

The Role of Emotioncy in Cognitive Load and Sentence Comprehension of Language Learners

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Abstract

Emotion and cognition are both considered influential factors in language learning. In this study, the role of "emotioncy" (which is a combination of emotion and frequency) in the cognitive load and sentence comprehension of a group of language learners was examined. Emotioncy includes emotions that are evoked by the senses. To this aim, 200 English as a foreign language (EFL) learners were asked to fill out the NASA Task Load Test, a sentence comprehension test, and an emotioncy scale. Confirmatory factor analysis (CFA) was run to measure the construct validity of the emotioncy scale. Subsequently, Pearson product-moment correlation coefficient and structural equation modeling (SEM) were used to analyze the data. The results showed that emotioncy has a significantly negative and positive relationship with cognitive load and sentence comprehension, respectively ($p < .05$). Moreover, emotioncy is a significant predictor of both variables ($p < .05$). In the end, the findings were discussed, and the implications were given in the context of language education.

Keywords: Emotion, Cognition, Emotioncy, Cognitive load, Sentence comprehension

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INTRODUCTION

Various elements in education have been taken into account, including different characteristics of students and teachers to reach a better and more effective system of teaching and learning. Two factors said to be interwoven are cognition and emotion which affect perception and interpretation in the learning process (Bowditch, Buono, & Stewart, 2008). For a long time, there has been a dispute over cognition and emotion as being dependent or independent from each other, and whether emotion comes first or second in this order (Leventhal & Scherer, 1987). It is believed by many scholars (e.g., Efklides & Volet, 2005; Linnenbrink, 2006; Schutz & Pekrun, 2007) that both concepts are complementary, and should be taken into account in academic environments.

As for cognition, effective learning methods and tasks that are based on brain research help teachers to provide students with a *brain-compatible* classroom that helps them acquire a foreign language easier (Kennedy, 2006). On the other hand, emotion is of importance in learning as it has been proven by brain research that the “human brain is an emotional brain” (Hanson, 2008, p. 8). Moreover, as put by Schutz and Lanehart (2002), emotion should be taken into account in academic environments since classrooms are emotional settings, and learners' emotional experiences can affect their learning process. Language learners' emotions may be generated by various factors, including the classroom environment and the material presented (see Martinez Agudo, 2018).

Based on the above, one of the factors related to cognition in learning is cognitive load. Cognitive load is the entire amount of mental work imposed on working memory which leads to imperfect understanding and learning obstruction (Malamad, 2011). The reduction of cognitive load helps boost comprehension (Deleeuw & Mayer, 2008). In line with this, sentence comprehension, as a component of reading comprehension, is an important factor in learning a new language (McNamara, 2009). In fact, the reading skill is a cognitive ability (Liu, 2010) and consists of different

factors relating to the reader and the text, including prior knowledge (Shahian, Pishghadam, & Khajavy, 2017). Moreover, as stated by Mikulecky (2009), the reading skill is "the basis of instruction in all aspects of language learning" (p. 1); however, many learners have trouble with reading comprehension which might have different sources such as affective ones (Davoudi & Yousefi, 2015). As Krashen (1985) pointed out, a filter decreasing comprehension rises when the learner feels a high degree of negative emotion and comprehension increases as the learner feels positive emotions.

The concept related to emotion used in this study is "emotioncy". Inspired by Greenspan's (1992) functional emotional approach (i.e., the Developmental, Individual-Difference, Relationship-Based model (DIR) in the first language), the term was introduced by Pishghadam, Adamson, and Shayesteh (2013). What is meant by emotioncy is the emotions aroused by the senses. Each person has a certain degree of emotioncy towards a language component based on whether they have heard, seen, touched, experienced, or done research on that entity. As one of the factors affecting reading comprehension is the emotion the readers have for the text, as well as how the reading material reflects their interest (Johnson & Giorgis, 2002), emotioncy and sentence comprehension seem to be related to each other. There exist two studies so far (i.e., Borsipour, Pishghadam, & Naji Meidani, 2019; Shahian, 2016) which have examined emotioncy concerning sentence comprehension. It is noteworthy to mention that these studies have been restricted to examining emotioncy and its relationship with willingness to read and reading topics; however, this study investigates emotioncy and its relationship to sentence comprehension as to accurately test the reading skill of the students. In addition, no study has examined the relationship between emotioncy and cognitive load to date.

LITERATURE REVIEW

Emotioncy

Emotion, neglected in language instruction and studies earlier, was taken

into account by Greenspan (1992) as the basis of a child's functional development, and this inspired Pishghadam, Tabatabaeyan, and Navari (2013) to scrutinize this concept, and coin a new word called "emotioncy", a combination of the words 'emotion' and 'frequency'. Based on emotioncy, each person can have different feelings towards words/concepts (Pishghadam, Adamson, et al., 2013). These feelings can have varying degrees based on the individual's experience of the entity and frequency of exposure to it.

