METAPHORICAL INSIGHTS: PHRASAL VERB KNOWLEDGE GAINS IN THE LIGHT OF CONCEPTUAL METAPHOR THEORY[i]

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Abstract:

The primary objective of this research is twofold: first, to elucidate the explicit teaching of phrasal verb constructions within the framework of conceptual metaphor theory, with a specific focus on the metaphorical aspects of particle usage, and second, to examine the correlation between such explicit instruction in phrasal verbs and the gains in implicit knowledge of these verb forms. This study employed a within-group pretest/posttest design as part of an experimental investigation involving 60 Turkish English as a Foreign Language (EFL) learners who were students at the School of Foreign Languages (SFL) at a state university in Turkey. The research was analyzed across three dimensions: the achievement and retention of both receptive and productive knowledge of phrasal verbs, subconscious recognition and processing of lexical items, and the processing of phrasal verb meanings in a semantic context. To assess the first dimension, a multiple-choice test to gauge the students' receptive understanding of phrasal verbs and a c-test to measure their controlled productive knowledge of these verb forms were administered at three points: the initial pretest, an immediate posttest, and a delayed posttest. A masked repetition priming lexical decision task was utilized to investigate the subconscious recognition and processing of lexical items. Additionally, a self-paced task was employed to scrutinize the participants' semantic processing of phrasal verb meanings. The study's findings revealed that the explicit presentation of phrasal verb knowledge within the conceptual metaphor framework significantly impacts not only the acquisition and retention of receptive and productive knowledge but also the subconscious recognition and processing of lexical items, as well as the semantic priming of phrasal verb meanings,

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which substantiates the influential role of conceptual metaphors in the lexical aspects of language learning.

Keywords: phrasal verbs; conceptual metaphor theory; interface hypothesis; explicit instruction; implicit word knowledge

1. Introduction

Mastery of vocabulary is among the crucial components of second language acquisition (SLA) as it both helps learners deliver their message meaningfully and promotes their listening, writing, and especially reading skills (Nation, 2011; Al-Darayseh, 2014). Approximately 8000-9000 word families are considered necessary for English learners after full development of their mother tongue to be competent enough to understand authentic texts in another language (Nation, 2006).

Vocabulary acquisition, being at the core of language learning and one of the essential building blocks in SLA, became the center of theories such as the Lexical Learning Hypothesis (Ellis, 1997), which proposes that grammatical development is incremental and determined by learning of lexical constituents (Malvern et al., 2008; Eisenbeiss, 2009). With this recent change in the focus of studies besides learning of single words, learning of multiword units such as idioms (e.g., to smell a rat), phrasal verbs (e.g., to give up), stock phrases (e.g., last but not least), prefabs (e.g., take-home food) and other similar multiword sequences gained great prominence since these words have an important place in English as the language prospers with such structures (Gardner & Davies, 2007). Multiword knowledge is considered a crucial aspect of native-like fluency in language development (Schmitt, 2004; Wray, 2000, 2002).

As one of these multiword combinations, phrasal verbs (PVs) that are the focus of this study, have an important place in spoken communication. Phrasal verbs are defined as multiword sequences consisting of a verb followed by an adverbial particle, such as *carry out*, *find out*, or *pick up* (Biber et al., 1999). These combinations have an important role in gaining fluency, as Gardner and Davies (2007, p. 340) state they *"tend to be very common and highly productive in the English language as a whole"* and also conceivably settle *"the multiword middle ground between syntax and lexis"* which results in vital ramifications for second language acquisition (Gass & Selinker, 2008). At the same time, PVs pose great difficulty for non-native learners because of the unpredictability of their meanings (Lee, 2012; White, 2012), which leads to the situation that non-native speakers of English, especially at lower levels of language proficiency, are prone to avoid resorting to PVs in production due to the difficulty they get into while dealing with such words (Laufer & Eliasson, 1993; Kayael, 2007; Güleryüz Adamhasan, 2014; El-Dakhs, 2016). As a matter of fact, these combinations are constructions that are mostly encountered in spoken language (Biber et al., 1999), and they are generally not in the lists of most frequent words (Saltık, 2014; p. 80), which leads language teachers to ignore them. Therefore, it might be difficult for language learners to be exposed to these forms if they have limited

opportunities to practice them both in and out of the class. Within this perspective, how to teach PVs effectively is a matter of debate in the field of instructed foreign language learning. Coady (1997) puts forward that such structures *"are not learned well through ordinary language experience"* (p. 282). In other words, language learners need to be instructed explicitly on these multiword constructions instead of being left to their own resources for implicit processing (Lewis, 1997).

As for explicit instruction versus implicit processing dichotomy, the debate continues in SLA research (DeKeyser, 1995). It is generally acknowledged that implicit processing occurs automatically and subconsciously, whereas explicit processing takes place deliberately and consciously. Regarding the complexity of explicit versus implicit dichotomy, Ellis (2005) expanded on this distinction, noting that although such processes are carried out in separate parts of the brain, they interact. To explain, implicit knowledge develops when explicit language mechanisms are followed by subsequent input processing. This relationship between explicit instruction and implicit knowledge acquisition is called *the Interface* of explicit and implicit knowledge. In SLA, discussions on this relationship generally refer to high-level constructions and abstract rules, emphasizing the process of grammar acquisition (Ellis, 2005; Sorace, 2011).

Concerning the lexical dimension of language learning, the interface is the connection between the L2 form of the words and their meaning, which is different from the general interface position since implicit lexical knowledge starts to improve immediately with the former explicit learning task, whereas subsequent input processing is required for the development of other kinds of implicit knowledge after explicit learning tasks (Ellis, 2005). This form-meaning connection of vocabulary is generally established when learners encounter words in context and resort to differing strategies to come up with their meaning. With the establishment of form-meaning bonds in memory, the connection gets more rooted in the semantic system. When PVs are concerned, establishing form-meaning connection gets much more complicated since most of these verbs are multiword sequences built up as combinations of common verbs like *get, come, put, take* and prepositions called particles such *as in, on off, up, down*; *"functioning as a single unit both lexically and syntactically"* (Liao & Fukuya, 2004; p.196), which means that a change in one of the components of the PV leads to the change in overall meaning (Güleryüz Adamhasan, 2014). Therefore, a systematic way of binding PV forms to meanings seems to be a need for proper learning of these structures.

Bearing all these in mind, the primary purpose of the current study is to find out the short-term and long-term retention of PVs taught explicitly in the light of conceptual theory following noticing, retrieval, and generative activities. When vocabulary acquisition as a general term is concerned, as Wei (2007) states, it isn't very meaningful if language learners pick up a lot of vocabulary but are not able to process it receptively and productively in the long run. Therefore, with the concern of storage and retrieval of PVs, establishing form-meaning bonds is a critical point in the present study.

Apart from these, regarding the PV instruction in the EFL/ESL field, the traditional method, which mainly focuses on pairings of target PVs with their L1 equivalents,

followed by fill-in-the-blanks or matching exercises, is commonly criticized in the literature (Darwin & Gray, 1999; Gardner & Davies, 2007; Tyler & Evans, 2004), since it paves the way for mere memorization and rote learning without semantic and conceptual analysis (White, 2012). Thus, an explicit, systematic semantic presentation of PVs is needed to help language learners conceptualize these constructions.

To this end, the second aim of the present study is based on the interface between explicit PV instruction in consideration of conceptual metaphor theory and implicit PV knowledge gains. Understanding this relationship between explicit instruction and implicit knowledge is crucial for SLA research (Elgort, 2007; 2011; Obermeier, 2015) since, despite the benefits of explicit teaching techniques, it is a common belief that implicit knowledge cannot be easily gained through explicit methods (Ellis; 2005; Hulstijn, 2002). With a lexical acquisition perspective, by investigating the interface between explicit instruction and implicit PV knowledge, it is expected that the present study will make contributions to the process of vocabulary acquisition with respect to implicit - long-term - vocabulary knowledge gains attained through explicit vocabulary instruction in the light of conceptual metaphor theory. Furthermore, the study's findings are expected to contribute to the existing body of research by shedding light on how learners establish form-meaning relationships in the acquisition of PV structures. Finally, according to Elgort (2007; 2011) and Obermeier (2015), most interface discussions have generally focused on grammar acquisition. The absence of interface research concerned with vocabulary knowledge is an obvious gap in the SLA field. Therefore, the results of the current study are expected to encourage researchers to go beyond grammar acquisition and elaborate on vocabulary, specifically phrasal verbs.

