frontiers | Frontiers in Education

TYPE Original Research
PUBLISHED 06 January 2023
DOI 10.3389/feduc.2022.969554

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Educational Psychology, a section of the journal Frontiers in Education

RECEIVED 15 June 2022
ACCEPTED 14 November 2022
PUBLISHED 06 January 2023

CITATION
León-Gutiérrez M, Morales-García WC, Morales-García M, Jaimes-Soncco J, Saintila J and Mamani PGR (2023) Psychometric properties and invariance of the self-efficacy for writing scale in Peruvian high school students. *Front. Educ.* 7:969554. doi: 10.3389/feduc.2022.969554

Psychometric properties and invariance of the self-efficacy for writing scale in Peruvian high school students

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Introduction: Being able to write is a key competency in educational models; therefore, it is important to have a scale to assess writing self-efficacy.

Objective: The study evaluated the internal structure, providing evidence of reliability, validity, and factorial invariance of the self-efficacy for writing scale (SEWS) across sex and age in Peruvian schoolchildren.

Methods: An instrumental study was carried out on 1,107 Peruvian adolescents (early, middle, and late) of school age. A confirmatory factor analysis was carried out and the factorial invariance for sex and age was evaluated.

Results: A good fit was obtained for the total sample ($\chi^2 = 1229.08$, df = 101, CFI = 0.997, TLI = 0.997, RMSEA = 0.057 [90% CI: 0.0540.059], and SRMR = 0.029) and presented good α, ω, and H reliability (>0.89). Correlations between another measure of writing self-efficacy ($p = 0.76$; $p < .01$), study satisfaction ($p = 0.31$; $p < .01$), and burnout ($p = -0.12$; $p < .01$) scales supported convergent and concurrent validity. Multigroup factor analysis supported strict invariance for sex and age, for which the SEWS provides evidence of validity and reliability.

Discussion: This adaptation of the SEWS is a valid, reliable, and invariant measure that can be considered for assessing self-efficacy for writing in Peruvian high school students.

KEYWORDS

self-efficacy, high school, writing, Peru, invariance, validation

Introduction

It is important for adolescents at the school stage to develop a strong sense of confidence in an effective way to communicate through writing (Klassen, 2002). Confident students will have strong self-esteem regarding their writing (Pajares, 2010). Having the skills to perform a complex activity, however, does not ensure adequate performance; when faced with complex tasks, people with higher levels of functioning can have mediocre results if they do not trust their ability to face the challenge.

Self-efficacy affects the development of self-perception of competence by experiencing that the results were successful verbal messages and positive perceptions that encourage and empower (Bandura, 1977). Self-efficacy refers to the perception of personal abilities to perform a given action and makes possible the integration, organization, and application of cognitive, social, and behavioral skills to successfully perform a given task (Bandura, 1982; Pajares, 2002). In learning settings, self-efficacy provides students with: persistence in the face of difficulties, self-confidence, low levels of anxiety and the use of self-regulation and self-learning strategies, which allows greater commitment to tasks (Golparvar and Khafi, 2021). Thus, low self-efficacy for writing in students is related to a delay in the progressive growth of academic programs (Bai and Guo, 2018).

Being able to write is a key competency in educational models (Pajares, 2002). Self-efficacy for writing is the student's perception of his or her ability to write (Volkan and Seçkin, 2019). Previous studies indicate that self-efficacy plays an important role in the use of personal skills to cope with learning tasks. Students with high self-efficacy have greater motivation to learn (Honicke and Broadbent, 2016; Trautner and Schwinger, 2020) and provide solutions to academic problems (Ornelas et al., 2015). Furthermore, students who adopt a strategic study plan and are aware of the writing process (Demir, 2018) improve their willingness to write (Berk and Ünal, 2017) and are effective writers (Cassany, 1995), as opposed to students who have a simple or less sophisticated idea of the writing process (Villalón and Mateos, 2009).

