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Designing and Validating a Brainling Model: A Case of High School and Language School Textbooks

Samira Sanatipour¹, Shaghayegh Shayesteh²,
Reza Pishghadam³, Nasim Boustani⁴

¹Ph.D. Candidate, Department of English, Faculty of Letters and Humanities, Ferdowsi University of Mashhad, Mashhad, Iran, Email: samira.sanati@yahoo.com

²Corresponding author, Assistant Professor, Department of English, Faculty of Letters and Humanities, Ferdowsi University of Mashhad, Mashhad, Iran, Email: shayesteh@um.ac.ir

³Professor, Department of English, Faculty of Letters and Humanities, Ferdowsi University of Mashhad, Mashhad, Iran, Email: pishghadam@um.ac.ir

⁴ Ph.D., Department of English, Faculty of Letters and Humanities, Ferdowsi University of Mashhad, Mashhad, Iran, Email: nboustani@mail.um.ac.ir

Abstract

Textbook evaluation is of paramount importance in ensuring that textbooks are of high quality and aligned with educational goals. This study evaluated two common English language textbooks in Iran (i.e., American English File [private schools] and Vision series [state schools]) based on the brainling (brain+ language) model, heeding EFL learners' cognition, senses, emotions, and culture. To this end, a brainling-based scale was validated based on "cogling", "emoling", "sensoling", and "cultuling" components of the brainling model and distributed among Iranian teachers ($N=218$) and EFL learners ($N=236$). It was found that there were significant differences in the brainling components present in English textbooks used in state and private schools. Moreover, the independent samples t-tests revealed that there were significant differences in mean scores for brainling components between the two types of textbooks for students. However, it is worth noting that such differences were not observed among teachers' ratings of these components. The results could assist content developers in incorporating brainling as a worthwhile scale for evaluating English language textbooks.

Keywords: textbook analysis, sense, emotion, cognition, culture

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1. Introduction

Textbooks are beacons of knowledge enlightening the path of learning. Textbooks constitute an invaluable educational resource, comprising an exhaustive collection of content that not only survives but also thrives (Hutchinson, 1994). They hold paramount significance as they serve as repositories of knowledge (Gulya & Fehérvári, 2023; Syairofi et al., 2022). Thus, textbooks can embody the ground of improvement in shaping the learners' perceptions (Hodkinson et al., 2018). As English has become the prevailing lingua franca of the global community, the weightiness of ensuring the potency of English language textbooks (ELT) has intensified significantly. In light of the global ubiquity of ELT, executing an analysis of their effectiveness can ensure English as a foreign language (EFL) learners' development in attaining the requirements of education. Hence, through a thorough appraisal of English textbooks, educators and policymakers can discern any deficiencies or inaccuracies in content that could impede EFL learners' potential mastery of the language (Tomlinson, 2012). In fact, textbook evaluation is a practical language-focused task that allows teachers, supervisors, administrators, and material developers to assess the impact of learning materials on their users (Tomlinson et al., 2001).

Textbook evaluation has engendered enduring scrutiny and has been subjected to macro and micro (Ellis, 1998) or external and internal evaluation (Shaw & McDonough, 2003). External evaluation is primarily concerned with a holistic perspective on the organizational structure of the content, while internal evaluation necessitates a meticulous examination of the content (e.g., language skills, tests, exercises, etc.) (Shaw & McDonough, 2003). As a result, poorly or incomprehensible designed textbooks may slow down communication. For instance, deficiency in authenticity (Andon & Wingate, 2013; Huang, 2019) or functionality (Crawford et al., 2002) makes textbooks not considered a preeminent pedagogical resource. To meet the points, the inclusion of real topics (Jacobs & Goatly, 2000) or accurate themes (Jordan, 1997) align with learners' needs (Aydin, 2013; Litz, 2005) and proficiency (Foroozandeh & Forouzani, 2015) could improve content. In this respect, to optimize the learning and teaching potentials, stimulating cognitive and emotional engagement in learners via stimulating their creativity and analytical thinking can lead to deeper learning (Tomlinson, 2012).

Indeed, a flawless textbook that caters to all requirements may be an elusive ideal, but policymakers should be aware of the information they transmit either overtly or covertly to learners. Preceding methodologies employed to appraise textbooks have often focused on conventional measures, encompassing content analysis, grammar exercises, and vocabulary selection with regard to some established predictive standards or evaluative criteria (Brown, 1995; Cunningsworth & Kuse, 1991; Hamer, 1996; Sheldon, 1988; Williams, 1983). While these criteria bear significance in textbook evaluation (e.g., physical and methodological characteristics) and point to the dynamism and subjectivity (Sheldon, 1988) of evaluations, they may fall short in capturing all facets. Moreover, although some investigators (e.g., Anderson & Petch-Hogan, 2001; Bloom et al., 1956; Crawford et

al., 2002; Pogorzelska, 2016; Tomlinson, 2012) acknowledge the importance of cognitive, affective, and cultural factors, they inadequately explicate the precise theoretical framework or comprehensive conceptual structure. This failure is noteworthy as it serves as a reminder that learners' traits are manifold and limiting them to particular attributes can lead to flawed measurements and implications. Hence, we posit that researchers should redirect their attention to learners' brain structure. If we examine the degree to which the intricate interplay among the brain structures can give rise to distinctive attributes, then we can suggest that the demands imposed upon learners by unreadable content may stem from the brain-based features (Khosravany Fard & Amirian, 2023).

