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Priming as a Learning Effect: The Case of Phrasal Verbs

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Abstract: While second language acquisition can be a complex and time-consuming process, developing efficient approaches that are less demanding on the part of the learner can greatly enhance the learning outcomes. The present study was an attempt to explore the potential application of priming as an approach to enhance the production of motion phrasal verbs. Ninety students were divided into intermediate and upper-intermediate groups based on their proficiency levels. The participants were required to narrate a silent movie as a baseline written production task. In the next stage, for the purpose of priming, they were required to read a storybook containing instances of motion events expressed in phrasal verbs. Immediately afterward, the participants were asked to narrate a second silent movie. The researchers also administered a working memory test to investigate its potential impact on the learning outcomes. The results indicated that only the upper-intermediate group benefited from the priming mechanism. Additionally, the results suggested that working memory did not show a significant predictive role in implicit learning within the specific context of motion phrasal verbs. These findings are in line with the processability hypothesis, which posits that developmental readiness plays a significant role in language learning.

Keywords: Second Language Acquisition, Implicit Learning, Priming, Phrasal Verbs, Motion Event.

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Introduction

Priming refers to the idea that the current cognitive processing of speakers influences their subsequent production. Ample evidence has been provided in support of the idea that when participants are exposed to a particular structure for instance passive sentences, they are more likely to produce more passive structures in subsequent sentences they make. Different aspects of the mechanism have been addressed in previous studies both in language and cognitive sciences. Masked conditions where primes are presented briefly to prevent conscious awareness (Ansarin & Javadi, 2018) and unmasked instances have been extensively explored in experimental studies on language processing and have provided valuable insights (Pickering & Garrod, 2017). The underlying factors that trigger structural priming have also been extensively investigated. For instance, according to Bock (1986) among others, while the priming effect has been attributed to shared syntax recently, it has been argued that both syntactic and semantic similarities contribute to priming effects (e.g., Ansarin et al., 2024; Ziegler et al., 2019).

Irrespective of the underlying factors at play, recent evidence supports the idea that priming is not transient and leaves traces behind that last longer and are capable of evoking the use of recently processed structures at even longer intervals. This has led to a new area of interest within priming studies which pertains to its impact on learning. It fits well in cognitivist approaches which suggest that language learning occurs from exposure to instances of language use which brings about changes in the language system of the learner and is supported by general cognitive mechanisms. This phenomenon is known as the learning effect of priming which is implicit in nature (Bock & Griffin, 2000). As a rather new emerging line of research, to the best of our knowledge, the number of studies addressing the learning impact of priming in L2 is limited. Further research, exploring different structures and participants with different L1s must be explored to yield conclusive results.

Priming as an Implicit Learning Account

Implicit learning is the ability to acquire knowledge and skills without conscious awareness or intentional effort and plays a significant role in various domains including language acquisition. Perruchet and Pacton (2006) define implicit learning as an adaptation to the underlying patterns of the world around us which forms unintentionally. In this vein, experiments providing evidence that learning can result from processing operations that lead to long-term adaptations in the cognitive system have introduced priming as a potential mechanism for implicit learning (Boyland & Anderson, 2022; Chang et al., 2000; Fine &

Jaeger, 2013). Accessibility for future use and automaticity in production as two defining characteristics of implicit learning align with the resultant production in cases of priming, and this way there has been a growing interest in priming as an implicit learning paradigm both in L1 and L2 (Jackson & Hopp, 2020; Kaan & Chun, 2017).

The relationship between priming and implicit learning is best explained by Loebell and Bock (2003) who suggest that priming does not necessarily involve conscious access to the structure but even a single occurrence can facilitate reoccurrence. Bock and Griffin (2000) suggested that priming leads to longer adaptations within the cognitive system i.e., an experience that leaves behind changes in the cognitive system. This way, it is argued that if priming does not dissipate with time or interference of unrelated sentences, it can be considered as having a lasting effect and consequently can be considered as a potential learning mechanism (Bock & Griffin, 2000; Huttenlocher et al., 2004; Kootstra & Doedens, 2016; Shin & Christianson, 2011). One of the earliest studies showing the underlying potential of priming as a learning account was Bock (1986) who found that L2 learners were more likely to produce sentences with a passive structure if they were previously exposed to a sentence with the same structure. The study provided valuable evidence in support of priming as a learning mechanism suggesting that L2 learners can be primed by syntactic structures in a similar way to native speakers. This way, the paradigm has been recognized as an important and promising technique for L2 learning, leading applied linguists to explore its underlying mechanisms and potential applications in L2 settings (Bock & Griffin, 2000; Chang et al., 2000; Kaschak et al., 2011). In another study, Chang et al. (2000) argued that structural priming can be regarded as implicit learning in case its effect persists over intervening sentences. They argued this persistence, if supported by evidence, cannot be attributed to activation as the only mechanism at work, but rather a longer-term change in the production system. The computational model they designed learned to map from messages to word strings. In other words, the model came up with statistical inductions in comprehension and later applied them in production. The results supported the hypothesis that the same mechanisms used in comprehension were used in production. Overall, they concluded that the model accounted for structural priming as a learning mechanism. The model approached learning the structures in a similar way to the assumed processes supposedly underlying human learning.