According to Pishghadam (2015), these different degrees show the ranges of emotioncy: *avolvement* which demonstrates lack of emotion, *exvolvement*, which contains external emotions, and *involvement* which represents the level of being emotionally engaged from inside. These emotioncy levels include different emotioncy types. Avolvement refers to null emotioncy (0), exvolvement refers to auditory (1), visual (2) and kinesthetic (3) emotioncies, and involvement refers to the inner (4) and arch (5) ones (see Table 1).

Table 1: Emotioncy types

| Type | Experience |
|-----------------------|---|
| Null emotioncy | When an individual has not heard about, seen, or experienced an object or a concept |
| Auditory emotioncy | When an individual has merely heard about a word/concept |
| Visual emotioncy | When an individual has both heard about and seen the item |
| Kinesthetic emotioncy | When an individual has touched, worked, or played with the real object |
| Inner emotioncy | When an individual has directly experienced the word/concept |
| Arch emotioncy | When an individual has done research to get additional information |

Note. Adapted from "Conceptualizing *Sensory Relativism* in Light of Emotioncy: A Movement beyond Linguistic Relativism," by R. Pishghadam, H. Jajarmi, and S. Shayesteh, 2016, *International Journal of Society, Culture & Language*, 4(2), p. 14.

As noted by Pishghadam, Adamson, et al. (2013) a key point to remember is that people do not have the same emotion toward each word; therefore, they suggested the reinforcement of "emotionalization" in the second/foreign language teaching context. This concept was inspired by Greenspan (2001), who mentioned the significance of the effect, as giving meaning to language entities. As put by Pishghadam, Adamson, et al. (2013), emotionalization is the development of emotions towards the vocabulary of the second or foreign language, and the emotional link existing between the first and the second/foreign language. As a result, the more the learner has feelings towards a language entity, the more he or she learns. In fact, a text can be better understood when there exists an emotional connection between the reader and the text (Pishghadam, Tabatabaeyan, et al., 2013). Consequently, helping students to proceed steadily and move from the avolvement to the involvement phase (Figure 1.) is considered an important step in second/foreign language teaching (Pishghadam, Jajarmi, et al., 2016). In other words, language teachers should engage students and their already-possessed world that is the pragmatic dimension of a language and teach them the missing word which is the semantic dimension of a language. This may lead to learning vocabulary items more conveniently as they are built on learners' already-possessed emotions. The motion of emotions between the first language and the second language is called "inter-emotionality" (Pishghadam, Adamson, et al., 2013, p. 12), which can facilitate or impede acquiring a new language. When this flow moves in the aforementioned direction (first language to the second language), it advances learning; nevertheless, the opposite direction hinders this process because the learner should create both the word and the world. (Pishghadam, Adamson, et al., 2013).

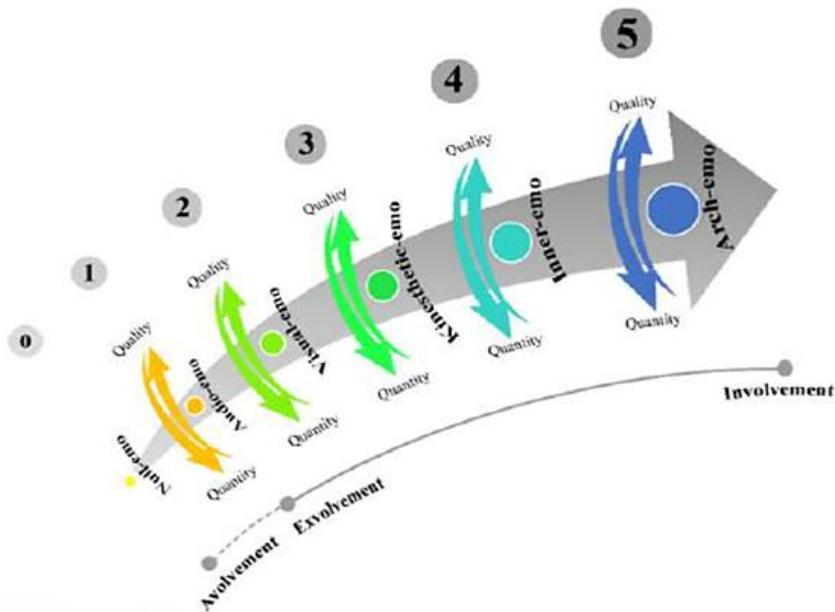


Figure 1: Emotioncy levels. Adapted from “*Emotioncy in Language Education: From Exvolvement to Involvement*,” by R. Pishghadam, 2015, October, Paper presented at the 2nd Conference of Interdisciplinary Approaches to Language Teaching, Literature, and Translation Studies. Iran, Mashhad).

