VALIDATION OF SELF-EFFICACY FOR SELF-REGULATION OF ACADEMIC WRITING SCALE: AN EFA AND CFA WITH MEASUREMENT INVARIANCE

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Abstract:

Academic writing plays a vital role in academic success of students. Studies showed that self-efficacy is predictive of actual performance. Among several instruments of self-efficacy, an effort was made to develop an instrument specifically focusing on self-efficacy for self-regulation of academic writing (SSAW). Present study aimed to validate the SSAW scale (English version) to check its psychometric properties at higher education level in Pakistani context. A sample of 313 Pakistani university students responded to an online survey. The age of respondents ranges from 18 to 54 (M=25.02, SD=5.62). Exploratory factor analysis, confirmatory factor analysis and measurement invariance were conducted to check validity of the SSAW scale. The SSAW scale is positively correlated with a sub-scale of Writing Self-efficacy Scale and General Self-Efficacy Scale, thus showing evidence of convergent validity. It is also correlated positively, but weaker with Rosenberg self-esteem scale, thus showing evidence of divergent validity. The external validation is satisfactory while the findings for internal validation allow further examination of the factor structure. The measurement invariance revealed no substantial disagreements between the fully constrained and unconstrained models. Findings suggest that SSAW scale may provide an opportunity to methodically assess and streamline writing interventions to properly support students in one of their most difficult area/subjects.

Introduction

Academic writing (AW) is a complicated task and considered as difficult skill to learn (Huwari & Abd Aziz, 2011; Kurk & Atay, 2007). It is a process in which writers need to accumulate their views and judgements along with particular approaches to plan, initiate, perpetuate, and evaluate the writing process (Golombek *et al.*, 2018). It is a discrete practice within academic disciplines which plays a significant role in learners' academic progress(Hyland, 2006; Kellogg & Raulerson, 2007). For academic and professional success, it is global inevitability to have the ability to write well (Kavanoz & Yüksel, 2016). At higher education level, it is expected from students to quickly acquire AW skills though most of them have little to no prior knowledge of this kind of writing (Phillips & O'Flaherty, 2019). Hayes (2000) described that the process of AW is affected by various cognitive and affective factors. Therefore, it is significant to learn about the factors which motivate students to write in order to give benefits to writing ((Ng *et al.*, 2021). These factors could be individual, personal and social factors, knowledge and practice of subject and discipline and student's perceptions about AW (Altınmakas & Bayyurt, 2019). Besides, the written problems could efficiently be resolved if the factors which produce them are recognized (Fareed *et al.*, 2016).

In the process of writing, self-efficacy (SE) beliefs are deemed as contributing factor towards writing (Golparvar & Khafi, 2021). SE is the belief that people have on their own competence to perform and accomplish a course of action to reach the desired target (Bandura, 1986). SE is task-specific and the previous experience of students about a specific task help them to identify their level of SE (Ersanlı, 2015). Since writers' self-confidence to perform writing task creates a sense of SE that enhances writer's self-belief on his/her ability to perform a writing task (Khojasteh *et al.*, 2016). SE has also been shown as a significant predictor to predict AW performance in the ESL context (Han & Hiver, 2018; Huang *et al.*, 2015; Sun & Wang, 2020; Sun *et al.*, 2021; Zabihi, 2018).

Furthermore, SE and self-regulated learning (SRL) are being applied as active inclination and significant predictors of writing achievement. According to Schwarzer and Jerusalem (2002), SE is "the key to competent self-regulation". The degree in which individuals "metacognitively, motivationally and behaviorally" actively participate in the learning process is SRL (Zimmerman & Bandura, 1994). SRL is the ability to positively influence and control the learning process so that learners can take the influential and practical initiative to monitor learning, enhance struggle to achieve goals, increase understanding and eliminate the possible comprehension problems to keep themselves on track (Paris & Paris, 2001; Schraw, 1998; Zimmerman, 2002). Based on this, self-efficacy for self-regulation (SESR) is a compelling notion. According to Bandura (1997) SESR is concerned with one's personal beliefs about self-regulatory efficacy and has an impact on how well abilities such as focusing on a task or motivating oneself are coordinated and sustained. Pajares *et al.* (2007) examined students' perceived efficacy for SRL and writing self-efficacy. However, they did not examine students' ideas about their ability to control their writing. In writing, the confidence of students is undoubtedly affected by the cognitive and situate multitasking (Mitchell *et al.*, 2021). Several

studies explored the predictive role of SE and AW (Chen & Zhang, 2019; Golparvar & Khafi, 2021; Ng *et al.*, 2021; Pajares *et al.*, 2006; Qiu & Lee, 2020) but dearth of studies and instruments are found on SESR especially in the context of Pakistan.