Writing in the early years of adolescence becomes increasingly demanding and complex, requiring greater revision, planning, and self-regulation of the processes (Klassen, 2002). Academic motivation is sometimes considered to decline during adolescence due to hormonal changes, maladaptation among adolescents, social and academic competition, and the school environment (Klassen, 2010). Therefore, the usefulness of the perception of writing and motivation of adolescents is crucial to understand their development, since it is the area where students experience the greatest difficulties (Bruning and Horn, 2000). Thus, students with lower levels of self-efficacy have greater difficulty participating in writing tasks and tend not to persist in the task when they encounter difficulties or failures (Pajares, 2010). In addition, unlike primary school children where basic learning and organization strategies are used, sophisticated cognitive and metacognitive learning strategies are required in adolescence due to a higher expectation of learning (Klassen, 2010). Writing in adolescence facilitates access to information and is a key skill in the construction of knowledge. Therefore, the growing beliefs and motivations allow their development and are part of expressive writing with the social interaction of their emotions. New activities generally produce certain levels of anxiety and stress, which sometimes interfere with self-efficacy in writing (Bandura, 1986; Hooper et al., 2019; Azila-Gbettor et al., 2021). Therefore, for Spanish, an instrument that has the potential to make writing self-efficacy explicit for schoolchildren since this type of belief could be hidden, both for students and teachers. In fact, individuals with a lot of ability to write could be perceived as unprepared to face writing tasks, and this could generate a rejection of this type of task. Whereas when adolescents become aware of their own abilities and reflect on their self-efficacy, they are prepared to make the necessary corrective adjustments (Bandura, 2006; Zumbrunn et al., 2020).

Self-efficacy in writing skills predicts academic performance, allows the evaluation of theoretical and applied domains, and provides guidelines and interventions in the results of instruction to improve writing skills in adolescents (Bruning et al., 2013). Therefore, the instrument should efficiently assess perceived writing ability while also allowing the student to make a judgment about what they can do when performing writing tasks. Currently, most of the instruments used in Latin America to measure writing self-efficacy were developed in English and for university students: *Description of Self-Assessment of Writing Measure* (McCarthy et al., 1985), *Writing self-efficacy* (Shell et al., 1989), *Writing Self-Efficacy Scale* (Pajares and Schunk, 2001), and *Writing Goals Items and Subscale* (MacArthur et al., 2016). Similarly, the Self-Efficacy for Writing Scale (SEWS) developed by Bruning et al. (2013) for a school context and its Spanish version applied to a university population (Ramos-Villagrasa et al., 2017) provide sufficient evidence regarding its reliability and validity, whereas other instruments do not report broad validation standards (González et al., 2019). The SEWS uses very readable language that incorporates clear and simple sentences in the first person (Pajares et al., 2001). Its use has made it possible to find the strengths and weaknesses of those being evaluated, making it valuable for guiding student interventions (Bruning et al., 2013; Ramos-Villagrasa et al., 2017). It focuses on the experience of mastery through positive self-perception of skills and neglects negative patterns, considering that the positive perception can be a stimulus and reinforcement, while the negative perception can weaken the beliefs regarding their capabilities (Volkan and Seçkin, 2019). Likewise, the number of SEWS items (16 items) makes it preferable for mass application in educational settings rather than larger scales (Sanders-Reio et al., 2014).

The SEWS version in Spanish (Ramos-Villagrasa et al., 2017), named in the same way as the English version by Bruning et al. (2013), consists of three dimensions that include ideation, conventions, and self-regulation of writing (Ramos-Villagrasa et al., 2017). On the contrary, the initial version (Bruning et al., 2013) was evaluated in high school students in the US through a confirmatory factor analysis (CFA). In comparison with other measures of self-efficacy assessed in adolescents that explore the dimensions of success and failure attributed to various aspects such as luck, effort, and the ability to perform a task (Álvarez-Fernández and García-Sánchez, 2014), the writing self-efficacy model described by Bruning et al.

(2013) maintains harmony with other writing process models that centralize working memory (Hayes, 2006, 2012), writing representations, and writing development (Bruning and Horn, 2000; Schunk and Zimmerman, 2007). Thus, the dimensions of the SEWS are as follows: (a) ideation, which measures cognitive processes, idea generation linked to semantics, and schematic knowledge (Schraw and Egory, 2015); (b) writing conventions, which refers to the articulation of ideas in writing forms and aligned to translation (Hayes, 2006, 2012); (c) self-regulation, which extends from writing activities to their management, monitoring, and evaluation (Zimmerman and Kitsantas, 2006). The proposed dimensions classify the perception of the student's ability to perform tasks in relation to writing. To date, the SEWS has not been validated in the population of high school students for whom it was initially built, and given the lack of validation studies in Spanish high school students, it is imperative to analyze it in this context.