However, it should be mentioned that the distinguishing factor between L2 acquisition and L1 is the idea that the development of new associations between forms and meanings can potentially compete with the already established connections between forms and meanings in

L1. (McManus, 2021). This is especially important when the two languages in question make use of different surface-level structures to express a single underlying concept. Motion constructions in Persian and English according to the typology proposed by Talmy (1985), belong to distinct categories and are challenging for Persian L2 learners of English (Barekat & Baniasady, 2014). Talmy (1985, 1991) suggested that languages are categorized under two groups based on whether they express the path of a motion event within the verb itself or with the help of a satellite attached to the verb. He regarded the path of motion as the determining factor for classifying a language as either s-framed or v-framed. According to this typology, v-framed languages incorporate the path of motion within the motion verb itself, merging the concept of motion and path-info into a single word. Examples of v-framed verbs in English include words like "ascend" and "return". On the other hand, s-framed languages connect the path of motion to a verb through a satellite. A satellite is defined as any accompanying non-nominal lexical item that is in a sister relation to the verb in a syntactic tree. The verb phrase "go back" in English exemplifies this type, and since this kind of verb predominates expressing motion concepts in English, English is classified as an s-framed language. However, while Talmy's dichotomy provides a useful framework for understanding how different languages express motion events, it is not always straightforward and can be subject to variability and exceptions. Some languages exhibit a mixed typology, using both types of verbs with similar frequency. Others deviate from the binary framework altogether and are referred to as serializing languages (Zlatev & Yangklang, 2004). In these languages, a series of verbs, with or without an argument, can be used in a single clause in a sequence to convey a single motion event. Mandarin is suggested to fall into this category. A third type of structure that falls out of the binary typology is light-verb constructions (LVCs). LVCs, a predominant structure in Farsi, consist of two core elements: a verbal component and a non-verbal component (such as a noun or an adjective) that together convey the motion event. For instance, the structure "baazi kardan" (to play) in Farsi serves as an example of this category (Feiz, 2011). Feiz (2011) compares Persian and English in their expression of motion events based on Talmy's (1985) typology. The author concludes that while English can be categorized as an S-framed language, Farsi uses both s-framed and v-framed patterns and even makes use of light verb constructions to express motion events. The different patterns used by the two languages are supposed to be potential challenges for English learners of Persian. However, yet another source of the problem lies in the idea that different satellites in English can be combined with the same verb to indicate different paths of motion which makes the constructions even more complicated and challenging for learners to be

mastered. What is more, we argue in line with (Sinha & Kuteva, 1995) that the semantics of the motion event are distributed over more than a single lexical item, and the distributed semantics of the motion event are linked with a shared structure (verb and the associated satellites). This way priming triggers the activation of form-meaning mapping pertinent to phrasal verbs regardless of a specific verb root but rather the category of verbs, satellites, and other elements expressing motion events. We hypothesize that priming participants with motion phrasal verbs would lead to the activation of other phrasal verbs with the same semantic and structural similarities from both L1 and L2. Consequently, this effect would lead to the transfer effect from L1.

However, it is essential to establish the definition of the learning impact of priming as it is addressed in this particular study. Priming in this study refers to the consistent use of a specific verb structure throughout a 30-minute task. This definition of the learning effect of priming aligns with feasible conditions similar to real classroom conditions. Notably, to the best of our knowledge, the number of studies addressing the issue from this perspective is relatively limited.

To sum up, the present study was based on the hypothesis that priming would have a facilitatory effect through a subconscious association between the verbs and particles that form phrasal verbs. We assumed that through repeated exposure and practice under a priming paradigm, learners would develop a more automatic and intuitive understanding of these lexical combinations in a subsequent written production task. It should be noted that the design of the experiment allowed the learners to provide their own input during the whole task. To elaborate on this, it was assumed that with every single use of the target structure, the effect would boost, and would remain in effect for later use.

One of the important factors is working memory and the capacity of the cognitive system to hold and process information (Wen et al., 2019) which is related to priming. In this vein, individual differences have long been suggested to be a defining factor in how effective different approaches to language learning can be for different learners (Ellis, 2004). Consequently, the present study explored the role of working memory with regard to implicit learning and priming mechanisms. Working memory and implicit learning have long been explored in a study by Tagarelli et al. (2011) who investigated the relationship between WM and two learning conditions (implicit vs. explicit) concluding that explicit learning may correlate with working memory compared to implicit learning. However, further research is needed to establish an association between priming and implicit learning, while also emphasizing the importance of considering and controlling for potential influencing factors

that might impact the technique's effectiveness or practicality. Furthermore, we argue that, while much research has been conducted on priming as an implicit learning approach, the number of studies implementing priming in conditions similar to real learning conditions in classrooms is still limited. This way, the two research questions the study attempts to answer are:

Research question 1: Does priming Farsi L2 learners of English with motion phrasal verbs enhance their phrasal verb usage in a subsequent written production task in the intermediate and upper-intermediate groups?

Research question 2: Does working memory as an individual difference factor correlate with participants' performance under priming conditions?

Methods

Design

The research was conducted in two stages. The data for the research were gathered in two consecutive weeks. To this end, the research was designed as a pre-test, priming, and post-test study. In the first week, participants were asked to narrate a silent movie as a baseline production task. The movie was full of scenes depicting motion events and provided a good deal of chances for participants to narrate them. During the second session, i.e., the following week, at the beginning of the session, participants were primed by reading storybooks that contained phrasal verbs narrating a story. Immediately, after the priming phase, participants were asked to narrate a second silent movie to determine if there was a significant change in phrasal verb production compared to the baseline production data gathered in the previous week. This narration task was designed and scored in a way that allowed for controlling phrasal verb production throughout the story and to see if the production of primed target structures lasted till the end of the task.