Therefore, there is a need to examine students' beliefs regarding self-efficacy for self-regulation of academic writing (SSAW). Although, multiple scales are being used worldwide to assess SE beliefs of students such as Self-efficacy for writing Scale (Bruning *et al.*, 2013), Self-regulation Scale (Schwarzer & Warner, 2000), General SE Scale (Schwarzer & Baessler, 1996), SE for Writing (Pajares *et al.*, 2001), Self-efficacy questionnaire (Axboe *et al.*, 2016), Self-efficacy Survey (Panc *et al.*, 2012), and Writing Self-efficacy Scale (Shell *et al.*, 1989) etc. However, instruments specifically designed to assess SSAW are currently unavailable. Such instruments provide critical insight into the practice and research in academic writing. It will not only assist in a better understanding of academic writing as a feature of SESR, but it will also allow for the assessment and enhancement of academic writing interventions. Thus, the current paper focuses on SSAW in an educational setting, validating the SSAW scale and evaluating its performance on a group of university students. The validation of SSAW scale will be a prolific effort to add up a detailed instrument to assess students' SSAW at higher education level. It can help with the design of interventions for certain parts of the AW process.

SSAW Scale

SSAW scale was developed by Golombek *et al.* (2018) and focused on the cyclical model of SRL proposed by Zimmerman and Kitsantas (2007). SSAW has three dimensions; forethought, performance and self-reflection (figure 1). These dimensions distributed among 22 items in 0-100 response format. SSAW scale response format is considered to be more suitable, appropriate and precise than conventional Likert scale based on small set of responses (Golombek *et al.*, 2018). SSAW scale has various substantial aspects such as its theoretical foundation helpful to understand AW as an aspect of SRL in detail. Moreover, SSAW scale focuses on the creative and cognitive features of writing and provides opportunity to analyze individual differences (Golombek *et al.*, 2018). It offers a critical understanding of research and practice in AW at higher education level. Thus, the validation of English version of SSAW scale will extend the assessment of students' SSAW with an instrument of simple language and valid structure.
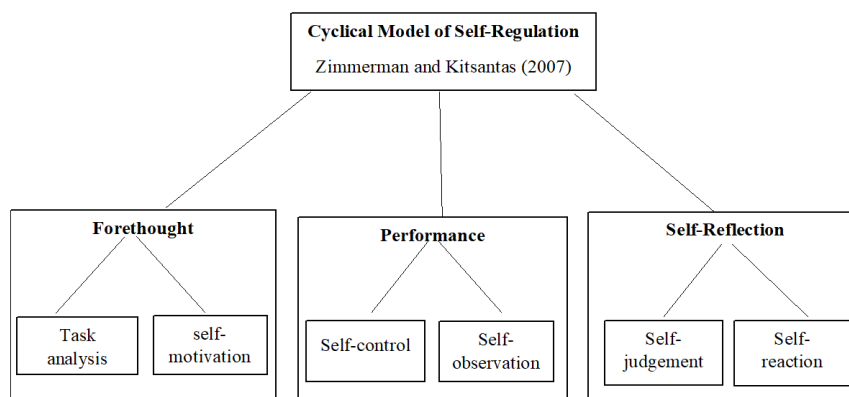
Figure 1: Cyclical Model of Self-Regulation by Zimmerman and Kitsantas (2007)