As can be seen, the concept of emotioncy has opened the door to scrutinizing the language teaching and learning process from a different viewpoint. Since its emergence, many studies have been conducted on its relationship with other variables, such as willingness to communicate (Maktabadi, Pishghadam, Naji Meidani, & Khajavy, 2019), readability (Pishghadam & Abbasnejad, 2016), linguistic bias (Pishghadam & Abbasnejad, 2017), test bias (Pishghadam Baghaei, & Seyednozadi (2016), etc. In order to investigate further ways to improve learning and reduce extra mental activity, the concept of emotioncy is examined in relation to cognitive load theory and sentence comprehension in this study.

Cognitive Load

Almost every day, we encounter a situation where we have to keep something in mind or remember a piece of information, for instance, an address or a telephone number. We need to keep specific information in mind, process it, and if necessary, manipulate it at the time. All these processes should happen in memory, more specifically in working memory. Working memory is not easily distinguishable from short-term memory, and at times they are used interchangeably; however, they are different concepts. In effect, both short-term memory and long-term memory make available the data required for working memory (Cowan, 2008). Working memory is defined as a short-term information storage unit of the brain that enables us to use it for the ongoing thinking process (Holmes, 2012). It is considered as one of the main parts of the brain which is vital for cognitive abilities such as paying attention, remembering, reasoning, and problem-solving; thus, the level of cognitive functioning is based on the capacity of working memory which is limited (Redick et al., 2012). As Kalyuga (2011) stated, working memory prevents the long-term memory from being damaged by working as a limited storage of information providing the data for the current use; moreover, working memory overloads when the limitations are exceeded, and as a result, the process of learning would be interrupted.

Cognitive load theory (Sweller, Ayres, & Kalyuga, 2011) is an instructional approach that consists of working memory limitations, long-term memory information organization, and the interplay between the two (Sweller, 2016). There are three types of cognitive load: extraneous, intrinsic, and germane (Sweller, 1994). Extraneous cognitive load is linked to teaching methods and techniques which are necessary for learning (Sweller, 1994), and can be avoided by implementing a variant design. Intrinsic cognitive load is about the intrinsic difficulty of the task itself, and teachers do not have any control over it. Material containing fewer interactive elements, which are simple and can be acquired in isolation, is observed as an easy one in comparison with material consisting of more

element interactivity, in which elements cannot be comprehended separately (de Jong, 2010). The last type of cognitive load refers to the learning strategies learners adopt, such as inferring and interpreting. In other words, this type of cognitive load is the resource of working memory which tackles intrinsic cognitive load to sustain attention to the information presented (Kalyuga, 2011). Working memory resources are used to cope with intruding thoughts (Klein & Boals, 2001). Consequently, they generate more cognitive load and hinder understanding; thus factors that help reduce the load can accelerate the learning process. As Cain and Oakhill (2003) explained, working memory failure is the basis of difficulty in sentence-level comprehension, which is explained in the following section.

Sentence Comprehension

As it has been stated by McGeown (2013), reading is essential for both academic achievement and general life skills. It is an intricate mental process involving factors such as text, reader, and the conditions under which the process of reading takes place, and it consists of thinking in both conscious and unconscious ways (Mikulecky, 2009). As put by Brantmeier (2003), the reader takes a personal stance at the text-based on factors, such as gender or prior knowledge. At the same time, the text may bring unique features to the reader such as form, length, and content. All of these are considered as notable factors helping the process of reading comprehension.

Being able to comprehend reading, be it a sentence, a paragraph, or plenty of paragraphs, requires several cognitive and affective factors. The absence of any of these factors can cause difficulties in reading comprehension. Westwood (2008) demonstrated two groups of possible reasons for reading difficulties: external influences, and reasons intrinsic to the learner. The former comprises cultural factors, teaching methods, and teacher effectiveness, while the latter involves the reader's cognitive abilities, attitude, motivation, and psychological processes, to name a few.

Many theorists such as Kintsch and van Dijk (1978) have mentioned

the importance of working memory capacity in reading comprehension. It has been said by Daneman and Carpenter (1980) that differences in the capacity of working memory lead to differences in comprehending readings in learners. Additionally, as Pardo (2004) stated, for the reader to be able to make sense of what he or she reads, background knowledge and emotion are needed which can affect the individual's perception. In the same vein, Hudson (1982) stated that a high degree of background knowledge could help overcome linguistic difficulties; thus, if the students lack enough prior knowledge, teachers can give students information about different topics taught in classes. Furthermore, a learner would not be successful in reading comprehension unless his vocabulary knowledge is adequate based on his English level (Dickinson, 1920); thus learning vocabulary can also be significant in improving understanding. Moreover, non-linguistic data influences the process of language when comprehension takes place (Frank & Vigliocco, 2011); therefore, using images in a reading task would help learners understand better by engaging their emotions and senses, and reducing working memory load.

PURPOSE OF THE STUDY

In light of the theoretical background presented above and the empirical studies reviewed, the present study attempts to, first of all, design an instrument to measure sentence comprehension, emotioncy, and cognitive load. Further purposes of the study are to investigate the associations between emotioncy and cognitive load, as well as emotioncy and sentence comprehension in EFL learners.