In this respect, considering the Triune brain model, the logic is that the human brain is composed of three (i.e., the reptilian brain, limbic brain, and neocortex) interrelated structures regulating various functions (e.g., language, cognition, emotion, senses, memory, etc.) (MacLean, 1978). From this perspective, this study held a brain-based pattern named brainling (i.e., brain + language) (suggested by Pishghadam & Ebrahimi, 2020), which may prove advantageous in analyzing textbooks. It specifically encompasses emoling (emotion + language), sensoling (sense + language), cogling (cognition+language), and cultuling (culture+language) components representing the importance of emotions, senses, cognition, and culture corresponding to the language, respectively (Pishghadam & Ebrahimi, 2020). Based on the emoling component, the content of textbooks contains emotions that can be inherently positive or negative (i.e., automatic emotions) or dependent on cultural and interpersonal differences (i.e., deliberative emotions) (Pishghadam & Ebrahimi, 2020). Correspondingly, these are not independent of physical and linguistic senses (i.e., sensoling), underscoring the remarkable outcomes of sensory input enrichments and communication-related issues on language (Ghadirzade Toosy & Jajarmi, 2023; Pishghadam, 2018; Sadeghi Ordoubadi et al., 2023; Shirzadeh & Jajarmi, 2023). In this regard, culture and language can reciprocally foreground learners' comprehension (Pishghadam et al., 2013b), highlighting cultuling-based analysis of textbooks. Moreover, the way in which language shapes learners' thoughts and interpretations of the world is intricately linked to their word repertoires (i.e., cogling). Therefore, a cogling-centric analysis accentuates that textbooks can serve as powerful tools for enhancing thinking (Pishghadam & Ebrahimi, 2020).

Regarding Triune's tripartite model and Pishghadam and Ebrahimi's (2020) brainling model, we are going to check if the brainling scale enjoys psychometric properties, if brainling components are considered in the EFL textbooks used in Iranian state schools and private institutes and finally, analyzing if there are any significant differences between different brainling components across English textbooks used in Iranian state schools and private institutes. Considering the importance of these points, we conducted the brainling model to scrutinize the implicit and explicit message content by identifying the cogling, emoling, sensoling, and cultuling components that are interconnected with one another and content. The underlying rationale for choosing the brainling model is incorporating neurological and cognitive sciences into the field of

English language textbook evaluation, thereby endeavoring to provide a comprehensive content analysis approach. For this content analysis, EFL students' and teachers' ideas of the recurring patterns in EFL textbooks served as the foundation for interpretations to uncover subtle content embedded in English high school (i.e., Vision) and institution (i.e., American English File series) textbooks. The reason behind selecting these books is that they have become an established constituent of Iran's educational curricula, providing knowledge on education disciplines so examination of their potential in preserving the linguistic as well as the prevailing components could be informative and efficacious. By engaging students in the process, it becomes possible to ensure that their needs and perspectives are taken into account while involving teachers allows for an evaluation of their capacity to convey content and stimulate students' interests in textual objectives. Consistent with the literature and measures reviewed and mentioned above, the objective of this study was to determine the design and validation process of a new scale, brainling model. This scale evaluates the school and language school textbooks to see how much they consider four factors of emoling, cultuling, sensoling, and cogling in their design consequently causing a better understanding of the students in materials that have been taught.

2. Review of Related Literature

The educational value of textbooks is of utmost importance. Textbooks play an important role in today's school world since most teachers use them as the most important tool in teaching (Luukka, 2008). They serve as a means to deliver curriculum materials and are considered central components of the education system (Altbach et al., 1991; Malmir & Bagheri, 2019; Patrick & Smart, 1988). Therefore, it is crucial to carefully design the content and structure of textbooks to encourage a defined educational program. Language textbooks are windows to the world (Risager, 2021).

Textbook analysis has a long history dating back to 900 AD, when Talmudists began counting words and opinions in some texts (Mikk, 2000). The process of textbook analysis involves examining various features and evaluating how they may impact the effectiveness of textbooks. Although the studies in textbook evaluation in the aspect of curriculum 2013 have been conducted by numerous researchers from different ways and points of view, there is a need to conduct further investigation since there is a revision of the curriculum. Curriculum 2013 is the current curriculum in Indonesia. As a means of improving the recent curriculum, the Ministry of Education and Culture made changes to several aspects of the curriculum in 2013. It is then called Curriculum 2013 revised edition (Kurikulum, 2013 yang disempurnakan).