Participants

A total of 157 students from four intact classes at the University of Tabriz participated in the study. Of these, 54 were English Language and Literature students enrolled in developed writing or research methods courses. The remaining 103 students were engineering students from either the faculty of Electrical and Computer Engineering or the faculty of Mechanical Engineering. The English Language and Literature students were in their fourth year of study, while the engineering students were taking English as a general and compulsory course. All participants had previous experience with English, having taken English lessons in high

school and some even taking additional courses in private language institutes. Their ages ranged from 18 to 24, with a mean of 21.5. None of the participants reported living in an English-speaking country, and they all had either normal vision or vision that was corrected to normal. Initially, all students were allowed to participate in the data collection process. The Oxford Quick Placement Test was administered to put the participants in either the intermediate or the upper-intermediate group. However, those who scored below the minimum on the proficiency test were excluded from the analysis. Additionally, some students did not attend all three sessions during data collection, and their data were also excluded. Furthermore, one student was found to be attempting to cheat on the working memory test, and his data were also not included in the final analysis. As a result, data from a total of 90 students were used for the final data analysis.

Materials

Priming Booklet

The book chosen for priming was "Frog Where Are You?" by Mayer (1969). Originally, the story is illustrated in pictures without any accompanying narration. It is the story of a boy and his dog who find a frog and bring it home. While the boy and his dog sleep at night, the frog leaves the jar in which they keep him. As the boy and his dog explore the area to find the frog, different aspects of motion events like "climbing up", "falling off", and "carrying away" are depicted in pictures throughout the pages of the book. The book was edited for the purpose of the present study, and descriptions were provided below each picture by the researchers. The verbs used to describe the pictures were phrasal verbs produced by native speakers participating in Feiz's (2011) study for narrating "Banjo Frog" and "Chafe's Pear". The list of the verbs is provided in Table 1. A total of twenty-nine scenes were included in the priming booklet, out of which twenty-two were described using phrasal verbs. Notably, three scenes had two phrasal verbs each, contributing six instances to the overall priming count. Seven scenes did not include any phrasal verbs in their description, and they were included as fillers. Consequently, approximately seventy-six percent of the data were dedicated to prime items.

Table 1. Priming Verbs

Primes:	Crawl out of, walk away, fall out of, go around, fly around, go up, come out of, climb up, fly off, fall off, push out, step over, fall over, ride on, fell off, dump in, toss in, go off, crawl under, come by, walked further, walk past

Movies

Two silent short films, “Banjo Frog” and “Chafe’s Pear Film”, were used for data elicitation purposes. Both films, despite being silent, presented numerous opportunities for participants to describe the motion events happening in the stories. In "Banjo Frog," the story revolves around a frog that gets trapped in a truck and eventually ends up in a garbage dump. As the frog explores the surrounding area, various motion events occur, such as "climbing up a tree," "going back to the dump site," and "falling out of the truck." These events provide participants with ample material to narrate and describe using phrasal motion verbs. On the other hand, "Chafe’s Pear Film" focuses on a gardener working in his garden and picking pears. Throughout the film, various motion events occur as the gardener "goes up the tree" to gather the pears and "comes down the tree" to put them into baskets. Additionally, people "pass by the tree," creating more opportunities for participants to use motion phrasal verbs in their narration. Overall, both films were chosen for their silent format and abundance of motion events, providing researchers with a means to elicit data from participants in line with the purpose of the experiment.

Procedure

The data of the study were collected in two sessions. In the first session, the students were informed that they would be taking a midterm exam that required them to narrate a silent movie, “Banjo Frogs”. The movie was projected in class, and students were given 30 minutes to write a narration for it. In the second session, scheduled a week later, students watched the second silent movie, “Chafe’s Pear” and were exposed to priming material immediately afterward. The comic book “Where Are You Frog?” by Mayer (1969) was used to prime the participants. Each illustration was followed by one or two sentences explaining the picture. The explanations throughout the book were followed by a five-point Likert scale, and the students were asked to score each description according to how well the description that followed the picture captured the details of what was happening in the picture. They were told that a publishing company plans to publish a children's storybook and is interested in finding out whether the descriptions describe the scenes properly. Likert scale was used to ensure that the students read the primes carefully. They were instructed that they were required to consider not only if the description entailed the main event happening in the picture, but also if there were any problematic variations like “stept*” or “every where*”. Booklets were collected after ten minutes, and the students were required to narrate the movie immediately afterward. It should be noted that in both sessions the students were instructed to

write more than 250 words and try to mention every event happening in the movie. This was to make sure that they would write in detail and capture the targeted scenes. After the second experiment, the students were informed that the investigator was conducting a study and those who volunteered to participate would receive extra course credit for participation. Individual appointments were scheduled for working memory tests accordingly. The working memory test took place in the following 4 weeks in a quiet room and lasted from 10 to 15 minutes.

Working Memory Test

Short-term verbal memory was measured using a visual digit span test (forward recall) using *Inquisit* software. During the experiment, the participants were presented with sequences of numbers and had to recall them in the order that they were presented. The numbers were presented in a circle after which the participants started choosing the numbers with a mouse in the order they were originally presented. The experiment lasted for about 8 minutes and ended after 14 trials.

