark for each correct answer.
  - A Can men-of-war kill people? \_\_\_\_\_
  - B How far can a man-of-war reach when attacking a creature? \_\_\_\_\_
  - C What type of life-form is the man-of-war? \_\_\_\_\_
  - D What could cause loss of blood? \_\_\_\_\_
  - E Do men-of-war live only in warm water? \_\_\_\_\_
  - F What is the usual habitat of the man-of-war? \_\_\_\_\_

# ACADEMIC WRITING SKILLS

Correct the punctuation of the sentences below (sometimes there are two sentences to punctuate). 1 mark for each correct answer.

- 1 an animal is a living organism that eats organic matter and is typically able to respond quickly to its environment
- 2 a bird has feathers wings and a beak and is usually able to fly
- 3 fish have no limbs and are cold-blooded they live only in water
- 4 insects are small animals with six legs usually with one or two pairs of wings
- 5 arachnids are arthropods such as scorpion or spiders

Put the sentences in the best order to make a 5-sentence paragraph that starts with a topic sentence, then has supporting sentences and ends with a concluding sentence. You will not need to use two of the sentences. 1 mark for each correct answer.

- a Although this skill is useful in keeping it out of danger, the lynx is a protected animal in many countries.
- b It lends its name to a constellation of stars between Ursa Major and Gemini.
- c It is possibly best known for its excellent hearing. \_\_\_\_
- d The lynx is a medium-sized wild cat with yellowish-brown fur, a short tail and pointed ears.
- e For example, the Alpenzoo in Innsbruck provides a safe environment from which young lynx cubs can be reintroduced into the wild. \_\_\_\_\_
- f Indeed, in some countries people are described as having the hearing of a lynx. \_\_\_\_
- g It should not be confused with the sphinx, which was a winged monster with a woman's head and a lion's body.

# VOCABULARY

Match the words (1–5) with the definitions (a–e). 1 mark for each correct answer.

1 engagement	a the area immediately surrounding someone
2 registry office	b a friendly sign of welcome
3 personal space	c a local government building where civil marriages are held
4 greeting	d arriving or happening at the correct time
5 punctual	e an agreement to marry someone

Choose the one word (a or b) that fits both sentences. 1 mark for each correct answer.

- 1 The \_\_\_\_\_ looked beautiful in her long, white dress.
- In some cultures, the father 'gives away' the \_\_\_\_\_ at the wedding.
- a bride b groom
- 2 They gave us a very warm \_ The wedding \_\_\_\_\_ \_\_ must have been very expensive. There were over 150 guests! a reception b greeting
- 3 The \_\_\_\_\_ \_\_\_\_ is proof that you have passed the course. We were given a marriage \_\_\_\_\_\_ at the registry office. a requirement b certificate
- 4 We plan to have a very traditional wedding \_ The \_\_\_\_\_\_ will be held at St Paul's Cathedral in London next Wednesday. b engagement a ceremony
- 5 Are there any \_\_\_\_ \_ that must be met before you are allowed to marry? What are the \_\_\_\_\_\_ for establishing a company in your country? a personal spaces b legal requirements

# Self-Determination Theory of Second Language Scale (SDT-L2) \*

Why are you learning English?

Item
Autonomous motivation
Intrinsic orientation
Because I enjoy learning English
Because of the pleasure I get when hear and read English
For the satisfaction I feel when I speak and write in English
For the enjoyment I experience when I achieve a new goal in English learning
Because learning English is a fun activity in and of itself
Identified orientation
Because learning English is important for my personal growth
Because learning English can open new opportunities and possibilities for me
For the value it holds in my self-development
Because learning English is important for my current and future studies
Because learning English allows me to read and hear English-based materials that are necessary for
my personal success
Controlled motivation
Introjected orientation
Because I would feel guilty if I didn't understand English
Because I would feel ashamed if I'm not successful in English learning like my friend(s)/family
Because people around me (the teacher/peers/parents) expect me to learn English
Because people around me (the teacher/peers/parents) would think I'm a failure if I didn't speak
English
Because I feel pressured by the people around me (the teacher/peers/parents) to learn English
External orientation
Because I want to get a prestigious job that requires English proficiency
Because I want to get better marks in the English course
(continued on next page)

(continued on next page)

#### (continued)

Item

Because English is just a required course that I want to pass Because I don't want to fail the final exam in the English course Because there will be negative consequences if I fail to learn English

\*(Alamer, 2021a, 2022a).