The Present Study

Being a multilingual country, practice of multilingualism is common in Pakistan, even students use multilingualism in their academic life. Pakistan has retained English as the official language with the exponential increase of its users from 2% in 1961 to 49% in 2003 (Dar & Khan, 2015; Mahboob *et al.*, 2008). At higher education level, English has been applied as medium of instruction in Pakistan (Mahboob, 2017). Thus, present study validated the English version of SSAW scale instead of translating it in Urdu (the national language of Pakistan). Moreover, it is manifest globally that diverse studies describe various scales used to measure SE and SRL in the context of academic writing (Chen & Zhang, 2019; Golparvar & Khafi, 2021; Ng *et al.*, 2021; Pajares *et al.*, 2006; Qiu & Lee, 2020). However, as mentioned earlier, it is hard to find a particular scale used to measure SSAW specifically at higher education level. Likewise, there is no available evidence of scale used to measure important dimensions of self-regulation i.e., initiating, planning, and perpetuating in academic writing. Therefore, due to the dearth of available instruments and significant impact of SSAW, there is then a decisive need that a scale should administer to examine students' SSAW at higher education level. It is important to note that the validation of SSAW scale (English version) has been made for the first time in any country as confirmed by the former researcher.

Aim of the Study

The primary aim of the study is to validate the English version of SSAW scale in the context of Pakistan at higher education level. The authors believe that this study will provide empirical support for SSAW. The English version of the SSAW scale may produce a more adequate factor analysis, as well as endorsed to previous research findings. The absence of dropped items due to insufficient factor loading in the variables that make up the self-efficacy for self-regulation construct would be a good indicator. Other researchers are expected to use the SSAW scale and perform research on other factors related to self-efficacy for self-regulation, such as critical thinking, self-esteem, and writing apprehension, based on the findings of this study. As a result, the current study intends to see if the SSAW scale, which was developed by Golombek *et al.* (2018), has the same structural components of self-efficacy for self-regulation construct as explained by Zimmerman and Bandura (1994).

Methods

Participants

Due to research limitations, using university students as participants in study is a widespread practice. This is done with the premise of educational level homogeneity and other psychographic characteristics, as well as the consideration of convenience (Hanel & Vione, 2016; Peterson & Merunka, 2014). Consequently, present study obtained a convenient sample of 313 Pakistani university students currently studying at Bachelor, Masters and PhD level at public and private universities of Pakistan. Students were notified about the study through social media and invited to utilize the SSAW scale to assess their SSAW beliefs. The age of students ranges from 18 to 54 (M=25.02, SD=5.62) and there were 46.3% Bachelor students, 33.9% Masters students and 19.8%, PhD level students who participated in the online survey (see table 1).

Instruments

The present study validated the SSAW scale (English version) to check its psychometric properties at higher education level in the context of Pakistan. The survey instrument for data

gathering utilized in the present study was constitute of three SE scales which were Writing Self-Efficacy Scale (WSES), General Self-efficacy Scale (GSES), and Rosen Berg Self-esteem Scale (RSES). A description of SSAW scale with three other instruments used in this survey are as follows:

Self-efficacy for Self-regulation of Academic Writing Scale (SSAW)

SSAW scale (Golombek *et al.*, 2018) has 22 items including three dimensions: (i) Forethought (6 items); (ii) Performance (9 items); (iii) Self- reflection (7 items). The SSAW scale features a response scale which include 11 categories that range from 0 (no chance) to 100 (completely certain). The purpose of the guidelines is to ask respondents to indicate how confident they are to achieve a certain level of AW ability. This response format and instructions are in line with the guidelines developed by Bandura (2006) on how to construct SE scales (Golombek et al., 2018). Current study evaluated all (22) items of SSAW scale.

Self-Efficacy for Writing Scale (SEW)

SEWS (Bruning *et al.*, 2013) is a 16 items scale developed under the recommendations presented by Bandura (2006) and Pajares *et al.* (2001)). SEWS examines 3 dimensions of SE for writing: (1) Ideation ;(2) Conventions; (3) Self-regulation with 5, 5 and 6 items respectively. The items response scale ranges from 0 (I'm not sure I could do) to 100 (I'm totally sure I could do). For this study, only the sub-scale of self-regulation (6 items) was used.

General self-efficacy scale

GSE scale is for the assessment of general self-efficacy developed by Schwarzer and Baessler (1996). It is a self- reported scale with 10 items. For each item, the response options ranging on a four-point Likert scale which are (Not at all true) to 4 (Exactly true). For present study, the 10 items of GSE were used.

