November 2018

The Effects of Using Textual Enhancement on Processing and Learning Multiword Expressions

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The Effects of Using Textual Enhancement on Processing and Learning Multiword Expressions

by

Adel Zain Alshaikhi

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Second Language Acquisition and Instructional Technology Department of Teaching and Learning College of Education University of South Florida

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Date of Approval: October 31, 2018

Keywords: Textual enhancement, idioms, collocations, comprehension

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DEDICATION

I dedicate this work to my mother Fatimah, father Zain, wife Wedyan, and my daughter Lana.
For their endless support and prayers throughout all the process of studying abroad. I also
dedicate this work to my sister Maryam and brothers Belqasem, Ahmad, and Mohammed. They
have been always there when I need them.
ACKNOWLEDGEMENTS

First and foremost, this work will be impossible to finish without the endless support, enthusiasm, and guidance from my major professor Dr. John I. Liontas! He never spared a moment to teach me both the art of research and to be a successful academic. His advice and debates about research have been always inspiring me to be a better researcher and above all to be a better person. I will miss your debates, discussions, and jokes Dr. Liontas!

My sincere thanks go to Dr. Sanghoon Park, Dr. Janet Richards, and Dr. Philip Smith. They made up such a great committee, helping and guiding me throughout all the stages of research in the quantitative and qualitative part. Dr. Park’s comments and suggestions in the quantitative part were very helpful and I have learned new ways of conducting quantitative types of studies. In the qualitative part, Dr. Richards taught me how to best address research problems using the right qualitative approach. Her insights and guidance sharpened my skills to think and reflect on the use of qualitative approaches. Dr. Smith’s suggestions for the overall conception and ideas in the dissertation have greatly helped me to ensure a quality and precise work.

I would like to express my gratitude to those participants who had dedicated time and effort to participate in this research without any incentives. Without them, I would never have completed this work. Thank you very much!
I want to express my gratefulness for the Institute of Public Administration (IPA) in Saudi Arabia. The IPA provided me with a generous scholarship covering tuitions, health insurance, travel expenses and other expenses to ensure I succeed in my Ph.D. endeavors.

Last but not least, my thanks go to all those who supported me including my cohorts, friends, and employees of the University of South Florida. To all the people who stood beside me while I am in Florida, thanks from the bottom of my heart!
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ABSTRACT

Multiword Expressions (MWEs) are crucial aspects of language use. Second language (L2) learners need to master these MWEs to be able to communicate effectively. In addition, mastering these MWEs helps L2 learners improve their cognitive processing of language input. In this study, my primary objectives were to explore the effectiveness of using Textual Enhancement (TE) to assist L2 speakers’ comprehension of MWEs, to explore whether there is a difference in comprehension between collocations and idioms, and finally, to explore how L2 speakers transact the MWEs’ meanings as presented in texts.

While several researchers have explored how input enhancement in general helps L2 learners to learn collocations and idioms for productive use (e.g., Boers et al., 2017; Pam & Karimi, 2016), my focus in this study was to understand and explain in depth how the technique of TE helps L2 learners comprehend MWEs. I included in this study two types of MWEs: collocations and idioms. I also studied the differences in the comprehension between these two types to further understand the transparency factors in the comprehension process.

I employed an explanatory sequential mixed methods design in which I used experimental quantitative methods and qualitative methods in one study. In phase one, I started with the experimental part and followed with the qualitative analysis to explain in depth the outcomes of the experimental part. In the qualitative section, I followed an explanatory descriptive case study approach to obtain a deeper understanding of how the participants transacted the meanings of the MWEs.
A total of 26 adult Arabic-speaking students in a major Southeastern university in the United States of America volunteered to take part in this study. I collected data through: (1) a reading proficiency test, and (2) a brief survey to gather background information, self-evaluation of language proficiency, and previous experiences with MWEs. In the experimental part, I presented 20 paragraphs derived from online newspaper and magazine articles. Each paragraph contained a collocation or an idiom. Following each paragraph, I presented multiple-choice questions to measure the comprehension of the MWE in the paragraph and an open-ended question for the participants to describe how they had comprehended the MWE. I divided the participants into control and experimental groups in which the MWEs were textually enhanced in the experimental group using bolding, italicization, and highlighting.

The results of the study demonstrated TE was effective in assisting the participants to comprehend idioms. In contrast, TE did not show a significant effect in leading the participants to comprehend the collocations. The qualitative data analysis showed the participants used contextual factors, guessing, constituents of the MWEs, and similarities of the MWEs with the first language (L1) as the major strategies to comprehend the MWEs meanings with different degrees between both groups.
CHAPTER ONE:  
INTRODUCTION

Background

Speakers of any language use large numbers of prefabricated chunks of language or multiword expressions. Among the different types of these multiword expressions are collocations and idioms. Native speakers of English use collocations such as do homework or pay a visit. However, non-native speakers may make mistakes in grouping these words together. For example, Arabic-speaking students may say write/solve homework instead of do homework. Non-native speakers often do not comprehend idioms from the literal meanings of their constituent words because their overall meanings are not clear. Consequently, idioms such as rain cats and dogs, and hit the roof may cause communication breakdowns, misunderstanding, and frustration among non-native speakers (Liontas, 1999, 2002c, 2013, 2015b, 2017).

Collocations and idioms are described in the research literature with different terms that reflect the different approaches and standpoints researchers take in their various disciplines. In this study, I collectively refer to collocations and idioms as Multiword Expressions (MWEs). MWE is a cover term describing groups of words that have a high probability of co-occurring in language use. There are many types of MWEs such as collocations (e.g., shrug shoulder, pay a visit), phrasal verbs (e.g., give up, put off), and idioms (e.g., pull one’s leg, red flag). MWEs are
increasingly gaining attention in the field of second language acquisition (SLA). Researchers have explored the notions of MWEs from various perspectives, such as psycholinguistics (e.g., Ellis, Frey, & Jalkanen, 2009; Weinert, 2010) and SLA (e.g., Conklin & Schmitt, 2008, 2012; Ellis, 2012; Ellis, Simpson-Vlach, & Maynard, 2008; Liontas, 1999, 2002a, 2002b; Schmitt, 2004). Researchers in these fields have shown that MWEs constitute an essential aspect of both language processing and language fluency and accuracy. For example, Ellis, Frey, and Jalkanen (2009) found that native speakers demonstrate faster processing of highly frequent verb-argument structures such as *end war* and *stop whingeing* and booster/maximizer-adjectives collocations such as *badly mauled* and *deeply opposite* than less frequent ones.

Many researchers in the field of SLA posit second language (L2) learners should be aware of these MWEs. L2 learners may face difficulties in identifying and developing awareness of MWEs. Ultimately, these difficulties can affect L2 learners’ performance and fluency even in advanced proficiency levels (Ellis, 2012; Fan, 2009; Liontas, 2015b, 2017; Meunier, 2012; Schmitt, 2004). Numerous textbooks and dictionaries exist to help L2 learners learn MWEs. For example, there is the *BBI Combinatory Dictionary of English* by Benson, Benson, and Ilson (2010) and the *Oxford Collocations Dictionary for Students of English* (2002) for collocations; *English Idioms in Use* by O’Dell and McCarthy (2010) for idioms; and *Longman Pocket Phrasal Verbs Dictionary* (2002) for phrasal verbs, as well as other dictionaries and textbooks dedicated to various types of MWEs. Yet, L2 teachers and curricula designers need to highlight collocations (Schmitt, 2004; Tsai, 2014) and idioms (Liontas, 2013, 2015a, 2017) in their teaching practices and textbooks because research shows L2 learners face challenges in
understanding and producing MWEs properly (e.g., Farghal & Obiedat, 1998; Irujo, 1993; Yorio, 1989). Among the various techniques that can assist L2 learners to learn MWEs is *Textual Enhancement*.

Textual enhancement (TE) is a method or a technique of presentation that helps draw L2 learners’ attention to language grammatical features and vocabulary patterns when applied to texts (e.g., Han et al., 2008; Smith, 1991, 1993). This extends to MWEs as some of the important vocabulary patterns L2 learners should notice and learn when they encounter them in texts. Reading, as a context of TE, is considered an essential skill in the academic world and everyday life (e.g., reading news or reports), not to mention that reading is a rich resource for learning new languages (Angel, 2014; Boers et al., 2017; Goudarzi & Moini, 2012; Grabe, 2009; Mall-Amiri, Alizadeh Oghyanous, & Zohrehvand, 2017).

Thus, I argue it is beneficial for L2 learners to make use of reading to learn the forms and the meanings of the language they attempt to acquire. In the realm of technology, reading has been a topic of extensive research. Using glosses and multimedia throughout reading materials can facilitate vocabulary learning by helping L2 learners avoid the daunting process of frequent consultations with dictionaries, which may wind up hindering rather than aiding comprehension. Liontas (2001b, p. 53) noted that “virtually all foreign language textbooks to date exhibit some type of ‘glossing,’ whether it is in the form of short definitions or notes that explain the meaning of unfamiliar words, typically on the side or bottom margins of the page”. The application of TE to MWEs in reading materials might help L2 learners; that is, it can raise their awareness and trigger further processing of these MWEs in meaningful contexts.
Meaningful exposure to vocabulary in reading texts is a critical factor to promote vocabulary development. According to Oxford and Scarcella (1994, p. 236), L2 learners should read extensively so that meaningful encounters of vocabulary in texts can help them in forming “a rich conceptual knowledge of the words.” TE of MWEs in reading materials should provide L2 learners with the conditions conducive to discovering the connections between the constituents of the MWEs, and given the meaningful context, increase the chances of understanding and learning these MWEs (Liontas, 2002a).