Therefore, this study aims to answer these questions:

1. Is there any significant relationship between emotioncy and cognitive load in EFL learners?
2. Is emotioncy a significant predictor of cognitive load in EFL learners?

3. Is there any significant relationship between emotioncy and sentence comprehension in EFL learners?
4. Is emotioncy a significant predictor of sentence comprehension in EFL learners?

METHOD

Participants

The participants included 200 EFL learners consisting of 100 males (50%) and 100 females (50%), whose ages ranged from 20 to 38 years. They were chosen based on convenience sampling. In order to account for the homogeneity of the participants, they were all selected from the first and second-year students of English language majors, i.e., English Language and Literature and Teaching English as a Foreign Language (TEFL), at different universities of Mashhad, Iran. Their language proficiency was at the appropriate level to answer the questions. Verbal consent was obtained from the participants, and they were assured about the confidentiality of the study.

Instrumentation

The instrument consisted of three sections to measure the three variables of the study, namely, sentence comprehension, emotioncy, and cognitive load. The sections included a question of sentence comprehension, four questions related to emotioncy, and five questions of cognitive load. They were repeated for 12 concepts (see Appendix for a sample item). In the following, a brief account of each section of the instrument will be provided.

Section 1: Sentence Comprehension Test

Sentence comprehension for each concept was measured by a question consisting of three choices, accompanied by a picture illustrating it. The particular concepts, aimed to be tested, were mostly put at the beginning of

the sentences since, in sentences of good average length, readers mostly show responses to the words put at the beginning (Delaney-Busch, Wilkie, & Kuperberg, 2016). The concepts were obtained from Borsipour et al. (2019), and were categorized into three subcategories: avolved, exvolved, and involved, based on the results of the pilot study. Initially, the questionnaire included 18 sentence comprehension test items; however, after conducting the pilot study, six of them were eliminated as the scores obtained were at the extreme ends of the score scale. The 12 remaining sentence comprehension items were about the following concepts: Easter, acupuncture, autism, Pilates, economic rent, electric guitars, Telegram, Borsch soup, Valentines' Day, Imam Reza Holy Shrine (a religious and sacred figure whose shrine is located in the city where the study took place), lipomatic, and the stock market. Following Dornyei's (2007) guidelines, test-retest reliability was used for measuring the reliability of the sentence comprehension test giving the same test to the same participants on two separate occasions. Results of the test-retest-reliability demonstrated that the test enjoyed high reliability ($r = .94, p < 0.05$).

Section 2: Emotioncy Scale

The emotioncy scale, which was based on Pishghadam's (2015) model of emotioncy, was used in the test to measure the level of familiarity of the subjects with the specified concept. First, the individuals had to select one of the choices, namely, null, auditory, visual, kinesthetic, inner, or arch emotioncies. Then, their emotion towards that concept, their frequency of encounter, and whether they knew the Persian equivalent of the term were asked to be marked. Cronbach's alpha was employed to check the reliability of the scale which was .71, showing acceptable reliability for the scale. Acceptable indices of Cronbach's alpha were also gained for its subscales: avovement, exvovement, and involvement which were .78, .73, .85, respectively.

Section 3: NASA Task Load Index

The last part of the test included the NASA Task Load Index (NASA-TLX) which was used to measure cognitive load. It was developed by the Human Performance Group at NASA's Ames Research Center, over a three-year cycle, with more than 40 laboratory simulations (Hart & Staveland, 1988). The test is suitable for assessing a task, based on mental workload (Colligan, Potts, Finn, & Sinkin, 2015). The test consists of five components: mental demand, temporal demand, performance, effort, and frustration. Its Cronbach's alpha calculated for this study was .71.

Data Collection Procedure

The study used the quantitative research method, and as a result, a questionnaire was designed to address the three concepts under investigation (emotioncy, cognitive load, and sentence comprehension). After obtaining permission from three universities, which offered courses in English Language and Literature and TEFL, the researchers distributed the questionnaires to the individuals. The completion of the instrument took about 20 minutes for each participant. The researchers clarified the aim of the study and the process of taking the test to the respondents beforehand and ensured them that their identities would remain anonymous.

Data Analysis

For the statistical analysis of the data, the Statistical Package for Social Sciences (SPSS) version 21 and Analysis of Moment Structures (AMOS) software were used. Thereby, CFA, Pearson product-moment correlation coefficient, and SEM were run.

RESULTS

Checking the validity of the emotioncy scale was done with CFA. To check the model fit, =the goodness of fit indices were used. The model with all its

factor loadings can be seen in Figure 2.