Rosenberg Self-Esteem Scale

RSES (Rosenberg, 2015) has broadly been used to measure individual self-esteem by investigating both positive and negative feelings about self. It has 10 items of which 6 are positive (1, 2, 4, 6, 7, 8), and 4 are negative (3, 5, 9,10). All items are graded on a four-point Likert scale ranging from 1 (strongly agree) to 4 (strongly disagree). This scale is supposed to be unidimensional.

Procedure

In the initial steps, the authors contacted Golombek *et al.* (2018) to request permission to use English version of SSAW scale. The SSAW scale initially consisted of 22 items. The authors chose to use translation and back translation method as the former researcher informed that the English version of SSAW scale is not validated yet. Therefore, for the translation and back translation method of original scale (Hambleton, 2005) authors consulted the three experts who were bilingual (one PhD fellow from University of Malaya, Malaysia and 2 English language experts from University of Balochistan, Pakistan). After obtaining consent from the experts on English version of SSAW scale, a pilot study was performed to determine the reliability and validity of the instrument. An online survey (Google Form) comprised of 22 items was administered by providing a link to the survey via social media. Total 69 Pakistani university students participated in the online survey. The participants of pilot study were not the part of the final study. Internal consistency of SSAW scale (English version) was found to be excellent (Cronbach α= 0.971) and its subscales; forethought(α=0.89), performance(α=0.94), and self-

reflection(α=0.92). Moreover, the SSAW scale and its subscales have satisfactory reliabilities, and the data is normally distributed (see table 2). Therefore, no changes were made in the scale to proceed further.

After pilot test, a survey comprising demographic items, SSAW scale (22 items), SEWS (6 items), GSES (10 items), Rosenberg self-esteem scale (10 items) were circulated among Pakistani university students through an online survey (Google Form) on social media for data collection. This survey was comprised of 48 items altogether. Respondents are not restricted to time limit to fill the survey. The response rate for this survey was 98% which was excellent.

Table 1: Demographic Profile of Participants in Terms of Age, Gender, Education (N=313)

Sr. No.	Variables		f (%)	M± SD
1	Age (Range)	18 to 54	313	25.02±5.62
2	Gender	Male	142(45.4)	
		Female	169(54)	
		Undisclosed	2(0.6)	
	Education	Bachelor	145(46.3)	
3		Masters	106(33.9)	
		PhD/Doctorate	62(19.8)	

Note. f= frequency; M= mean; SD= standard deviation

Table 2: Cronbach Alpha Reliability Coefficients of SSAW and its Subscales (N=69)

Scale	No. of items	M	SD	α	Range		Skewness	Kurtosis
					Actual	Potential		
SSAW (Total)	22	146.8	38.56	.971	15-22	09-45	-.846	.824
Forethought	06	40.19	11.04	.899	6-60	04-20	-.711	-.201
Performance	09	58.91	17.27	.945	0-90	05-25	-.809	.540
Self-reflection	07	47.70	12.34	.928	05-70		-.945	1.24

Note. M= mean; SD= standard deviation; α= Cronbach Alpha; $p < 0.05$

Data Analysis

For present study, mean (M), standard deviation (SD), skewness, minimum and maximum score, kurtosis and correlation coefficient between items was calculated. Kolmogorov-Smirnov (K-S) test was used to test the univariate normality. Moreover, internal consistency was computed for SSAW's total score, its subscales, GSES, SEWS and RSES by applying descriptive analysis (SD, M, α). Exploratory factor analysis (EFA) was calculated for factor validity. Confirmatory factor analysis (CFA) was established to measure construct validity as it is helpful when multidimensional instruments are supposed to be tested (Prudon, 2015). A covariance matrix was computed, and CFA was used to see if the matrix contradicts any presumptions about factor structure or pattern. This statistical procedure was employed to measure how perfectly the data fit to the models. To ensure the current study's novelty,

researchers examined the skewness and kurtosis of the obtained results. Measurement invariance (MI) is a feature of an instrument (typically a questionnaire) that is used to assess a psychological construct (Cieciuch & Davidov, 2015). Therefore, configural invariance was conducted between the unconstrained and fully constrained models.