In this aspect, the present study addresses the following research questions that constitute the basis of the study:

1) Are there any significant differences between the pretest, immediate posttest, and delayed posttest scores of the participants receiving explicit phrasal verb instruction in the light of conceptual metaphor theory on;
   a) achievement and retention of receptive phrasal verb knowledge in Multiple choice tests?
   b) achievement and retention of productive phrasal verb knowledge under a controlled situation in C-tests?
2) Are there any significant differences in response times (RTs) of the participants due to prime types for formal lexical representations in the Masked Repetition Priming Lexical Decision Task;
   a) within each test (pre/post/delayed)?
   b) between three tests (pre/post/delayed)?
3) Are there any significant differences between the pretest, immediate posttest and delayed posttest results of participants' response times (RTs) for;
   a) formulaic sequencing in the Self-paced Reading Task?
   b) semantic associations in the Self-paced Reading Task?

2. Literature Review

2.1. Interface of Explicit/Implicit Knowledge

Implicit learning, as described by Ellis (2005; 2009), pertains to the acquisition of information, including its underlying structure, in complex environments. It occurs naturally and unconsciously through an automatic process that draws learners' attention to the meaning of target forms. In contrast, as elucidated by DeKeyser (1995), explicit learning involves a selective learning process that necessitates conscious operations, often to test hypotheses, for the assimilation of specific rules or structures. Explicit teaching, as discussed by Archer and Hughes (2011), can be recognized as a series of supports and scaffolds that guide students through the learning process. It includes clear statements about the purpose and rationale for acquiring new skills, clear explanations and demonstrations of the instructional target, and supported practice with feedback until independent mastery is attained.

When distinguishing between explicit and implicit knowledge, the primary distinction lies in the absence of awareness, as highlighted by Sonbul and Schmitt (2013). Explicit knowledge, in line with Ellis (2006), is declarative knowledge that is consciously controlled, learned, and can be verbalized. Implicit knowledge, on the other hand, is procedural knowledge that resides unconsciously and can be accessed rapidly and easily. Considering knowledge as a continuum, it becomes more conceivable to envision the transition of explicit knowledge to implicit or vice versa through continued practice, sustained exposure, and repetitive drills (Gass & Selinker, 2008, p. 243). Nevertheless, the debate surrounding the relationship between these two types of knowledge continues to be a subject of ongoing interest within the field of second language acquisition.

The interface debate within the field of Second Language Acquisition (SLA) research centers around the question of whether explicit language instruction significantly contributes to the improvement of implicit knowledge, which is considered the ultimate goal of language learning (Ellis, 2007). Three primary positions have emerged in response to this question: the No Interface Position, Weak Interface Position, and Strong Interface Position (Gass & Selinker, 2008).

The *No Interface Position*, exemplified by Krashen's (1985) acquisition and learning distinction, posits that what is explicitly learned cannot become fluent and automatic, remaining separate from the acquired system. However, this position faces criticism, including arguments that fluent and unconscious speech does incorporate formally learned structures, challenging the notion of separate linguistic systems for explicit and implicit learning. Additionally, it is argued that learners in formal settings do acquire language, contradicting the notion that acquisition is solely implicit in informal contexts. Furthermore, some critique the lack of empirical evidence supporting Krashen's distinction between acquisition and learning (Gass & Selinker, 2008). Consequently, this position has been largely discredited, and the debate now revolves around the Strong and Weak Interface positions (Ellis, 2014).

N. Ellis (2005, 2007) advocates the *Weak Interface Position*, asserting that there is a relationship between explicit and implicit knowledge, as these two types of knowledge are "dissociable" but "cooperative." By "cooperative," N. Ellis (2005) suggests that conscious and unconscious mechanisms work together in cognitive tasks, including language processing. However, this cooperation does not imply a complete conversion of explicit knowledge into implicit knowledge or vice versa.

The *Strong Interface Position* proposes that explicit knowledge can transition into implicit knowledge through repeated practice, akin to skill-building theories (Obermeier, 2015). DeKeyser (1997) illustrates this strong relationship through a continuum in which learning progresses from declarative knowledge to procedural knowledge and eventually to automatized knowledge. In this context, explicitly instructed language structures can be internalized and converted into implicit knowledge through productive practice.

Nevertheless, a significant question pertains to which language components fall within the purview of the interface. Specifically, do discussions regarding the interface of explicit and implicit knowledge encompass not only grammatical structures but also lexis and semantics? In the literature, the debate on the interface generally pertains to higher-level constructions and abstract language rules, often framed as syntax and/or pragmatics (Ellis, 2005). Concerning the lexical aspect of language learning, scholars concur that in order to strengthen the connection between explicit lexical learning and gains in implicit lexical knowledge, explicit lexical instruction should be embedded within contexts of natural use (Ellis, 2005; Elgort, 2007, 2011; Obermeier, 2015). For instance, Ellis (2005) reports observations of incidental word learning through deliberate conscious attention and noticing. In this study, learners encountered a nonword in a fictitious language and gradually deduced its meaning through conscious attention, contextual clues, and interaction within the context, highlighting the importance of natural contextual use and repeated encounters for implicit lexical knowledge gains.

2.1.1. Assessing Implicit Knowledge

The effectiveness of explicit instruction in enhancing both explicit and implicit knowledge in the context of second language acquisition has been extensively explored in recent years. Nevertheless, the ongoing debate regarding the extent to which explicit teaching contributes to gains in implicit knowledge remains unresolved. According to R. Ellis (2005, 2009), this debate is partially attributed to the challenges associated with operationalizing implicit knowledge and the absence of appropriate tests for its measurement. This perspective is supported by the meta-analysis conducted by Norris and Ortega (2000), which indicates that the tests used to assess the impact of explicit language instruction often evaluate explicit rather than implicit knowledge. R. Ellis (2005) further underscores the distinction between implicit and explicit knowledge, even though they are interconnected. He proposes that measures for each knowledge type should focus on separate factors and suggests that distinct measures for explicit and implicit knowledge can be developed when implicit knowledge is appropriately

operationalized (R. Ellis, 2005, 2009; R. Ellis et al., 2009; Akakura, 2012). Within this framework, psycholinguistic techniques are employed to gain a deeper understanding of implicit knowledge acquisition.

For instance, Tokowicz and MacWhinney (2005) applied two measures to English speakers learning L2 Spanish - one involving explicit instruction and the other an Event-Related Potential (ERP) behavior measure. Their results revealed differences in participant performance on these measures. Similarly, Osterhout, McLaughlin, Pitkanen, Frenck-Mestre, and Molinaro (2006) assessed the ERP behavior of English learners of L2 French. Although the subjects did not perform well on the explicit instruction task, their ERP behavior was qualitatively similar to that of native speakers. These studies suggest that psycholinguistic measures like ERP are suitable for evaluating implicit knowledge and may indicate that, when appropriately operationalized, implicit knowledge can develop even before explicit knowledge, even within a short period of instruction (Sonbul & Schmitt, 2013).

The priming technique is another prevalent experimental paradigm used to investigate cognitive aspects of language acquisition, particularly in explaining the processing and operationalization of target language patterns. While it originated in theoretical psycholinguistics, it has gained increasing prominence in applied linguistics over the past two decades (Trofimovich & McDonough, 2011).

2.1.2. Criteria for Investigating Implicit Knowledge Gains

In order to understand implicit knowledge processes, operationalization of its measures is an important element to keep in mind (Gass, 1999). Based on Elgort's (2007, 2011) studies, Obermeier (2015) proposed four criteria to investigate the implicit knowledge gains of multiword sequences (p. 85):

a) The analysis of formal-lexical representations of target multiword units,
b) The analysis of individual words of multiword units that are formulaically sequenced as a coherent whole,
c) The analysis of lexical-semantic representations of target multiword units,
d) The analysis of the fluent access to the lexical representations of newly learnt multiword sequences.

In the present study, the implicit knowledge gains have been investigated based on Obermeier's (2015) criteria, as his criteria involve not only formal but also semantic representations, in addition to formulaic sequencing of determined word combinations. The word combinations emphasized in this study have been specified as "Phrasal Verbs" since they are the multiword sequences that have always posed difficulty for non-native speakers of English to acquire due to the unpredictability of their meanings (Lee, 2012; White, 2012), which leads those learners, especially low proficiency ones, to avoid using phrasal verbs within a context (Kayael, 2007; Barekat & Baniasady, 2014; Güleryüz Adamhasan, 2014; Saltık, 2014; El-Dakhs, 2016).