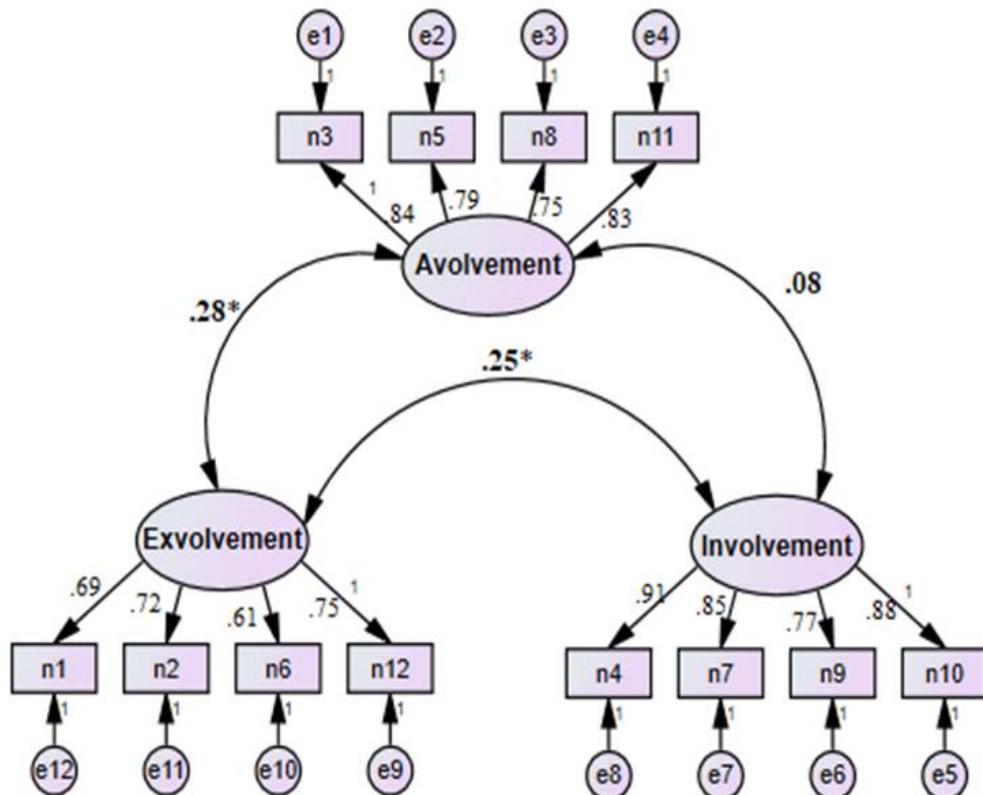


Figure 2: CFA model of emotioncy subscales

Table 2 shows the acceptable range of goodness of fit indices and the results obtained from the model. As the table demonstrates, all goodness of fit indices are inside the acceptable range; therefore, the scale was valid.

Table 2: Goodness of fit indices

| | χ^2 | df | χ^2/df | GFI | CFI | RMSEA |
|----------------------|----------|----|-------------|-----|-----|-------|
| Acceptable fit model | 103.13 | 51 | 2.02 | .91 | .92 | .072 |

Referring to the relationship between emotioncy and cognitive load, Table 3 shows the results of the correlation between the two variables. The results of Pearson product-moment correlation indicated that avolvement correlated positively and highly with students' cognitive load ($r = .569, p < .05$); however, there was a significantly weak and negative association between exvolvement and cognitive load ($r = -.21, p < .05$). Moreover, involvement correlated negatively and moderately with students' cognitive load ($r = -.42, p < .05$). Therefore, the more learners had seen, heard of, touched, experienced, or done research on a concept, the less cognitive load they experienced when doing a sentence comprehension activity on it.

Table 3: Results of the correlation between emotioncy and students' cognitive load

| | 1 | 2 | 3 | 4 |
|-------------------|--------|--------|----------|------|
| 1. Avolvement | 1.00 | | | |
| 2. Exvolvement | .410** | 1.00 | | |
| 3. Involvement | .110 | .394** | 1.00 | |
| 4. Cognitive Load | .569** | -.215* | -.420 ** | 1.00 |

**Correlation is significant at the level of 0.01

*Correlation is significant at the level of 0.05

To answer the second research question regarding whether emotioncy can predict cognitive load, SEM was conducted. To examine the structural relations, the proposed model was tested, and a number of fit indices were checked to evaluate the model fit. To examine the strengths of the causal relationships among the components, the standardized estimates were checked. As demonstrated in Figure 3, an estimate is displayed on each path.