**Purpose of Study**

The purpose of this study was threefold. First, I explored how TE can lead the participants to notice and comprehend the MWEs (collocations and idioms) presented in texts. Second, I studied the differences between comprehending collocations and idioms as two different types of MWEs. Third, I employed qualitative methods to explore the processes, or in another term, the transactions the participants demonstrated to reach the meanings of the MWEs. The various perspectives I employed in this study were useful in broadening the understanding of the phenomenon of MWEs and shedding light on how TE might be a helpful tool to draw the attention of the participants to MWEs, to increase their identification, and ultimately lead to MWE comprehension.

In this study, I draw on two theoretical frameworks in developing a methodology to increase the effectiveness of teaching and learning MWEs: Smith’s Input Enhancement hypothesis (Smith, 1993) and Liontas’ (1999, 2002c, 2002a). First, Smith (1993), in his Input
Enhancement hypothesis, posits that L2 learners should be aware of the language they receive and that the features of the language should be highlighted to achieve learning. Second, Liontas (1999, 2002c, 2002a), in his Idiom Diffusion Model, postulates that contextual and pragmatic factors play important roles in idiom processing and understanding. As input enhancement can play a significant role in the attention dynamics of L2 learners to language forms, the Idiom Diffusion Model provides a comprehensive framework to understand the cognitive processes underlying transacting the meanings of the MWEs (I provided further discussions in Chapter 2).

**Research Questions**

Since I adopted a mixed methods design, I designed three research questions to guide the study. In the quantitative phase, I addressed the questions of the effects of textual enhancement (TE) in leading the participants to process and comprehend the MWEs (collocations and idioms) presented in texts, and whether there was a difference between collocations and idioms in terms of comprehension.

1. Does textual enhancement help the participants to comprehend different types of Multiword Expressions?
2. Is there a difference in comprehension between collocations and idioms?

In the qualitative phase, I addressed the question of the experiences of learning MWEs, specifically in what ways the participants reached the meanings of the collocations and idioms presented in the texts. The main question in this phase is;
3. In what ways do the participants describe their experiences of processing and comprehending Multiword Expressions?

**Significance of Study**

In a world characterized by fast-paced events and limited time in classrooms, L2 educators and language teaching professionals seek practical solutions to address learning and teaching difficulties. Research shows MWEs are some of the most difficult language patterns for non-native speakers. Even students in advanced levels struggle with grouping the words correctly. TE can be a practical solution to help L2 learners master these MWEs (e.g., Barfield & Gyllstad, 2009a; Liontas, 2015a). Reading several times and pausing reading to look up words or to pay attention to specific language items can be time consuming and daunting. Therefore, TE can be a practical solution curriculum designers and teachers of other languages can implement to improve learning.

The findings of several research studies suggest that native speakers process words in MWEs as whole units (e.g., Choi, 2017; Matsuno, 2017; Siyanova-Chanturia, Conklin, & Schmitt, 2011). Therefore, raising L2 learners’ awareness of these type of linguistic units is necessary because learning MWEs might help to facilitate native-like processing of language and help to conserve the working memory resources for faster and fluent language use (Henriksen, 2013). Adding to that, MWEs that are wholly or partially idiomat (non-compositional) are important because their meanings are indiscernible from their constituent words.
The lack of saliency in specific language features in reading materials can be a significant obstacle preventing L2 learners from consciously processing the elements of language. It may hinder L2 learners from developing sensitivity to MWEs compared to native speakers whose frequent exposure to their L1 engenders a sensitivity to language features (Ellis & Wulff, 2015; Weinert, 2010). L2 learners may consider these important MWEs as groups of words insignificant as whole units. Frequent and repeated encounters with MWEs throughout language input, either spoken or written, can help L2 learners to notice their distinctive features and relationships (Durrant & Schmitt, 2010). However, noticing depends on frequent exposure to the L2, which occurs less for non-native speakers, especially in English as a foreign language (EFL) contexts.

Furthermore, in his Idiom Diffusion Model, Lontas (1999, 2002c) posits that contextual factors and attention mechanisms are important factors in idiom comprehension. Thus, I argue that applying the techniques of TE in reading materials can enhance attention and assist L2 learners to process the contextual cues to comprehend the meanings of the MWEs. Therefore, TE can play a significant role in addressing the issues of noticing, and as a result, learning and acquiring MWEs (Bishop, 2004; Han et al., 2008; Smith, 1991, 1993).

This study will contribute to the state of current research on MWEs. One contribution is that I explored variations among collocations and idioms regarding comprehension. By doing so, I explored in depth the factors of transparency in comprehension. Most researchers, to the best of my knowledge, have approached MWEs without considering the variations and the challenges pertinent to each type of MWE. For example, several researchers have solely addressed input
enhancement of a specific kind of MWE, such as collocations (e.g., Bishop, 2004; Boers et al., 2017; Goudarzi & Moini, 2012), phrasal verbs (e.g., Mall-Amiri, Alizadeh Oghyanous, & Zohrehvand, 2017), and idioms (e.g., Pam & Karimi, 2016). In this research endeavor, I addressed this point by exploring different types of MWEs, specifically idioms and collocations, which are characterized as being combinations of words treated as whole units and differ on the semantic transparency levels. Eventually, I was able to further explore the effects of semantic transparency on learning.

In the qualitative phase of the study, I attempted to comprehensively understand the effects of TE on drawing the learners’ attention and how L2 learners comprehend the meanings of MWEs embedded in texts. Learners’ descriptions of transacting the meanings of MWEs provided significant insights into the nature of processing and learning. Valle, King, and Halling (1989) stated:

What is there to know about people anyway?, we very often in our everyday speculations conclude that there are two quite different aspects: (a) the outward, observable side of others; that is, what they do and what they say, commonly referred to as their physical or verbal behavior; and (b) the inward, unobservable side of others; that is, their thoughts, emotions, and sensations, commonly referred to as their private world of experience. (p.4)
The mixed methods design helped me to address the ‘outward’ and the ‘inward’ issues effectively and provided me with powerful tools to understand the ways the participants transacted the meanings of the MWEs.

Authenticity is another critical aspect I addressed in this study. Reading is an activity that carries a purpose—to seek out specific information presented in texts, to learn vocabulary, and many other purposes. Alderson (2000) has defined reading as “an enjoyable, intense, private activity, from which much pleasure can be derived, and in which one can become totally absorbed” (p. 28). Therefore, it is widely acknowledged that reading is a fundamental human activity and is a crucial skill L2 learners should acquire. Berardo (2006) suggested that artificial language (i.e., language that is highly modified for L2 learners) does not represent the language L2 learners are usually exposed to in the real world. Widdowson (1990) highlighted the importance of authenticity in his statement, “it has been traditionally supposed that the language presented to learners should be simplified in some way for easy access and acquisition. Nowadays there are recommendations that the language presented should be authentic” (p. 67). In the current study, the texts I used to present the MWEs were authentic texts derived mainly from online newspapers and magazines that present topics related to real-world issues.

Issues of Terminology in MWEs Research

One of the terms many researchers use is *Formulaic Sequences* (FSs) to refer to different types of MWEs. Myles and Cordier (2017) noted that the term FS “is used by various researchers to refer to constructs that, although they might overlap, are nonetheless different” (p. 5). Myles and
Cordier argued to discontinue using the term formulaic sequence as an “umbrella term” for various types of MWEs. In the beginning, the term FS was used to refer to MWEs that are processed as whole units. Instead, Mayles and Cordier (2017) suggested considering L2 learners’ external factors (i.e., recognition of MWEs as conventional in a language by the speech community) as opposed to learners’ internal factors (what is consider formulaic or MWE for a given speaker in particular).

In addition, the challenges of terminology extend to the types of MWEs, which result in diverse terms for MWEs sharing the same characteristics. Thus, what can be termed collocations and idioms vary across studies. Regarding collocations, Shin and Nation (2008) identified collocations they consider the most common in English for L2 learners according to corpus research, including various types such as in fact, very much, at the moment, and this morning. In another corpus, Macis and Schmitt (2017b) classified collocations into three types: (a) literal collocations, for which the words of the collocation are literal in meaning, such as left knee; (b) figurative collocations, which have an idiomatic meaning, such as big ticket; and (c) duplex collocations, which can be literal and figurative, such as big nose. These collocations serve various functions of language such as lexical and discourse markers.

Regarding idioms, Liontas (2019) has raised issues in idiomaticity nomenclature, and how they can affect the overall research on this topic. Liontas asserted that “while individual investigative efforts need not be mentioned here…it must be said most clearly and most assertively that the field of idiomatics, as nascent as it is presently, is in desperate need of an easy-to-understand nomenclature of the very discipline it seeks to define” (p. 63). A cursory look
at the idioms targeted in various studies revealed how researchers have used various types that can be classified differently. For example, Liontas (1999, 2001a, 2002a) used vivid phrasal (VP) idioms such as *look for a needle in a haystack* and *burn the midnight oil*. In another study, Macis and Schmitt (2017a) used what they called “idiomatic collocations” such as *red flag* and *hit the roof*.

