



## Measuring Self-Efficacy in Students with and Without Reading Difficulties: A New Scale

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### ABSTRACT

**Purpose:** The main goal of this study was to develop a novel self-efficacy scale in relation to reading skills for several underlying rationales and subsequently, to verify the reliability and validity of the scale for students with reading difficulties (SRD) and without reading difficulties (SWRD), as cohorts and on an individual basis. **Methods:** The way in which the scale was created, managed, and ranked was described. The study sample encompassed 569 elementary school upper grade pupils from Al Kharj City, Saudi Arabia, of whom 469 had a normal ability to read and 100 experienced issues with reading. Scale validity and reliability were identified by using exploratory (EFA) and confirmatory (CFA) factor analysis, respectively, together with Cronbach's alpha. Accepted factor loading for each item was determined by EFA; an apposite fit with respect to the multi-factor paradigms with various content-specific domains as associated latent elements was demonstrated by CFA. Data obtained from SWRD and SRD, either in combination or individually, generated an appropriate intrinsic uniformity, as indicated by Cronbach's alpha evaluation.

**Findings:** The outcomes demonstrated that the scale exhibited satisfactory psychometric characteristics and demonstrated validity and reliability. In addition, it displayed intrinsic uniformity, together with construct, content and convergent reliability when applied to the three cohorts in this study. **Implications for Research and Practice:** According to the findings, this validated Reading Self-Efficacy Scale can be considered a suitable and helpful scale for researchers, teachers, and experts in measuring the level of reading self-efficacy among students with and without reading difficulties.

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## Introduction

Reading develops the ability to infer and deduct meaning through comprehension skills. Joseph Addison once wrote, "Reading is to the mind what exercise is to the body." Perhaps, it is the human brain which is most benefited with reading, as it stimulates the complex network of circuits and signals in the brain. As readers improve their reading ability, these networks become stronger and more sophisticated. In addition, reading has many other benefits: it helps in developing the power of concentration and improves readers' focus by reducing stress and improving mental health. While reading provides exposure to new things, it helps in improving work relationships with colleagues and peers. Reading can improve a person's memory as it helps store new information and recall events more effectively. Last, but not the least, reading improves the ability to empathize with others. Here begins the role of self-efficacy

Self-efficacy and reading abilities are intrinsically related and they comprise a central aspect in learners' education and intellectual accomplishments. Poor self-efficacy forces learners to disengage from tasks necessitating reading aptitude; while pupils with greater self-efficacy demonstrate a greater enthusiasm and take pleasure in reading activities (Henk & Melnick, 1995; J. Lee & Zentall, 2012; Schiefele et al., 2012). Reading assignments allocated through schools and their requisites comprise a significant part of children's experiences, and so a number of scientists have concentrated on scholarly self-efficacy (Schunk, 1991). This concept can be described as students' confidence in their capacity and aptitude to conclude educational tasks effectively and to attain their intellectual objectives (Bandura, 1997).

Academic self-efficacy is therefore an accurate indicator of academic prowess and additionally, for the success of particular intellectual undertakings (Nasa, 2014; Pajares, 1996). Academic self-efficacy is also the evidence of the relationship between learners' cognitive skills and reading aptitude. Precisely, reading self-efficacy then would act as a significant construct which must be measured accurately. This requires scales and instruments to assess particularly in the FL/L2 scenario.

The objective of this work was therefore to evolve a novel scale for the purposes of quantifying self-efficacy as it pertains to reading skills, and to establish its reliability and validity. This study aimed to interpret and to evaluate the intrinsic configurational validity of a self-efficacy scale in relation to reading within cohorts of SRD and SWRD. In order to create the scale items, previous publications pertinent to self-efficacy were reviewed. The items were selected according to the social cognitive hypothesis proposed by Bandura (1993, 1997), which described reading self-efficacy content domains. Subsequently, formerly published self-efficacy ranking systems for reading were critiqued, which facilitated the generation of items which reflected the relevant underpinning concepts (Henk & Melnick, 1995; McKenna & Kear, 1990; Shell et al., 1995).

## Problem statement and theoretical framework

Scales pertaining to overall self-efficacy have been generated previously; but these have narrowly encompassed academic self-efficacy and frequently been targeted towards use in young children (Bandura, 1990; Chen et al., 2001; Muris, 2001; Pajares, 1996; Schunk & Pajares, 2002; Usher & Pajares, 2008). A few of these gauges have though evolved to quantify individuals' self-assessment of their ability to read, such as their fluency,

understanding, lexical analysis and identification (Henk & Melnick, 1995; McKenna & Kear, 1990; Shell et al., 1995). However, a detailed evaluation of these examples led to the conclusion that these scales were less aimed towards generating and confirming reading self-efficacy, ranking reliability and validity in pupils of an equivalent age. Several limitations were recognised in these scales, so the current work is aimed towards surmounting these restrictions.