Scoring and Analysis

For analysis, 9 salient actions were selected that could possibly be described using phrasal verbs for the pre-test movie, "Frog Where Are You?", and 13 scenes for the test movie, "Chafes' Pear". It should be noted that target events were strategically chosen to represent scenes from the beginning, middle, and end of the study. The number of times each student used phrasal verbs to describe these targeted scenes was counted and called recall in the analysis procedure. The data were normalized by dividing the total count by 9 for the pre-test and by 13 for the test production. It is important to note that "Chafes' Pear" was longer and had more motion scenes compared to "Where Are You Frog" in the pre-test production. The figures provided us with the overall number of attempted opportunities. It should be noted that cases with significant grammatical mistakes were excluded from the analysis. These included instances of transfer (ex. he came down from the tree) and incorrect prepositional usage (ex. he went through the garbage can). Other grammatical problems such as incorrect past forms or disregarding third person singular -s, were not considered serious grammatical errors because they did not significantly affect the meaning. A regression model was performed to determine if treatment had affected the scores. Furthermore, another regression model analysis was conducted to find out whether there was a correlation between working memory and the performance of the participants.

Results

Descriptive statistics for the intermediate and upper-intermediate groups are presented in Tables 2 and 3 respectively.

Table 2. Descriptive Statistics for the Intermediate Group

	N	Minimum	Maximum	Mean	Std. Deviation
Recall	90	0	8	.47	.18
Working Memory	90	4	10	6.53	1.173
Valid N (listwise)	90				

Table 2 presents the descriptive statistics for the intermediate group. The data collected from 90 participants in the intermediate group show that the lowest recall score was 0, suggesting that some students did not use any phrasal verbs in their narration. On the other hand, the highest score was 8, revealing that certain students correctly utilized approximately all targeted scenes. Additionally, the values for working memory range from a minimum of 4 to a maximum of 8, suggesting a range for the correct answers. The mean for the intermediate group is .47 which is not surprisingly lower than the means for the upper-intermediate group shown in Table 3.

Table 3. Descriptive Statistics for the Upper-intermediate Group

	N	Minimum	Maximum	Mean	Std. Deviation
Working Memory	88	3	10	6.84	1.338
Recall	88	0	8	.56	.88
Valid N (listwise)	88				

Considering the upper-intermediate group, Table 3 suggests that there was at least one participant who did not use any of the targeted structures in their narration, or if they had attempted any, it seriously damaged the meaning so was not counted for analysis; the number at the other end of the extreme was 8. The numbers are higher compared to the intermediate group in Table 3. The range for working memory was 3 to 10. The standard deviation indicated a greater variability in both recall and working memory for this group, implying a wider range of results around the average. This suggests that there is a wider range of performance levels among individuals in the upper-intermediate group. Some individuals might score significantly higher than the average, while others might score significantly

lower. In other words, it implies that there are both high and low performers within the upper-intermediate group in terms of recall and working memory abilities.

Priming Effect

Estimates of fixed effects for recall are given in Tables 4 and 5 for the intermediate and upper-intermediate groups, respectively.

Table 4. Estimates of Fixed Effects for Recall in the Intermediate Group (No Interaction)

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	.36	.13	46	2.82	.00	.10	.63
Time	.01	.03	45	.35	.72	-.05	.07

The concept of time in Tables 4 and 5 refers to the two conditions under which narrations were produced i.e., non-primed vs. primed condition. Time had two values non-primed narrations were coded as 1 and primed narrations as 2. According to the numerical data in Table 4, as time changed (from non-primed to primed) there was not a significant change in the number of phrasal verbs produced by the intermediate group (.72>.05).

Table 5. Estimates of Fixed Effects for Recall in the Upper-intermediate Group (No Interaction)

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	-.09	.49	47	-.19	.85	-1.07	.89
Time	.36	.17	44	2.03	.04	.00	.72

The values in Table 5 indicate that when the situation changes from non-primed to primed conditions the estimate changes greatly for the upper-intermediate group (.36) compared to the intermediate group (.01). This way, the findings in Table 5 suggest that priming significantly affected phrasal verb usage in the upper-intermediate group (.04<.05).

Working Memory

Further analysis was carried out to investigate the effect of working memory on participants' performance. Table 6 illustrates the results for participants' performance with working memory as an independent variable. Table 6 presents the results for the intermediate group

followed by Table 7 for the upper-intermediate group. The table suggests that working memory did not interact with time (.44>.05).

Table 6. Estimates of Fixed Effects for Recall in the Intermediate Group

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Working Memory	.01	.01	45	.77	.44	-.02	.05

According to Table 7, the upper-intermediate group did not show a different performance compared to the intermediate group with regard to working memory impacting their results. The effect of working memory was not significant for the upper-intermediate group as well (P>.05).

Table 7. Estimates of Fixed Effects for Recall in the Upper-intermediate Group

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Working Memory	.06	.06	44	.96	.34	-.07	.20

Discussion

The present study aimed to investigate the effectiveness of priming as a method of implicit learning with two groups of participants, intermediate and upper-intermediate learners of English in an Iranian L2 setting. It should be noted that the study was designed to be as similar as possible to the conditions of the classroom. There are two features of the study that did not follow the regular patterns in priming studies. First, the lag between priming and production was not controlled, and students were required to follow their own pace in producing targeted structures. It was hypothesized that every use of a phrasal verb would prime the structure for later use throughout the narration task. This way, the initial prompt was provided by the teacher and the students were providing the upcoming primes in their own production. The results of the study revealed that the upper-intermediate group experienced a significant benefit from the priming paradigm, with an improvement in their learning outcomes. However, the intermediate group did not show significant benefit from the priming method. On the other hand, the study failed to provide evidence in favor of working memory impacting the effect of priming.