To evaluate a textbook in the post-use stage, evaluators and psychologists suggest different approaches. Schriver (1989, as cited in Hartly & Branthwate, 2000) divides different approaches to evaluating textbooks into three broad parts: expert-focused evaluation, reader-focused evaluation, and text-focused evaluation. Expert-focused evaluation techniques are used by experts to evaluate

the efficacy portion of the text. In this field, the experts not only have a high level of information but also, are skillful enough to write educational texts. In this sense, the experts are asked to use some prepared checklists for evaluation. In contrast, the reader-focused evaluation approach wants audiences and main users to evaluate textbooks. To do so, the readers are given a questionnaire and asked to present their impressions about the textbook. In this sense, textbooks will be evaluated based on readers' minds. Against the last approach, text-focused evaluation can be performed without resorting to specialists' and readers' minds. This approach includes a computer-based readability formula.

Regarding evaluation schemes, there is fundamentally a need for criteria and instruments. Superior scholars in the field of ELT textbook design and analysis, such as Williams (1983), Sheldon (1988), Brown (1995), and Hamer (1996) all agree, for instance, that evaluation checklists should have some criteria pertaining to the physical characteristics of textbooks such as layout, organizational, and logistical characteristics. Other vital criteria that should be included are those that evaluate a textbook's methodology, aims, and approaches and the degree to which a set of materials is not only teachable but also fits the needs of the individual teacher's approach as well as the overall organization curriculum. Furthermore, criteria should analyze the specific language, functions, grammar, and skills content that are covered by a particular textbook, as well as the relevance of linguistic items to the prevailing socio-cultural environment. Indeed, finding a "perfect" textbook is almost impossible. We are not looking for a "perfect" textbook which meets all our requirements. But rather the best possible fit for what the teachers and the students need. For that reason, textbook evaluation is necessary to be conducted. Tok (2010) describes that course book analyses and evaluations help teachers improve them and attain useful insights into the basis of material.

Despite the critical importance of the topic, very few researchers have directly addressed issues related to methods for conducting textbook analysis. As Nicholls (2003) points out, the methods employed in textbook research have been rarely discussed clearly and in-depth, and "too little work has been conducted on generic methods for textbook research and it remains as a gap hole in the field" (p. 63-84). Ultimately, studies have mainly focused on information regarding the appearance and differences of the textbooks in question. However, they cannot offer direct evidence-based answers regarding the desirability or superiority of specific treatments or arrangements, nor can they tell us how to bring about improvements. Addressing these aspects essentially necessitates research that is specifically designed to answer causal questions. A notable gap in studies within the field of textbook research is the limited display of sophisticated scientific methods. This poses a significant challenge to the progress and advancement of textbook research.

Overall, the role of textbooks in accounting education has received little or no research attention, and textbook author teams (and the resulting textbooks) have been significantly overlooked as an important dimension of the educational reform process. To address the gap, this study considered and validated the brainling model for analyzing textbooks used in both state

schools and private language schools. The analysis was based on four components: emotional intelligence (emoling), cultural understanding (cultuling), sensory perception (sensoling), and cognitive development (cogling). Given the significance of the reciprocal relationship between language, culture, thinking, emotions, and senses in establishing and maintaining effective communications, the paper employed the brainling model, as an effective approach in preparing and developing materials for teaching and learning. Developed by Pishghadam and Ebrahimi (2020), brainling is a combination of brain and language and has been inspired by MacLean's (1978) theory of the triune brain. Indeed, it is based on the relationship between language and four components of culture (cultuling), emotion (emoling), sense (sensoling), and thinking (cogling). The factors of cultuling, cogling, sensoling, emoling, which are integral to the brainling framework, are further explained in the following paragraphs.

Cultuling places great emphasis on the cultural content included in the language, as it is crucial for learners to master the target language, acquire cross-cultural communication skills, and develop an understanding of related cultural knowledge and values. Due to the inseparable relationship between language and culture, language input inherently contains a wide range of local and international cultural knowledge pertaining to both the target language communities and the learners' cultures.

Cogling sheds light on cognitive learning as an active style of learning that focuses on helping individuals maximize their brains' potentials. It makes it easier for them to connect new information with existing ideas, hence deepening their memory and retention capacity. Research into the relationship between language and cognition is useful in understanding the functioning of the cognitive mechanisms underlying any language learning activities, particularly in educational settings. The cognitive theory of multimedia learning proposed by Clark and Mayer (2008) suggests that meaningful learning can occur when a learner is presented with words and pictures as they can start to build a mental representation. In this way, the learner gets engaged in active learning through multimedia like pictures, maps, charts, figures, graphs, or dynamic media such as videos and simulations.

Sensoling, as the third component, highlights that sensation and perception are remarkable topics, yet a major gap often separates the richness of our perceptual experiences and the pallid academic discussion of these experiences found in most textbooks. The purpose of this study is to analyze integrated English course books with the theme of all their senses, like hearing, seeing, tasting, touching, and smelling, and whether these textbooks are already using an integrated learning type connected and integrated 21st-century learning.