2.2. Phrasal Verb Acquisition

As previously mentioned, phrasal verbs in the English language are notorious for being particularly challenging, especially for ESL/EFL students (Kurtyka, 2001; Gardner & Davies, 2007; White, 2012; Güzel, 2014; Güleryüz Adamhasan, 2014; Saltık, 2014). One significant reason for this challenge arises from the lack of consensus regarding the terminological definition of PVs, leading to conflicting results in their application (Darwin & Gray, 1999). Although PVs are typically defined as verb + particle combinations that act as single verbs, there is ongoing debate as to whether verb + particle combinations should be considered PVs or free combinations (such as "drink up") (p. 66-67). Consequently, this definitional confusion results in challenges for teachers and students in correctly using PVs, including the movement of particles in separable and inseparable transitive PVs. Darwin and Gray (1999) exemplify this confusion by highlighting that if language learners are told that particles in PVs cannot be placed at the beginning of the phrase, but they encounter PVs like "improve on" and "go down" that allow particle fronting, it is likely to cause confusion and lead learners to avoid using PVs.

Celce-Murcia and Larsen-Freeman (1999) also stress the exceptional and widely variable nature of PVs, which results in significant learning difficulties, particularly in terms of their semantics. The semantic unpredictability, along with the random and unsystematic use of PVs, adds to the complexity. While it may be possible to guess the meaning of a PV based on its components (the verb and/or adverbial particle), this approach does not always apply due to the idiomatic nature of PVs (Darwin & Gray, 1999), referred to as "*deceptive transparency*" (Laufer, 1997, p. 25). This deceptive transparency means that the meanings of phrasal verbs cannot always be deduced from analyzing their constituent parts. In other words, these structures can have multiple polysemous meanings (Schmitt & Redwood, 2011; White, 2012). Gardner and Davies (2007) examined the British National Corpus and found that the 100 most frequent verb + particle combinations had an average of 5.6 different meanings (p. 353). Polysemous PVs pose two challenges: Learners may not be familiar with the extended idiomatic meanings of the target PVs that go beyond their literal and transparent meanings, and learners may not recognize the PV structure itself, leading them to analyze it as separate words rather than a single chunk. Both of these issues result in learners often opting for one-word equivalents rather than using the PV forms (Dagut & Laufer, 1985; Celce-Murcia & Larsen-Freeman, 1999) or avoiding PVs altogether (Saltık, 2014).

Another difficulty in learning PVs is related to the native languages of English learners. According to Neagu (2007), learners whose native languages lack phrasal verbs face challenges in understanding and mastering these structures. Celce-Murcia and Larsen-Freeman (1999) argue that PVs are generally unique to Germanic languages such as English, German, Dutch, and so on. Studies indicate that learners from non-Germanic languages encounter difficulties in comprehending and using PVs during the learning process (Dagut & Laufer, 1985; Liao & Fukuya, 2004). These difficulties can be attributed to typological differences between the native language and the target language being

learned. Different languages exhibit distinct lexicalization of conceptual structures (Talmy, 2000). For instance, the core schema of path trajectory, such as movement, is expressed through a satellite to the main verb, like a particle or a preposition, in languages like German and English. In contrast, the verb itself conveys this schema in languages like Japanese, Korean, and Turkish (Talmy, 2008). This discrepancy is why speakers of verb-framed languages may struggle to understand the significance of satellites in PVs and may treat these verb combinations as idiomatic and inseparable (Yasuda, 2010), resulting in avoidance (Liao & Fukuya, 2004; White, 2012).

For speakers of satellite-framed languages, the presence of prepositions and adverbial particles in a sentence, as well as the distinction between them, can be another source of difficulty. Learners may find it challenging to determine whether a preposition or a particle should follow a noun, adjective, or verb since a particle changes the meaning of the structure it combines with, while a preposition does not (Heaton, 1995; p. V). Furthermore, some particles, such as "about," "over," "through," and so on, can be used both as adverbials and prepositions in specific word combinations, whereas others cannot. Some phrasal verbs take a pronoun as their object, while others do not (Collins Cobuild Dictionary, 2002). Learners may struggle to understand the meanings of verbs when they are paired with prepositions or particles, especially when they do not comprehend the meaning of the main verb, as the meanings of the verbs change with different particles and/or prepositions (Alexandra, 2001). This can render entire sentences incomprehensible and challenging to process (Güleryüz Adamhasan, 2014).

An additional complexity that learners face regarding the grammatical forms of PVs pertains to the adverbial particle and its position in a sentence. Despite PVs being multiword constituents, particles can be separated from the main verb based on whether the phrasal verb is transitive or intransitive, which gives rise to questions such as "*Which phrasal verbs can be separated?*" and "*What is the structure that can separate the main verb and the particle in a phrasal verb?*" (Schmitt & Redwood, 2011). These uses are influenced not only by transitivity and grammatical dimensions but also by context, intended meaning, and syntactic possibilities, further complicating the learning process for PVs (Schmitt & Redwood, 2011).

Schmitt and Redwood (2011) also argue that PVs in English are productive, meaning that the number of PVs increases over time, and new ones are continually formed. Gardner and Davies (2007) discuss that the most frequent 160 PVs in the corpus are generated from 20 verbs and 8 particles, which creates difficulties for ESL/EFL learners, as they may encounter a verb with a different particle in various contexts. Celce-Murcia and Larsen-Freeman (1999) refer to phrasal verbs as "ubiquitous," and Gardner and Davies (2007) support this notion by stating that learners of English are expected to encounter a PV every 150 words they are exposed to (p. 347). This ubiquity makes mastering PVs exceedingly complex and challenging.

In summary, English PVs are notorious for their complex and challenging nature, attributed to their unclear definition, unique properties in specific languages, extensive variability, polysemy, grammatical complexity, productivity, and ubiquity. Given these

challenges, PV constructions require special attention from language educators in the teaching process. In the following section, we explore traditional and current approaches to teaching PVs, along with potential issues stemming from these methods.

2.3. Conceptual Metaphor Theory

Conceptual metaphor theory originates from the term "metaphor," which is deeply ingrained in people's everyday conceptual systems (Lakoff & Johnson, 2003). This theory not only examines thoughts and actions but also delves into the structure of language itself. Conceptual metaphor theorists recognize that language serves as evidence for the largely metaphorical nature of our conceptual systems, which is because communication and interaction are integral components of the same system, grounded in our experiences with the external world (Lakoff & Johnson, ibid).

Conceptual metaphors are conceptualizations that reveal "*how humans perceive the world and how language's various aspects are organized*" (Tyler, 2008, p. 460). These metaphors also fundamentally shape everyday realities within our conceptual systems (Lakoff & Johnson, 2003). As such, these metaphors are crucial for understanding human thought processes, potentially even exposing unconscious thoughts (Johansen, 2007, p. 11).

Conceptual metaphors arise from the connections between knowledge from two distinct domains or concepts. In simpler terms, they involve mapping knowledge about one domain onto another, resulting in conceptual metaphors. These metaphors consist of two essential components: the target domain and the source domain (Lakoff & Johnson, 2003). The target domain is the concept being mapped onto, while the source domain is the concept being mapped from. The source domain provides the patterns of inference used to reason about the target domain (Lakoff & Johnson, 2003).

To clarify further, the source domain is a basic and readily accessible concept encompassing attributes, processes, and relationships that are semantically linked and stored together in the mind. Conversely, the target domain is a more abstract concept that cannot be directly experienced. It requires the aid of conceptual metaphors to reflect the features of the source domain. In this sense, the "logic" of a language is based on the relationships between the spatialized form of the language and the conceptual system, particularly its metaphorical aspects (Lakoff & Johnson, 2003).

2.3.1. Conceptual Metaphor Theory and PVs

The conceptual metaphor theory is grounded in the fundamental concept of "metaphor," deeply woven into the fabric of everyday human thought (Lakoff & Johnson, 2003). This theory not only explores the realms of thoughts and actions but also delves into the very structure of language itself. Scholars in the field of conceptual metaphor theory acknowledge that language provides substantial evidence for the predominantly metaphorical nature of our conceptual systems. This recognition stems from the fact that communication and interaction are integral components of this same system, rooted in our experiences with the external world (Lakoff & Johnson, ibid).