The findings of the present study are in line with previous studies suggesting that priming is an effective approach in improving the acquisition of a particular language item by merely being exposed to it but suggest that proficiency level might be a factor to be considered, as it could significantly affect the results. From a cognitive perspective, the concept of priming suggests that when mental representations are activated, they have a subsequent impact on behavior. The impact on behavior is suggested to be a result of tuning parameters in the processing operations (Bock & Griffin, 2000). The basis for this assumption is the idea that the mechanisms for language production involve the operations responsible for language comprehension (Dell & Chang, 2014). So, when a piece of language is processed, it leaves traces behind which persist and facilitate access and consequently the production of the recently processed information more favorably. This way, Dell and Chang (2014) maintain that acquisition involves adaptation of processing leading to acquisition. This cognitive interpretation aligns with the processability hypothesis which proposes that language acquisition occurs when individuals engage in the actual process of language processing (Pienemann, 2005). In other words, when an individual encounters a piece of language, the cognitive system undergoes changes that contribute to language learning (Dyson & Håkansson, 2017). This way, both models share the same assumptions as to how language acquisition occurs, and both models suggest that this process is entirely implicit and is not available to conscious awareness. However, PT predicts that if all conditions are satisfied learners will not acquire the intended structure unless they are developmentally ready for it (Pienemann, 1998, 2005) which we argue is the reason why priming was an effective learning paradigm for the upper-intermediate group but not for the intermediate group. According to Pienemann (2005), there are five developmental stages (word/lemma stage followed by category, noun-phrase, verb-phrase, and intra-phrasal stage), and sentence-level functions are not available until learners achieve stage four. We argue that the reason why the intermediate group did not benefit from the priming paradigm was the idea that they were not developmentally ready for it, and cognitive constraints limited the ability to effectively benefit from the priming paradigm. The verb-phrase stage, for the particular case of motion event, we suggest, is approached when the verb and whatever contributes to its meaning at the syntax (verb and the satellites), and semantics (all elements of path, manner, etc.) level, and the interface between the two (motion and path merged into the main verb or distributed on different lexical items) can be conceptualized by the processing operations; in other words, when the architecture of human language processing does not constrain the processing of the distributed elements of a concept to be processed.

What is more, the idea that the study failed to find any evidence for working memory impact aligns with Tagarelli et al. (2011) and Kaufman et al. (2010) among others who argue that working memory does not correlate with implicit learning.

The implications of priming for classroom teaching are thoroughly explored by Trofimovich and McDonough (2011) with the hope of bridging the gap between theory and practice. The book centers around three types of priming—semantic, syntactic, and auditory, and the methodologies related to each category. Their research is an attempt to capture the implicit language learning processes involved; however, the major section is dedicated to the priming technique applied and acknowledges the scarcity of studies related to syntactic priming for L2 acquisition.

Conclusion

The practical implementations of priming in real classroom settings in the present study offer valuable insights for future research and also its implication in the classroom. Previous exposure to target structures through priming can be advantageous if these structures align with the learners' proficiency levels. This makes priming a promising alternative to traditional tasks used in language teaching, which typically require participants to perform specific activities. Since priming often operates unconsciously and requires only minimal exposure, it could serve as an effective substitute for more involved tasks.

To gain a more comprehensive understanding of the paradigm, future research is suggested to explore other individual differences such as implicit learning aptitude, and incorporate additional linguistic structures other than phrasal verbs engaging experimental as well as several control groups. Additionally, it is recommended to include learners with diverse first languages (L1) to enhance the study's generalizability.

The present study was subject to various limitations. First of all, the number of EFL learners who participated in the study was limited, resulting in a relatively small sample size that limits the extent of randomization and generalizability. Secondly, due to the previously mentioned reason, the study lacked a control group, which is regarded as the primary limitation of the research. Besides, the study was conducted among university-level students, but it would be more advantageous to include students from other levels as well. Besides, delayed production could not be obtained due to a lack of time and resources.

References

Ansarin, A. A., & Javadi, S. (2018). Masked semantic/associative and translation priming across languages. *East European Journal of Psycholinguistics*, *5*(1), 7-15. https://doi.org/10.5281/zenodo.1436209

Ansarin, A. A., Yaghoubi Notash, M., & Javadi, S. (2024). Syntactic priming: Is shared semantic content an obligation?. *Journal of Applied Linguistics and Applied Literature: Dynamics and Advances*, *12*(1), 51-62. Doi: 10.22049/jalda.2024.28639.1547

Barekat, B., & Baniasady, B. (2014). The impact of phrasal verb avoidance on the writing ability of the University EFL learners. *Procedia - Social and Behavioral Sciences*, *98*, 343–352. https://doi.org/10.1016/j.sbspro.2014.03.425

Bock, J. K. (1986). Syntactic persistence in language production. *Cognitive Psychology*, *18*(3), 355–387. https://doi.org/10.1016/0010-0285(86)90004-6

Bock, K., & Griffin, Z. M. (2000). The persistence of structural priming: Transient activation or implicit learning?. *Journal of Experimental Psychology: General*, *129*(2), 177–192. https://doi.org/10.1037/0096-3445.129.2.177ytiry

Boyland, J. T., & Anderson, J. R. (2022). Evidence that syntactic priming is long-lasting. In *Routledge eBooks* (p. 1205). https://doi.org/10.4324/9781315782416-225

Chang, F., Dell, G. S., Bock, K., & Griffin, Z. M. (2000). Structural priming as implicit learning: A comparison of models of sentence production. *Journal of psycholinguistic Research*, *29*, 217-230.