Additionally, the items of the aforementioned scales were not validated and therefore could be challenged on individual basis. These scales generally contained a minimum of twenty items (Henk & Melnick, 1995; McKenna & Kear, 1990), which created difficulties in SRD, for whom reading or comprehending the items provided difficult owing to the use of prolonged sentences or material that was dull for young children (Shell et al., 1995). Thus, a need was felt to design a scale for the evaluation of reading self-efficacy and to evaluate its reliability and validity in SRD and SWRD.

There is a dearth of effective reading self-efficacy scales that could measure the reading levels of college students. Such a deficiency necessitates to develop and validate a reading self-efficacy instrument. To the author's best knowledge, so far no scales are validated nor are designed to quantify reading self-efficacy in the Arab territories, specifically within Saudi Arabia. The aim of this study was therefore to design a reading self-efficacy scale fully applicable to this nation. This study describes the manner in which such a scale should be constructed keeping in view the initial appraisal of psychometric characteristics. Since self-efficacy is intrinsically related to reading skills, this study also examined reading-related cognitive factors contributed to developing self-efficacy, in general and improving reading comprehension, in particular.

The following research questions were identified for the study:

1. Does the reading self-efficacy scale have acceptable reliability and validity when applied to students with and without reading difficulties attending upper elementary school?
2. Does the reading self-efficacy scale have acceptable reliability and validity when applied to students with reading difficulties attending upper elementary school?
3. Does the reading self-efficacy scale have acceptable reliability and validity when applied to students without reading difficulties attending upper elementary school?

### Literature Review

The term, self-efficacy, describes a person's capacity to conduct an assignment in particular circumstances. It includes choice of undertaking, consideration of the degree of endeavor required and the determination to conclude the task (Bandura, 1993). Self-efficacy is deemed to be a major constituent of social cognitive theory, which states that each person's life is influenced by numerous elements; behavioral, cognitive and social aspects, which can be controlled by an individual in relation to routine day-to-day tasks. This hypothesis therefore implies that behaviors can be adjusted and comprehended by individuals via the interplay between behavioral, societal, and personal factors (Bandura, 1999).

Reading self-efficacy dictates the pupil's standard of reading, precision and positive ability in this sphere (Applegate & Applegate, 2010; Solheim, 2011; Yang et al., 2018).

Various researchers have demonstrated that, in comparison to their peers, the academic rankings attained by challenged pupils are less, and their reading self-efficacy is of a poorer level (Baird et al., 2009; Chapman et al., 2004; Klassen, 2010; Tabassam & Grainger, 2002). Additionally, students experiencing difficulties and who display poor self-efficacy encounter a number of intellectual challenges (Margolis & McCabe, 2003). One study, conducted in city schools within the United States, reported that self-efficacy in reading had a notable positive influence on young pupils' abilities and that it could be estimated in very young children (Y. S. Lee & Jonson-Reid, 2016).

A few recent studies have focused on reading self-efficacy and its relationship with various constructs such as reading motivation (Hedges & Gable, 2016); reading anxiety and reading achievement (Ghonsooly & Elahi, 2010); and reading perception (Şahin & Öztahtalı, 2019). A host of studies have also focused on measuring reading self-efficacy through different scales, namely Peura et al. (2019a, 2019b) developed a scale for quantifying reading fluency; Kula and Budak (2020) attempted to measure reading self-efficacy perceptions of primary school students; Karabay (2013) developed a scale with the assistance of pre-service language teachers, focusing on evaluation, research, and visualization; Şahin and Öztahtalı's (2019) scale focused on physical dimensions like breathing, pausing and appearance; and Ahmadian and Pasand's (2017) scale prioritizes content and validity for learners at intermediate levels. None of these scales align with Bandura's recommendations of measuring constructs including behavior and learners' locus of control. Moreover, the scales available in previous literature did not measure reading self-efficacy, in particular, as they addressed learners' common reading problems related to their academic success or failure (Hager, 2017; Ortlieb & Schatz, 2020).