Overall, MWEs serve various functions in language use. There is a need to precisely understand and specify the collocations and idioms used in research (Liontas, in press; Myles & Cordier, 2017). Not doing so may complicate the issue of generalization beyond the major notions of idioms and collocations. Durrant (2014) emphasized that what can be categorized as a collocation in a particular context might not be a collocation in another context. The same principle applies to idioms. Idioms are diverse and come in many types—VP idioms, slangs, proverbs, and many other types serving various uses and functions. Thus, in this research, I emphasize that I do not intend to generalize beyond the types defined in the study.

**Definition of Terms**

In this study, I focused on specific types of collocations and idioms as described in this section on the definitions of terms. Moreover, this section of definitions includes other terms that are necessary to highlight throughout my dissertation.

*Textual enhancement* is the use of various types of modifications to the MWEs intended to be the target for learning. In this study, I used bolding and coloring as the textual enhancement technique to make the MWEs salient.
Multiword Expression is a term I used to describe various types of word combinations. These types include collocations, idioms, phrasal verbs, and many others. In this study, the term is used to refer to collocations and idioms collectively.

Collocation. I referred to collocations in the sense of restricted collocation (e.g., commit suicide) according to the phraseological approach to collocations (Cowie, 1994; Howarth, 1996, 1998). A collocation is a combination of words that have some limitations on substitutions, and the combination overall is transparent, but at least one element is used in a non-literal or special meaning.

Idioms. Various definitions are available in the research on idioms. In this study, the idioms I presented were mainly composed of two or three words and their meanings are non-transparent.

Authentic texts are texts derived from authentic sources such as newspapers, magazines, books, or any other text that reflects authentic situations. They are not artificially made or modified and are used for specific purposes.

Organization of Study

Chapter 1. In the introduction, I develop an outline by providing a brief background of the nature of the study, the research questions, and the significance of the study. Other sections include the issues of terminology within the MWE research in general and collocations and idioms in particular. The introduction also includes the definitions of the major terms that constitute the aspects I intend to highlight in the study.
Chapter 2. I discuss the theoretical framework that helps in constructing this study. The theoretical framework includes the importance of vocabulary in general and the notion of MWEs, the definitions of collocations and idioms as the primary target of the study, usage-based approaches to language learning, and the Idiom Diffusion Model as a descriptive theory to understand and explain the processing of MWEs. Furthermore, I discuss the concept of TE within the general framework of Input Enhancement and reviewed previous studies that are related to the current study. I also review the various lines of research regarding idioms and collocations as types of MWEs. I presented detailed accounts of studies concerning learning and teaching idioms and collocations, as well as studies that have addressed the issues of TE of MWEs.

Chapter 3. In this chapter, I present a detailed description of the study methodology. It includes descriptions of the participants, the instruments, and the procedures of the experiment. Moreover, the chapter includes the data analysis procedures I used to understand the outcomes and their interpretation. I divided the chapter into two phases. First is the quantitative part, which includes a description of the experiment. The second is the qualitative phase, which includes a description of the qualitative part of the study in which I used to delve into the experiences of the learners using TE as a technique that helps in noticing and learning MWEs.

Chapter 4. I present in this chapter the results of the data analysis and discuss the outcomes of the study. This chapter includes different parts. In the first part, I present the quantitative analysis of the survey and the experimental part. In the second part, I present the qualitative analysis of the study, which includes discussions and interpretations of the results. I
also present discussions of the results and link the results from both the quantitative and qualitative analyses to form an overall picture of the effects and efficiency of the TE technique.

Chapter 5. In this chapter, I present the dissertation conclusion, pedagogical implications, limitations, and suggestions for future research.
CHAPTER TWO:
REVIEW OF LITERATURE

Introduction

In this chapter, I discuss the theoretical background of the study. Several theoretical frameworks helped in conceiving the topic of this research, in constructing the methodological approach, and in the analysis of the findings. I also review previous studies where I identify the major lines of research on collocations and idioms in the field of SLA. Furthermore, in the review, I discuss previous studies that addressed the use of Textual Enhancement (TE) and other types of input enhancement to learn Multiword Expressions (MWEs) in general and idioms and collocations in particular. Therefore, this chapter is divided into two major themes, a theoretical background and several empirical studies.

Theoretical Background

In this section, I discuss the theoretical frameworks I used to construct this study. First, I present an overview on the importance of vocabulary learning in L2 education and what constitutes vocabulary knowledge. Second, I review various definitions of MWEs, some theoretical underpinnings of the notion of MWEs, and discuss in detail the notions of idioms and collocations. In addition, I address the issues of noticing and raising awareness of MWEs in
general and collocations and idioms in particular and the techniques of TE in the literature on this topic. Then, I discuss idiom processing and the Idiom Diffusion Model (IDM) as a framework of MWE comprehension.

**Vocabulary Learning**

There is no doubt that vocabulary is a crucial aspect of any human language. Words are the semiotic symbols that capture the essence of meanings, concepts, and our surroundings. Milton (2009) stated that “words are the building blocks of language and without them, there is no language” (p. 3). In the world of second language acquisition (SLA), vocabulary knowledge is complex and multi-faceted. Nation (2001) proposed a taxonomy of what constitutes vocabulary knowledge (see Table 1). In general, word knowledge can be divided into three categories: *form*, *meaning*, and *use*.

Word knowledge consists of multi-level structures, some of which L2 learners may master and others they may not. Formal and semantic properties of words are essential constructs. Formal properties include spoken sounds and orthographic presentations. Semantic properties include the concept of lexemes, or lexical units, which means “an item that functions as a single meaning unit regardless of the number of words it contains” (Barcroft, Schmitt, & Sunderman, 2011, p. 573), and that accounts for either single words or MWEs.
<table>
<thead>
<tr>
<th>Form</th>
<th>Spoken</th>
<th>Receptive</th>
<th>What does the word sound like?</th>
<th>Productive</th>
<th>How is the word pronounced?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Written</td>
<td>Receptive</td>
<td>What does the word look like?</td>
<td>Productive</td>
<td>How is the word spelled?</td>
</tr>
<tr>
<td>Word Parts</td>
<td>Receptive</td>
<td>What parts are recognizable?</td>
<td>Productive</td>
<td>What word parts are needed to express meaning?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Productive</td>
<td>What items does the concept refer to?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associations</td>
<td>Receptive</td>
<td>What other words does this make us think of?</td>
<td>Productive</td>
<td>What other words are possible to use instead this one?</td>
<td></td>
</tr>
<tr>
<td>Form and Meaning</td>
<td>Receptive</td>
<td>What meaning does this form signal?</td>
<td>Productive</td>
<td>What word form can be used to express this meaning?</td>
<td></td>
</tr>
<tr>
<td>Meaning</td>
<td>Concepts and Referents</td>
<td>Receptive</td>
<td>What is included in this concept?</td>
<td>Productive</td>
<td>What items does the concept refer to?</td>
</tr>
<tr>
<td></td>
<td>Associations</td>
<td>Receptive</td>
<td>What other words does this make us think of?</td>
<td>Productive</td>
<td>What other words are possible to use instead this one?</td>
</tr>
<tr>
<td>Grammatical functions</td>
<td>Receptive</td>
<td>In what patterns does this word occur?</td>
<td>Productive</td>
<td>In what pattern is this word required to be used?</td>
<td></td>
</tr>
<tr>
<td>Use</td>
<td>Collocations</td>
<td>Receptive</td>
<td>What other words or types of words occur with this one?</td>
<td>Productive</td>
<td>What words or types of words must we use with this one?</td>
</tr>
<tr>
<td>Constraints on use (register, frequency)</td>
<td>Receptive</td>
<td>Where, when and how often would we expect to encounter this word?</td>
<td>Productive</td>
<td>Where, when, and how often can we use this word?</td>
<td></td>
</tr>
</tbody>
</table>
Researchers of L2 vocabulary acquisition have concluded there is a difference between *productive* and *receptive* use of the language. Productive use of vocabulary is the ability of the speaker to produce meaningful spoken or written texts while receptive use is the ability of the speaker to understand the words in others’ spoken or written language (Gairns & Redman, 1986; Nation, 2001; Schmitt, 2008). Research in the field of SLA has shown productive use develops at a later stage than receptive, which is not surprising given that, at the beginning, learners need ample exposure to L2 input to familiarize themselves with the language. Adding to that, L2 learners usually have a larger receptive lexicon than productive, which explains the ease with which L2 learners usually experience listening or reading versus speaking or writing (Laufer, 2005). Also, L2 learners show different capacities to employ words in written and spoken discourses. In written contexts, L2 learners exhibit greater use of words compared to spoken contexts (Milton & Hopkins, 2006). Regarding word recognition, learners show that they recognize many more words in written form than in spoken form (Schmitt, 2008).