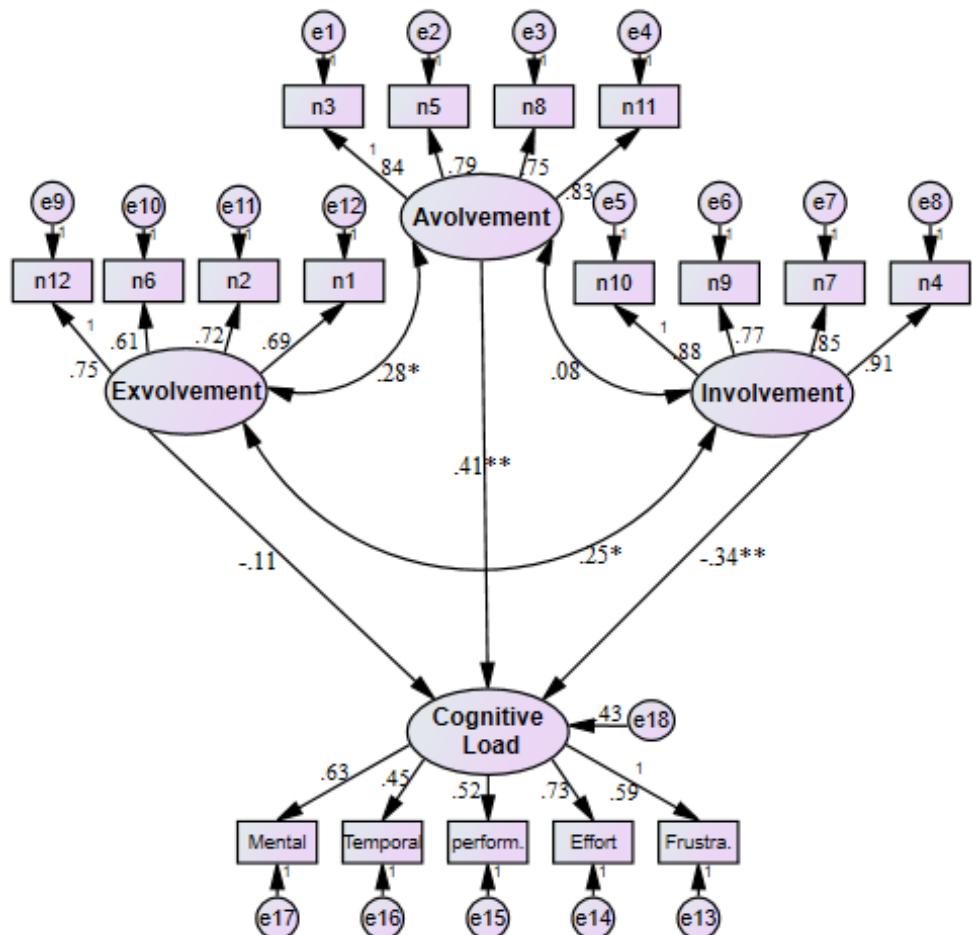


Figure 3: The schematic representation of the relationships among EFL learners' emotioncy and cognitive load

As the model reveals, there is only one non-significant path from exvolvement to cognitive load ($\beta = -.11, p > .05$); however, avolvement is a significantly positive predictor of cognitive load ($\beta = .41, p < .05$). Furthermore, involvement is a significantly negative predictor of cognitive load ($\beta = -.34, p < .05$). Therefore, the more sensory involvement one has in a topic, the less cognitive load s/he experiences when reading about it.

To find out the relationship between emotioncy and sentence comprehension, the Pearson product-moment correlation was run. Table 4 indicates the results of the correlation between Iranian EFL learners' emotioncy and their sentence comprehension. Avolvement correlated negatively and moderately with students' sentence comprehension ($r = -.43$, $p < .05$); however, there was a significantly weak and positive relationship between exvolvement and sentence comprehension ($r = .35$, $p < .05$). Additionally, involvement correlated positively and highly with students' sentence comprehension ($r = .61$, $p < .05$). Thus, the more sensory involvement in a concept, the more sentence comprehension there will be.

Table 4: Results of the correlation between emotioncy and students' sentence comprehension

| | 1 | 2 | 3 | 4 |
|---------------------------|----------|--------|--------|------|
| 1. Avolvement | 1.00 | | | |
| 2. Exvolvement | .410** | 1.00 | | |
| 3. Involvement | .110 | .394** | 1.00 | |
| 4. Sentence Comprehension | -.432 ** | .352** | .611** | 1.00 |

**Correlation is significant at the level of 0.01

To assess the last research question, SEM was conducted once again. Figure 4. demonstrates the schematic representation of the relationships among EFL Learners' emotioncy and sentence comprehension.