There are however only two scales that could be deemed to fit into Bandura's guidelines namely the scales designed by McLean and Poulshock (2018) and Mullins (2018); but there are limitations of these two scales as both addressed reading self-efficacy issues on non-English majors (e.g., Spanish) and for specific target group (e.g., novice learners). Those students with learning difficulties (SLD) view reading as a hard skill to learn, and they blame this situation on their personal failings (Wiggs, 2012). The suboptimal reading self-efficacy that they experience impedes their ability to surmount more difficult reading assignments, and so they circumvent tasks that they consider too challenging (Zimmerman, 2000). The ability to quantify self-efficacy is a key step for ultimately acquiring this quality. Any parameters should be applied to a particular sphere of cognitive behavior and be in keeping with the self-efficacy needed in this context (Bandura, 1993). The more focused the assignment, the greater the capacity to quantify self-efficacy for that undertaking; self-efficacy contributes to forecasting success (Bandura, 1997). Thus, students' degree of self-efficacy in relation to reading should be assessed in order to comprehend the way in which this characteristic impacts this literary skill. The ability to quantify self-efficacy in relation to reading is a key necessity for scientists who wish to study this trait.

## Method

- *Research design*

The study adopted a quantitative research design, using the survey method to collect data and understand the perception of the respondents towards reading self-efficacy.

- *Sample*

The participants were all pupils at public upper elementary educational facilities of Al-Kharj City, which were approached as they offered reading difficulty initiatives and so encompassed pupils working these programs. The population comprised 25 elementary schools for boys with reading difficulties with 196 pupils; and 19 elementary schools for girls provide teaching for approximately 157 pupils with reading difficulties (The Ministry of Education, 2018). These learning facilities were asked if they wished to take part in this research; a positive response was received from 8 and 10 schools that taught girls and boys, respectively. The Saudi Ministry of Education rankings were utilized to recognize SRD (General Administration of Special Education & General Administration of Evaluation and Quality of Education, 2016).

The participating educational institutions which offered initiatives to assist SRD were also attended by children without reading issues. The scale was instigated in these facilities, helped by the pedagogues in general and special education, and those in training. The study sample encompassed non-duplicated data and scales completed without omission; where there were repeated data or missing information, these scales were excluded from the data set. The final sample of elementary pupils who had no reading problems included 235 (41.3%) boys and 234 (41.1%) girls. The population of SRD included 54 girls and 46 boys, i.e. 9.5% and 8.1% of the total number of subjects, respectively. The grade distribution of the children was 194 (34.1%), 182 (32%) and 193 (33.9%) from grades 6, 5 and 4, respectively. 352 (61.9%) of the pupils fell within the 10-12-year age-group; 173 (30.4%) within the 11-13-year age-group, and 44 (7.7%) were aged over 13 years.

These pupils were offered the Arabic language component of their test following information provided from their pedagogues regarding their suboptimal reading aptitudes. A paper form of the scale was disseminated to each pupil within the schools taking part in the study.

- *Research Instrument and procedure*

An English edition of the scale was produced by three Saudi professors; the items were translated into the Arabic language to get a bilingual scale in both English and Arabic. The back translation of the Arabic edition to English was performed in order to establish the precision of the translated scale. Following this process, the Arabic version was prepared for a pilot study during which the scale was tested on ten pupils in order to confirm that the questionnaire was comprehensible to the children. Additionally, questions regarding their attitudes with respect to their aptitude for reading were posed to 8 pedagogues, 25 SWRD and 7 SRD.

Following an in-depth review, the decision was made to divide the scale into three components, i.e. reading ability, difficulties in reading and reading attitude. Twenty-two items were thus established in Arabic, which comprised the scale. These underwent review and content validity assessment by nine panels, which were composed of specialists from the fields of psychology and special education. Guidance on the inclusivity and transparency of the items and their pertinence to purpose were offered. Furthermore, three and six specialists from special education and psychology disciplines, respectively, were required to judge the relevance, i.e. relevant or not relevant, of each item. Item proportions were then computed with respect to their pertinence to the ranking system; scores of  $\geq 0.78$  were deemed to be apposite, data which reflected validity of the scale's content (Polit & Beck, 2006). The scale was therefore created using the 14 content-valid items; five-point Likert scales were applied over the opinion spectrum of strongly agree to strongly disagree.

Obtaining measures of reading self-efficacy domains exhibited validity in terms of content; scale items were generated with the implementation of brief and straightforward phrases. The linguistics utilized were appropriate; pupils were acquainted with their content even if their reading abilities were suboptimal. The phraseology meant that only individual statements were used within an item in order to circumvent the perplexing situation of two notions being offered simultaneously, a situation which could have generated inapposite data (Schriesheim et al., 1993). Fourteen items were established pertaining to proficiency and challenges with reading, which reflected features, such as fluency, understanding and vocabulary identification. The scale was presented to elementary school pupils in Al-Kharj City, Saudi Arabia, including SWRD and SRD in order to establish the scale's reliability and validity.