In addition, in the initial study of the SEWS carried out on basic education students (Bruning et al., 2013) and the Spanish version carried out on university students (Ramos-Villagrasa et al., 2017), they show that male students have higher writing self-efficacy than female students. Other studies in school-age populations indicated that female students have higher self-efficacy for writing than male students (Pajares et al., 2007; Andrade et al., 2010). Indeed, female students tend to maintain goals (or mastery), while male students tend to have goals focused on performance (or ego) (Pajares et al., 2000). Women also tend to be more concerned with mastering a writing task than men, who, on average, tend to be more concerned with showing people what they are capable of. That is, women may derive more satisfaction and confidence from self-generated evidence of progress on a writing task, while men seek confirmation of their progress from people around them, including teachers and peers (Andrade et al., 2010). Likewise, age is also important for self-efficacy in writing, since early adolescence (10–13 years old), they experience changes in attitudes and motivational beliefs; however, these changes can be observed in middle adolescence (14 to 16 years old) and late adolescence (17–21 years old), as they achieve greater autonomy in their activities (Klassen, 2002; UNICEF, 2020).

In this case, no study has examined the invariance of SEWS measurement between sex and age. Measurement invariance is necessary to make meaningful comparisons between groups since it tests the equivalence of the meaning of the elements between both groups (Byrne and Stewart, 2009; Inglés et al., 2017). In addition, because psychometric properties may vary, measurement invariance has been considered a prerequisite for making comparisons between groups and examining whether the properties remain invariant, thus making it possible to control for and distinguish differences between groups and avoid concluding erroneous or unfounded data (Hopwood and Donnellan, 2010; Steinmetz, 2019). If the instrument presented a lack of invariance, the comparisons would be partial and not significant, so the validity of the empirical conclusions would not be guaranteed (Byrne and Stewart, 2009).

Therefore, the main objective of the study was to determine the suitability of the SEWS in its Spanish version for its application in Peruvian school adolescents at the secondary level from first to fifth grade. The following objectives were established: (a) to evaluate the proposed initial structure of the SEWS, through confirmatory factor analysis (CFA), and internal consistency; (b) to examine the convergent validity based on the relationship of the SEWS with another measure of Self-Efficacy for Writing (SEW) and the concurrent validity based on correlations with other measures of Brief Scale of Study Satisfaction (BSSS) and academic burnout; and (c) to evaluate the factorial invariance of SEWS according to schoolchildren, male students, and female students and according to the stages of adolescence (early, middle, and late).

Method

Study design and participants

A methodological study was carried out. To determine the sample size, we analyzed the effect size which considers the number of observed and latent variables in the model, the anticipated effect size ($\lambda = 0.10$), the desired statistical significance ($\alpha = 0.05$), and the statistical power level ($1 - \beta = 0.95$) which considers a recommended minimum sample of 184 participants. The inclusion criteria were as follows: students enrolled in educational institutions who agreed to participate in the research after signing informed consent. A non-probabilistic sample was used for data collection and the exclusion criteria were as follows: students who transferred to other institutions or were discharged, students who do not wish to participate in the research or have unresolved questionnaires, and students with some special educational needs. Furthermore, they were selected using a convenience sampling method. The final sample consisted of 1,107 Peruvian adolescent high school students enrolled in the 2021 period. The proportions according to sex, 47.6% ($n = 527$) were male students and 54.4% (n=580) were female students, with a mean age of 14.43 (SD = 1.75) ranging from 11 to 19 years. On the contrary, most of the students were adolescents in the middle phase (36%), in the first grade of secondary school (34.8%), from public schools (89.3%), and from a geographical unit or coastal region of Peru (86.8%). Finally, the students were asked how often they practiced reading; 49.3% of students stated that they read sometimes, 32.2% read almost always, 14.3% always read, and only a smaller proportion (5%) read rarely or never (Table 1).

TABLE 1 Characteristics of the participants.

Characteristic	*n*	%	
Sex	Male	527	47.6
	Female	580	52.4
Phases			
Adolescence	Early (11–13)	398	36.0
	Mid (14–16)	561	50.7
	Late (17–19)	148	13.4
Study grade	First	385	34.8
	Second	198	17.9
	Third	159	14.4
	Fourth	166	15.0
	Fifth	199	18.0
College	Public	989	89.3
	Private	118	10.7
Region	Coast	961	86.8
	Sierra	70	6.3
	Jungle	76	6.9
How often do you practice reading?	Always	158	14.3
	Almost always	356	32.2
	Sometimes	546	49.3
	Rarely	42	3.8
	Never	5	0.5

Measurements

Self-efficacy for writing scale

The Spanish version of the SEWS was used for the Spanish university population (Ramos-Villagrasa et al., 2017), which consists of three dimensions (see Annex): ideation (items 1–5), linguistic conventions (items 6–10), and self-regulation (items 11–16). Internal consistency using Cronbach's alpha for the Spanish version ranged between 89 and 90 for all dimensions. For this study, a 7-point Likert-type ordinal scale was considered (0 = nothing and 7 = total certainty). The version of this study differs from the original version in that a scale from 0 to 100 is used, justified by the need to standardize and simplify the evaluation measures (Krosnick and Stanley, 2009).