Conceptual metaphors serve as essential conceptualizations that illuminate "*how humans perceive the world and organize various aspects of language*" (Tyler, 2008, p. 460). These metaphors hold a central role in shaping our everyday realities within the framework of our conceptual systems (Lakoff & Johnson, 2003). Therefore, they are of paramount importance in comprehending human cognitive processes, and they may even unveil unconscious thoughts (Johansen, 2007, p. 11).

Conceptual metaphors emerge from the connections between knowledge from two distinct domains or concepts, effectively resulting from the mapping of knowledge from one domain onto another. These metaphors encompass two fundamental components: the target domain and the source domain (Lakoff & Johnson, 2003). The target domain represents the concept onto which knowledge is mapped, while the source domain embodies the concept from which knowledge is mapped. The source domain provides the inference patterns used to reason about the target domain (Lakoff & Johnson, 2003).

To further elucidate, the source domain consists of basic and readily accessible concepts such as attributes, processes, and relationships that are semantically interlinked and stored together in the mind. Conversely, the target domain is a more abstract concept that cannot be directly experienced. Consequently, it requires the assistance of conceptual metaphors to mirror the features of the source domain. In this context, the "logic" of a language is founded on the relationships between the spatialized form of the language and the conceptual system, particularly emphasizing its metaphorical aspects (Lakoff & Johnson, 2003).

3. Methodology

3.1. Participants and Research Setting
The current study was conducted at the School of Foreign Languages (SFL) at a state university in Turkey, which is a Turkish-medium university. The English preparatory class was obligatory for the students of the Faculties of Western Languages, Mathematics Teaching, and Electric and Electronical Engineering.

The participants of this study were composed of 60 elementary-level Turkish EFL students, who were selected according to the nonprobability sampling method, in which the researcher chooses the subjects as they are available and convenient in pre-determined classrooms/groups (Creswell, 2012). The participant number was determined through G*Power, a tool used to compute statistical power analyses in a study (Faul et al., 2009). Given the type of analysis and effect size in a study, G*Power calculates the optimal sample size, assuring an adequate power to detect statistical significance. In the present analysis, with 60 participants, the power was specified as .95.

3.2. Instruments
Data gathering instruments for treatment are separated into two: The instruments measuring receptive and productive PV knowledge in terms of achievement and

retention and the instruments measuring subconscious lexical recognition as well as formulaic sequencing and semantic processing gains.

3.2.1. PV Knowledge Tests

In order to investigate the achievement and retention of receptive and productive PV knowledge, two tests were administered – namely, a multiple-choice test and a c-test. Items in both of these tests were specified through Corpus of Contemporary American English (COCA; Davies, 2008), which is composed of more than 520 million words of text (20 million words each year 1990-2015) from various genres (Davies, 2008) and British National Corpus (BNC), which was originally created by Oxford University Press in the 1980s - early 1990s and consists of 100 million words of text from a wide range of similar genres (the British National Corpus, 2007).

The reason why COCA (Davies, 2008) and BNC were chosen as the reference corpus is that it is much easier to find specific contexts in which target PVs occur; hence, the contexts with sentences including PVs were extracted from these corpora and adapted as test items in both multiple-choice test and c-test. The criteria to choose the contexts were determined as follows: (1) There should be enough context for test takers to process and select the correct PV, and (2) the vocabulary level should be appropriate to participants' proficiency level. With these purposes, firstly the readability score of the items in both tests was calculated through the Flesch Reading Ease Readability Test (Flesch, 1948). The reason why this test was selected for the analysis is that this readability formula utilizes word and sentence length in a text to reveal how readable a text is, and thus, it is commonly used in the development of L2 reading materials (Crossley et al., 2011).

To evaluate receptive PV knowledge, *the multiple-choice test* format adopted by Schmitt et al. (2004) and Schmitt and Redwood (2011) was utilized in the present study. The test comprised 32 questions on target PVs, and test takers were to select one from five options according to this format. The three distractors were designed as semantically and formally close to the correct answer in terms of meaning, length, and structure. When the items were specified based on the contexts extracted from COCA, their readability analysis was calculated through the Flesch Reading Ease Readability Test (Flesch, 1948). The readability score of the overall multiple-choice test was found to be 80.8, which shows they are expected to be easily understood by target participants (Renuka & Pushpanjali, 2013). Secondly, the frequency of the words in items was assessed via Compleat Lexical Tutor (Cobb, 2007). The analysis revealed that 91.66% of the vocabulary in sentences was within the level of most frequent 1.000 or 2.000 words, which means that most of the words in the items of the multiple-choice test could easily be understood by the target participant group. Furthermore, item analysis was carried out to evaluate the quality and effectiveness of the individual test items and the test as a whole (Brown, 1996). For each item in the multiple-choice test, item difficulty and item discrimination analysis were employed. The KR20 calculation was also conducted to measure the overall test reliability. The analysis has indicated that most items are moderately difficult, and

nine are fairly easy. Just two of the items prove to be difficult. Concerning item discrimination, most items have a positive discrimination index of 0.3 or above, which reveals that test takers with high scores have a high probability of responding correctly, whereas the ones with low scores have a low probability. Finally, KR20 analysis has shown that the reliability coefficient is .81, which means that as it is above .80, this test has internal consistency and high reliability (Kubiszyn & Borich, 2000).

To assess the productive PV knowledge in a semi-controlled situation, *the C-test* format adapted from Schmitt et al. (2004) and Schmitt and Redwood (2011) was used in the current study. In this test format, the context was presented intact, but instead of words in target sequences, a blank was inserted. In order to constrain possible word choice for each blank, the initial letters of each word were given. As producing the target phrase appropriate to the surrounding context was crucial in this test, the meaning entailed by the context was provided in the right margin as part of the item. Also, the whole phrase was presented in bold to highlight that each blank belongs to a larger phrase (Schmitt et al., 2004). For the extracts taken from COCA, the Flesch Reading Ease Readability Test (Flesch, 1948) presented the readability score as 77.6, which reveals that the items are relatively easy to understand (Renuka & Pushpanjali, 2013). Regarding the frequency of the words evaluated via Compleat Lexical Tutor (Cobb, 2007), it was indicated that 92.68% of the vocabulary in sentences was within the level of most frequent 1.000 or 2.000 words revealing that the words in the test were easily understood. Furthermore, concerning the item analysis and difficulty analyses, most of the items proved to be fairly easy, and thus, no item is difficult. With respect to item discrimination, most of the items have a positive discrimination index of 0.3 or above, which indicates that the item is good at discriminating between good or bad test takers. KR20 analysis has shown that the reliability coefficient of the overall test is .77, which is acceptable (Fraenkel & Wallen, 1996).

3.2.2. PV Processing Tasks

Two instruments determined for investigating interface in the current study were the masked repetition priming lexical decision task and the self-paced reading task, as used in Obermeier's study (2015). The experiment was implemented by assessing subjects individually in a testing room by using a Hewlett Packard Elitebook 8560p personal computer, with 2.40 GHz Intel Core i7 processors, displayed on 15.6 inch LCD monitors. Both instruments were designed to measure response times (RTs); therefore, the tasks were created through PsychoPy, a software for developing psychological experiments (Pierce, 2007; 2009; 2018).

96 items, called targets, were created for *the masked repetition priming lexical decision task* (MRPLDT) through an open-source psycholinguistic software, PsychoPy (Pierce, 2007; 2009; 2018). With this lexical decision task, participants were expected to decide whether the PVs presented were English. On the computer keyboard, participants were to press the [X] button (labeled as YES) corresponding to their left index finger to say "YES" while they were to push the [N] button (labeled as NO) corresponding to their

right middle finger to say "NO". To continue with the following trail, they pressed the [SPACE] button (labeled as CONTINUE) corresponding to their right index finger, which was determined owing to the right-hand dominance of the upcoming self-paced reading task. Before starting the task, participants were given a handout with some instructions about the MRPLDT, and to warm up, the participants were provided 20 practice trials prior to the actual task, which focused on totally different PVs. Following the practice trail, participants started the actual task to be completed in 15 minutes.