Finally, the emotion lexicon in terms of the function consists of emotion words (i.e., conceptualization perspective) and emotion-laden words (i.e., expression perspective; Bednarek, 2008; Foolen, 2012; Pavlenko, 2008). Emotion words are those content words or fixed expressions in a language that allow speakers to refer to and describe human feelings, whether basic or more complex. This study aimed to analyze the affective lexical content of American English File and

Vision series textbooks to determine whether they provide EFL students at that stage with emotional vocabulary input.

3. Methodology

3.1. Participants

The study encompassed the participation of both teachers and students, who are deemed pivotal contributors to the educational process. The investigation involved the engagement of 218 Iranian EFL instructors, comprising 86 males and 132 females, who held undergraduate or graduate degrees. It also incorporated a total of 236 Iranian students (90 males and 146 females), who were enrolled in state and private schools and received instruction in English as a foreign language. To assess their perceptions of the textbooks used in class, data were obtained from students across three grade levels: tenth ($N=35$), eleventh ($N=15$), and twelfth ($N=186$).

Students of both schools and institutes, and also experienced teachers were chosen based on a convenient sampling model and answered the questionnaire questions based on their understanding of the textbook content and whether factors like cognition, sensation, emotion, and culture were considered in designing them. The participants were asked to choose among “highly disagree, disagree, neither agree, nor disagree, agree, highly agree” items in the area of practical considerations, layout and design, activities, skills, language type, subject and content, and conclusions. These questions were written in Farsi and distributed online during class time, preceded by a brief explanation of the purpose and nature of the study and if they had difficulty in interpretation of any item, the researchers helped them to understand the item.

The research undertaken was quantitative and centered on the development of the brainling scale. The number of items for each of the brainling scale’s subcomponents was specified in advance, and after initial item writing, reduction led to a compilation of 50 items. The criteria for gathering these items were the subcomponents of the brainling model, consisting of cultuling, (5 items), cogling (8 items), emoling (5 items), and sensoling (5 items). Eventually, a total of 23 items remained for inclusion in the final version. Three professional field-specific experts in ELT took on the responsibility of submitting feedback regarding the clarity of items and proposing modifications if required. The brainling scale items aimed to acquire data pertaining to the common English book series in Iran, namely Vision (high school) and America English File (2, 3, & 4), as taught to EFL learners in state and private schools, respectively. Then, the brainling scale was sent in the format of a Google form to both teachers and learners.

Moreover, to establish the construct validity of the brainling scale for teachers and students, confirmatory factor analysis was employed. A dual-sided validation (i.e., validation for teachers and students) of the brainling scale was undergone, as we intended to use it for both teachers and students. The items were developed and verified to be applicable to both groups. The outcomes are provided in the results section.

3.2. Materials

3.3. Procedure

IBM SPSS Statistics software (version 25) was run to conduct the data analysis. Reliability estimates were calculated for the two versions of the brainling scale, the brainling scale for teachers and the brainling scale for students, along with their respective sub-constructs. The normality test for the brainling scale (for teachers) and the brainling scale (for students) was verified. The Skewness and Kurtosis estimates were within the range of -2 and +2, indicating the normality of the distribution. Internal consistency was assessed using Cronbach's alpha coefficient, with estimates of 0.95 for the brainling scale for teachers and 0.96 for the brainling scale for students, indicating high levels of internal consistency. Furthermore, reliability estimates for the sub-constructs were also above the acceptable threshold of 0.8, with values ranging from 0.81 to 0.92. These results provide evidence for the reliability of the brainling scale and its sub-constructs, supporting their use as valid measures.

Moreover, to establish the construct validity of the brainling scale for teachers and students, confirmatory factor analysis was employed. A dual-sided validation (i.e., validation for teachers and students) of the brainling scale was undertaken for both teachers and students. The items were developed and verified to be applicable to both groups. The outcomes are provided in the result section. The validation analysis is followed by two single-factor repeated-measures ANOVA tests for the teachers and students across the American and Vision series, used in private and state schools, respectively. Furthermore, to investigate potential differences in brainling components between the English textbooks, a series of independent sample t-tests were conducted for each group of the participants.

To address the first research question pertaining to the psychometric properties of the brainling scale, Harman's single-factor test was carried out. Goodness-of-fit indices were conducted to detect any significant differences in the Brainling components across English textbooks used in Iran's schools and institutes. To evaluate the brainling model components (i.e., emoling, cultuling, sensoling, and cogling) used in Iranian state schools and private institutes -the second research question- a single-factor repeated-measures ANOVA was conducted separately, both for teachers and students. Moreover, to examine the extent to which these components are incorporated in the textbooks-the third research question- a series of independent sample t-tests were run for both teachers and students. This statistical analysis aimed to evaluate any possible differences in brainling components between Vision and America English File textbooks.