Once the pupils had chosen their grade and their age-group, they were given written instructions, which included details regarding the number of scale items, the five responses and how they were abridged, together with an example and its explication. The latter had the objective of providing the responders with guidance in relation to how to select their options. The pupils were requested to read each stem and to give it a measure according to the five-point Likert scale. Any queries that they had regarding the scale were answered. Furthermore, until they had finished working through the scale, they were told not to engage with any of their peers. Those invigilating the process told the pupils to be truthful and that there was no right response for any of the items.

Approximately 20 minutes were taken for SRD to fill in the scale; SWRD were generally quicker. The Likert scale comprised: 5 = strongly agree; 4 = agree; 3 = not sure; 2 = disagree; and 1 = strongly disagree. If 'strongly agree' were chosen for each item, this would give the highest score of 70, which indicated optimal self-efficacy with respect to reading. The lowest possible score of 14, where 'strongly disagree' for each item was chosen, reflected the other end of the reading self-efficacy. Positive phrasing was utilized for all the scale items and reflected reading proficiency apart from stems 5, 6, 7, 13 and 14, which had a negative connotation and encompassed challenges relating to reading.

- *Data Analysis*

Tools utilized for the evaluation of internal components of social aptitudes or character appraisal often include an admixture of exploratory (EFA) and confirmatory (CFA) factor analyses, respectively (Paulhus & Carey, 2011). These were combined in the current study using AMOS 23 software (Blunch, 2013); outputs for the reading self-efficacy scale were described. CFA was carried out according to the data determined by EFA in order to verify the scale's dimensionality configuration. EFA encompassed assessment of the factor loadings relating to the scale's individual items for the various scale dimensions within the three cohorts. Maximum factoring was utilised in association with EFA. A necessary extraction technique, principal axis factoring was utilized; the extracted factors underwent varimax rotation with Kaiser normalization (Fabrigar et al., 1999).

EFA provided data for the factor loadings relating to each item on the latent variables and underpinning factor architecture (Costello & Osborne, 2005). The association between the items and a factor that has a value other than zero is presented in the tables below; this indicates the scale's convergent validity (Hafiz & Shaari, 2013). Heterogeneous trends for the factor loadings for all the stems within the three cohorts were noted, indicating that the

operation of the items was not identical across the three study populations with respect to the scale of reading self-efficacy. Items loading for the reading self-efficacy scale's fundamental factors were recognized using principal components analysis (PCA). This process was applied to the entire study population.

### Results

As can be determined from the scree plot, a triad of factors emerged that had eigenvalues of over 1, which explicated the respective variances of 21%, 19% and 13%, i.e. 53%, in total. Since all 14 items played a role in factor structure and fulfilled the parameter of  $\geq 0.3$ , no items were eradicated. Varimax rotation with Kaiser normalization, applied during PCA of the 14 items, came together in 5 repeats, and offered the most optimally described factor configuration, with all items evidencing primary loadings  $> 0.5$  (Table 1). The three factors reflected reading attitude, difficulty in reading (a negative facet) and reading abilities, and comprised 5 (1, 2, 3, 4 and 12), 5 (5, 6, 7, 13 and 14) and 4 (8, 9, 10 and 11) items, respectively. The EFA data are presented in Table 1.

**Table 1**

*Rotated Factor Scores from Pattern Matrix (Oblimin Rotation) for Reading Self-Efficacy Scale (both groups, N=569)*

Item Description	F1-RAT	F2-DR	F3-RAB
1. I am a fast reader.	.785		
2. I understand reading materials.	.696		
3. I recognize the main idea.	.709		
4. I make a few mistakes in reading.	.724		
5. Reading is difficult.		.751	
6. I dislike reading.		.801	
7. I avoid reading difficult materials.		.715	
8. I understand the word's meaning.			.336
9. I focus with my reading teacher.			.654
10. Reading is my favorite subject.			.719
11. I repeat reading to understand.			.731
12. I read better than my friends in class.	.626		
13. Reading is boring.		.686	
14. I receive assistance to complete my reading task.		.592	