The classification and understanding of the nature of vocabulary help to develop dictionaries, curricula, and lists of words that frequently occur in specific fields. These classifications have contributed to understanding the nature of languages and provide valuable implications in many areas in L2 education. For instance, corpus linguistics, a field that has developed because of the capabilities of computers to process large quantities of data, has enabled researchers to notice what I call Multiword Expressions (MWEs).
Teaching vocabulary: Explicit or Implicit. Researchers indicate that vocabulary is an important aspect to consider in language teaching practices and curriculum design (e.g., Decarricco, 1991; Gairns & Redman, 1986; Nation, 2001; Schmitt, 2008; Seal, 1991). However, there are disagreements regarding how L2 learners acquire vocabulary. Is it explicitly through activities and teaching vocabulary in and of itself, or implicitly through extensive reading and exposure to the L2 (Boers & Lindstromberg, 2008)? Some proponents of the implicit learning of vocabulary claim that learners can acquire vocabulary through exposure to language input, and that grammatical structures are relatively more important to address in the limited time of the classroom (Krashen, 1985; Long, 1988, 1991). Other researchers note that implicit vocabulary acquisition is painfully slow, and that teachers and learners alike should allocate time for explicit teaching and learning of vocabulary (Laufer, 2005; Nation, 2001). For various reasons, (e.g., the ample chance of encountering important words from lower frequency bundles), productive vocabulary knowledge can only be promoted through explicit tasks that require a productive use of language (Laufer, 2005). Therefore, adopting explicit forms of teaching vocabulary is preferable. Hill and Laufer (2003) further explained that L2 learners consolidate and enrich their knowledge of previously studied vocabulary by being exposed to input in reading or writing. Therefore, it is important to reconsider the role of vocabulary in L2 pedagogy and to adopt explicit forms of vocabulary instruction and presentation in L2 curricula.

In this study, I take the position that both implicit learning of vocabulary through reading and explicit learning by highlighting vocabulary features are beneficial. The use of TE combines both implicit and explicit forms of learning while L2 learners are involved in reading activities.
Multiword Expressions

The increasing appreciation of the role of Multiword Expressions (MWEs) play in language learning is a result of the pioneering works of Lewis (1993, 2000), Nattinger and DeCarricco (1992), Pawley and Syder (1983), and Liontas (1999, 2002a, 2002b, 2013, 2019). Pawley and Syder, for example, stated that native speakers’ fluency is due to the amount of MWEs they have at their disposal. Sinclair (1987) proposed the notions of the idiom principle and open choice principle. The idiom principle postulates that successful language production and effective processing depends on our ability to create form-meaning connections on multi-word unit levels. In the open choice principle individuals are free to choose lexical items that fit their purposes.

Numerous L2 vocabulary researchers have suggested that MWEs knowledge can help improve communication, and, furthermore, language learners should pay attention to these MWEs, which can affect their fluency (Barfield & Gyllstad, 2009b; Nation, 2001; Schmitt, 2004).

MWEs are not easy to define. A lack of unified agreement on the nature of an MWE is due to the diverse approaches and various research interests across fields such as child language, applied linguistics, and language pathology (Wray, 2002, pp. 4–5). Wray (2002) provided the following general description of MWEs, which she labeled as formulaic sequences: “words and word strings which appear to be processed without recourse to their lowest level of composition are termed formulaic” (p. 4). She further provided a lengthy list of terminology used by researchers across different disciplines, for example, chunks, collocations, conventional forms, formulas, and many other terms. Furthermore, Wray (2002) has defined a formulaic sequence as
a sequence, continuous or discontinuous, of words or other elements, which is, or appears to be, prefabricated: that is, stored and retrieved whole from memory at the time of use, rather than being subject to generation or analysis by the language grammar. (p. 9)

Multiword Expressions in this research is a cover term that encompasses various types of word combinations such as idioms (pull someone’s leg, spill the beans, pop the question), figurative expressions (he has a heart of stone, the test was a breeze, he is as big as a house), discourse markers (on the one hand, first and foremost, in the case of), collocations (do homework, break a promise, pay a visit), and formulaic sequences (nice to meet you, how are you?). In this dissertation, I primarily focus on idioms and collocations as some of the major types that researchers have highlighted for their ubiquity in language use and their importance for L2 learners.

In this context, it is important to understand what makes a word combination recognizable as an MWE. There are specific criteria that researchers apply to identify idioms and collocations. These criteria are

(1) institutionalization, that is, how conventionalized the use of the multiword expressions are, regarding their frequency, and how the language speakers’ community acknowledges the wholeness of the expressions (Pawley, 1986);

(2) fixedness, that is, how the expressions are frozen and whether the multi-word expressions are used in various forms; and
(3) compositionality, which refers to how the meaning of a multiword expression could be discerned based on its constituent words.

For example, some expressions are considered non-compositional as in kick the bucket, which is the case for most idioms, while other expressions are considered compositional expressions as in fast food (Moon, 1997). Applying these principles, idioms and collocations vary on their degrees of fixedness and compositionality. Idioms represent non-compositional, fixed MWEs. In contrast, collocations can entertain some degrees of fixedness and are considered compositional or semi-compositional in their meanings.

In general, idioms are less controversial regarding classification. The major difficulties of idioms lie in the non-compositionality of their meanings, which poses problems for L2 learners in the decoding level (Handl, 2008, p. 47). Idioms have been well recorded and identified in idiom dictionaries. Handl continued that

For everyday conversation and standard writing tasks, however, collocation is much more important, since the incorrect use of a word in the context immediately unmasksthe non-native speaker. Avoiding idioms in language production only leads to a more sober style; it is not as revealing as mistakes in the use of collocations. (p. 47)

Nonetheless, Handl (2008) has outlined the importance of collocations in terms of productive use. Idioms and collocations, I argue, entertain equal status, as both are important because they are part of everyday language; that is, they are a part of conversations we hear and read every
day, and if L2 learners ignore them, they will eventually come across them either in reading or listening.

**MWE Continuum.** Researchers have sought ways to classify MWEs based on continuums. For example, Howarth, (1996, 1998) following Cowie, proposed a continuum that classifies word combinations based on certain criteria. Howarth divides word combinations into four categories, (see Table 2).

**Table 2. Howarth Continuum (Howarth, 1996, 1998)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free combinations</td>
<td>in which the components (words) within the combination are used in their literal sense, such as <em>pay a bill</em>.</td>
</tr>
<tr>
<td>Restricted collocations</td>
<td>are collocations that include at least one of the components used in a figurative sense, such as <em>pay a visit</em>.</td>
</tr>
<tr>
<td>Figurative idioms</td>
<td>in which the overall meaning of the expression could be discerned from its components, an example being <em>pay the price</em>.</td>
</tr>
<tr>
<td>Pure idioms</td>
<td>in which the meaning of the expression is non-compositional and is hard to discern from the constituent parts of the combination, such as <em>pay the piper</em>.</td>
</tr>
</tbody>
</table>

In this research study, the continuum serves as a platform to classify the types of collocations and idioms I employed. Gyllstad and Wolter (2016) used this continuum to identify collocations and free combinations to measure the processing burden each type represents for non-native and native speakers. They found that there is a processing cost for both native and non-native speakers when it comes to collocations, and that is related to the factors of semantic transparency these collocations carry as opposed to the free combinations.
**Importance of MWEs.** Formulaic language is a crucial element in language use. Classic theoretical works suggest that words, in general, are at the periphery of language and argue that the relationship between words and other systems of language, such as syntax and semantics, are rather weak (Chomsky, 1957; Pinker, 1994). Growing evidence in corpus research studies showed that these theoretical approaches that put the lexical systems of the language at a weaker position are mostly accounting for “only…what is possible in a language not for what is natural” (Hoey, 2005, p. 2). Hoey places *words* at the center of language in what is known as the theory of *lexical priming*. The theory postulates that the human mind carries networks of co-occurring language sequences that are linked to specific domains. Hoey states that “every word is mentally primed for collocational use” (p. 8). Further, Hoey explains that lexical priming is

Priming can be transitory or (semi-)permanent. Speakers or writers may combine certain words repeatedly in a discourse and this repeated combination may become part of the cohesion of the text. The listener or reader will grow to expect these words together in the text in question, but unless subsequent texts reinforce the combination it will not become part of the permanent priming of either of the words. Emmott (1997) discusses priming in these terms where a reader is primed to construct a frame which permits them to process more effectively the text they are reading. (Hoey, 2005, p. 12)

Further evidence of the importance of MWEs is their ubiquity in language (Conklin & Schmitt, 2012). For instance, Oppenheim (2000) found that MWEs make up an average of 66% in short speeches that contain similar topics. In her corpus of spontaneous Canadian-English
speech, Sorhus (1977) found that there is one multiword expression in every five words. Erman
and Warren (2000) found in their analysis that formulaic language makes up 52%–58% of the
language. Foster (2001) concluded that 32% of speech is formulaic, and Biber, Johansson,
Leech, Conrad, and Finegan (1999) found that 30% of their conversation corpus consists of
lexical bundles, 21% in their academic prose corpus. These numbers shed light on the crucial
role learning these MWEs could play in language learning.

Second language learners will benefit from learning MWEs in different ways. Henriksen
(2013), for example, in her review of research on collocations has identified five areas where
learning collocations helps L2 learners:

(a) to make idiomatic choices and come across as native-like; (b) to process language
fluently under real-time conditions; (c) to establish ‘islands of reliability’ which enable
the language user to channel cognitive energy into more creative production; (d) to
disambiguate meaning of polysemous words, e.g., the verb commit in the following
collocational contexts: commit a crime, commit oneself, commit to memory; (e) to
understand connotational meaning e.g., the fact that the verb cause is often associated
with negative connotations as in cause an accident. (p. 33-34).

MWEs have also been emphasized considerably in the usage-based approaches to
language learning. Usage-based approaches to language learning are groups of theories that have
common underlying assumptions. These assumptions are summarized as
1. Language learning is primarily based on learners’ exposure to their second language (L2) in use, that is, the linguistic input they receive.