Self-efficacy for writing

This version was adapted to Spanish in its version for high school students (Pérez et al., 2015). The one-dimensional scale allows the evaluation of the perception of the student's effectiveness with respect to writing conventions, based on their beliefs and skills of composition, grammar, use, and mechanics according to their academic level. It contains 10 items on a Likert-type scale from 1 (I'm sure I can't do this activity correctly) to 10 (I'm totally sure I can do this activity correctly), and its internal consistency is $\alpha = 0.83$.

Burnout unique item (IUB)

It is a measure that integrates only one item with five responses to assess academic burnout in students at different levels (Merino-Soto and Fernández-Arata, 2017). It allows you to perceive both mental and physical exhaustion, understood as "burned out" by spending a lot of time studying. The content analysis has been satisfactory both in the clarity of the content and in the ordering of the responses. The intensity rating analysis of the responses was from 1 (minimum perceived intensity) to 5 (maximum perceived intensity).

BSSS

This is a unidimensional measure composed of three items that evaluate the student's satisfaction with his or her way of studying, performance, and overall experience with his or her studies (Merino-Soto et al., 2017). The level of internal consistency of the scale was adequate ($\alpha = 0.78$). The scale presents five response options regarding agreement or disagreement with each of the statements (from strongly disagree to strongly agree).

Procedure and ethical aspects

The study protocol was reviewed and approved by the Research Ethics Committee of the Universidad Peruana Unión (Reference: CE-EPG-000012). Four directors of public and private educational institutions from the three regions of Peru (coast, highlands, and jungle) were contacted. An application was sent, indicating the objective of the study, and authorization was subsequently requested to apply the instrument. Likewise, informed consent was sent through Google forms and social networks (WhatsApp groups and Facebook Messenger accounts) to parents and in the same way to schoolchildren whose parents agreed to participate. The survey was administered to students during their virtual classes. The teaching collaborators informed the purpose of the study and then administered the surveys and answered the questions that arose. Participants were also informed that they could withdraw from the study at any time if they wished. Finally, the study was carried out following the ethical guidelines established in the Declaration of Helsinki, which implies the guarantee of protection of participant's privacy and the confidentiality of personal information, as well as the minimization of the possible effects of the study on the participant's physical, mental, and social apparatus (Puri et al., 2009; AMM, 2013).

Data analysis

Statistical analysis was performed using the free software R 4.1.1 (R Foundation for Statistical Computing, Vienna,

Austria; http://www.R-project.org). Descriptive statistics for each SEWS item were performed by calculating the mean, standard deviation, skewness, kurtosis, and corrected inter-test correlation analysis. For skewness and kurtosis, values between −1 and + 1 were considered adequate (Ferrando and Lorenzo-Seva, 2014). Item-test correlation analysis corrected for item recall in case of r(i-tc) ≤ 0.2 or multicollinearity (i-tc) ≤ 0.2 was used, and internal consistency was estimated using the ordinal α coefficient (Kline, 2016).

For the confirmatory factor analysis (CFA), it was estimated using the *lavaan* library of the RStudio interface, and the weighted least-square method (WLSM) was used due to the ordinal nature of the items (Brown, 2015), and the mean-variance extracted from the SEWS was calculated. The following indicators were considered for the evaluation of the fit models: the chi-square test (χ^2), confirmatory fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residuals (SRMRs), where CFI and TLI values >0.90 indicate an acceptable fit and >0.95 indicates a good fit (Schumacker and Lomax, 2016). For the RMSEA and SRMR, values below 0.05 indicate a good fit and below 0.8 are considered acceptable (Kline, 2016). The convergent internal validity was estimated by calculating the average variance extracted (AVE), the values indicate that more than 50% of the variance is due to its indicators (Fornell and Larcker, 1981), and the values above 0.50 in the factor loadings (λ) are considered adequate (Dominguez-Lara, 2018). The reliability of the latent model for the total sample and the subsamples of men and women was calculated with the McDonald's ω (McDonald, 1999), and H (Hancock and Mueller, 2001) magnitudes >0.80 are considered adequate (Dominguez-Lara, 2016).