F=factor, RAT=Reading attitude, DR=Difficulty in reading, RAB= Reading ability

PCA was utilized in order to recognize items loading for the factors underpinning the scale for reading self-efficacy for the SWRD. As evidenced by the scree plot, three factors were recognized with eigenvalues of over 1.0, which explicated the respective variances of 18%, 17% and 13%, i.e. 48%, in total. Since all 14 items played a role in factor structure and fulfilled the parameter of  $\geq 0.3$ , no items were deleted. Varimax rotation with Kaiser normalization, utilized during PCA of the 14 stems, congregated in 4 repeats, and generated the most superior factor configuration, with all items exhibiting primary loadings  $> 0.5$  apart from items 8 and 12, which had values of 0.42 and 0.35, respectively (Table 2). The three factors were representative of reading attitude, difficulty in reading (a negative) and reading abilities, and comprised 5 (1, 2, 3, 4 and 8), 5 (5, 6, 7, 13 and 14) and 4 (9, 10, 11 and 12) items, respectively. These data are presented in Table 2.

**Table 2**

*Rotated Factor Scores from Pattern Matrix (Oblimin Rotation) for Reading Self-Efficacy Scale (SVRD, N=469)*

Item Description	F1-RAT	F2-DR	F3-RAB
1. I am a fast reader.	.779		
2. I understand reading materials.	.657		
3. I recognize the main idea.	.667		
4. I make a few mistakes in reading.	.708		
5. Reading is difficult.		.749	
6. I dislike reading.		.778	
7. I avoid reading difficult materials.		.663	
8. I understand the word's meaning.	.423		
9. I focus with my reading teacher.			.696
10. Reading is my favorite subject.			.744
11. I repeat reading to understand.			.663
12. I read better than my friends in class.			.351
13. Reading is boring.		.664	
14. I receive assistance to complete my reading task.		.583	

F=factor, RAT=Reading attitude, DR=Difficulty in reading, RAB= Reading ability

Items loading for the reading self-efficacy scale's fundamental factors were established utilizing PCA for the SRD. Three factors arose which displayed eigenvalues of over 1, which explicated the respective variances of 24%, 18% and 17%, i.e. 49%, in total. Since all 14 items played a role in factor configuration and met the requisite of  $\geq 0.3$ , no items were eradicated. Varimax rotation with Kaiser normalization, applied during PCA of the 14 items, demonstrated convergence in 6 repeats, and offered the most optimally characterized factor structure, with all items having primary loadings  $> 0.5$  apart from item 9, which had a value of 0.47 (Table 3). The three factors were indicative of reading attitude, difficulty in reading (a negative facet) and reading abilities, and comprised 5 (1, 2, 3, 4 and 12), 5 (5, 6, 7, 13 and 14) and 4 (8, 9, 10 and 11) items, respectively. The EFA data are presented in Table 3. Nevertheless, the second factor also encompassed item 8, which is inconsistent with this factor and the associated items.

**Table 3**

*Rotated Factor Scores from Pattern Matrix (Oblimin Rotation) for Reading Self-Efficacy Scale (SRD, N=100)*

Item Description	F1-RAT	F2-DR	F3-RAB
1. I am a fast reader.	.782		
2. I understand reading materials.	.689		
3. I recognize the main idea.	.782		
4. I make a few mistakes in reading.	.665		
5. Reading is difficult.		.679	
6. I dislike reading.		.833	
7. I avoid reading difficult materials.		.775	
8. I understand the word's meaning.			.696
9. I focus with my reading teacher.			.744
10. Reading is my favorite subject.			.663
11. I repeat reading to understand.			.351
12. I read better than my friends in class.	.724		
13. Reading is boring.		.708	
14. I receive assistance to complete my reading task.		.480	

F=factor, RAT=Reading attitude, DR=Difficulty in reading, RAB= Reading ability

### Confirmatory Factor Analysis

The output of the EFA for the three study cohorts was used as the basis for the CFA, which concentrates on both observable and hidden variables. During this process, the paradigm fits multi-factor models through the evaluation of various domains with a particular content that are used as unrelated latent variables (Marsh et al., 2004). The parameters obtained from the model fit and its criteria were utilized to appraise the model's GFI, AGFI, TLI, CFI and RMSEA for the study's data set. The results are shown in Table 4.

**Table 4**

*CFA for the reading self-efficacy scale amongst the three groups*

Groups	$\chi^2$	RMSEA	GFI	CFI	AGFI	TLI
Students with reading difficulties	144.713	.089	.836	.863	.767	.831
Students without reading difficulties	182.435	.059	.944	.915	.944	.896
Both groups	222.226	.056	.947	.928	.925	.912

$\chi^2$  = Square Root, (RMSEA) = Root Mean Square Error of Approximation, (GFI) = Goodness of Fit Index, (CFI) = comparative Fit Index, (AGFI) = Adjusted Goodness of Fit Index and (TLI) = Tucker-Lewis index

Founded on the aforementioned model fitting parameters relating to the CFA, the multi-factorial paradigm with associated latent factors demonstrated a good and apposite fit for the SRD, SWRD and these two cohorts combined.