The *self-paced reading task* (SPRT) was administered immediately after the MRPLDT. SPRT is an adapted version of the one used by Vine and Warren (2012) and Obermeier (2015) and was created via PsychoPy software (Pierce, 2007; 2009; 2018). Each item was comprised of a sentence as well as a comprehension question. The target PV was presented in the middle of the sentence and semantic associates were placed four to nine words after the PV. The first purpose of the self-paced reading task was to measure formulaic sequencing gains by focusing on the final word of critical PVs. In this SPRT, the words in the sentences were presented one by one; regarding the processing of PVs, subjects should expect the other components when they read the first word of a phrasal verb, which remarks that lexical priming takes place for words consistently occur together (Hoey, 2005). As previous studies have revealed and examined for formulaic sequences, faster RTs are observed in processing the final words of multiword sequences as a result of the priming effect of initial components (Wray, 2000, 2002; Underwood et al., 2004; Tremblay et al., 2011). The second purpose of this task was to analyze semantic association gains by examining semantic associates. The hypothesis was that critical PV in the sentences would act as semantic primes for their semantic associates. The premise of such a hypothesis is that meaning, as well as context processed during reading, have a priming effect on following semantically related words (McNamara, 2005; Elgort, 2011). There were 48 sentences and 6 example trials in the task, which took approximately 20 minutes for each participant to complete. While composing sentences, COCA (Davies, 2008) and BNC databases were utilized to provide participants with appropriate contexts. The items developed were also re-examined via the vocabulary profiler "Compleat Lexical Tutor, v.8.3" at www.lextutor.ca (Cobb, 2007). The analysis revealed that, excluding the common names, 92.04% of the vocabulary in sentences of SPRT was within the level of most frequent 1.000 or 2.000 words. Similarly, the comprehension questions were designed through the same procedure to keep the vocabulary level within the proficiency level of participants. Before starting the task, some instructions about the SPRT were given to the participants. The same three buttons on the keyboard were used for responding to the sentences in the task.

3.3. Instruction Procedure
3.3.1. Selecting the Target PVs/Particles
The target PVs and particles focused were presented as "OUT, UP, DOWN, BACK" because, according to Gardner and Davies (2007), these are the most frequent words functioning as adverbial particles (AVP) - their frequency is above 75% - that combines

with lexical verbs, and so account for more than half of the 518,923 PV occurrences in the 100-million-word BNC. Following that, a pool of target PVs was built up from the frequency lists by Liu (2011) and Garnier and Schmitt (2015). These lists were created based on the criterion that for a PV to be considered among the most frequent ones is 10 tokens per million words (PMWs) in either COCA (Davies, 2008) or the BNC (Liu, 2011; p. 667). Overall, the final 32 target PVs (Table 1) were selected from the ones participants had no knowledge of.

Table 1: Target PVs

Particles	Senses	PVs	
OUT	Entities moving out of containers	Come out	Set out
		Turn out	Move out
	Non-existence, ignorance, invisibility as containers	Figure out	Point out
		Carry out	Bring out
UP	Upward movement/ Position	Come up	Sit up
		Go up	Put up
	Up as an endpoint/ Completion	Hold up	Wind up
		Blow up	Break up
DOWN	Movement from a higher to a lower place	Go down	Come down
		Get down	Take down
	Decrease in quality, size, value, activity, status…	Break down	Bring down
		Lay down	Settle down
BACK	Return to or stay an earlier location	Put back	Step back
		Get back	Give back
	Return to an earlier state, time, situation	Turn back	Bring back
		Pull back	Come back

3.3.2. The Treatment

The study lasted 11 weeks, with a session each week (8 sessions) for treatment and a 3-week interval for the delayed posttests. Out of 8 sessions, 6 sessions were carried out as treatment based on explicit PV knowledge presented through conceptual metaphors, focusing on metaphorical orientations of the target particles, and 2 sessions were allocated to testing. Each treatment session was devoted to the explicit teaching of target PV constructions in context in the light of the Conceptual Metaphor Theory and took two class hours, 90 minutes. Each particle with the chosen PV was concentrated in each session with its deeper meanings. During the treatment process, subjects were expected to carry out three activities: Noticing, retrieval, and generative exercises. 7 types of tasks were designed, one of which was a noticing task, three of which were retrieval activities, and three of which were comprised as generative exercises (Kalay, 2019). Finally, as Schmitt (2007) states, *Expanding Rehearsal* schedules should be integrated into the teaching process for recycling vocabulary in a principled manner (p. 832-833); each PV session was followed with a revision session in the following week.

3.4. Data Collection and Analysis

Prior to introducing the treatment, a standardized proficiency test, the Michigan English Test, was conducted among all participants. The purpose was to ensure uniform proficiency levels among the participants and to align the activities, items, and exercises with their respective proficiency levels.

In Week 1, the multiple-choice test for examining the receptive PV knowledge and the C-test for investigating PV knowledge in a semi-controlled situation were employed to the participants. Moreover, to analyze how fast instructed PVs were processed, MRPLDT and SPRT were also carried out as pretests. Following these implementations, as participants might not be familiar with the concept of "metaphor", the term was identified as the figure of speech which constructs analogies and makes connections between entities and ideas (Cameron & Maslen, 2010) and some examples from their mother tongue were given for in-depth understanding.

The treatment procedure was initiated, as illustrated in Table 2. The instruction process took 6 consecutive weeks (90-min. sessions every week), and throughout the 6-week treatment period, the contributions of ontological and orientational metaphors of adverbial particles to the meaning of each PV was the main concern of the instruction.

Concerning the data analysis, first, normality tests were administered to examine whether the scores from the PV knowledge test and RTs from the processing tasks were normally distributed in a bell-shaped curve (Creswell, 2012). According to Tabachnick and Fidell (2013), the data with +1.5 and -1.5 deviation from the normality of Skewness and Kurtosis can be accepted as normally distributed. Therefore, both the test scores and the RTs in the present study have met the normality assumptions.

For the receptive and productive PV knowledge tests, one-way repeated measures ANOVA analyses were run to compare the mean scores of pretests, posttests, and delayed posttests. Moreover, to reveal where the significant difference occurred across three tests, pairwise comparisons with Bonferroni adjustment were carried out.

Concerning the comparisons of response times (RTs), to test whether the representations of explicitly presented target PVs could be accessed automatically, experimental conditions were created in a way that the primes were presented to the participants too briefly to process consciously in MRPLDT and SPRT. To make an overall comparison of the effects of explicit PV instruction on formal lexical processing as well as the processing of formulaic sequences and semantic associates, a one-way repeated measures ANOVA analysis was conducted in repeated test conditions (pretest/immediate posttest/delayed posttest). Pairwise comparisons with Bonferroni adjustment were carried out to examine where the significant difference occurs.

Table 2: Treatment Process

WEEK 1	Pretests
	  a) Multiple-choice test (Receptive PV knowledge)
	  b) C-test (Productive PV knowledge)
	  c) MRPLDT (Subconscious Lexical Processing)
	  d) SPRT (Formulaic sequencing & Semantic association gains)
	Introduction to the term "metaphor" with basic meanings of particles

WEEK 2	Presentation of 2 particles **(UP-DOWN)** with the PVs that students know and establishing the form-meaning connection of target particles (from concrete to abstract)
WEEK 3	Presentation of **UP** in the light of 2 senses determined referring to the form-meaning relations Exercises 1) Noticing activity 2) Retrieval activities 3) Generative activities
WEEK 4	Revision (UP) Presentation of **DOWN** in the light of 2 senses determined referring to the form-meaning relations Exercises 1) Noticing activity 2) Retrieval activities 3) Generative activities
WEEK 5	Revision (DOWN) Presentation of 2 particles **(OUT-BACK)** with the PVs that students know and establishing the form-meaning connection of target particles (from concrete to abstract)
WEEK 6	Presentation of **OUT** in the light of 2 senses determined referring to the form-meaning relations Exercises 1) Noticing activity 2) Retrieval activities 3) Generative activities
WEEK 7	Revision (OUT) Presentation of **BACK** in the light of 2 senses determined referring to the form-meaning relations Exercises 1) Noticing activity 2) Retrieval activities 3) Generative activities

WEEK 8	Overall revision of all 32 PVs
	Posttests
	  a) Multiple-choice test (Receptive PV knowledge)
	  b) C-test (Productive PV knowledge)
	  c) MRPLDT (Subconscious Lexical Processing)
	  d) SPRT (Formulaic sequencing & Semantic association gains)