#### References

- Alamer, A. (2021a). Construct validation of self-determination theory in second language scale: The bifactor exploratory structural equation modeling approach. *Frontiers in Psychology, 12,* Article 732016. https://doi.org/10.3389/fpsyg.2021.732016
- Alamer, A. (2021b). Grit and language learning: Construct validation of grit and its relation to later vocabulary knowledge. Educational Psychology. https://doi.org/ 10.1080/01443410.2020.1867076
- Alamer, A. (2022a). Basic psychological needs, motivational orientations, effort, and vocabulary knowledge: A comprehensive model. *Studies in Second Language Acquisition*, 44(1). https://doi.org/10.1017/S027226312100005X
- Alamer, A. (2022b). Exploratory structural equation modeling (ESEM) and bifactor ESEM for construct validation purposes: Guidelines and applied example. Research Methods in Applied Linguistics, 1(1), Article 100005. https://doi.org/10.1016/j.rmal.2022.100005
- Alamer, A., & Almulhim, F. (2021). The interrelation between language anxiety and self-determined motivation; A mixed methods approach. Frontiers in Education, 6, 618655. https://doi.org/10.3389/feduc.2021.618655
- Alamer, A., & Alrabai, F. (2022). The causal relationship between learner motivation and language achievement: New dynamic perspective. *Applied Linguistics*. https://doi.org/10.1093/applin/amac035
- Alamer, A., & Lee, J. (2019). A motivational process model explaining L2 Saudi students' achievement of English. System, 87, Article 102133. https://doi.org/ 10.1016/j.system.2019.102133
- Alamer, A., & Lee, J. (2021). Language achievement predicts anxiety and not the other way around: A cross-lagged panel analysis approach. Language Teaching Research. https://doi.org/10.1177/13621688211033694
- Alamer, A., & Marsh, H. (2022). Exploratory structural equation modeling in second language research: An applied example using the dualistic model of passion. Studies in Second Language Acquisition. https://doi.org/10.1017/S0272263121000863
- Chen, X., Lake, J., & Padilla, M. (2021). Grit and motivation for learning English among Japanese university students. System, 96, Article 102411. https://doi.org/ 10.1016/j.system.2020.102411
- Chen, X., Vallerand, R., & Padilla, A. (2021). On the role of passion in second language learning and flourishing. Journal of Happiness Studies. https://doi.org/10.1007/s10902-020-00339-0

Cohen, L., Manion, L., & Morrison, K. (2011). Research methods in education (7 edition). Routledge.

- Collier, J. (2020). Applied structural equation modeling using AMOS: Basic to advanced techniques. Routledge. https://doi.org/10.4324/9781003018414
- Dörnyei, Z., & Ushioda, E. (2021). Teaching and researching motivation. Routledge.

Duckworth, A. (2016). Grit: The power of passion and perseverance (1st ed.). Scribner Book Company.

- Duckworth, A., Peterson, C., Matthews, M., & Kelly, D. (2007). Grit: Perseverance and passion for long-term goals. Journal of Personality and Social Psychology, 92(6), 1087–1101. https://doi.org/10.1037/0022-3514.92.6.1087
- Duckworth, A., & Quinn, P. (2009). Development and validation of the short grit scale (grit-S). Journal of Personality Assessment, 91(2), 166–174. https://doi.org/ 10.1080/00223890802634290
- Elahi Shirvan, M., Taherian, T., Shahnama, M., & Yazdanmehr, E. (2021a). A longitudinal study of foreign language enjoyment and L2 grit: A latent growth curve modeling. Frontiers in Psychology, 12. https://doi.org/10.3389/fpsyg.2021.720326
- Elahi Shirvan, M., Taherian, T., & Yazdanmehr, E. (2021b). L2 grit: A longitudinal confirmatory factor analysis-curve of factors model. Studies in Second Language Acquisition, 1–28. https://doi.org/10.1017/S0272263121000590
- Elahi Shrivan, M., & Alamer, A. (2022). Modeling the interplay of EFL learners' basic psychological needs, grit and L2 achievement. Journal of Multilingual and Multicultural Development. https://doi.org/10.1080/01434632.2022.2075002
- Hair, J., & Alamer, A. (2022). Partial least squares structural equation modeling (PLS-SEM) in second language and education research: Guidelines using an applied example. Research Methods in Applied Linguistics. In press.
- Hair, J., Hult, G., Ringle, C., & Sarstedt, M. (2017). A primer on partial least squares structural equation modeling (PLS-SEM) (2nd ed.). SAGE.
- Hair, J., Risher, J., Sarstedt, M., & Ringle, C. (2019). When to use and how to report the results of PLS-SEM. European Business Review, 31(1), 2–24. https://doi.org/ 10.1108/EBR-11-2018-0203
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling, 6, 1–55. https://doi.org/10.1080/10705519909540118
- JASP Team. (2022). JASP [Computer software] Version 0.16. .
- Joe, H., Hiver, P., & Al-Hoorie, A. (2017). Classroom social climate, self-determined motivation, willingness to communicate, and achievement: A study of structural relationships in instructed Second Language settings. Learning and Individual Differences, 53, 133–144. https://doi.org/10.1016/j.lindif.2016.11.005
- Khajavy, G., MacIntyre, P., & Hariri, J. (2020). A closer look at grit and language mindset as predictors of foreign language achievement. Studies in Second Language Acquisition, 1–24. https://doi.org/10.1017/S0272263120000480

Kline, R. (2016). Principles and practice of structural equation modeling (6th ed.). Guilford Publications.