Dell, G. S., & Chang, F. (2014). The P-chain: relating sentence production and its disorders to comprehension and acquisition. *Philosophical Transactions of the Royal Society B*, *369*(1634), 20120394. https://doi.org/10.1098/rstb.2012.0394

Dyson, B. P., & Håkansson, G. (2017). Understanding second language processing. In: *Bilingual Processing and Acquisition*. https://doi.org/10.1075/bpa.4

Ellis, R. (2004). Individual differences in second language learning. In: *The Handbook of Applied Linguistics*, pp. 525-551.

Feiz, P. (2011). Traveling through space in Persian and English: A comparative analysis of motion events in elicited narratives. *Language Sciences*, *33*(3), 401–416. https://doi.org/10.1016/j.langsci.2010.10.010

Fine, A. B., & Jaeger, T. F. (2013). Evidence for implicit learning in syntactic comprehension. *Cognitive Science*, *37*(3), 578–591. https://doi.org/10.1111/cogs.12022

Huttenlocher, J., Vasilyeva, M., & Shimpi, P. M. (2004). Syntactic priming in young children. *Journal of Memory and Language*, *50*(2), 182–195. https://doi.org/10.1016/ *Tabriz* j.jml.2003.09.003

Jackson, C. N., & Hopp, H. (2020). Prediction error and implicit learning in L1 and L2 syntactic priming. *International Journal of Bilingualism*, *24*(5–6), 895–911. https://doi.org/10.1177/1367006920902851

Kaan, E., & Chun, E. (2017). Priming and adaptation in native speakers and second-language learners. *Bilingualism: Language and Cognition*, *21*(2), 228–242. https://doi.org/ 10.1017/ s1366728916001231

Kaschak, M. P., Kutta, T. J., & Jones, J. L. (2011). Structural priming as implicit learning: Cumulative priming effects and individual differences. *Psychonomic Bulletin & Review*, *18*(6), 1133–1139. https://doi.org/10.3758/s13423-011-0157-y

Kootstra, G. J., & Doedens, W. (2016). How multiple sources of experience influence bilingual syntactic choice: Immediate and cumulative cross-language effects of structural priming, verb bias, and language dominance. *Bilingualism: Language and Cognition*, *19*(4), 710–732. https://doi.org/10.1017/s1366728916000420

Kaufman, S. B., DeYoung, C. G., Gray, J. R., Jiménez, L., Brown, J., & Mackintosh, N. J. (2010). Implicit learning as an ability. *Cognition*, *116*(3), 321–340. https://doi.org/10.1016/j.cognition.2010.05.011

Loebell, H., & Bock, K. (2003). Structural priming across languages. *Linguistics*, *41*(5). https://doi.org/10.1515/ling.2003.026

Mayer, M. (1969). *Frog, where are you?*. http://ci.nii.ac.jp/ncid/BA87815583

McManus, K. (2021). *Crosslinguistic influence and second language learning*. Routledge. https://doi.org/10.4324/9780429341663

Perruchet, P., & Pacton, S. (2006). Implicit learning and statistical learning: One phenomenon, two approaches. *Trends in Cognitive Sciences*, *10*(5), 233–238. https://doi.org/10.1016/j.tics.2006.03.006

Pickering, M. J., & Garrod, S. (2017). Priming and language change. In *Cambridge University Press eBooks* (pp. 173–190). https://doi.org/10.1017/9781316091746.008

Pienemann, M. (1998). Developmental dynamics in L1 and L2 acquisition: Processability Theory and generative entrenchment. *Bilingualism: Language and Cognition*, *1*(1), 1–20. https://doi.org/10.1017/s1366728998000017

Pienemann, M. (2005). An introduction to processability theory. In M. Pienemann (Ed.), *Cross-linguistic aspects of processability theory* (pp. 1–60). Amsterdam, the Netherlands: John Benjamins.

Shin, J., & Christianson, K. (2011). Structural priming and second language learning. *Language Learning*, *62*(3), 931–964. https://doi.org/10.1111/j.1467-9922.2011.00657.x

Sinha, C., & Kuteva, T. (1995). Distributed spatial semantics. *Nordic Journal of Linguistics*, *18*(2), 167–199. https://doi.org/10.1017/s0332586500000159

Tagarelli, K. M., Mota, M. B., & Rebuschat, P. (2011). The role of working memory in implicit and explicit language learning. *Cognitive Science*, *33*(33). http://csjarchive.cogsci.rpi.edu/proceedings/2011/papers/0472/paper0472.pdf

Talmy, L. (1985). Lexicalization patterns: Semantic structure in lexical forms. *Language typology and syntactic description*, *3*(99), 36-149.

Talmy, L. (1991). Path to Realization: A typology of event conflation. *Proceedings of the Annual Meeting of the Berkeley Linguistics Society*, *17*(1), 480. https://doi.org/10.3765/bls.v17i0.1620

Talmy, L. (2000). *Toward a cognitive semantics: Concept structuring systems* (Vol. 1). MIT Press.