### AMOS Graphic

AMOS software was used to perform the CFA, which used the EFA data as its foundation, on the three cohorts as noted above. The principal behind this process was to ascertain the degree to which the quantified parameters reflected a particular factor (Worthington & Whittaker, 2006). The scale's content validity was acquired by CFA through the computation of the association between the items and their related factor, which should give a value other than zero; the items are reflective of the areas that the scale is designed to quantify (Hafiz & Shaari, 2013). The output from this stage for each cohort is detailed in the following sections. A triad of factors were inferred by the multi-factorial model which applied to all three cohorts, i.e. reading attitude, difficulty in reading and reading ability. The association between items and factor values obtained from the paradigm that are other than zero were within the ranges 0.77-1.48, 0.69-1.34 and 0.69-1.21 for both groups (Figure 1), SWRD (Figure 2), and SRD (Figure 3), respectively.

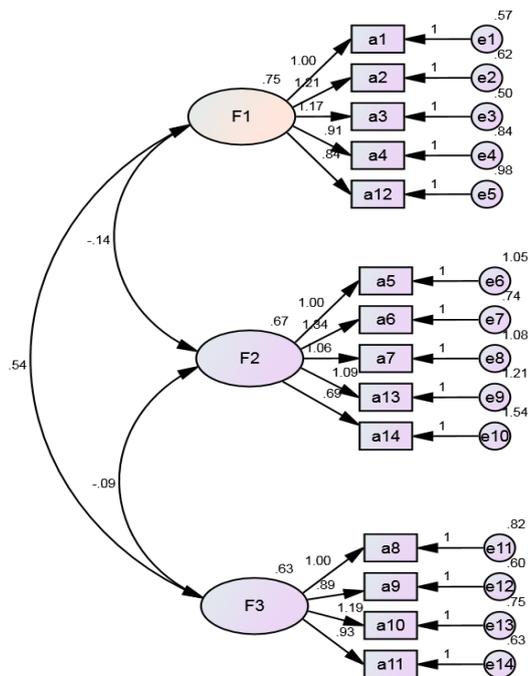


Figure 1. CFA for SRD

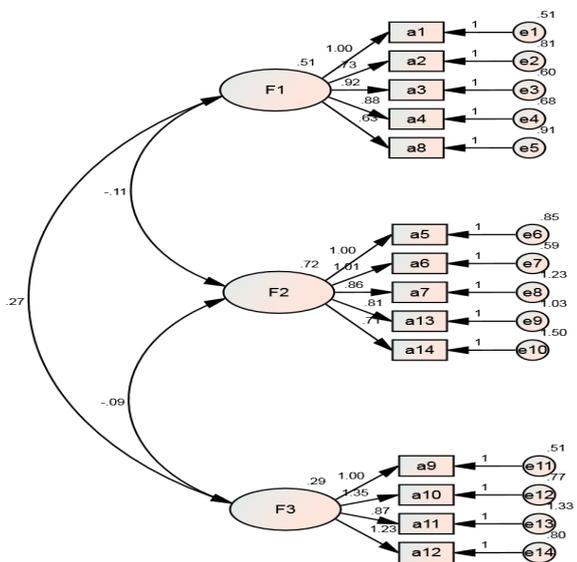
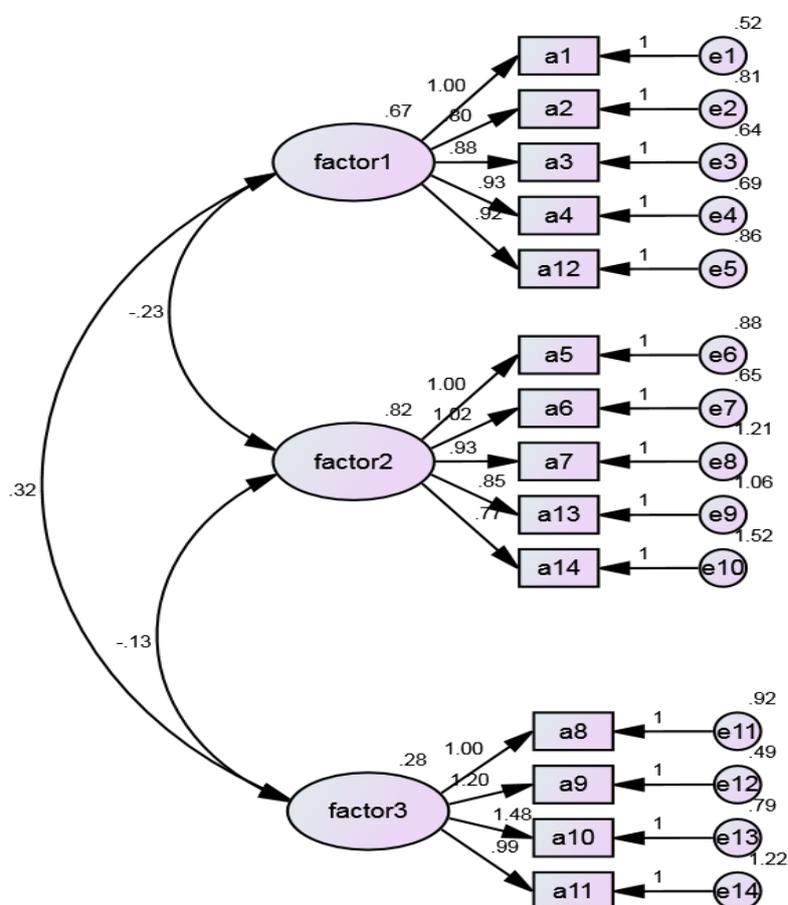