- Lee, J. (2020). The role of grit and classroom enjoyment in EFL learners' willingness to communicate. Journal of Multilingual and Multicultural Development, 1–17. https://doi.org/10.1080/01434632.2020.1746319, 0.
- McEown, K., Noels, K., & Chaffee, K. (2014). At the interface of the socio-educational model, self-determination theory and the L2 motivational self system models. In *The Impact of self-concept on language learning* (pp. 19–50). Channel View Publications. https://waseda.pure.elsevier.com/en/publications/at-the-interface-of-the-socio-educational-model-self-determinatio.

Muthén, L., & Muthén, B. (1998-2017). Mplus User's Guide. Los Angeles: Muthén & Muthén.

Noels, K., Clément, R., & Pelletier, L. (1999). Perceptions of teachers' communicative style and students' intrinsic and extrinsic motivation. *The Modern Language Journal*, 83(1), 23–34.

- Noels, K., Lascano, D., & Saumure, K. (2019). The development of self-determination across the language course: Trajectories of motivational change and the dynamic interplay of psychological needs, orientations, and engagement. *Studies in Second Language Acquisition*, 41(4), 821–851. https://doi.org/10.1017/ S0272263118000189
- Oga-Baldwin, Q., & Nakata, Y. (2017). Engagement, gender, and motivation: A predictive model for Japanese young language learners. System, 65, 151–163. https://doi.org/10.1016/j.system.2017.01.011
- Oxford, R., & Khajavy, H. (2021). Exploring grit: "Grit linguistics" and research on domain-general grit and L2 grit. Journal for the Psychology of Language Learning, 3 (2), 7–36. https://doi.org/10.52598/jpll/3/2/2

Pae, T. (2008). second language orientation and self-determination theory: A structural analysis of the factors affecting second language achievement. Journal of Language and Social Psychology, 27(1), 5–27. https://doi.org/10.1177/0261927X07309509

Plonsky, L., & Oswald, F. (2014). How big is "Big"? Interpreting effect sizes in L2 research. Language Learning, 64(4), 878–912. https://doi.org/10.1111/lang.12079 Ringle, M., Wende, S., & Becker, J. (2015). SmartPLS 3. http://www.smartpls.com.

Ryan, R., & Deci, E. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. American Psychologist, 55, 68–78.

- Ryan, R., & Deci, E. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, *61*, Article 101860. https://doi.org/10.1016/j.cedpsych.2020.101860
- Schmitt, N. (2010). Researching vocabulary: A vocabulary research manual. : Springer.
  Shao, K., Elahi Shirvan, M., & Alamer, A. (2022). How accurate is your correlation? Different methods derive different results and different interpretations. Frontiers in Psychology. https://doi.org/10.3389/fpsyg.2022.901412
- Shmueli, G., Ray, S., Velasquez Estrada, J., & Chatla, S. (2016). The elephant in the room: Predictive performance of PLS models. Journal of Business Research, 69(10), 4552–4564. https://doi.org/10.1016/j.jbusres.2016.03.049
- Sudina, E., Brown, J., Datzman, B., Oki, Y., Song, K., Cavanaugh, R., et al. (2020). Language-specific grit: Exploring psychometric properties, predictive validity, and differences across contexts. Innovation in Language Learning and Teaching, 1–18. https://doi.org/10.1080/17501229.2020.1802468
- Teimouri, Y., Plonsky, L., & Tabachnick, B. (2020). L2 grit: Perseverance and passion of learning a new language. Language Teaching Research. https://doi.org/ 10.1177/1362168820921895
- Wang, R., Shirvan, M., & Taherian, T. (2021). Perseverance of effort and consistency of interest: A longitudinal perspective. *Frontiers in Psychology*, *12*, 3687. Wei, H., Gao, K., & Wang, W. (2019). Understanding the relationship between grit and foreign language performance among middle school students: The roles of
- foreign language enjoyment and classroom environment. *Frontiers in Psychology, 10.* https://doi.org/10.3389/fpsyg.2019.01508 Wu, X. (2003). Intrinsic motivation and young language learners: The impact of the classroom environment. *System, 31*(4), 501–517.

with X. (2005). Internste motivation and young language learners. The impact of the classroom chyrolinicht. System, 57(7), 501-517.

Abdullah Alamer is an assistant professor in the Department of English at Imam Mohammad Ibn Saud Islamic University (IMSIU), Saudi Arabia. He has received his PhD in second language motivation from The University of New South Wales (UNSW), Sydney, Australia. His PhD thesis was nominated for the top 10% theses that make an outstanding contribution to the field. Abdullah's main interest lies in advanced quantitative research with second language motivation, and psychological factors that enhance our understanding of the success in language learning.