Results

The EFA and CFA

The foremost aim of this research is to validate the English version of SSAW scale, the EFA and CFA have been carried out. Since this measure is being tested in English language, therefore, both EFA and CFA have been performed. For statistical determination of underlying factors, the correlations between items were used to perform EFA. The underlying structure for the 22 items of the SSAW scale was assessed using principal axis factor analysis with varimax rotation, as shown in Table (3). The assumptions of normality, the variables' being correlated at high level, and linear relationships between pairs of variables were checked. Since the items were designed to index three constructs, three factors (forethought, performance, and self-reflection) were constructed. More than the recommended value of .60, Kaiser-Meyer-Olkin test of sampling adequacy value of .97, is supporting the factor analysis. The Bartlett's test of sphericity was significant ($\chi 2 = 6177.11$, df =231, p < .001), suggesting that the correlation matrix was not an identity matrix and that the items were related and therefore suitable to identify a factor structure. It is confirmed that every item shared some variance with other items as the communalities for all items were above .5. After rotation, the first, second and third factor accounted for 25.03%, 24.19%, 21.41% of the variance respectively as expected.

To evaluate model fit, Schermelleh-Engel et al. (2003) established the following criteria: $\chi 2$ divided by DF would not go over a value of 2, CFI would be $\geq$ .97, and RMSEA would be <.05. In addition, an appropriate fit is also defined as $\chi 2$ divided by DF not exceeding a value of 3; CFI should be $\geq$ .95; and RMSEA should be <.08 (Browne & Cudeck, 1992). The analysis revealed a poor fit for initial model of 3 factors with 22 items with ($\chi 2 = 775.53$, df =206), p>0.05, CFI= 0.907, and RMSEA=0.291. The recommended Cut-off values for RMSEA (<0.06) and CFI (>0.95) have not been found in the initial model. By the help of modification indices, model was revised for 3 factors with 18 items. Some of the co- error variance has been allowed which resulted in significantly improved fit of data, i.e., CFI=0.97; $\chi 2$ =285.06(df =126), p>0.05; GFI=0.90. While RMSEA (0.32) didn't yield satisfactory. Therefore, the fit is "good" according to the CFI but "poor" based on the RMSEA. According to Lai and Green (2016), when RMSEA and CFI are inconsistent, it is not necessary to discard the model simply because an index does not meet the cut-off, nor it should be retained by stating only the "good" index. This discrepancy in fit indices is diagnostic, indicating specific model specification or data issues (Lai & Green, 2016).

**Table 3: Rotated Factor Loadings and Commonalities for SSAW in EFA and Factor Loading in CFA (N=313)**

	EFA Factor Loadings				CFA Factor Loading
	1	**2**	**3**	h^2	
Item1	-	.58	.55	.66	.62
Item2	-	.58	.45	.62	.71
Item3	.34	.38	.69	.70	.79
Item 4	-	.58	.42	.59	.77
Item 5	-	-	.79	.68	.44
Item 6	.34	-	.74	.75	.59
Item 7	.55	.31	.58	.73	.62
Item 8	.52	-	.65	.77	.69
Item 9	.63	-	.55	.75	.58
Item 10	.69	-	.48	.75	.67
Item 11	.75	-	-	.72	.68
Item 12	.66	.42	-	.64	.71
Item 13	.65	.46	.32	.74	.70
Item 14	.63	.43	.41	.74	.69
Item 15	.56	.40	.43	.66	.63
Item 16	.52	.55		.64	.63
Item 17	.53	.60		.72	.53
Item 18	.58	.56	.38	.79	.67
Item 19	.51	.64	.31	.77	.57
Item 20	-	.76	-	.64	.56
Item 21	.31	.71	.31	.70	.72
Item 22	.38	.68	-	.68	.65
Eigen Values	13.66	1.04	.84		
% of Variance	25.03	24.19	21.41		