4. Results

Based on the primary objective of the study, which aimed to examine the psychometric properties of the brainling scale, Harman's single-factor test was conducted. The results revealed

that the first factor accounted for only 45.15% and 49.05% of the variance for the teachers and students, respectively, confirming the construct's multidimensionality. The second objective of this study was to determine whether there were any significant differences in brainling components across English textbooks used in Iran's schools and institutes. The scales include four sub-constructs of cultuling (5 items), cogling (8 items), emoling (5 items), and sensoling (5 items). Standardized factor loadings can be seen for teachers (Figure 1) and students (Figure 2). No items were removed from the scales to improve model fit. Goodness-of-fit indices are reported in Table 1.

Figure 1

Measurement Model for the Brainling Scale (For Teachers)

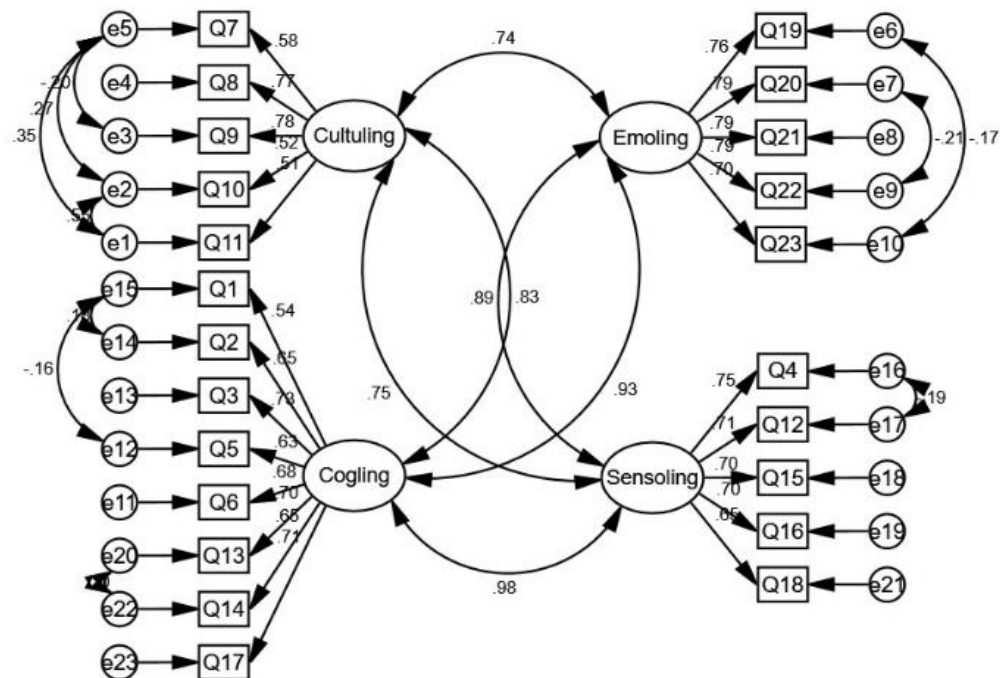
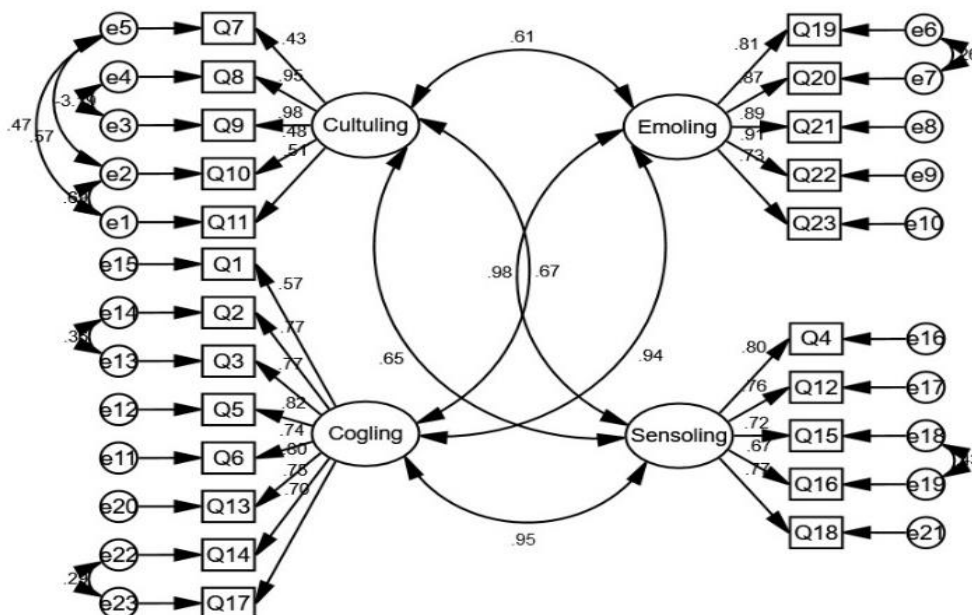


Figure 2

Measurement Model for the Brainling Scale (For Students)



To determine whether the models fit the data, goodness of fit indices were calculated using Amos. Table 1 displays the relative chi-square (i.e., chi-square index divided by the degrees of freedom [χ^2/df]), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Squared Error (SRMR). The criterion for what constitutes an acceptable fit varies among researchers. For this study, the values for χ^2/df should be less than 3 (Ullman, 2001), while the values for TLI and CFI should be above .90. Moreover, the values for RMSEA and SRMR were equal to or less than .08 (Browne & Cudeck, 1993).