Statistical analysis was performed using the *semTools* package to calculate invariance. Factorial invariance was evaluated according to sex (males vs. females) and stages of the early, middle, and late adolescence of the participants through a sequence of hierarchical models, evaluating the most restricted CFA (Chen, 2007). The first level, configural invariance (M1), evaluates the reference model; the second level, metric invariance (M2), evaluates the equality of factor loading; the third level, scalar invariance (M3), evaluates the equality of factor loading and intersection; and the fourth level, scalar invariance (M4), evaluates the equality of factor loadings, intersections, and residuals. Because χ^2 ($\Delta\chi^2$) is sensitive to sample size, the absolute difference CFI (ΔCFI) value was used, where values <0.01 indicate that the factor structure is invariant between the groups compared (Cheung and Rensvold, 2009). For evidence of validity based on the relationship with other SEWS variables at the latent level, a structural equation model was performed with the factors of self-efficacy for writing, satisfaction with life, satisfaction with studies, self-efficacy for studying, and academic burnout.

TABLE 2 Descriptive statistics and reliability of the SEWS.

Items	M	SD	g^1	g^2	r.cor	α ordinal
ID 1	5.03	1.31	−0.44	−0.13	0.79	0.95
ID 2	5.01	1.35	−0.44	−0.32	0.77	0.95
ID 3	5.04	1.39	−0.48	−0.33	0.75	0.95
ID 4	4.95	1.43	−0.44	−0.42	0.73	0.95
ID 5	4.86	1.39	−0.30	−0.51	0.80	0.95
CO 6	4.55	1.41	−0.16	−0.63	0.65	0.95
CO 7	5.11	1.36	−0.48	−0.33	0.78	0.95
CO 8	4.89	1.43	−0.38	−0.52	0.73	0.95
CO 9	4.60	1.36	−0.17	−0.60	0.82	0.95
CO 10	4.97	1.37	−0.39	−0.35	0.76	0.95
SR 11	4.98	1.50	−0.43	−0.56	0.75	0.95
SR 12	4.59	1.57	−0.25	−0.70	0.70	0.95
SR 13	4.88	1.48	−0.40	−0.47	0.71	0.95
SR 14	4.77	1.56	−0.39	−0.56	0.67	0.95
SR 15	4.98	1.39	−0.45	−0.22	0.79	0.95
SR 16	4.91	1.46	−0.46	−0.34	0.72	0.95

ID, ideation; CO, conventions; SR, self-regulation; M, mean; SD, standard deviation; g^1, asymmetry; g^2, Kurtosis.

Results

Descriptive statistics of the SEWS items

Descriptive statistics were analyzed in the total sample (Table 2), where the highest mean was found in item 7 (M = 5.11; SD = 1.36), which belongs to the language convention dimension, and the lowest mean was observed in item 12 (M = 4.59; SD = 1.57) corresponding to the self-regulation dimension. Skewness (g^1) and kurtosis (g^2) values were < ±1 for all items. All corrected item-total correlations were greater than the acceptable limit of 0.3, indicating that each item is related to the overall scale.

Evidence of validity and reliability

The confirmatory factor analysis was used to evaluate the three-dimensional structure derived from the hypothetical structure of the original version (Bruning et al., 2013; Ramos-Villagrasa et al., 2017). The goodness-of-fit indices for the total sample were χ^2 = 1,229.08, df = 101; CFI = 0.997, TLI = 0.997, RMSEA = 0.057 (90% CI: 0.054–0.059), and SRMR = 0.029, indicating that the Peruvian version model fits the observed data adequately. In addition, all λ were >0.71 and the AVE values are adequate (AVE> 0.50), indicating that the latent factors are adequately explained by their observed variables, and α, ω, and H coefficients are shown in Table 3.

TABLE 3 Factor loadings, goodness-of-fit index, and reliability of the total sample, men, and women.

	F_1 (λ)	F_2(λ)	F_3(λ)
ID 1	0.83		
ID 2	0.82		
ID 3	0.80		
ID 4	0.77		
ID 5	0.84		
CO 6		0.69	
CO 7		0.82	
CO 8		0.79	
CO 9		0.87	
CO 10		0.81	
SR 11			0.79
SR 12			0.74
SR 13			0.75
SR 14			0.71
SR 15			0.83
SR 16			0.76
AVE	0.66	0.64	0.58
α	0.90	0.89	0.89
ω	0.91	0.90	0.89
H	0.91	0.91	0.90
χ^2	1,229.08		
df	101		
p	<0.001		
CFI	0.997		
TLI	0.997		
RMSEA	0.057		
90% CI	0.054–0.059		
SRMR	0.029		

ID, ideation; CO, conventions; SR, self-regulation; F1= factor ideation; F2, conventions; F3, self-regulation; λ, factor loadings. AVE, average variance extracted; α, ordinal alpha coefficient; ω, coefficient omega; H, coefficient H.
χ^2, chi-square; df, degrees of freedom; RMSEA, root mean square error of approximation; CFI, comparative fit index; SRMR, standardized root mean square residual.