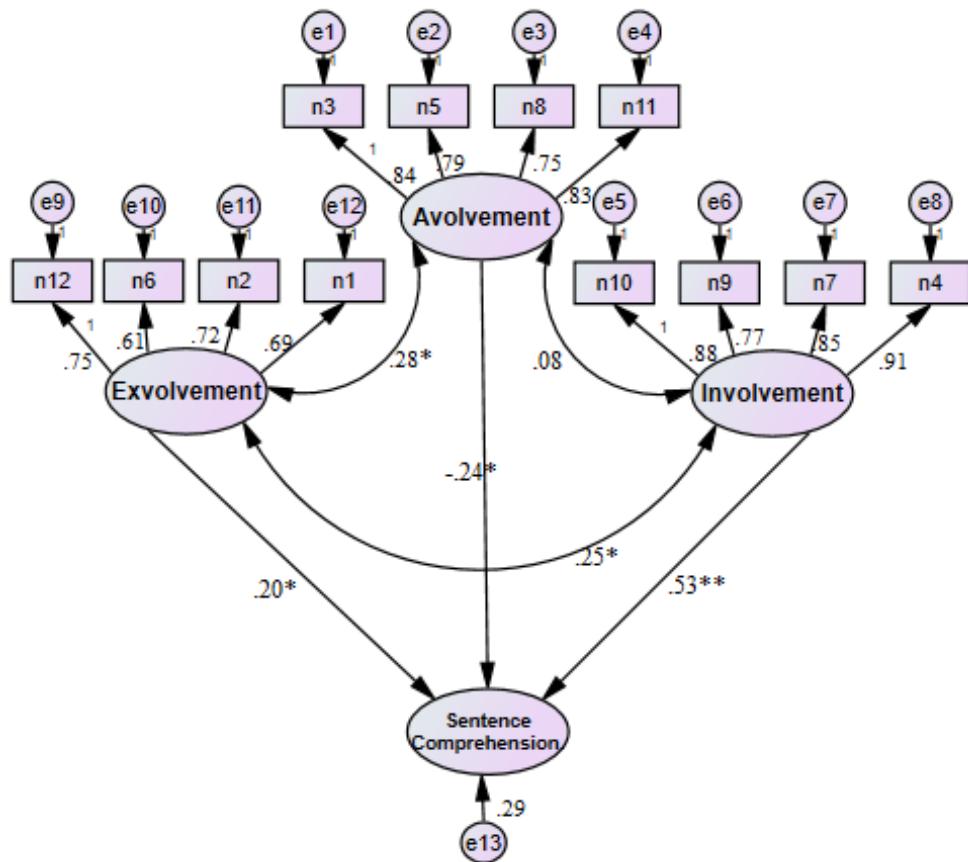


Figure 4: The schematic representation of the relationships among EFL learners' emotioncy and sentence comprehension

As the model demonstrates, there is only one significantly negative path from avolvement to sentence comprehension ($\beta = -.24, p < .05$); nevertheless, exvolvement ($\beta = .20, p < .05$) and involvement ($\beta = .53, p < .05$) are significant positive predictors of sentence comprehension. Thus, sensory exvolvement and involvement have a significantly positive role in EFL learners' sentence comprehension.

DISCUSSION

The study aimed to examine the role of emotioncy in the cognitive load and sentence comprehension of a group of EFL learners. To do so, correlations were run to find out whether any significant relationship existed between emotioncy and the two variables, and SEM was conducted to see whether emotioncy was a significant predictor of cognitive load and sentence comprehension.

Concerning the first research question, the findings revealed a significant relationship between emotioncy and cognitive load among the participants. The results illustrated that there was a significantly high and positive association between avolvement and cognitive load; nevertheless, a significantly weak and negative relationship existed between exvolvement and the participants' cognitive load. In addition, involvement correlated negatively and moderately with the learners' cognitive load. The findings indicate that the higher one goes through the levels of emotioncy, the less cognitive load s/he experiences. In other words, a high level of sensory experience is associated with less cognitive load.

Concerning the second research question, there was only one non-significant path from exvolvement to cognitive load; however, avolvement was displayed as a significant positive predictor of cognitive load, and involvement as a significant negative predictor of cognitive load. Based on the results, the more involved a learner is in a concept, the less cognitive load s/he experiences about it. Reversely, the more avolved a learner is towards a topic, the more cognitive load there is in learning it. Thus, it can be concluded that emotioncy reduces mental activity and working memory overload. The findings are consistent with those of Pishghadam, Adamson, et al. (2013), who mentioned that when students' level of emotioncy towards a word is high, they learn it more easily, compared to when they have little or no emotion towards it. Artino (2008) notes that prior knowledge helps working memory use more resources as it transfers information from long-term memory to working memory; thus, it decreases

cognitive load and provides more capacity at the time of learning. Moreover, according to neurophysiological theories, positive emotions systematically enhance a broad range of cognitive processes (Isen, 2008) and improve working memory, long-term memory, as well as controlled attention (Isen & Shmidt, 2007). It can be said the role of emotioncy is similar. As mentioned previously, the concept of emotioncy brings about the notions of feeling, familiarity, experience, and background knowledge; all of which are significant in reducing cognitive load.

Regarding the relationship between emotioncy and sentence comprehension, which refers to the third research question, the analysis done by Pearson product-moment correlation indicated a significantly negative and moderate association between avolvement and participants' sentence comprehension. A significantly positive but weak correlation was found between exvolvement and sentence comprehension, as well as a significantly positive and high association between involvement and sentence comprehension. All these findings reveal that the more familiar a learner is with a topic or concept, and the higher level of sensory exposure s/he has had to it, the better sentence comprehension takes place.