Table 1

Goodness of Fit Indices for the Models

Models	χ^2/df	Df	CFI	TLI	RMSEA	SRMR
The Brainling Scale (For Teachers)	1.98	214	.92	.91	.07	.05
The Brainling Scale (For Students)	2.27	216	.94	.92	.07	.05

We conducted subsequent analyses to test the second hypothesis and identify any significant variations in the brainling components between the Vision and American English File series used in Iranian state and private schools, respectively.

4.1. Mean Differences for State Schools

To examine potential differences between different brainling components across English textbooks used in state schools, a single-factor repeated-measures ANOVA was conducted for the teachers and students.

The Brainling Scale for Teachers. The F test [$F(3, 255)=5.10, p=.003, \eta^2=0.06$] of the brainling scale for teachers revealed that significant differences existed between the brainling components across the English textbooks used in state schools. Bonferroni's pairwise comparison test showed a significant difference between emoling and cogling ($MD=-0.26, p<.05$), emoling and cultuling ($MD=-0.21, p<.05$), and emoling and sensoling ($MD=-0.19, p<.05$) (Emoling [$M=3.17$] $<$ Sensoling [$M=3.36$]/Cultuling [$M=3.39$]/Cogling [$M=3.43$]).

The Brainling Scale for Students. The F test [$F(3, 450)=50.28, p=.00, \eta^2=0.25$] revealed that there are significant differences between the brainling components across English textbooks used in state schools. Bonferroni's pairwise comparison test showed a significant difference between emoling and sensoling ($MD=-0.26, p<.05$), emoling and cogling ($MD=-0.31, p<.05$), and emoling and cultuling ($MD=-0.7, p<.05$). Moreover, there were significant mean differences between cultuling and sensoling ($MD=0.43, p<.05$), and cultuling and cogling ($MD=0.39, p<.05$) (Emoling [$M=2.87$] $<$ Sensoling [$M=3.14$]/Cogling [$M=3.18$] $<$ Cultuling [$M=3.57$])

4.2. Mean Differences for Private Schools

To investigate potential differences in brainling components across English textbooks utilized in private schools, a single-factor repeated-measures ANOVA was employed.

The Brainling Scale for Teachers. The analysis revealed significant differences between the brainling components, as indicated by the F-test [$F(3, 393)=24.6, p=.00, \eta^2=0.15$]. To identify the differences between the four sub-constructs, Bonferroni's pairwise comparison test was performed. The test showed a significant difference between cultuling and cogling ($MD=-0.35, p<.05$), cultuling and emoling ($MD=-0.36, p<.05$), and cultuling and sensoling ($MD=-0.4, p<.05$) (Cultuling [$M=3.29$] $<$ Cogling [$M=3.64$]/Emoling [$M=3.65$]/Sensoling [$M=3.69$]).

The Brainling Scale for Students. Based on the F test [$F(3, 252)=13.30, p=.00, \eta^2=0.14$], there are significant differences between the brainling components across English textbooks used in private schools. Bonferroni's pairwise comparison test indicated the mean difference between cultuling and cogling ($MD=-0.36, p<.05$), cultuling and sensoling ($MD=-0.39, p<.05$), and cultuling and emoling [$MD=-0.41, p<.05$](Cultuling [$M=3.41$] $<$ Cogling [$M=3.78$]/Sensoling [$M=3.8$]/Emoling [$M=3.82$]).(i.e.,Cultuling< Cogling/Sensoling/Emoling)

4.3. Mean Differences for State and Private Schools

To investigate the third hypothesis and potential differences in brainling components between English textbooks used in state and private schools, a series of independent samples t-tests were run for both teachers and students.

The Brainling Scale for Teachers: The results of independent samples t-tests presented that there were no significant differences in mean scores for brainling components between English textbooks used in state and private schools for teachers (Table 2).

Table 2

Independent Samples T-Test for the Brainling Components across English Textbooks Used in State and Private Schools (For Teachers)

	Gender	N	Mean	SD	Df	T	Sig. (2-tailed)
Brainling	State	86	13.35	2.10	216	-2.24	.66
	Private	132	14.28	2.96			
Cogling	State	86	3.43	.75	216	-2.07	.61
	Private	132	3.64	.73			
Cultuling	State	86	3.39	.81	216	.79	.50
	Private	132	3.29	.88			
Emoling	State	86	3.17	.94	216	-3.84	.96
	Private	132	3.65	.88			
Sensoling	State	86	3.36	.89	216	-2.75	.71
	Private	132	3.69	.82			

The Brainling Scale for Students: There are significant differences in the brainling ($t[234] = -4.61, p=0.006$) and its components (including cogling ($t[234] = -5.26, p=0.02$), emoling ($t[234] = -6.81, p=0.001$), and sensoling ($t[234] = -5.22, p=0.003$)) between English textbooks used in state and private schools. Specifically, the usage of cogling and sensoling is more prevalent in English textbooks used in private schools, whereas emoling is utilized to a greater extent in English textbooks in state schools (Table 3).