Figure 2. CFA for SWRD



**Figure 3.** CFA for both groups (SWRD and SRD, N= 569)

Finally, the reading self-efficacy scale's reliability was determined for the three study cohorts, using Cronbach's alpha. Respective values for reading attitude, difficulty in reading, reading abilities, and the entire scale for each group were as follows: SRD, 0.844, 0.755, 0.780 and 0.732; SWRD, 0.708, 0.724, 0.629, and 0.632; both cohorts, 0.793, 0.762, 0.637 and 0.635.

### Discussion

The objective of this study was to evaluate the differing aspects of a self-efficacy scale in relation to reading, which was designed specifically for Saudi pupils from various contexts. The scope of the study was restricted to establishing the scale's reliability and validity, as implied by the research questions, in relation to the various pupil cohorts, evaluating the scale in groups of SWRD, SRD and in both groups in combination.

The scale dimensionality was assessed to affirm the scale's validity, and to establish that the output of the scale was as designed [Yong and Pearce \(2013\)](#). Several dimensionality parameters were calculated for this purpose; the outcomes agreed. The data assisted in the recognition of three dimensions that existed in relation to the scale, and demonstrated that the features of the scale exhibited a triad of similar dimensions with respect to the two sub cohorts, i.e. SWRD and SRD. EFA revealed that the arising factors related to those theorized according to the social cognitive hypothesis described by [Bandura \(1997\)](#) which encompassed the content domains pertaining to reading self-efficacy. A threshold of 0.32 was deemed the lowest reasonable loading of an item in relation to a factor, which is equivalent to in the region of 10% common variance with the residual items ([Tabachnick & Fidell, 2001](#)). EFA data affirmed that all items were loading for a particular factor  $> 0.3$  for all three cohorts; the loading was deemed appropriate for items associated with a factor for each group.

In order to evaluate the model-fit achieved by CFA, the model fit indices should be contemplated in relation to the three cohorts. CFI of  $> 0.95$  and 0.90-0.95 indicate an optimal and adequate fit, respectively. Where the RMSEA is  $> 0.05$ , a perfect fit is achieved; an RMSEA value of 0.05-0.08 describes an adequate fit ([Kline, 2015](#)). GFI, AGFI and TLI parameters, should ideally fall between 0 and 1, where 1 and  $\sim 0.9$  infer a good fit ([Schumacker & Lomax, 2016](#)). Values in the range 0.08-0.1 are deemed to be marginal; a parameter  $> 0.1$  is judged to be a poor fit ([Fabrigar et al., 1999](#)). Thus, for the SRD cohort, an RMSEA parameter of 0.089 implies a marginal fit. RMSEA values for the two cohorts of 0.56 and 0.59, respectively, are indicative of a perfect to acceptable model fit. For the SRD, SWRD and the combined cohort, GFI and AFGI data were 0.836, 0.944 and 0.947, and 0.767, 0.944 and 0.925, respectively. These outcomes demonstrate an optimal model for the cohorts of SWRD and combination of students, but for the SRD group both parameters were  $< 0.9$ . This is likely to be a consequence of the low sample size of only 100 subjects ([Mulaik et al., 1989](#)).