Note. EFA= Exploratory Factor Analysis; CFA= Confirmatory Factor Analysis

Test of Measurement Invariance (MI)
The Tucker-Lewis Index (TLI) and Comparison Fit Index (CFI) are comparative indexes that compare the fit of the model under examination to the fit of a baseline model. If the CFI and TLI values are >.90, the fit is deemed adequate, and if they are >.95, the fit is considered better (Hu & Bentler, 1999; Van de Schoot *et al.*, 2012). The CFI is set to 1.0 if the χ2< df is true, making it a normed fit index (Van de Schoot *et al.*, 2012). Moreover, absolute indices, such as the RMSEA, are used to assess the closeness of fit. Those with RMSEA scores <.06 are regarded "good," while those with values between .08 are rated "mediocre" (Teo & Kam, 2014). There are indexes based on information theory, such as the Bayesian Information Criterion (BIC) and Akaike Information Criterion (AIC). BIC/AIC are applied to compare models and make trade-offs between model fit and complexity. A lower BIC/AIC number suggests a better fit/complexity trade-off (Teo & Kam, 2014). The chi-square test is the most often used test to verify global model fit, and it is also applied to compare different fixed models, however it has also been found sensitive to vast sample size (Chen, 2007).
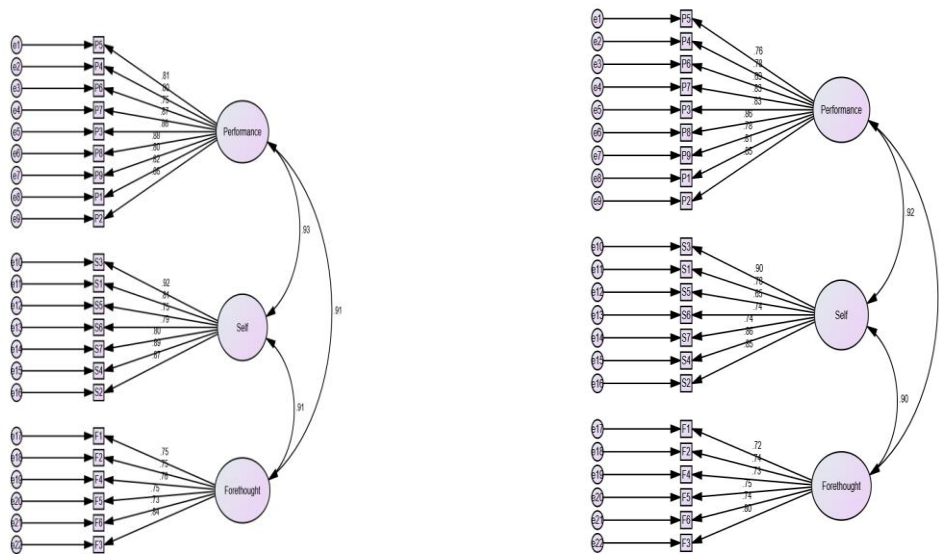
Figure 2: Cyclical Model of Self-Regulation by Zimmerman and Kitsantas (2007)

Starting with the baseline configural invariance, the three-factor model for the SSAW was evaluated for measurement invariance. The CFA model with the unconstrained and fully constrained model and intercepts can be seen in Figure 2. Two CFAs were conducted for unconstrained model ($\chi2$ = 2.688; TLI = .874; CFI = .887; RMSEA = .074), and fully constrained model ($\chi2$ = 2.631; TLI = .878; CFI = .885; RMSEA = .073). Later, for the fit indices MI was tested (see Table 4). Group 2 with the lowest AIC/BIC value (1286.005) has the best trade-off between model complexity and model fit. The other fit indices of Group 2 indicated a good fit. Group 2 have significantly lower mean factor score ($\Delta M¼$; p.000) as compared to Group 1. While the results showed that at the model level groups are not different but at the path level, they could be different (see table 4). CFA proved that the proposed three-factor model suited the data in this investigation, indicating that configural invariance exists.