As for the fourth research question, the findings of SEM demonstrated that although one negative significant path goes from avolvement to sentence comprehension, exvolvement and involvement are significant positive predictors of sentence comprehension. Therefore, there is a significant direct relationship between emotioncy and sentence comprehension, meaning that the higher the level of emotioncy, the more sentence comprehension will be. The present findings seem to accord with those of Johnson and Giorgis (2002), and Pishghadam, Tabatabaeyan, et al. (2013) who claimed that the emotion aroused by the text, and the emotional connection formed between the reader and the text are considered as some of the factors influencing comprehension. Westwood (2008) also mentioned the noteworthiness of freeing up working memory capacity for a better comprehension, which would be possible by reinforcing emotion and emotionalizing students. The results are also in line with those of Borsipour

et al. (2019), who indicated that learners are more motivated to read when they are more involved in a topic. Above all, as shown by event-related potential (ERP) experiments, involvement facilitates retrieval of real-world knowledge and thus leads to better sentence comprehension (Shayesteh, Pishghadam, & Khodaverdi, 2020). Overall, emotioncy makes a significantly positive impact on learners' sentence comprehension.

CONCLUSION AND IMPLICATIONS

The study has gone some way towards enhancing our understanding of emotioncy, which can have a positive effect on reducing cognitive load, and boosting sentence comprehension. As the findings indicated, being avolved in a topic had a significantly positive relationship with cognitive load, while having sensory evolvement and involvement resulted in more sentence comprehension.

Material developers and teachers can benefit from the findings of this study through taking learners' needs into account and designing more interesting and suitable materials which do not cause high intrinsic cognitive load and help increase students' emotioncy levels by engaging their senses, emotions, and frequency of exposure to concepts, moving them from avolvement to involvement. As the findings of this study revealed, employing more sensory channels in classes to evoke learners' emotions through their senses is beneficial and even essential. Language instructors can promote the process of learning by using techniques and teaching methods that engage learners' emotions and senses. Thereby, multimedia tools, pictures, videos, objects, etc. should be used in class instead of merely giving lectures and teaching solely through the auditory or visual channels.

Based on the fact that emotioncy is a newly-developed concept, further studies with more focus on this notion are suggested. In future investigations, it might be possible to use emotioncy in relation to other skills and other factors influential in education. In addition, expanding the study by using a larger sample, as well as having contributors with other

English proficiency levels, may yield different outcomes. Furthermore, inquiring into a wider range of topics and varying sentences can generate more comprehensive results. Finally, the results only relied on the participants' self-report. Conducting interviews and neurological experiments may help gain more comprehensive results.

Disclosure statement

No potential conflict of interest was reported by the authors.

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APPENDIX

Sample Item



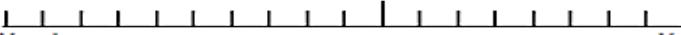
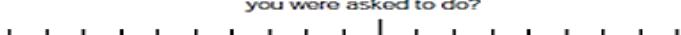
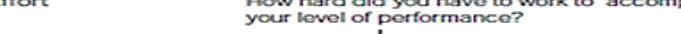
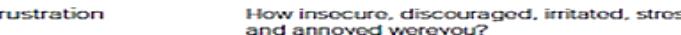
- a. Easter is the celebration of Jesus Christ returning from the dead.
 - b. Easter is a seven-day Christian celebration in June when people buy bunnies.
 - c. Easter is a time of celebrating good things in life when people wear special clothes.

Emotioncy Scale

| 1. Easter | I do not know what it is | I have heard about it | I have heard and seen it | I have heard, seen and been in touch with people who know about it | I have experienced it myself | I have experienced and researched deeply on it |
|-------------------------|--------------------------|--|---|---|---|---|
| How I feel about Easter | | A. Extremely negative B. Negative C. Neutral D. Positive E. Extremely positive | . Extremely negative B. Negative C. Neutral D. Positive E. Extremely positive | . Extremely negative B. Negative C. Neutral D. Positive E. Extremely positive | . Extremely negative B. Negative C. Neutral D. Positive E. Extremely positive | . Extremely negative B. Negative C. Neutral D. Positive E. Extremely positive |

| | | | | | | |
|------------------------------------|--|--|--|--|--|--|
| My exposure to and contact with it | | A. Extremely low B. Low C. Normal D. High E. Extremely high | A. Extremely low B. Low C. Normal D. High E. Extremely high | A. Extremely low B. Low C. Normal D. High E. Extremely high | A. Extremely low B. Low C. Normal D. High E. Extremely high | A. Extremely low B. Low C. Normal D. High E. Extremely high |
| | | Yes No | | | | |
| I know its Persian equivalent | | | | | | |

NASA Task Load Index

| | |
|---|--|
| Name | |
| Mental Demand | How mentally demanding was the task? |
|  | |
| Very Low | Very High |
| Temporal Demand | How hurried or rushed was the pace of the task? |
|  | |
| Very Low | Very High |
| Performance | How successful were you in accomplishing what you were asked to do? |
|  | |
| Perfect | Failure |
| Effort | How hard did you have to work to accomplish your level of performance? |
|  | |
| Very Low | Very High |
| Frustration | How insecure, discouraged, irritated, stressed, and annoyed were you? |
|  | |
| Very Low | Very High |