The CFI data for the SRD, SWRD and combined groups were 0.863, 0.915 and 0.928, respectively, indicative of a good fit. The TLI, which, ideally, should be  $> 0.9$  to describe a good fit, attained this value in the combined data, but not when the two groups were evaluated separately, with values of 0.831 and 0.896 in the SRD and SWRD cohorts, respectively, which fall below the threshold. In view of these parameters, it can be concluded that the fit of the three factors paradigm in relation to the samples is satisfactory ([Bentler, 1990](#)). The factor configuration that emerged from the CFA for the reading self-efficacy scale suggested an acceptable model fit. The latter was established with respect to the multi-factorial models with various content-determined domains as associated latent variables.

For perfect convergent validity, the factor loadings should equate to  $\geq 0.707$  ([Gefen et al., 2000](#)). The CFA data indicated that 14 items had loadings  $> 0.707$ . The loadings of 2 items were within the range 0.6-0.707, i.e. items 4 and 14, which had values of 0.63 and 0.69, and occurred within the SWRD cohort and SRD, respectively. Relatively good convergent validity was identified in factor items from the three cohorts, and so the model was indicative of convergent and content validities. Additionally, construct reliability was appreciated which suggested internal validity for the scale; this was founded on the data obtained from the cohorts in isolation and in combination ([Hafiz & Shaari, 2013](#)). Lastly, scale reliabilities were confirmed for the various subcohorts of SRD and SWRD; these were deemed apposite, implying that the scale rankings allocated to each subcohort were reliable and could be trusted. The reliability values were within the range 0.6-0.7 and indicated internal consistency for the reading self-efficacy scale items for the three tested groups ([Drost, 2011](#)).

Thus, construct reliability, content and convergent validities were shown for this scale in relation to a group of SWRD and a cohort of SRD, and the two in combination. These statistics validated that, following confirmation of external validity, within Saudi Arabia, this scale could be applied to groups of upper elementary SWRD and SRD (Steckler & McLeroy, 2008).

### Conclusion, Limitations and Recommendations

The presented research has added to the assessment of the reliability and validity of a designed reading self-efficacy scale when utilized within three groups, i.e. SWRD, SLD and the cohorts in combination. During the evolution of this scale, a specimen data set was acquired from pupils in upper elementary public educational facilities who were in grades 4, 5, and 6 in Al-Kharj, Saudi Arabia. The sample comprised 469 SWRD and 100 SRD, i.e. 569 in total. As far as the authors are aware, this study designed and instigated a scale which is the initial authenticated quantification system for reading self-efficacy to be implemented in Saudi Arabia. It was designed on principles delineated by the social cognitive theory published by Bandura (1997); items were included within the scale following a detailed review of current equivalent assessment measures.

The way in which this scale was generated, translated, utilized and scored was described. EFA, CFA and Cronbach's alpha were performed in order to appraise the validity and reliability of the scale. EFA demonstrated that the factor loadings for each item attained the threshold value of  $\geq 0.3$ . There was variation across the item loadings with respect to the three cohorts but consistent performance factors were identified, i.e. reading attitude, difficulty in reading and reading ability. CFA was performed according to the results of the EFA for the three cohorts. The data for the group combination, SWRD and SRD were: RMSEA=0.05, GFI=0.94, CFI=0.92, AGFI=0.92, TLI=0.91; RMSEA=0.05, GFI=0.94, CFI=0.91, AGFI=0.94, TLI=0.89; and RMSEA=0.08, GFI=0.83, CFI=0.86, AGFI=0.76, TLI=0.83, respectively. Cronbach's alpha values for the three cohorts indicated a satisfactory internal consistency with respect to the three elements, i.e. reading attitude, difficulty in reading and reading ability, and also for the ultimate score obtained by the scale for each data set. The data demonstrated evidence of apposite psychometric indices relating to the scale's validity and reliability.

This validated scale will facilitate scientists in Saudi Arabia to perform studies, offering a way in which to quantify reading self-efficacy of both upper elementary SWRD and SRD, particularly within Al-Kharj City. In summary, this scale can be utilized in these cohorts either individually or in combination, offering acceptable construct reliability, content, and convergent validities.

The sample utilized in this validation research was of moderate size, encompassing 569 pupils. Nevertheless, this is an appropriately sized population, but the data could have been of higher quality if the sample size had been increased. In addition, additional studies are advised which encompass targeted data sets from different nations and countries. The presented scale could be enhanced if a number of items were modified and assessed with additional research. The adapted and reassessed scale would have enhanced validity and reliability. However, although these limitations were present, this is the initial scale of its type to be designed and validated within this context.

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### Declaration

There is no conflict of interest to declare.

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