WEEK 11	Delayed Posttests
	  a) Multiple-choice test (Receptive PV knowledge)
	  b) C-test (Productive PV knowledge)
	  c) MRPLDT (Subconscious Lexical Processing)
	  d) SPRT (Formulaic sequencing & Semantic association gains)

4. Findings

4.1. Achievement and Retention of PV Knowledge

The first research question investigated the effects of explicit PV treatment on the achievement and retention of receptive and productive PV knowledge through a multiple-choice test and a c-test. As demonstrated in Figure 1, findings put forward that an increase was observed in the mean scores of participants from pretests to delayed posttests in terms of the mastery and retention of productive PV knowledge, which indicated that participants showed a remarkable improvement as a result of the explicit PV instruction through conceptual metaphors in both tests. However, delayed posttest

results revealed a slight decrease from the mean scores of the immediate posttests to delayed posttests with respect to the retention of PV knowledge gained.
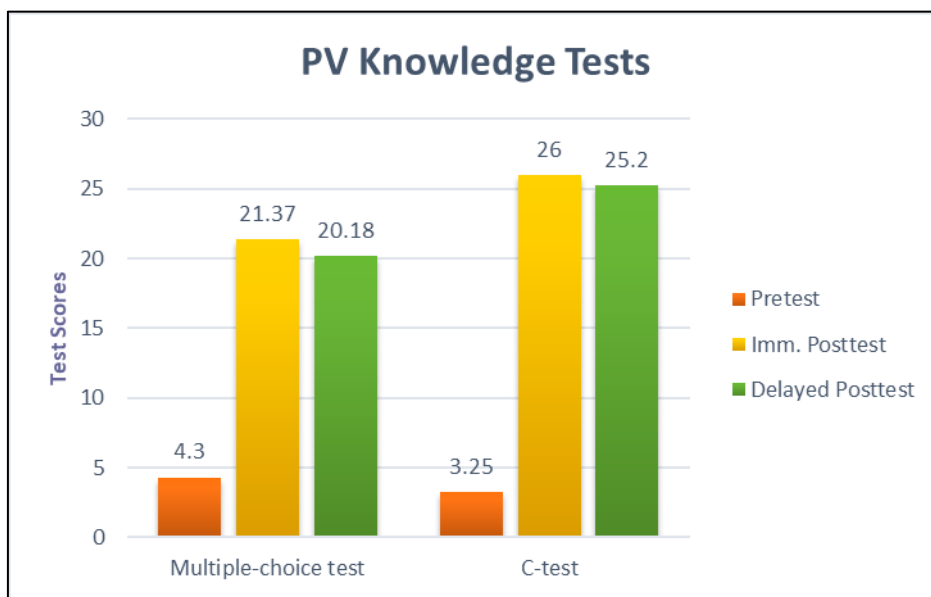

Figure 1: Comparison of Scores on Multiple-Choice Test and C-Test

Concerning the receptive PV knowledge, as illustrated in Table 3, the analysis revealed a statistically significant difference (F (2, 58) = 338,48, p<.001, ŋ = .921) across the pretest, immediate posttest and delayed posttest in terms of receptive PV knowledge scores in the multiple-choice test. The effect size was calculated to be large (ŋ = .921) (Cohen, 1988), which is explained as approximately 92% of the variance in the receptive PV knowledge scores of participants can be attributed to the explicit PV instruction in the light of conceptual metaphor theory. Moreover, when the Bonferroni adjustments were carried out, the analysis that explicit PV instruction in the light of conceptual metaphor theory not only had a crucial impact on the increase of receptive PV knowledge, but the treatment also facilitated the retention of receptive PV knowledge three weeks after the instruction.

Table 3: Receptive PV Knowledge

MC-test	N	Range	Mean	SD	F	p
Pretest	60	10	4,30	2,367		
Immed. posttest	60	21	21,37	4,712	338,48	,000*
Delayed posttest	60	22	20,18	6,091		

* The mean difference is significant at the ,001 level.

As for the productive PV knowledge, Table 4 illustrated that the ANOVA analysis revealed a statistically significant difference (F (2, 58) = 1144,31, p<.001, ŋ = .975) across pretest, immediate posttest and delayed posttest with respect to productive PV knowledge scores in C-test. The effect size was calculated to be large (ŋ = .975) (Cohen, 1988), which is explained as approximately 97% of the variance in the productive PV

knowledge scores of participants can be attributed to the explicit PV instruction in the light of conceptual metaphor theory. Similar to the previous analysis of Bonferroni adjustments, explicit PV instruction in the light of conceptual metaphor theory had a statistically significant influence on the increase of productive PV knowledge in a semi-controlled situation. What is more, the retention of semi-controlled productive PV knowledge was also facilitated by the treatment three weeks after the instruction.

Table 4: Productive PV knowledge

C-test	N	Range	Mean	SD	F	p
Pretest	60	8	3,25	2,229		
Immed. posttest	60	16	26,00	3,888	1144,31	,000*
Delayed posttest	60	21	25,20	4,418		

* The mean difference is significant at the ,001 level.

4.2. Response Times in MRPLTD

First, the prime types were analyzed within each pretest, immediate posttest and delayed posttest in MRPLTD.

Table 5: Analysis of Prime Types on MRPLDT

MRPLDT	N	Range	Mean	SD	t	df	p
Pretest							
Identity prime	60	786,97	776,00	177,74	-1,798	118	,075
Unrelated prime	60	776,36	834,62	179,37			
Immediate posttest							
Identity prime	60	449,60	611,59	99,87	-4,014	118	,000*
Unrelated prime	60	570,26	695,36	127,08			
Delayed posttest							
Identity prime	60	569,32	600,89	108,80	-3,396	118	,001*
Unrelated prime	60	455,42	667,55	106,20			

* The mean difference is significant at the ,005 level.

As Table 5 suggested, there was a statistically significant difference between the mean RTs of identity and unrelated primes, which reveals that the processing of target PVs in terms of formal representations was much more facilitated by identity primes than unrelated primes right after the explicit PV instruction in the light of conceptual theory. When the RTs formal lexical representations in MRPLDT were investigated, Table 6 showed that participants got faster in formal processing and recognizing target PVs from the pretest to the immediate posttest as a result of the explicit PV instruction in the light of conceptual metaphor theory. On the other hand, when the internalization of target PVs three weeks after the treatment was concerned, RTs in the delayed posttest indicated a just slight decrease from the mean RT of the immediate posttest, which shows that participants' processing speed did not change much in delayed posttest compared to the speed change between the pretest and the immediate posttest.

Table 6: Subconscious Lexical Recognition on MRPLDT

MRPLDT	N	Range	Mean	SD	F	p
Pretest	60	751,52	804,79	170,97		
Immediate posttest	60	494,36	653,08	107,54	42,674	,000*
Delayed posttest	60	414,70	634,05	97,22		

* The mean difference is significant at the ,001 level.

4.3. Response Times in SPRT

To examine the impacts of explicit PV instruction through conceptual metaphors on formulaic sequencing gains, RTs for the final word of PVs, the particles, were measured and compared in pretest, immediate posttest, and delayed posttest in SPRT. The final word was selected for this analysis because this design resembles a priming experiment since the words in the task are read one at a time, and reading the verb in a PV will prime the processing of the following particle. Hence, the verbs served as primes, whereas the particles served as targets, which leads to the analysis of formulaic sequencing gains through the RTs of particles in SPRT.

Table 7: Formulaic Sequencing Gains on SPRT (FS)

SPRT – FS	N	Range	Mean	SD	F	p
Pretest	60	589,53	600,02	144,28		
Immediate posttest	60	457,71	414,73	90,73	109,301	,000*
Delayed posttest	60	302,34	347,98	69,49		

* The mean difference is significant at the ,001 level.

Based on the comparison of the mean scores, Table 7 suggested that explicit PV instruction in the light of conceptual metaphor theory significantly facilitated the processing of target particles in SPRT. The significant difference between the immediate and delayed posttests can be attributed to incidental learning from doing the same task three times (Obermeier, 2015; p. 141).

Moreover, to investigate the effects of the explicit PV instruction on semantic association gains, RTs for the semantic associates, purposely presented a few words after the target PVs in each item in SPRT, were compared and analyzed in the pretest, immediate posttest and delayed posttest. This structure in the task created a condition similar to the semantic priming in that PVs acted as primes, and semantic associates following them in a few words acted as targets in the analysis. Semantic association gains were scrutinized through the RTs of semantic associates in SPRT.