Factorial invariance

Comparisons of the factorial invariance models by sex and stages of adolescence are shown in Table 4. Again, it is shown that the three-factor structure for the groups of men and women was adequate. Furthermore, the three-factor model was suitable for all three phases: (1) early (11–13), (2) middle (14–16), and (3) late (17–19). The configurational invariance model (M1) presented a good fit for both groups. This model serves as a baseline for the evaluation of others. Subsequently, the metric invariance (M2) in the groups was evaluated and presented as a good fit for the data. Once the metric invariance was established, the scalar invariance (M3) was evaluated. Finally, strict invariance (M4) was evaluated in the groups whose values were significant, the ΔCFI coefficients were <0.01, and ΔRMSEA coefficients were <0.01. Thus, the models M1, M2, M3, and M4 are within the expected range, which confirms the factorial invariance of SEWS and the different measures can be compared in the sex and age groups.

Convergent and concurrent validity

This type of validity was examined, and a structural equation model was evaluated where four latent variables are modeled: self-efficacy for writing, satisfaction with life, satisfaction with studies, and academic burnout. The model had a good fit: χ^2 = 2,008.292, df = 400; CFI = 0.993, TLI = 0.992, RMSEA = 0.035 (90% CI: 0.034–0.037), and SRMR = 0.041. As expected, the SEWS significantly correlated positively with the other measure of writing self-efficacy (SEW) ($p = 0.76$; $p < 0.01$) and BSSS ($p = 0.31$; $p < 0.01$) and negatively with burnout ($p = -0.12$; $p < 0.01$), evidencing acceptable convergent and concurrent validity (Figure 1).

Discussion

The objective of the present research was to analyze the factorial structure, as well as the reliability and adequate psychometric properties. The study suggests a promising instrument for assessing writing self-efficacy in Peruvian schoolchildren. The CFA supports the three-factor structure proposed in the original version. Likewise, the results supported reliability, validity (convergent, concurrent, and discriminant), and the invariance of the measurement at the strict level between sex and age.

The CFA was performed, which supported the three-factor structure of the original questionnaire, so the Peruvian version maintains the same factors as the original questionnaire in English (Bruning et al., 2013) and the Spanish version (Ramos-Villagrasa et al., 2017). The CFA provided a good fit to the model data, thus showing that the 16-item version of the SEWS classified on the dimensions of ideation, language conventions, and meaningful theory-based self-regulation adequately assessed writing-related tasks. In the first dimension of the Flower and Hayes model of writing, students generate ideas from thematic and world knowledge. The second dimension is linked to writing, having the ability to successfully express ideas in linguistic forms. Finally, self-regulation is part of the value judgments you have about yourself. Therefore, the instrument seems suitable for future applications with other multidimensional constructions associated with the wellbeing of schoolchildren (Bruning et al., 2013).

The results also showed good internal consistency. Reliability, based on ordinal alpha, was acceptable for the total scale and the three factors, with a range of 0.89–0.90. Reliability

TABLE 4 Measurement invariance between sex and age groups.

Groups	χ^2	df	RMSEA	[IC 90%]	p	SRMR	TLI	CFI	ΔCFI	ΔRMSEA
Sex										
M1	197.888	124	0.017	0.012–0.021	0.000	0.025	0.999	0.999	-	-
M2	215.011	134	0.020	0.015–0.024	0.000	0.031	0.998	0.998	0.001	−0.003
M3	226.244	144	0.019	0.014–0.024	0.000	0.031	0.998	0.998	0.000	0.001
M4	245.636	157	0.020	0.015–0.024	0.000	0.033	0.998	0.998	0.000	−0.001
Phases										
M1	253.371	186	0.015	0.000–0.020	0.000	0.027	0.999	0.999	-	-
M2	255.110	206	0.016	0.000–0.022	0.000	0.033	0.999	0.999	0.000	−0.001
M3	313.831	226	0.020	0.014–0.025	0.000	0.035	0.998	0.998	0.001	−0.004
M4	339.486	252	0.019	0.014–0.024	0.000	0.038	0.998	0.998	0.000	−0.001

M1, configural; M2, metric; M3, scalar; M4, strict.
χ^2, chi-square; df, degrees of freedom; RMSEA, root mean square error of approximation; CFI, comparative fit index; ΔCFI, comparative fit index difference; ΔRMSEA, root mean square error of approximation difference.