Table 4: Summary of Measurement Invariance (MI)

	Group 1 (unconstrained)	Group 2 (fully constrained)
$\chi2$	2.688	2.631
df	412	434
p	.000	.000
CFI	.887	.885
TLI	.874	.878
RMSEA	.074	.073
AIC	1295.560	1286.005

Note. $\chi2$= chi-square; df = degree of freedom; CFI= Comparison Fit Index; TLI= Tucker-Lewis Index; RMSEA= Root Mean Square Error of Approximation AIC= Akaike Information Criterion; p<0.05

Internal Consistency and Reliability

To calculate the internal consistency of the SSAW scale and subscales i.e., GSES,SEWS, RSES, Cronbach alpha was computed for each subscale and for the total scale (see table 5). SSAW (α=0.97) and GSES (α=0.73) has high values (>0.70) while SEWS(α=0.58) and RSES(α=0.54) has values (>0.50). Furthermore, the value of skewness is <1 for the SSAW scale and other subscales (SEWS, GSES, RSES) which reflects the normality of the data (see Table 5).

Table 5: Cronbach Alpha Reliability Coefficients of SSAW Along with Other SE Scales

Scale	No. of item	M	SD	α	Range Actual	Potential	Skewness	Kurtosis
SSAW(Total)	22	146.8	38.56	.97	16-45	09-45	-.846	.824
SEWS	06	39.03	11.32	.58	04-20	04-20	-.35	-.33
GSES	10	29.87	5.32	.73	07-25	05-25	-.24	-.93
RSES	10	22.11	4.13	.54	10-35	10-40	-.13	.44

Note. SSAW= self-efficacy for self-regulation of academic writing scale; SEWS= self-efficacy for writing scale; GSES= general self-efficacy scale; RSES= Rosenberg self-esteem scale; p<0.05

Convergent Validity

The analysis for convergent validity showed a significant positive correlation between SSAW scale and SEWS (r =.83**). Since SEWS is only based on student perceptions regarding their writing, therefore it is having the most significant correlation with self-reflection subscale of SSAW (r =.80**). Besides, all the subscales of SSAW scale i.e., self-reflection, (r =.94**), performance (r=.97**), forethought (r =.93**) are showing very high correlation values suggesting the inter-correlation and use of combined measure as SSAW. Furthermore, significant but weak correlations of SSAW have been reported with GSES and RSES as r =.45**and -.27** respectively, thus suggesting the use of specified measures for assessing the SSAW (see table 6).

Table 6: Convergent Validity for SSAW Along with Other SE Measures (N=313)

		Mean	SD	1	2	3	4	5	6	7
1	SSAW(Total)	146.82	38.56	1	.94**	.97**	.93**	.83**	.45**	-.27**
2	SSAW (self-reflection)	47.70	12.34	-	1	.86**	.82**	.80**	.47**	-.27**
3	SSAW (performance)	58.91	17.27	-	-	1	.32**	.52**	.40**	-.26**
4	SSAW (forethought)	40.19	11.04	-	-	-	1	.44**	.41**	-.23**
5	SEWS (self-regulation)	39.03	11.32	-	-	-	-	1	.44**	-.24**
6	General Self Efficacy	29.87	5.32		-	-	-	-	1	-.38**
7	Rosenberg Self Esteem Scale	22.11	4.13		-	-	-	-	-	-

Discussion

Comparing the previous efforts of Golombek *et al.* (2018) with this research, the authors validated the newly developed instrument of SSAW (English version) with a sample of 313 university students in the context of Pakistan. Primarily, the findings endorse the three-

dimensional structure of SSAW (i.e., Forethought, Performance and Self-reflection) and the psychometric properties are satisfactory. The hypothesis was confirmed in terms of the scale's convergent validity.

To begin with, the reliability coefficient (Cronbach's Alpha > 0.500) in this study indicated good reliability in all aspects. This is in line with previous research findings of Golombek *et al.* (2018). The authors did not rely solely on Cronbach's alpha values in a series of efforts to test for validity. However, both findings are positive indicators that support the SSAW scale's validity. The item total correlation values (>0.500) indicated that each item is related to the measured scale's total values. As a result, the authors conducted factor analysis, which is commonly used in similar research in a variety of subjects.

Furthermore, findings reveals that there is a positive correlation among SSAW scale, SEWS and GSES while weak correlation with RSES. The strong correlation of SSAW with SEWS shows its precision as SSAW is a construct which concerned with the academic writing of students. The findings of this context sensitive relationship between SSAW and SEWS propose that the SSAW scale is sensitive to various settings. According to Bühner (2011), it provides the most accurate indication for the domain specificity of the scale as well as preliminary evidence of discriminant validity. SSAW is also correlated positively, but weaker with GSES and RSES, thus showing evidence of divergent validity.