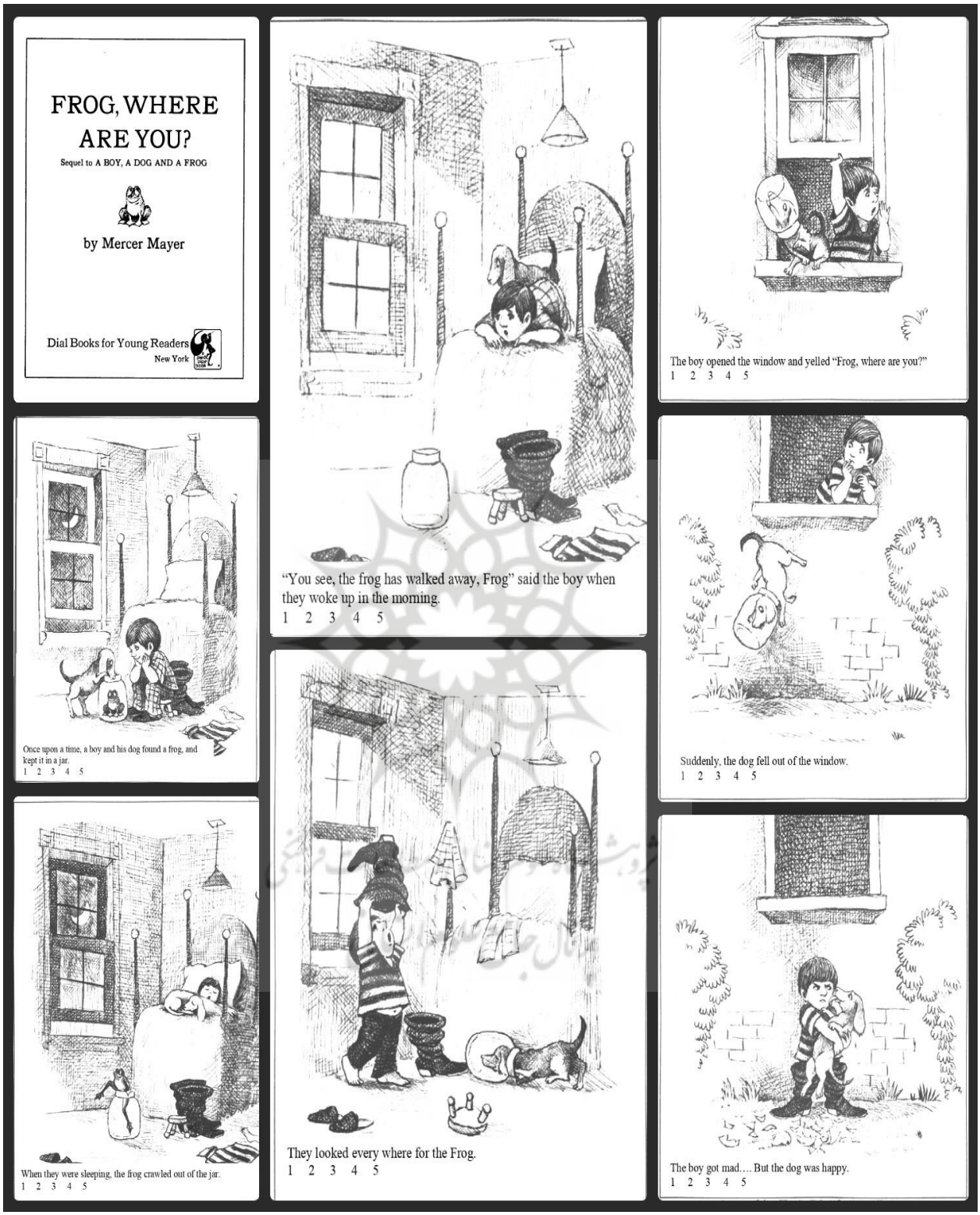
Trofimovich, P., & McDonough, K. (Eds.). (2011). Applying priming methods to L2 learning, teaching and research: *Insights from psycholinguistics (Vol. 30).* John Benjamins Publishing.

Wen, Z., Li, S., Schwieter, J., & Benati, A. (2019). Working memory in L2 learning and processing. In: *The Cambridge Handbook of Language Learning*, pp. 365-389.

Ziegler, J., Bencini, G., Goldberg, A. E., & Snedeker, J. (2019). How abstract is syntax? Evidence from structural priming. *Cognition*, *193*, 104045. https://doi.org/10.1016/j.cognition.2019.104045