2. Learners induce the rules of their L2 from the input by employing cognitive mechanisms that are not exclusive to language learning but that are general cognitive mechanisms at work in any kind of learning, including language learning. (Ellis & Wulff, 2015, p. 75)

One of the central tenets of usage-based approaches is that language learning is basically “sequence learning” (Ellis, 1996) through excessive exposure to language. Learners, depending on their phonological short-term memory capacities, can acquire the grammatical structures and vocabulary patterns of the language. Ellis (2012) also argues that “learners’ long-term knowledge of lexical sequences in formulaic phrases serves as the database for the acquisition of language grammar, and it proposed what was called chunking as a general process of SLA” (p. 17).

Researchers of L2 learning and teaching have also emphasized the importance of idioms. Liontas (1999, 2002b, 2002a, 2015a), who pioneered the research on idioms in L2 education, has called for serious research to understand the complexities of idiom learning and teaching. According to Ramonda (2016), developing idiomatic competence is a challenge for language learners and it needs to be addressed seriously in SLA research. Liontas (2017) noted that learning idioms increases the learners’ lexical and etymological knowledge and develops their knowledge in the areas of grammar and syntax. Furthermore, idiom learning can increase the
learning awareness of not only the language per se, but rather the culture of the community.

Liontas (2017) provided various reasons to implement teaching idioms in SLA contexts such as

a. idioms encourage learners to understand the workings of natural human language in its creative development;

b. learners can appreciate the importance of context when they go beyond the literal meanings of idioms;

c. learners can internalize idioms when they are encouraged to learn them and thus facilitate the mapping process of idiom internalization; and

d. learners can evaluate mental images of the figurative meanings associated with idioms.

To conclude, there is a growing interest in finding pedagogical applications that can help L2 learners to develop MWE competency. For further understanding of collocations and idioms, in the sections that follow I elaborated more on the notions of collocations and idioms from SLA perspectives.

**Collocations.** To better understand collocations, first I reviewed the various approaches researchers have taken to address the definitions of collocations. Then I offered some definitions from publications dedicated to collocation learning and teaching for L2 students.

Durrant and Mathews-Aydinili (2011) identified three approaches to understanding the notion of collocations: *(a)* the occurrence frequency approach; *(b)* the fixedness or phraseology
approach; and (c) the psycholinguistic approach. In the frequency approach, collocations are described as the frequent co-occurrence of words. According to this approach, the distinguishing feature is the probability of specific strings of words appearing together in a large number of texts. However, the proponents of this approach differ on the significance of various syntactic features and word order regarding collocations.

In the phraseological approach, collocations are classified based on a continuum. The continuum spans from idioms to free-combinations (Cowie, 1994; Howarth, 1996, 1998). Cowie (1994) distinguished between ‘composite’ and ‘formula’ within lexical combinations. For Cowie, expressions such as ‘how are you?’ and ‘nice to meet you’ are considered as formulae, and composites are combinations that have mainly syntactic relationships. Other collocation characteristics in this approach are that these combinations could be classified based on their transparency (i.e., literal vs. non-literal) and commutability (i.e., the degree of the strictness in the movement of the lexical components of the sequences). To understand commutability, Cowie (1994), followed by Howarth (1996, 1998), described the relationships among word combinations in four categories ranging from free combinations, such as drink coffee to pure idioms, as in pull someone’s leg. This is the approach I employed to identify collocations and idioms for the current dissertation.

According to the psycholinguistic approach (Hoey, 2005; Wray, 2002) words have psychological relations nested in the mind, so speakers treat these lexical chunks as intact wholes as opposed to individual elements of phrases when processing language. The major finding of
psycholinguistic research is that it is easier to process language in bundles rather than individual words (e.g., Conklin & Schmitt, 2012; Ellis, 2012).

Defining Collocations in L2 Publications. Many publications are available that address teaching and learning collocations in L2 contexts (Benson et al., 2010; McCarthy & O’Dell, 2005). The authors of these publications provide their working definitions of collocations and classification criteria. Benson et al. (2010), in their BBI Combinatory Dictionary of English, defined collocations as “fixed, identifiable, non-idiomatic phrases and constructions. Such groups of words are called recurrent combinations, fixed combinations, or collocations” (p. xix). Moreover, they classified collocations into grammatical collocations and lexical collocations. A collocation that consists of a (verb + preposition) is considered a grammatical collocation (e.g., acceptable to, amazed at). Lexical collocations are those that include a combination of (verb + noun, adjective + noun) and other types (e.g., formidable challenge, override a veto, argue heatedly). In Collocations in Use, a practice book for English language learners, McCarthy and O’Dell (2005) defined a collocation as “a pair or group of words that are often used together. These combinations sound natural to native speakers, but students of English have to make a special effort to learn them because they are often difficult to guess” (p. 6). McCarthy and O’Dell provided some examples to clarify their definition, such as fast cars and quick glance versus quick cars and fast glance. Regarding dictionaries, the Oxford Collocations Dictionary for Students of English (2002) defines a collocation as “the way words are combined in a language to produce natural sounding speech and writing” (p. vii).
As there are various definitions of collocations, it is obvious that there are various features characterizing collocations. The frequency with which word groups co-occur in corpora and semantic transparency are among the various characteristics which can aid in the identification of collocations. However, there are disagreements among scholars regarding the boundaries of collocations (Gablasova, Brezina, & McEnery, 2017). Collocations, in general, are more difficult to identify than idioms. Although idioms can be considered collocations if we use the literal meaning of collocations—words that have a high probability of co-occurring together—the main difference lies in the transparency of the meaning (more discussion of the notion of idioms in the section that follows).

**Idioms.** Idioms are among the most salient types of MWEs available in any language. The major feature that separates idioms from other types of MWEs is their compositionality or semantic opaqueness. Liontas (1999), for example, noted the complexities of defining idioms and that researchers adopt various approaches and interpretations of idioms. However, I will present some of the definitions that are most suitable for the current research. Makkai (1969) provided a general definition that an idiom is “a linguistic form whose meaning is unclear in spite of the familiar elements it contains” (p. 44). The definition highlights in general that *the opaqueness* of the meaning is the main feature that represents the nature of idioms. Moon (1997) defined idioms as “multi-word items which are not the sum of their parts: they have holistic meanings which cannot be retrieved from individual meanings of the component words” (p. 46). She further explained that
Idioms are typically metaphorical in historical or etymological terms. The metaphor may be relatively straightforward to decode, as in *a snake in the grass* or *bite off more than one can chew*, or obscure, as in *kick the bucket* and *rain cats and dogs*. (p. 46).

Other researchers provide specific definitions for specific types of idioms. For instance, Liontas (1999, 2002c, 2002d, 2017) defined ‘vivid phrasal idioms’ as

Polysemous phrasal units that combine powerful literal visual imagery (literal, referential meaning) with a memorable, striking expression (institutionalized, figurative meaning) occurring above word level and often, but not always, in the length of a sentence.

Examples of the latter idiom type are: *to look for a needle in a haystack*. (Liontas, 2017, p. 7)

*Defining Idioms in L2 Publications.* Different publications dedicated to teaching idioms to English language learners include various definitions. For instance, O’Dell and McCarthy (2010) in their *English Idioms in Use* defined idioms as “expressions which have a meaning that is not obvious from the individual words” (p. 6). Spears (2003), in his *McGraw-Hill Dictionary of American Idioms and Phrasal Verbs*, explains that

All languages have phrases that cannot be understood literally and, therefore, cannot be used with confidence. They are opaque or unpredictable because they don’t have expected, literal meaning. Even if you know the meaning of all the words in a phrase and
understand all the grammar of the phrase completely, the meaning of the phrase may still be confusing. A phrase or sentence of this type is said to be idiomatic. (p. v)

Gibbs (2007) states that idioms “are analyzable to various degrees and linked to enduring metaphorical and metonymic conceptual structure” (pp. 697–698). That means L2 learners can decode the meanings of idioms if given proper contexts.

To better understand the diversity of idioms in general, it is useful to provide some of the types proposed in the literature on MWEs and idiomaticity. Gibbs (1997) gave some examples of what can be described as idioms in the literature:

1. Sayings:
   a. Take the bull by the horns
   b. Let the cat out of the bag
2. Proverbs:
   a. A bird in the hand is worth two in the bush
   b. A stitch in time saves nine
3. Phrasal verbs:
   a. To give in
   b. To take off
4. Idioms:
   a. To kick the bucket
b. To crack the whip

5. Binomials:
   a. Spick and span
   b. Hammer and tongs

6. Frozen similes:
   a. As white as snow
   b. As cool as a cucumber

7. Phrasal compounds:
   a. Red herring
   b. Dead-line

8. Incorporating verb idioms:
   a. To babysit
   b. To sightsee

9. Formulaic expressions:
   a. At first sight
   b. How do you do?

Idioms can be further analyzed based on fixedness and semantic transparency continuums. In the examples above, we notice that there are variations in the degrees of transparency, (e.g., *kick the bucket* vs. *as white as snow*).
I do not intend to redefine the boundaries between the types of MWEs or within the
different types of idioms in this study. There are differences and overlaps among MWEs;
however, in this study, I will adopt some types of these MWEs, specifically collocations and
idioms, according to Howarth's (1996, 1998) continuum of MWEs.

In the following section, I present the theoretical frameworks that have driven the
construction of this dissertation. I begin with discussing the theories behind the use of Textual
Enhancement and the models of comprehending MWEs.