The significant differences in correlation coefficient between the three validation constructs (SEWS, GSES, RSES) and the subscales of SSAW scale suggest that the subscales are related to different aspects of the construct. The heterogeneity of these relationships can be interpreted as strong evidence for the variation into three subscales, despite the lack of a clear and obvious pattern in these relationships. Moreover, the results of the present study strengthened the logically based and empirically validated division of the three subscales (forethought, performance, self-reflection).

Results also reveals that the Chi-square changes between unconstrained model (2.688) and fully constrained model (2.631) are not significant. Therefore, the measurement model is invariant by gender. Moreover, present study was conducted with university students to investigate students' SSAW beliefs because SE and self-regulation are closely correlated with academic motivation and affect academic success and achievement in the academic domain (Golombek *et al.*, 2018; Pajares, 2003; Shell *et al.*, 1995). According to certain findings, the SE beliefs and self-regulation of university students about AW, have an effect on their motivation and success while writing (Pajares, 2003).

We have explored in this study that SSAW has the potential to be useful in higher education and could be beneficial to enhance students' achievement in academic writing. As a result of these findings, we believe it would be important to look into the evolution of SSAW over time and through various stages of schooling, to see if certain dimensions stay constant while others increase significantly as a student progress through the educational system. Moreover, findings revealed that SSAW scale can be used in the EFL/ESL context for research purpose at higher education level. We assume that, as compared to other available SE instruments, SSAW scale is useful for guiding interventions at the individual level. When each student will be assessed on three distinct dimensions (forethought, performance, self-reflection) the strengths and weaknesses of each student can be explained and further addressed.

Our study, like any other, has some limitations. The biggest limitation is that we were unable to evaluate any writing product. As a result, our validation is limited to other SE scales like GSES, SEWS and RSES only. Although, this is common when translating measures into other languages; our findings may be strengthened if we can confirm the relationship between SSAW scale and writing outcomes such as essay scores. This is a new avenue for research that might increase possible value of using SSAW scale with university students, and it should be the next step in the expansion of SSAW scale in EFL/ESL contexts. Another constraint was that we couldn't control prior writing experience. The participants were all university students, which could imply any kind of range restriction. Therefore, it is recommended that this scale should be used primarily on university sample until a validation with overall adult population could be performed. One more limitation is unequal number of respondents by degree level; biased towards the undergraduates.

Despite some limitations, SSAW may enable researchers to study individual differences because it is a brief, trustworthy, and valid self-assessment measure. This research suggests that the scale could be used in a variety of settings. For example, the scale might be used in longitudinal studies to look at how SE attitudes about AW and self-regulatory writing skills change over time. It would be possible to investigate the influence of learners' perceived self-regulation for AW on their academic performance this way. Researchers might use cross-sectional designs to compare pupils from different disciplines. Gender differences can also be explored.

Further research can also use Rasch Measurement Model to ascertain the rating scale functionality (given the 0 to 10 categories used), range of ability levels that can be measured, unidimensionality test the data, when analysed with Rasch Model suggest a unidimensional structure; unlike the results of the CFA. Moreover, there are surprisingly few systematic assessments of the various interventions for AW. The SSAW scale may provide writing researchers and those working in academic writing centres to methodically assess and streamline writing interventions in order to properly support students in one of their most difficult area/subjects. Despite some limitations and further research avenues, it is believed that the current study will contribute to the study of writing SE and SRL in various countries and settings especially in EFL/ESL context.

Conclusion
Present study provided significant indications regarding the internal consistency and reliability, content validity, convergent validity, construct validity and measurement invariance of the English version of SSAW scale. The external validation is adequate, although, the internal validation data suggest that the factor structure should be investigated further. Measurement invariance analysis showed insignificant changes between unconstrained and fully constrained model which showed that SSAW scale can be used in diverse educational settings. Findings suggest that the SSAW scale can be utilized at higher education level to assess students' self-efficacy for self-regulation beliefs and its impact on their achievement in academic writing.

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