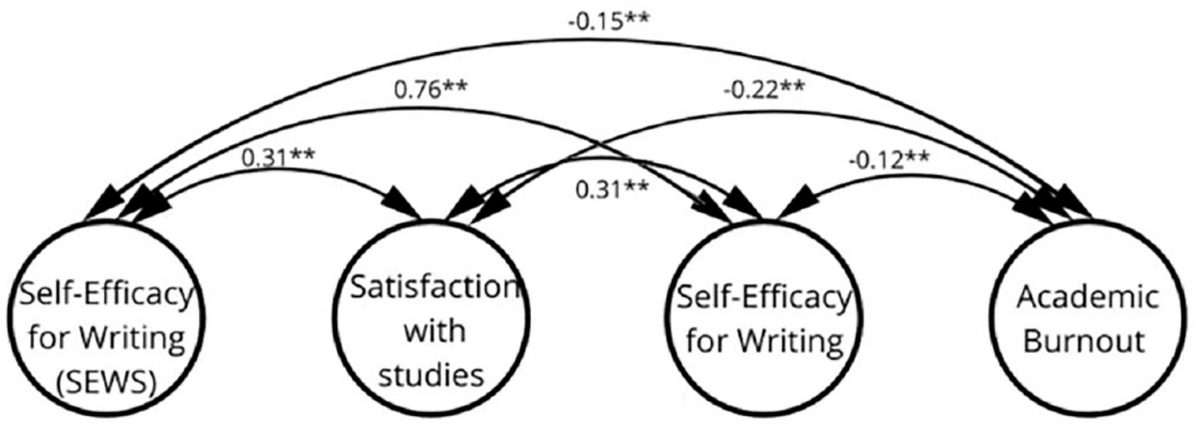

FIGURE 1
Structural equation structural model for concurrent and convergent validity of the SWLS. **$P < 0.01$.

was also consistent with the original version, indicating a good ability to similarly assess SEWS (Ramos-Villagrasa et al., 2017). Unlike other studies, we calculated the coefficient ω reflecting the proportion of variance in the scale scores associated with an overall factor (Zinbarg et al., 2005) and the H coefficient that evaluates the reliability of the construct, reflecting the influence of the construct in the overall model and subsamples. The greater its magnitude, the better it is represented (Dominguez-Lara, 2016). These coefficients are considered better estimators than alpha, which tends to underestimate reliability. The values of the corrected item-total correlations were good, indicating adequate homogeneity.

Convergent internal validity and validity in relation to other measures and concurrent validity were examined. Regarding the internal convergent validity of the SEWS, it showed adequate factor loadings ($\lambda > 0.50$) and an acceptable AVE (AVE> 0.50) in the three models (Fornell and Larcker, 1981). In addition, the related convergent validity of the SEWS was assessed with a homologous one-dimensional scale of Self-Efficacy for Writing (SEW) by Pajares et al. (2001) that focuses on the linguistic conventions of self-efficacy, and the results indicated an adequate correlation between the scores of each test, despite the fact that SEW by Pajares et al. (2001) only evaluates one dimension of the SEWS. Likewise, for concurrent validity, the latent variable of the SEWS and BSSS were correlated, indicating statistically significant and positive correlations.

Self-efficacy is an important element in how students feel about themselves in general (Sabouripour et al., 2021). Self-efficacy is also a universal psychological need that controls an individual's cognitive aspect, emotions, and decisions related to psychological wellbeing (Bartimote-Aufflick et al., 2016). Likewise, student self-efficacy is a fundamental variable in

the satisfaction of schoolchildren with their studies and, consequently, in the subjective results of education (Wach et al., 2016). Since it increases positive emotional states, it contributes to wellbeing and improved academic performance (Bresó et al., 2011). In the current study, a positive relationship was found between self-efficacy and satisfaction with studies. In another study, it is stated that high self-efficacy positively impacts people's wellbeing (Pajares and Schunk, 2001). Furthermore, it is likely that self-efficacy influences the amount of stress and anxiety that students experience when participating in a course (Doménech-Betoret et al., 2017). There is a large body of empirical literature that evidences the positive effects of self-efficacy on student wellbeing and study satisfaction (DeWitz and Walsh, 2002). A model has even been proposed in which beliefs of high efficacy in studies constitute a determinant of satisfaction with studies since they make possible a better adjustment between the level of demand of the task and the abilities that the student perceives he/she has to face it (Bebermeier et al., 2022). Bebermeier et al. (2022), this has been documented in some studies detailing the relationship between self-efficacy and satisfaction with studies (DeWitz and Walsh, 2002; Shehadeh et al., 2020). However, the mechanisms mediating the relationship between self-efficacy and student satisfaction in studies need to be further studied. Understanding these motivational mechanisms is crucial for implementing promotion programs that increase student satisfaction.