Table 3

Independent Samples T-Test for the Brainling Components across English Textbooks Used in State and Private Schools (For Students)

	Gender	N	Mean	SD	Df	T	Sig. (2-tailed)
Brainling	State	151	12.76	3.55	234	-4.61	.006
	Private	85	14.81	2.71			
Cogling	State	151	3.18	.90	234	-5.26	.020
	Private	85	3.77	.69			
Cultuling	State	151	3.57	.91	234	1.28	.42
	Private	85	3.41	.85			
Emoling	State	151	2.87	1.11	234	-6.81	.001
	Private	85	3.82	.86			
Sensoling	State	151	3.14	1.01	234	-5.22	.003
	Private	85	3.80	.79			

5. Discussion and Conclusions

The present study showed that the brainling model enjoys psychometric properties and it can be a reliable and valid measure of evaluating Vision and American English File series concerning the cogling, emoling, cultuling, and sensoling components. Based on the study's findings from the brainling scale, which was distributed among teachers and students, significant differences are evident across the four brainling components in the English textbooks used in state and private schools. Unfortunately, few studies have been done to examine the existence of emotion (emotion and language), sense (sense and language), cognition (cognition and language), and culture (culture and language) in academic course books, and also these factors weren't identified clearly and based on standard criteria. Over time, the scope of textbook analyses has been expanded to address how these materials help students become better at English. One more point is that the cognition item wasn't investigated in any books perfectly, but in this method, it was analyzed accurately, too.

In analyzing the second hypothesis, which asserts that there are no significant differences between the various brainling components across English textbooks used in Iranian schools, we found that emoling had the most level of significance in the state school textbook. Pishghadam et al. (2013b) held the view that emotion is one of the main factors in language teaching and learning. In this regard, Pishghadam and Tabataba'ian (2011) claimed that English language classrooms could be a place for improving human abilities along with teaching and learning English. Keeping this in mind, Pishghadam et al. (2013a), who were inspired by Greenspan's (1992) Developmental Individual Relationship-Based model, came up with a novel approach to second language acquisition named Emotion-Based Language Instruction, which is based on the fact that having stronger emotions toward second/foreign language vocabularies leads to a better understanding of them and facilitates learning. These facts highlight the significant role of emotion that students get from the contents of their books. Consequently, material developers should pay considerable attention to the actual emotional needs of learners and offer solutions and suggestions for better development of textbooks.

To address the research hypothesis that there are no significant differences between different brainling components across English textbooks used in Iranian schools and Institutes, some findings have been reported in the following paragraph. According to the results from teachers and students who used the American file book at a private institute, cultuling had the least impact among the brainling components. This suggests that the content and practices of the book series were not aligned with Iranian culture. However, it is worth noting that cultuling was emphasized more in the Vision textbook series. One explanation for this can be that the Vision is a book written primarily for Iranian students and is focused on national issues, while the American File textbooks are designed to have a more global perspective with the aim of promoting the English language and culture worldwide. What is more, cultuling refers to the culture obtained from the study of language, which is known as cultugraphy of language, under the notion that "language can represent

the culture of a society” (Pishghadam et al., 2013b). Based on the cultuling analysis, many lexicons and language expressions are constructed as a result of social activities and interactions that embody human characters and cultures, transmitted from one generation to the next (Pishghadam & Ebrahimi, 2020). In practice, like discourse analysis and unlike traditional types of analyses, linguistic structures, and expressions are not merely construed in terms of their lexical and syntactic roles in the text, but rather beyond the text, that is, cultural, situational, social, political contexts, etc. can play significant roles. When compiling textbooks for state schools, it is crucial to incorporate cultural elements into state school EFL textbooks to aid in better understanding and learning. On the other hand, global textbooks ought to encompass diverse cultures and portray them as they are utilized by EFL learners. In other words, it is suggested to include a variety of cultures and present them in the way they are commonly used by EFL learners worldwide. Additionally, many distinguished researchers (Risager, 2021) have focused on the language-culture relationship. Thus, people’s mindsets and behaviors hinge on their language and they construct their world based on their language. Consequently, language and culture are indubitably inseparable whereby culture influences people’s ideas and beliefs through language, and language, in turn, determines people’s thoughts. Some background from the research into the link between cognition and learning is useful to situate Bloom’s taxonomy within language learning and the development of materials for this. Language practitioners were quick to spot this link to language learning: “meaningful material is learned faster and remembered better than information that is less meaningful” (Ghosn, 2013, P.64)

According to the third hypothesis analysis which says that there are no significant differences between different brainling components across English textbooks used in Iranian institutes, although teachers reported no noteworthy discrepancies in the brainling components of English textbooks used in state and private schools, students expressed significantly different opinions. As per the students, the American book series emphasizes cogling and sensoling, whereas the Vision series prioritize emoling. In effect, cogling refers to the relationship between cognition and language, claiming that the selection of words and different language arrangements produce diverse thoughts. Basically, by comparing Vision and the American series, it is clear that learning through cognition is seen more in American textbooks than in Vision ones. There are a lot of reading parts that are followed by different kinds of questions which force and help students to be deeply involved in the process of learning the content. Due to this important item in learning objectives, when a student has a better understanding of a special word in the world outside of textbooks, we can say that they have achieved cognition, and this cognition improves their learning considerably. American English File series includes long and authentic reading texts that involve learners in analyzing and better understanding new words.