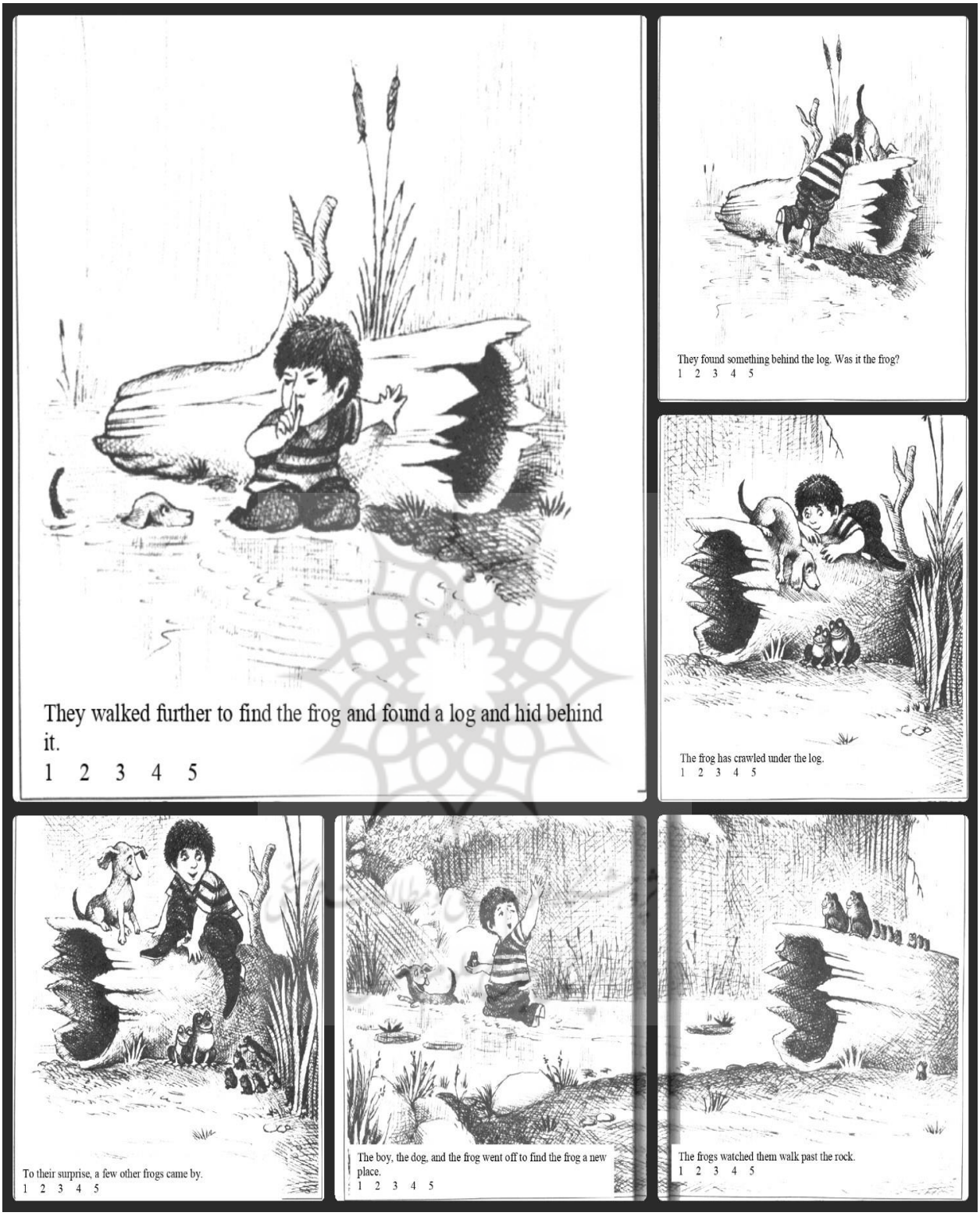
Zlatev, J., & Yangklang, P. (2004). A third way to travel: The place of Thai in motion-event typology. In: *Relating Events in Narrative, Volume 2* (pp. 159-190). Psychology Press. https://doi.org/10.4324/9781410609694-10

Appendix


FROG, WHERE ARE YOU?
Sequel to A BOY, A DOG AND A FROG
by Mercer Mayer
Dial Books for Young Readers
New York
Once upon a time, a boy and his dog found a frog, and kept it in a jar.
1 2 3 4 5
When they were sleeping, the frog crawled out of the jar.
1 2 3 4 5
"You see, the frog has walked away, Frog" said the boy when they woke up in the morning.
1 2 3 4 5
They looked every where for the Frog.
1 2 3 4 5
The boy opened the window and yelled "Frog, where are you?"
1 2 3 4 5
Suddenly, the dog fell out of the window.
1 2 3 4 5
The boy got mad.... But the dog was happy.
1 2 3 4 5


They were going around looking for the frog.
1 2 3 4 5
As the dog was trying to go up the tree, the frog came out of a hole.
1 2 3 4 5
The boy was looking inside the hole in the tree.
1 2 3 4 5
No way…. There was not a sign of the frog.
1 2 3 4 5
The boy fell off the tree; it seems like the owl pushed him out of the hole.
1 2 3 4 5
There was a beehive with flies flying around it.
1 2 3 4 5
The dog was still trying to climb up the tree, the bees were flying off the beehive with the frog watching them.
1 2 3 4 5


The boy stept over a rock.
1 2 3 4 5
The boy was riding on the deer.
1 2 3 4 5
The boy was on the tree, and the dog was next to the rock.
1 2 3 4 5
They were dumped in the puddle.
1 2 3 4 5
The boy and the dog fell off the deer into a puddle.
1 2 3 4 5
The boy suddenly fell over something weird. Was it a branch?
1 2 3 4 5
"You see doggie, we are tossed in a puddle." Said the boy.
1 2 3 4 5


They walked further to find the frog and found a log and hid behind it.
1 2 3 4 5
They found something behind the log. Was it the frog?
1 2 3 4 5
The frog has crawled under the log.
1 2 3 4 5
To their surprise, a few other frogs came by.
1 2 3 4 5
The boy, the dog, and the frog went off to find the frog a new place.
1 2 3 4 5
The frogs watched them walk past the rock.
1 2 3 4 5