Table 8: Semantic Association Gains on SPRT (SA)

SPRT – SA	N	Range	Mean	SD	F	p
Pretest	60	788,49	656,11	169,26		
Immediate posttest	60	458,52	429,46	95,07	101,094	,000*
Delayed posttest	60	340,66	354,60	64,91		

* The mean difference is significant at the ,001 level.

As can be understood from Table 8, similar to the processing of formulaic sequences in SPRT, explicit PV instruction in the light of conceptual metaphor theory significantly facilitated the processing of target semantic associates, as well. Besides, the fact that the difference between immediate and delayed posttests was significant can again be attributed to incidental learning as participants became familiar with the self-paced reading procedure and the items in the task from doing the same task repeatedly (Obermeier, 2015; p. 182).

5. Discussion

As a starting point of the present study, we followed the view that metaphorical orientations of particles in PVs are constructions that might be present in learners' minds; however, this does not necessarily mean that they will actively use them in the language learning process (Kovecses & Szabo, 1996). Hence, for them to be activated, language learners must be explicitly taught about orientational metaphors before they can fully master the PV constructions.

In English, although many PVs are bound to the literal senses of the component words, orientational metaphors play the main role in verb analysis (Valerio, 1998). Therefore, it may be acknowledged that a link between metaphorical concepts and PVs can be established, and the meanings of PVs can be clarified under the metaphorical concepts provided by orientational metaphors. Within this study, it has been evident that the "spatial movement" feature of particles acted as a bridge between core and metaphorical meanings of particles, hence linking the particles to the metaphorical orientations and applying the conceptual metaphor theory to the acquisition of PVs. In this sense, the instruction has proved to be fruitful for participants in associating the PV meanings to the hidden metaphors of the particles both in the short and long term. However, most studies in the literature focus on the short-term effects of the conceptual metaphor theory by comparing it to the traditional memorization method. For example, the study by Nhu and Nguyen (2009) was based on the theory of cognitive linguistics and conceptual metaphors to organize PVs within the scope of four particles, which were *in*, *out*, *up* and *down*. The findings of their study were gained from the performance of the students on the exercises in the worksheets, which were given immediately after the 10-minute presentation of metaphors. However, with a pretest/posttest design (within-subjects comparison), the present study investigated not only the immediate short-term but also the long-term PV knowledge gains as a result of the treatment based on the conceptual metaphor theory.

As the other concern of this study was to scrutinize the effect of explicit PV instruction in the light of conceptual metaphor theory on the long-term retention of receptive and productive PV knowledge, the current study revealed some significant contributions of the current PV treatment to not only the effective learning but also the recalling of the PVs. In other words, the recognition of PVs was maintained in mind even three weeks after the treatment. These findings of the study are in line with the results of

some other previous studies. As an example, in his study, Ganji (2011) compared the effectiveness of translation, sentential contextualization, and metaphorical conceptualization in PV learning. His comparison revealed that all three techniques facilitated learning equally regarding target particles - *up, down, off,* and *out*. However, when retention was concerned, sentential contextualization and metaphorical conceptualization proved much more effective than translation.

In addition to these studies, a recent study on whether the conceptual metaphor approach was effective with respect to the achievement and retention of PV knowledge was conducted by Güleryüz Adamhasan (2014) in a Turkish high school as an ESP context. Similar to the study by Hu and Lou (2013), Güleryüz Adamhasan (2014) designed a study based on different senses of target particles - *up, down, out, in, into, off* - and teaching as well as recycling them during the treatment process. In terms of long-term retention, her analysis underlined the facilitative influence of conceptual metaphors on PVs' retention over two weeks. The present study further supports the facilitative results on long-term PV knowledge gains in that the retention period was extended to three weeks, and still, there was no significant loss in the retention level of the participants.

On the contrary, the findings of the present study contradict the findings of Yang and Hsieh (2010), who argued against the evidence of conceptual metaphor awareness facilitating memory retention of PVs. Similar to the studies above, these researchers compared the traditional translation method with conceptual metaphor theory in two different participant groups, experimental and control. As for the treatment, the study focused on *off* and *up* as particles in a session and provided explanations either in the form of L1 translations or metaphorical concepts. The distinctions in the treatment process may appear to explain Yang and Hsieh's (2010) findings on conceptual metaphor theory not fostering PV knowledge retention contrary to the findings of the present study.

Apart from these, the productive dimension of vocabulary learning carries great importance as learners could prove their vocabulary knowledge by using it productively (Nation, 2001). Therefore, different from the studies mentioned above, the present study investigated both receptive and productive PV knowledge gains in terms of both achievement and retention. The findings indicated that teaching PVs based on the metaphorical orientations of particles led to the productive use and long-term persistence of PVs.

Overall, the current research differs from the previous studies as it concentrates not only on receptive but productive PV knowledge gains in terms of both short-term and long-term memory load. As a conclusive remark, this study's results indicating significant gains in achievement and retention of PVs validate that conceptual metaphor theory has facilitated PV mastery and long-term retention of these structures as it reveals the hidden relationships between conceptual metaphor expressions and PVs (Kövecses, 2002).

As another motivation for the study, the subconscious lexical recognition and processing have been investigated, and according to Ellis (1996), language learning is

layered as a process of sequence learning, and within this perspective, vocabulary learning requires sequencing the formal and phonological features of the words and then associating these forms with specific meanings.

Concerning the comparison of overall response times, the analysis of the overall processing speeds of the participants in the present study revealed significant differences between pretest and immediate posttest, emphasizing that explicitly taught PVs in the light of conceptual metaphor theory were transferred through implicit processing mechanisms and thus internalized. Besides, no statistical difference in RTs was observed among immediate and delayed posttests, only 19 ms. As Ellis (2005) explains, explicit teaching serves as an initial register for language mechanisms, which are later regulated and integrated into the system as implicit knowledge when followed by subsequent input processing, whereas implicit lexical knowledge starts to improve immediately with the former explicit learning task (p. 305). Indeed, the form-meaning connection of vocabulary is established immediately after learners encounter words in context and resort to differing strategies in order to reach the meaning. Within this perspective, in this study, subconscious lexical recognition and processing of PVs was immediately facilitated following the explicit PV instruction through conceptual metaphors, and this knowledge was retained throughout three weeks. These findings also support Obermeier (2015) in that he measures the RTs of the learnt and not-learnt multiword units both in the pretest and posttest with respect to both the priming condition (identity vs. unrelated) and meaning condition (figurative vs. literal). In both of the conditions, the RTs for the pretests were much higher than the RTs of the posttest, even for the not-learnt multiword units. The facilitated recognition and processing of target multiword units verified their subconscious activation in the lexicon and integration into the lexical representational system, leading to implicit knowledge gains.

For the semantic processing, two different analyses were carried out, one of which focused on the formulaic sequencing gains and the other on semantic association gains. As the first sub-question of the current analysis, whether the target PV was acquired as a chunk or not (formulaic sequencing gains) was scrutinized by comparing RTs of the final words of PVs, which are the particles in the SPRT. The reason why the final words were determined to be investigated in the study is that formulaic sequencing is similar to *the lexical priming* proposed by Hoey (2005, p. 8):

"We can only account for collocation if we assume that every word is primed for collocational use. As a word is acquired through encounters with it in speech and writing, it becomes cumulatively loaded with the contexts and co-texts in which it is encountered."

The comparison between mean RTs of particles during the pretest and immediate posttest revealed a statistically significant difference in the present study. That is to say, participants' processing of particles got faster right after the treatment. This finding is incongruent with the findings of Obermeier's (2015) study, which indicates no significant differences between learnt and not-learnt multiword units between the pretest and

posttest. This could be due to the choice of words as he also states that the multiword units, which were lexical bundles, were presented one word at a time in the task; the instrument might not have properly measured the gains made in processing the targets as wholes (p. 200). Likewise, with the same measurement concern, Schmitt and Underwood (2004) compared the RTs of words in formulaic sequences with the RTs of the same words in non-formulaic contexts, and no significant difference was found. However, to overcome the measurement problem in SPRT, Tremblay et al. (2011) varied the presentation format in their SPRT with word-by-word, chunk-by-chunk, and full-sentence presentation formats. Regardless of the type of presentation, all of these formats resulted in significantly faster processing in formulaic contexts, which indicates that SPRT properly measures the vocabulary gains made during processing.