**Textual Enhancement (TE)**

TE can be useful in directing L2 learners’ attention to specific language features (Boers et al.,
2017; Han et al., 2008). In the literature concerning TE, researchers refer to the language L2
learners receive during their learning as *input* (Gass & Selinker, 2008). Smith (1993) noted that
input in SLA classrooms could be misleading and that we cannot know what is being processed
and taken in by the learners by mere observation. Regarding defining input, Smith (1993) refers
to it as “potentially processable language data which are made available, by chance or by design,
to the language learner” (p. 167). The second level, coming after the input, is what is *intake*.
Intake is the stage in which the input has been proven to be processed by the learner and has
already turned into knowledge (Smith, 1993).

Smith’s (1993) framework of input enhancement provides a conceptual background that
helps in the inception of the current study. Smith’s interest in input enhancement blossomed out
of the questions he posed: “why is it that L2 learners typically appear to ignore a vast mass of
evidence and continue, obstinately, to operate with a system that is in contradiction with the target norms as manifest in the input?” (Smith, 1993, p. 168).

The terms *input* and *intake* cover within them the various processing levels that happen when learners are exposed to language. Additionally, understanding the effects of *TE* demands that we understand the various processing mechanisms L2 learners employ. TE can be considered part of the general term *input enhancement*, which according to Smith (1993) refers to “a deliberate focus on the formal properties of language with a view toward facilitating the development of second language knowledge. This focus can be initiated by the teacher or it can be self-initiated by the learner” (pp. 176–177).

TE is one example of the various techniques for input enhancement. Other forms of input enhancement include corrective feedback, error analysis, instructions on specific linguistic features using a board and other means of direct instruction. In this research, I explored the effects of TE. That is, highlighting collocations and idioms within texts by adopting typographic modifications (bolding, italicizing, different colors) to direct the learners’ attention to the formal structures of the MWEs and the context around them.

In the following section, I discuss the second major conceptual framework I employed in this research study. To understand in detail the effects of TE, it is important to understand the mechanisms and strategies the participants use to transact the meanings of the MWEs.
**Idioms and L2 Learning Models**

Various researchers have proposed models and hypotheses to explain and provide a theoretical foundations of idioms processing by either L1 or L2 speakers of languages. For L1 speakers, researchers have proposed various models to explain the mechanism of idiom comprehension. These models are divided into noncompositional and compositional models. In general, the noncompositional models “assume that idiom meanings are arbitrary and understood by retrieving the meaning of an idiomatic phrase as a whole, rather than by processing their component parts” (Cieślicka, 2015, p. 210). In contrast, the compositional models posit that “idiomatic meaning unfolds both from the literal analysis of idiom constituents and the specific figurative interpretation of these constituent word meanings within a given context” (Cieślicka, 2015, p. 211).

For L2 learners, there are other models and hypotheses that explain the mechanisms of idioms learning and processing. Since L2 learners are, by definition, learning a second or other language, they depend on their L1 lexical system as a basis or a foundation in learning the new language (Arabski, 2001; Dagut, 1977; Ellis & Beaton, 1993). In the competition model, MacWhinny (1992, 1997, 2002) posits L2 lexical development is heavily dependent, or parasitic on the L1 of the speaker. That is, as the L2 speaker matches the new word to its equivalent L1 word, the “new” L2 word will not have independent representation in the mental lexicon and instead will rely on the conceptual framework of the L1. As the L2 learner’s lexical knowledge gradually develops, he/she will replace the L1 as a basis with the new L2 and develop L2 conceptual representation with direct links to the L2 word form. Over time, parasitic linking
between the L2 and L1 will become linking from within the L2 domain without referencing the L1. Matlock and Heredia (2002) conducted a study to measure monolingual and bilingual processing of idiomatic phrasal verbs. They found that L2 learners with lower proficiency level retreat to translating L2 idioms in an attempt to make sense of them before accessing the figurative meanings. More advanced bilinguals might access the direct figurative meaning in a similar fashion to the noncompositional theories for L1 speakers. These findings and theories lead to the question: *What if there is no exact equivalent of the idiom in the L1?*

To answer this question, several studies have shown that the absence of similar idioms across languages means that the competition model cannot account for the processing of new L2 idioms. The degree of translational similarities between L1 and L2 idioms is purported to affect the processing of idioms. Similar idioms, in this case, would be easier to process, while different idioms prove to be difficult to process (Charteris-Black, 2002; Cieślicka, 2006; Liontas, 2002a). Transparency can also be a factor in learning idioms, with transparent idioms referring to the level of awareness of the motivation of the idioms in their figurative forms, as suggested in research (Irujo, 1986; Steinel, Hulstijn, & Steinel, 2007; Yorio, 1989). For example, if L2 learners understand that a concept such as *heat* refers to *anger*, this can help them in interpreting idioms. As previously mentioned, researchers attempted to explain the processes L2 learners go through to comprehend L2 idiomatic expressions. Liontas (2002a) proposed a comprehensive model taking into account the strategies L2 learners use to comprehend idioms; that is the *Idiom Diffusion Model of Second Languages.*
Idiom Diffusion Model (Liontas, 1999, 2002c)

To understand the Idiom Diffusion Model (IDM), it is important to situate the model within the framework that helped in its construction and shaping. The conception of the model is traced back to the socio-psycholinguistic approaches to reading. Traditionally, evaluating the reading abilities of students was based on understanding factual information from texts. According to Liontas (1999, 2002c), this type of evaluation does not reflect the constructs underlying the reading process. Reading is an interaction between texts and readers, an idea that comes in the dialectics of top-down and bottom-up models of reading. One of the most influential interactionist models of reading is Goodman’s Transactional Socio-psycholinguistic Model (Goodman, 1985, 1992). In Goodman’s model, meaning making is a function of the text and what the reader brings to the reading act. In this process, reading involves the interaction of three main levels: graphophonic, lexico-grammatical, and semantic levels.

Applying a socio-psycholinguistic approach to idiom comprehension, Liontas (1999, 2002c) argues that readers’ conceptions of idiom meaning-making are rarely explored. Thus, he proposes Transactional Idiom Analysis (TIA) to recognize the centrality and constructive abilities of the readers. Liontas in his TIA expanded Goodman’s socio-psycholinguistic model to transacting idioms meanings. The socio-psycholinguistic model posits that reading involves a simultaneous interaction of graphophonic, lexico-grammatical, and semantic levels recognized as meaning-carrying cycles. TIA stresses the importance of understanding the effects of prior knowledge, inferencing, and the activities that lead the readers in the meaning-making processes. As a result, Liontas in his TIA expanded Goodman’s reading model by adding pragmatic and
cultural levels to the graphophonic, lexico-grammatical, and semantic levels. By adding that to Goodman’s reading model, TIA expands its focus to what the learners know about idioms in general and how to use them in communication. It attempts to identify the factors that impede or enhance idiom comprehension and interpretation.

Furthermore, based on TIA, Liontas proposed a lexical-image continuum to explain the distance between idioms in the L1 and L2. This continuum can extend to collocations as well. Liontas identified and divided idioms L2 learners into three major categories:

1. Lexical level
2. Semi-lexical level
3. Post-lexical level.

Idioms that match between L2 and L1 in meaning and words are considered similar in the lexical level, and partially matching idioms which have the same meaning, but slightly different words, match in a semi-lexical level, and, finally, idioms that do not match in meaning and words are placed in the post-lexical level.

Another important construct in TIA is context. According to Liontas (2002a, 2002c), context plays a major role in understanding the meanings of idioms. As idiomatic expressions are available in context, L2 learners use various strategies and techniques to reach the meanings of MWEs. In the IDM, Liontas proposes two wide phases through which learners go to comprehend idioms: (1) “prediction phase”, and (2) ”confirmation or replacement, reconstructive phase” (Liontas, 2002a, p. 182). Here, Liontas asserts the following:
In the prediction phase, the learner, in the absence of context, uses the lexical items comprising the idiom in a variety of situations and contexts. This systematic free variation depends on how close or distant the semantic/image opacity of the target idiom is from the domain idiom, leading to the construction of a number of hypotheses and predictions. Learners are also limited by how much information they are able to process, based on the nature of a given task and their own information-processing abilities. In the confirmation or replacement, reconstructive phase, interpretation of VP idioms is restricted to its own context through the gradual elimination of possible interpretations. Even in context, learners are often not capable of attending to all the information available in the input. Some of it becomes the object of focused or selective attention, while other parts are attended to only peripherally. This leads to either the confirmation of earlier hypotheses/predictions, or to the replacement and reconstruction of new hypotheses/predictions in light of the constraints made by the context, suggesting that idiom variability and interpretation is context induced. Any inference an L2 reader is found to make depends on what kind of inference it is (i.e., graphophonetic, semantic, pragmatic, cultural) and on the condition of encoding (in context or out of context). (Liontas, 2002a, p. 182)

Figure 1 shows a visual representation of the IDM. The model provides a solid theoretical foundation in conceiving the current study. As learners read texts that contain textually enhanced MWEs, context could provide strong cues for learners to decipher the ambiguity of the MWEs’
meanings. Textual enhancement comes to serve the purpose of drawing attention as the context can be misleading if L2 learners fail to study it thoroughly.