Examples of cognition include paying attention to something in the environment, learning something new, making decisions, processing language, sensing and perceiving environmental stimuli, solving problems, and using memory. And also, cognitive analysis means to teach students

not just the content but how to think about the content. American books provide a balance of activities. There is an even distribution of free versus controlled exercises and tasks that focus on both fluent and accurate production. The activities encourage sufficient communicative meaningful practice, incorporate individual, pair, and group work, promote creative and independent responses, and can be modified or supplemented easily. Moreover, the study revealed that grammar points and vocabulary items are introduced in motivating and realistic contexts, and the tasks are conducive to the internalization of the newly introduced language. It is important to measure how English textbooks have helped students improve their ability to succeed in their English studies.

Senses may evoke different levels of emotions, which can alter students' perceptions of the world. (The main purpose of sensory language is to use the senses to help create a vivid image of a setting, scene, or emotion in the text. Based on the findings, it can be inferred that the Vision series employs sensory language to provoke emotional responses and facilitate a stronger sense of connection to content for EFL learners.

Assuming these points, book developers need not focus merely on designing a simple book, meaning that adequate attention should also be given to the process of designing textbooks that consider all these brainling components, which may bring about a great result in the learning process. Emotional influences should be carefully considered to maximize learner engagement as well as improve learning and long-term retention of the material (Shen et al., 2009). Numerous studies have reported that human cognitive processes are affected by emotions, including attention (Vuilleumier, 2005), learning and memory (Um et al., 2012), reasoning (Jung et al., 2014), and problem-solving (Issen et al., 1987).

Readers need to see the effect of the character's emotions through their body language, facial expressions, and actions, rather than simply being told that a character is scared. For example, illustrate the way their body tenses up with fear. In the Vision book series, there are many reading passages in which the emotions of the reader are evoked while reading the text. As the book writers let go of the emotional and mental chatter found in the real world, students enjoy deep reading that allows them to feel what the characters in a story feel. This in turn makes them more empathetic to people in real life, becoming more aware and alert to the lives of others.

Unlike other textbook analyses, analyzing based on the brainling model helps material developers to compile books that can meet the needs of students from different perspectives such as emotions, senses, cognition, and culture. By considering all these components of the brainling model, the learning process will get easier and faster and students can make the most of their course book contents.

According to the results, it can be concluded that tasks in American English File mainly focus on meaning, so these books try to enhance comprehension by the use of tasks that draw students' attention more to the meaning of the language than its form. Moreover, more mental operations may be used while the learners participate in language learning tasks. These books provide learners with activities that give them the opportunity to infer the meaning of the text that accompanies

applying language rules, recalling previous learning, and prior linguistic knowledge, which can be related and applied in new tasks and activities. Consequently, these book series pay less attention to repetition and more to brain functioning that involves students' cognition. Furthermore, the American English File provides the content to help students develop cultural fluency by creating an awareness of the varied rules across cultures for issues like politeness, greetings, introductions, etc. In the Vision series, special attention was given to the importance of students' emotions in the class, moreover, these books provide a suitable layout and acceptable physical appearance. What is more, as the Vision series has been designed based on Iranian culture, this creates a positive association with the product. That could be by evoking a positive emotion, like joy or power, or it could be by first evoking a negative emotion, like fear or disgust, then promising that the product will alleviate that emotion.

In summary, considering the significant impact of affective factors like emotion, cognition, culture, and sensation on language learning and based on the findings of the present study, it can be concluded that it is essential to help authors write kinds of books that take into account all these items to evaluate EFL textbooks. As Hutchinson (1987) points out, materials evaluation not only serves the immediate practical aim of selecting teaching materials but also plays a critical role in developing instructor's awareness in several ways, which assist instructors with the analysis of their presuppositions about the nature of language, cognition, and learning, forcing instructors to set their prerequisites and helping them to see materials as an essential part of the whole teaching/learning situation.

Consequently, this body of research can be distinguished from prior literature in terms of its focus on designing and validating the brainling model, which has a standard framework based on brain functions. Future research could continue to further evaluation and improvement of the devised scale. Researchers could continue to carry out a thorough assessment of the psychometric properties of this instrument. Moreover, new items could be added to make the scale more comprehensive. In the future, it would be valuable to replicate this study for a broader range of books published both in Iran and internationally. This can be achieved by increasing the number of participants as well as the number of variables taken into account.

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