Apart from these, when the RTs in the delayed posttest are concerned, decreases in RTs resulted in a significant difference between the two posttests, which is in line with the findings of Laufer and Girsai (2008) in that engaging in cognitive processing with formulaic sequences is believed to aid retention. As target PVs were presented explicitly through conceptual metaphors based on the metaphorical orientations of particles in the current study, the facilitative effect of the orientational explanation cannot be disregarded for short-term and long-term vocabulary gains. These findings can indicate that explicit PV instruction has led to the increased processing speed of formulaic sequences after a three-week interval; however, it may also be due to the repeated practice since the participants received the processing task three times as pre/post/delayed posttest (Obermeier, 2015).

Overall, different from the other studies in the literature, the present study centered around an explicit PV instruction process based on the metaphorical orientations of particles and the effect of this teaching on the formulaic sequencing gains of PV knowledge. Besides, whether this holistic processing has been short-term or long-term has also been examined. The findings have indicated the facilitative effect of the instruction process on the long-term holistic processing of target PVs.

As for the semantic association gains investigated through the same SPRT by comparing the RTs of semantic associates, the findings confirmed that the treatment significantly activated the meaning representations of the PV as the primes and thus facilitated the processing speed of the semantic associates, which is also not in line with the findings of Obermeier (2015). Following the deliberate learning treatment, providing the target multiword units out of context through flashcards and L1 equivalents, he also examined the RTs of semantic associated in the SPRT. However, his study revealed that differences between RTs of learnt multiword units in the pretest and posttest were insignificant, which shows a relatively small effect of deliberate vocabulary learning through flashcards, whereas in the present study, the psychological processes (Nation, 2001) required to acquire a word were followed based on the instructional treatment on the metaphorical orientations of particles in the light of conceptual metaphor theory. Overall, it can be asserted that following the treatment based on the conceptualization of particles, target PVs have been semantically internalized and retained. Furthermore,

these findings in this study are congruent with the results of Elgort's (2007, 2011) study in that she used pseudowords as objects of the treatment, ensuring no prior knowledge was attained before her experiments. As a result, positive semantic priming effects were found when target word processing was fostered by the prior presentation of primes with related meanings, which is a fairly robust facilitation effect reflecting the features of lexical knowledge in which semantically affined vocabulary are interlinked (McRae & Boisvert, 1998).

As an overall conclusion, the present study has supported both the short-term and long-term effects of the conceptual metaphor theory-based PV instruction. Besides, the findings could be considered with respect to the interface debate in the field of SLA. The results of the study have revealed the positive effects of explicit PV teaching on not only explicit receptive and productive PV knowledge gains but also implicit PV knowledge gains through both knowledge tests and psycholinguistic performance data. Hence, it can be stated that an interaction exists between explicit and implicit knowledge types. As Ellis (2005) puts forward, *"On the whole, the learning, representation, and processing of language is part of the same dynamic network system."* (p. 341).

6. Conclusion

The current research set out in order to explore the interface between explicit PV knowledge and implicit PV knowledge gains. With this purpose, this study investigated the impact of explicit PV instruction in the light of conceptual metaphor theory on not only the achievement and retention of receptive and productive PV knowledge but also the recognition as well as formal, formulaic, and semantic processing, leading to the internalization, of the PV structures.

A highly common criticism about PV instruction in the literature (Darwin & Gray, 1999; Gardner & Davies, 2007; Tyler & Evans, 2004) has been the traditional application that is the way of presenting the target structures in lists with their L1 equivalents or in reading texts/listening scripts and urging learners to remember, in other words memorize, these verbs themselves since they appeared to be completely random and complex (Cornell, 1985). With the difficulties PVs pose for non-native learners because of their unpredictable, random, and complex nature (Lee, 2012; White, 2012), it has become evident that learners avoid using these structures in production (Liao & Fukuya, 2004; Kayael, 2007; Barekat & Baniasady, 2014; Güleryüz Adamhasan, 2014; Saltık, 2014; El-Dakhs, 2016). Due to this problem of avoidance, the question of how to teach PVs effectively has become a matter of debate in the field of language teaching. Studies showed that PVs are not acquired in a natural way (Coady, 1997). Therefore, explicit teaching of PVs has been one of the core solutions to these problems to facilitate learners' PV acquisition (Lewis, 1997). It is also evident that PVs are multiword constructions consisting of a verb followed by an adverbial particle (Biber, Johansson, Leech, Conrad & Finegan, 1999), which gathers the attention rather than the main verb in interpretation (Richards & Schmidt, 2010, p. 436). That is to say, it seems crucial for learners to be aware

of the importance of particles to eliminate the difficulties they face while learning PV constructions.

In the current study, orientational metaphors of particles are utilized in order to ease the learning of these structures as they serve as pervasive everyday thoughts, being a part of conventional language and thus playing a central role in organizing the human conceptual system (Lakoff & Johnson, 2003). When language learners realize the associations between orientational metaphors and peoples' physical and cultural experiences, it becomes much more meaningful to explore the semantic networks phrasal verbs represent. Therefore, it is vital to raise learners' awareness about conceptual metaphors and awaken them about the bridge between these metaphors and particles so that they are able to create their own strategies in dealing with PV constructions. To succeed in this, explicit instruction on PV constructions is required with a basis of conceptual metaphors.

This explicit instruction is also necessary as conceptual metaphors include abstract meanings. At first, learners might have some difficulties in understanding the metaphorical meanings of particles; however, with contextual experiences accompanied by productive practices, it becomes much easier for them to embody these abstract meanings and visualize them. Therefore, metaphorical orientations of particles in phrasal verbs should be provided in such meaningful contexts that learners' cognitive load of PVs will be less demanding.

The final pedagogical implication of this research emphasizes that in the class materials and textbooks, language exercises and activities should be designed grouping PVs centered on the orientational meanings of particles, not the main verbs. Generally, PVs are presented to language learners by groups of a main verb followed by different particles in web diagrams (Carter & McCarthy, 2006). This kind of representation leads the way to rote memorization as it provides limited contextual clues for in-depth understanding. However, when the PVs are presented to the learners in groups with respect to the metaphoric senses of particles, they are able to make associations easily and understand the logic behind these hidden relations. Another point to mention is that material developers and curriculum writers should include more image schemas and visuals in the textbooks in addition to the previously mentioned PV presentation, as these pictures are expected to provide in-depth aid for strengthening the associations between orientational metaphors and particles.

Apart from these, the current study has attempted to shed light on whether explicitly presented declarative knowledge is automatized and internalized as implicit knowledge, which is addressed as the interface of the knowledge types (Gass & Selinker, 2008). Discussion on this hypothesis appears to continue in the field of second language acquisition; however, they generally refer to high-level constructions and abstract rules, emphasizing the process of grammar acquisition (Ellis, 2005; Sorace, 2011). In line with this premise, the present study has shed light on the interface position between explicit instruction and implicit knowledge with respect to PV acquisition. Different aspects of vocabulary acquisition, such as subconscious lexical recognition and processing,

formulaic sequencing and semantic associating gains, have been investigated to explain the interface position in terms of lexical dimension. All in all, different measurements have been utilized for proving the strong interface position; therefore, as a methodological implication, it could be stated that multiple measurements, at least for the evaluation of different aspects of lexical acquisition, should be implemented to make reliable descriptions.

As for further research, first of all, a cognitive linguistic approach focusing on meaning-enhanced awareness of orientational metaphors has been utilized as an explicit teaching technique for PV acquisition. Application of this complementary technique may also be helpful in the acquisition of not only PVs but also other multiword sequences such as compound nouns like *income, intake, output, downfall,* etc., or idioms, collocations, and lexical bundles in which contributions of particles to the holistic meanings cannot be disregarded. Second, regarding the production of phrasal verbs, an uncontrolled writing task can be used in future studies to elicit learners' productive PV knowledge. Furthermore, as mentioned in the limitations section, another delayed posttest can be administered after a few months to investigate whether explicitly presented PV has become a part of fluent productive PV knowledge. Finally, the analysis of recognition and processing in the present study was carried out only through visual stimuli. Therefore, it will be interesting to examine the impacts of explicit teaching on implicit knowledge gains responding to auditory stimuli.

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Conflict of Interest Statement

The authors declare no conflicts of interest.

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