**Figure 1.** Liontas’s Idiom Diffusion Model (1999, 2002c)

**Summary of the Theoretical Background**

In the previous section, I addressed the theoretical background that helped in shaping the construction of the current study. First, I overviewed the definitions of MWEs in general, and idioms and collocations as the target linguistic forms needed to be learned. Second, I provided the definitions of TE, a technique that helps to facilitate noticing and ultimately learning. Third, I reviewed other theoretical works that help in drawing attention to MWEs in general, such as
usage-based approaches to language learning. Finally, I introduced the notion of the *Idiom Diffusion Model*, as a comprehensive descriptive framework explaining the complexities of MWE meaning transactions.

In the following sections, I delved into the major areas of researching collocations and idioms within the field of second language acquisition. I thoroughly reviewed the major lines of research on collocations and idioms and discussed studies conducted to understand collocation and idiom learning and teaching. Moreover, I provide detailed reviews of studies addressing textual enhancement of MWEs.

**Major Lines of Research on Collocations**

Research on collocations has taken various strands focusing on different collocational categories, employing a variety of research approaches and occurring in different contexts. To begin with, various researchers have focused on the variation in competence of collocational knowledge between native speakers and second/foreign language (L2) speakers, hoping to understand whether L2 users experience collocations differently than L1 users (Fan, 2009; Nesselhauf, 2003, 2005; Peters, 2015; Sonbul & Schmitt, 2013). This line of research has shown that L2 speakers have a different experience of collocations use than native speakers. Researchers have carried out studies to explore the relationships and connections between general language skills and collocational knowledge. This line includes studies that explored the correlations between vocabulary knowledge size and collocational knowledge (Gyllstad, 2007), and the relationships between general language proficiency and collocational competence (Keshavarz & Salimi, 2007).
One of the areas in collocations research is development and growth of L2 collocational knowledge. Within this research trend, researchers have discussed various topics such as the relationship between the amount of exposure to L2 and collocational development (Gyllstad, 2007) and the nature of collocational mastery (Groom, 2009). Technology is another area that researchers have explored. Specifically, researchers have explored the impact of using concordancers or mobile technologies on learning collocations (Amer, 2014; Daskalovska, 2015; Kheirzadeh & Marandi, 2014). Within the realm of technology, Boers et al. (2017) explored the effects of typographic enhancement on the acquisition of collocations.

Researchers have addressed direct collocation teaching and learning (AlHassan & Wood, 2015; Rahimi & Momeni, 2012). Given the increasing attention to collocations in L2 education, researchers have investigated the presentation and treatment of collocations in language teaching programs and textbooks. For instance, Boers, Demecheleer, Coxhead, and Webb (2014) studied the effects of exercise types presented in textbooks on learning collocations. In another study, Serrano, Stengers, and Housen (2015) investigated how oral narrative competence can develop over intensive or regular language learning programs.

In the following sections, I present detailed review of some of the major studies conducted on the topic of collocations.

**Teaching and Learning Collocations**

Several researchers have explored the effectiveness of teaching collocations to L2 learners. Rahimi and Momeni (2012), for example, investigated techniques that can lead to effective
acquisition of vocabulary in general. The researchers explored how explicit teaching and presentation of collocations (lexical chunks), as opposed to presenting single words can enhance vocabulary learning. The results of a 16-week experiment demonstrated that presenting vocabulary as collocations or in chunks helps to improve vocabulary acquisition in general.

Investigating how teaching affects the use of collocations in oral skills (listening and speaking) is sparse in collocations research. Attar and Allami (2013) conducted one of the few studies to explore the effects of explicit teaching of collocations on improving speaking skills. The major focus of the study was on the relationship between collocational knowledge and language use. The researchers also focused on the attitudes of learners toward collocation teaching. The results indicated a significant improvement in speaking ability. Additionally, the study revealed the learners positively perceived the importance and effectiveness of teaching collocations to gain fluency in speaking skills.

AlHassan and Wood (2015) explored the effect of explicit teaching of formulaic sequences (e.g., it is clearly seen, according to) to L2 learners on the use of formulaic language in academic writing. The participants took part in focused instructional sessions on formulaic sequences and collocations of language. The results indicated that focused instruction of these formulaic sequences helped in developing the learners’ overall ability to produce accurate formulaic sequences and collocations. Furthermore, the instruction helped to increase the quality of writing and to elicit better use of sophisticated vocabulary.

An Ability to use dictionaries is one of the most important L2 skills that every language learner should have. Dictionaries provide useful information on the use of L2 collocations.
Laufer (2010) investigated whether learners attempting to use \((verb + noun)\) collocations could find unfamiliar verbs in dictionaries, and how this activity, in which learners perform a word-focused task, can lead to learning these collocations. The findings demonstrated that the use of dictionaries helps L2 learners to learn collocations and provides meaningful information in the learning of L2 collocations in general.

**Technology and Learning Collocations**

Technology can provide useful tools to facilitate collocation acquisition. Some of these technologies include concordancers (Daskalovska, 2015; Kheirzadeh & Marandi, 2014) and mobile collocation applications (Amer, 2014). These studies provided evidence that using technology promotes learning collocations. For example, Kheirzadeh and Marandi (2014) investigated the effects of using concordancing programs on the acquisition of collocations and what types of collocations the participants searched most often. The results indicated using concordnacing programs has on learning collocations, and that the students exhibited higher motivation to complete and search for the right collocations. The use of the concordancing program also helped increase the participants’ expressive abilities in writing and speaking. Furthermore, the results indicated that the \((verb + noun)\) collocations were the type most searched by students.

Daskalovska (2015) conducted a study on the effects of teaching \((verb + adverb)\) collocations using concordancers. The study used an online concordancer program developed by the British National Corpus (BNC) for the experimental group and a regular textbook for the control group. The results indicated significant improvement in the use of collocations by the L2
learners in the experimental group. This improvement in collocational performance was attributed to the detailed information the concordancer can provide. Additionally, the activity of using technology increased engagement, analysis, and deep processing, all of which are significant factors for learning in general, according to Nation and Webb (2011).

Amer (2014) explored the benefits of using mobile applications for learning idiomatic expressions and collocations. Amer employed questionnaires to inquire about the use of smartphones in general, data on the usage of the collocation applications (such as screen visits), wrong and correct trials, scores obtained from the application quizzes, and finally, exit interviews to explore the participants’ experiences. The results revealed that proficiency levels determined the use of the learning application and that higher-level students showed higher demand for the application since it can increase their awareness of collocations and fluency. In addition, students who used smartphones more often were more likely to use mobile applications to increase their level of knowledge.

**Factors Affecting Collocation Acquisition**

Researchers have acknowledged that there are factors that facilitate learning collocations. Some of these factors include L1 influence and conditions of presenting collocations in teaching materials. To begin with, the influence of the first language (L1) has proved to be an important factor in the use of collocations by L2 learners. For example Nesselhauf (2003) explored the written productions of German students learning English. The findings of her study suggest that L1 does influence the use of L2 collocations. Moreover, the study indicated that medium
restricted collocations, such as exert influence and exert power, were the most problematic for L2 learners.

Similarly, Yamashita and Jiang (2010) found that Japanese learners of English produced congruent collocations (i.e., collocations that have one-to-one correspondents in the L1) significantly better than incongruent collocations, and that the L1 mediates L2 collocation use. Additionally, the findings indicated that even advanced learners face some challenges regarding production and reception of L2 collocations.

Durrant and Schmitt (2010) studied various conditions of presenting (adjective + noun) collocations in texts to elicit data on the possibility of learning L2 in chunks. A collocation was presented either once in a sentence (condition 1), repeated in the same sentence (condition 2), or repeated in various contexts (condition 3). The results demonstrated a positive effect of repetition in general and suggested that L2 learners could acquire lexical units in chunks.

Alsakran (2011) examined the receptive and productive knowledge of grammatical and lexical collocations of students in ESL and EFL contexts. He also explored how the types of collocations (verb + noun, noun + adjective, verb + preposition) constitute different levels of difficulty to L2 learners. The results indicated that ESL students performed significantly better than the EFL students in terms of productive and receptive knowledge of the collocations. It also reveals that receptive knowledge is significantly higher than productive knowledge. Regarding the collocation types that were most problematic for L2 learners, the results indicated (verb + noun) collocations were the least difficult and (verb + preposition) were the most difficult.
Webb, Newton, and Chang (2013) explored the incidental acquisition of collocations. They focused on the frequency of occurrence as a factor in learning collocations. The results indicated that the frequency of occurrence could significantly predict incidental collocation learning. Moreover, the results demonstrated that L2 learners were able to acquire various aspects of collocations knowledge; that is, they learned the collocation in the receptive, productive, and the form-meaning conditions.

Concerning the factors that facilitate or impede learning, Boers, Demecheleer, Coxhead, and Webb (2014) explored the effect of textbook exercises presented to learners on the acquisition of \((\text{verb} + \text{noun})\) collocations. The study tested the efficacy of ‘insert the collocation’ format in comparison with ‘connect’, ‘insert the verb’, and ‘underline the verb’ formats. The results indicated that the learners understood collocations better when presented in the form of intact wholes as opposed to just verb and noun components. Overall, the findings of the study demonstrated that learning from these exercises, in general, was small and that none of the exercise formats proved to be superior. That could draw attention to the fact that other means of presenting collocations, such as meaningful input, may facilitate the acquisition of collocations more effectively than most regular textbook exercises.

Peters (2014) conducted a research study to explore the factors that may affect the learning of vocabulary in the forms of (single words vs. collocations). Specifically, the researchers attempted to examine whether factors of repetition, type of words (single vs. collocations), and the timing of the posttests affect vocabulary acquisition. The findings indicated that as the frequency of repetition increases, learning vocabulary increases, and that
this phenomenon occurred with both single words and collocations. Additionally, single words
were recalled relatively better than collocations, which suggests that collocations are more
complex and more difficult to acquire.