On the contrary, concurrent validity between SEWS and academic burnout indicated a negative relationship; previous studies have also identified a negative relationship between stress and self-efficacy (Zajacova et al., 2005; Rayan, 2018), taking into account that when a student perceives that he/she has fewer personal resources to face a task, he/she will seek to avoid and put less effort into solving that task, which will end up worsening the academic situation and generating greater stress (Krumrei-Mancuso et al., 2013).

The main advantage of the SEWS is that it allows the assessment of the three different areas of writing by finding the weaknesses and strengths of each student and allows for interventions at the individual level. Furthermore, in relation to the test scores of the same construct, they showed that all SEWS dimensions were positively correlated. Previous studies have shown high associations between ideation and self-regulation dimensions (Bruning et al., 2013). As indicated, individuals with high levels of ideation linked to cognitive processes in idea generation, systematic domains, and schematic knowledge may exhibit high levels of self-regulation that extend well beyond writing activities by having ideas to write about and mastery in the conventions of writing (Schraw, 2006; Zimmerman and Kitsantas, 2007; Bruning et al., 2013).

Discriminant validity results showed that all SEWS dimensions were negatively correlated with burnout, which is consistent with previous studies in other populations (Hall et al., 2019). Therefore, it is evident that the two scales are sufficiently independent and also measure separate constructs (Eignor, 2013). Previous studies suggest that the lower the feeling of self-efficacy, the more burnout one experiences (Cappe et al., 2021). Given the results of writing self-efficacy correlating negatively with a burnout in the current study, adolescent assessments could be conducted to assess the purpose, emotional reactions, effort, coping, and endurance. In this way, it is necessary to examine the effectiveness of interventions in coping with difficult tasks and activities or understanding problems that lead to the development of stress, depression, and weak problem-solving that allow continuous improvement in students (Rahmati, 2015).

In addition, the factorial invariance of the SEWS measure was reported for the first time in a sample composed of school adolescents, male students, and female students, and in the early, middle, and late stages. The configurational, metric, scalar, and strict invariance of SEWS were acceptable in the present study, indicating that it can be evaluated with the same accuracy in groups of female and male adolescents. This analysis is important, considering the psychological characteristics of male and female populations that can differentially affect their behavior (Hyde, 2005). Thus, findings from initial studies conducted with school students found that female students reported lower self-efficacy for male writing (Bruning et al., 2013). This is consistent with the Spanish study on university students which suggests that male students report higher self-efficacy than female students (Ramos-Villagrasa et al., 2017). However, other studies in school populations show the opposite, where boys are the ones who reach lower levels of self-efficacy, mainly due to stereotyped beliefs in the socialization process (Pajares and Valiante, 2001), while other findings do not show any difference (Pajares et al., 2001). Likewise, written self-efficacy may differ partially in the context according to the stages of school adolescence, given that in the early stage self-efficacy beliefs are less established (Klassen, 2002), while in middle and late adolescence it allows greater external and internal regulation (Cattelino et al., 2019). Moreover, future studies should explore the strict invariance of SEWS in other populations, in addition to exploring other groups, such as socioeconomic status, cultures, and clinical groups.

Limitations

The results showed appropriate psychometric properties for the Peruvian version of the SEWS. However, some limitations are considered. On the contrary, the study was cross-sectional and did not consider a longitudinal design, which prevented us from evaluating causal relationships between the variable's satisfaction with studies, self-efficacy for writing, and academic burnout. Likewise, the self-report techniques used in the study may be influenced by social desirability, introspection, and

memory, among other biases. Test–retest reliability was also not examined; therefore, its incorporation in future studies is recommended.

Conclusion

The validity of the internal structure of the SEWS was satisfactory, and a three-factor structure like the original one was determined, with adequate and stable psychometric properties. Strict factorial invariance was demonstrated for sex and age, which is an important contribution to the measurement of adolescence. Therefore, the SEWS is a valid and reliable measure of writing self-efficacy in the Peruvian school context.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The study was approved by the Ethics Committee of the Universidad Peruana Unión (CE-EPG-000012). Written informed consent to participate in this study was provided by the participants' or their legal guardian/next of kin.

Author contributions

WM-G and ML-G participated in the conceptualization. PM, JJ-S, MM-G, and JS were in charge of the methodology and software. WM-G, MM-G, and PM validated the study, involved in formal analysis, and performed the research. WM-G and ML-G were involved in the curation of data and collected resources. WM-G, JS, and MM-G were involved in first draft writing—review and editing, visualization, and supervision. All authors have read and approved the final version of the manuscript.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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