Peters (2015) researched the *interlexical* and *intralexical* factors that could impede
collocation acquisition. Peters investigated the effects of congruency, collocate-node relations,
and word length on learning. The results demonstrated that congruency was a significant factor
to predict the rate of learning collocations. For collocate-node relationship, the results indicated
that the relationship could determine the ease of learning. In specific, the findings demonstrated
the congruent (*adjective* + *noun*) collocations were the easiest to acquire, and (*phrasal verb* +
*noun*) incongruent collocations were the most difficult to acquire.

Time concentration of exposure to the second language is a basic condition for the
acquisition of either L1 or L2. Serrano, Stengers, and Housen (2015) aimed to find to what
extent time concentration (intensive vs. regular) plays a role in the acquisition of formulaic
sequences, how proficiency levels affect the acquisition, and how advance-level learners could
perform compared to native speakers. The formulaic sequences employed include various types
such as *first of all* and *it looks like*. The results showed that time concentration distribution
affects the learning of formulaic sequences positively; however, there were certain conditions
necessary for these effects to take place. The findings of the study indicated that intensive-
program elementary students performed significantly higher than the others regarding tokens but
not types. The intermediate-level students demonstrated better acquisition with the range and
number of the formulaic sequences compared to the students in the advanced level. For the
advanced students, the results showed that there was no significant improvement in their performance, which was attributed to the fact that learning in advanced levels is slow and non-linear compared to learning in lower proficiency levels.

In research related to collocations’ presentation in textbooks, Tsai (2014) analyzed the treatment of collocations in school textbooks in Taiwan. Tsai attempted to examine the collocational profiles in these textbooks and compare them to the discourse of native speakers. In the data analysis, the researcher focused on (verb + noun) collocations, which were counted as types and tokens of each type. The results provided various outcomes about collocations. First, the textbooks proved to include collocation profiles that are comparable to those of native speakers’ discourse, with various degrees of density and diversity. Additionally, the results demonstrated that most of the textbooks failed to recycle (repeat their presentation in the textbooks) collocations to the extent where L2 learners would be able to notice and establish the connections among their lexical elements. Second, the EFL learners demonstrated a large use of collocations but with small variations in collocational tokens as compared to the textbooks.

Most of the previously discussed studies adopted quantitative or mixed methods approaches in a cross-sectional manner. Few studies adopted in-depth analysis of the learners’ collocational knowledge development over an extended time. Adopting a longitudinal approach, Bell (2009) studied the development of collocational use over an extended period of time. Bell found that lexical development is nonlinear and that some structures come into prominence and some disappear.
In another study, Siyanova-Chanturia (2015) conducted a longitudinal study of Chinese students learning Italian. The study explored collocational knowledge development over an extended time and within the intervals of three levels. The findings indicated that the use of frequently occurring items increased, and the use of strongly associated combinations increased as the proficiency level increased as well.

Yoon (2016) examined (verb + noun) collocations in written samples of learners based on a longitudinal approach. The researcher extended the study for the length of a semester and employed corpus analysis tools to examine the learners’ essays. The results indicated various insights into the use of collocations by learners. The analysis showed that learners used frequent collocations heavily and relied less on low-frequent collocations as compared to native speakers.

**Summary of Collocation Research**

In sum, researching collocations has revealed various insights about their acquisition in the contexts of the SLA field. Research has shown that teaching is crucial to develop L2 learners’ collocational knowledge. This review demonstrates that, in general, presenting vocabulary in chunks (collocations) is more effective than teaching single words in the long term (Rahimi & Momeni, 2012). Teaching collocations helps to improve L2 learners’ writing and speaking abilities (AlHassan & Wood, 2015; Attar & Allami, 2013). As for dictionaries, research shows that they are helpful in providing the learners with information that is necessary to strengthen their collocational knowledge (Laufer, 2010).
Research has demonstrated that the use of technologies can be helpful in learning and acquiring collocations. Some of these technologies include the use of concordancers that dig into language corpora to provide L2 learners with accurate and detailed information about the use of collocations in contexts (Daskalovska, 2015; Kheirzadeh & Marandi, 2014). Mobile technologies, such as the use of smartphones, have also proved to provide affordances that L2 learners can employ to learn more about collocations (Amer, 2014).

Researchers have also studied the factors that either facilitate or impede learning collocations. First language has a significant effect on learning L2 collocations, and, specifically, similar collocations across L2 and L1 were easier to learn than collocations that are different across languages (Nesselhauf, 2003; Yamashita & Jiang, 2010). Another factor is the frequency of encountering collocations throughout language input. Research shows that it is important for L2 learners to experience several encounters with L2 collocations to master them in various contexts and in L2 textbooks (Durrant & Schmitt, 2010; Tsai, 2014; Webb et al., 2013). Research on collocations also shows other factors play a role in determining the learning of L2 collocations. Among these factors are (a) types of collocations such as verb + noun vs. adjective + noun (Peters, 2015); (b) types of exercises in textbooks that are created to promote learning collocations (Peters, 2014); and (c) contexts of learning the L2 (e.g., EFL vs. ESL) (Alsakran, 2011).

Longitudinal studies on collocation learning have demonstrated various insights about the nature of learning collocations. For example, research indicates that learning collocations is not linear and that learners demonstrated various levels of performance when learning collocations.
In addition, studies revealed that L2 learners in different proficiency levels face different challenges. For example, L2 learners in advanced levels experienced fewer gains in learning collocations as opposed to those in lower proficiency levels (Siyanova-Chanturia, 2015; Yoon, 2016). For a summary of the studies on collocations, see Table 3.

Table 3. Collocation Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Purpose of Study</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>AlHassan and Wood (2015)</td>
<td>The effects of teaching FSs on improving academic writing.</td>
<td>Explicit FS teaching leads to using them in writing; FSs increase the learners’ ability in academic writing.</td>
</tr>
<tr>
<td>Alsakran (2011)</td>
<td>Investigate receptive/productive collocational knowledge; investigate EFL/ESL environments on collocational knowledge; collocational types associated with levels of difficulty.</td>
<td>ESL learners showed better command of collocational knowledge; productive and receptive are different; difficulty index showed from easy to difficult: (verb-noun, adjective-noun, verb-preposition)</td>
</tr>
<tr>
<td>Amer (2014)</td>
<td>Learners’ characteristics and use of mobile applications to learn collocations.</td>
<td>Use of application correlates with the learners’ gains; application usage is predicted by proficiency, average daily use, and motivation to learn.</td>
</tr>
<tr>
<td>Attar and Allami (2013)</td>
<td>Collocation teaching effects on speaking ability; learners’ attitudes toward teaching collocations.</td>
<td>Teaching collocations improved speaking ability; participants exhibited positive attitudes towards collocation teaching.</td>
</tr>
<tr>
<td>Boers et al. (2014)</td>
<td>Types of exercises and learning verb-noun collocations.</td>
<td>Exercises that treat collocations as intact wholes are better for learning collocations.</td>
</tr>
<tr>
<td>Daskalovska (2015)</td>
<td>Traditional vs. corpus based-(concordancer) teaching.</td>
<td>Corpus based is more effective in teaching collocations.</td>
</tr>
<tr>
<td>Kheirzadeh and Marandi (2014)</td>
<td>Concordancers as tools to facilitate collocation learning; types of collocations sought more by learners.</td>
<td>Positive effects of concordancers as a tool to learn; verb-noun collocations are the most searched by learners.</td>
</tr>
</tbody>
</table>
Table 3. (Continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Purpose of Study</th>
<th>Findings</th>
</tr>
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<tbody>
<tr>
<td>Peters (2014)</td>
<td>Effects of repetition (1-3-5) occurrences, type (single or collocations), and time of post-testing on the learning of lexical items.</td>
<td>Repetition affects learning positively, single words are easier to recall than collocations, and repetition effect is independent of post-test timing.</td>
</tr>
<tr>
<td>Peters (2015)</td>
<td>Effects of congruency, collocate-node, word length on learning.</td>
<td>All factors affect learning; congruent, adjective-noun node, smaller word length are easier to learn.</td>
</tr>
<tr>
<td>Serrano et al. (2015)</td>
<td>Intensive vs. regular EFL programs and their effect on oral narrative.</td>
<td>Intensive program students showed better performance; advanced learners showed less use than native speakers.</td>
</tr>
<tr>
<td>Tsai (2014)</td>
<td>Investigating collocational profiles of textbooks, EFL learners, written native-speakers’ production</td>
<td>Density of textbooks is comparable to native-speaker productions, EFL learners showed large collocational density but limited diversity.</td>
</tr>
<tr>
<td>Webb et al. (2013)</td>
<td>Effects of repetition on incidental learning of collocations.</td>
<td>Learners acquired collocations incidentally; the number of times encountering collocations leads to learning.</td>
</tr>
</tbody>
</table>

**Major Lines of Researching Idioms**

Idioms are the second type of MWEs in the current study. In this section, I reviewed various studies regarding idioms in the field of SLA. Idioms and idiomaticity in general have gained considerable interest in the field of SLA. The importance of idioms has been emphasized as a crucial aspect in real life communicative acts (e.g., Liontas, 1999, 2013, 2015a; Ramonda, 2016).

In addition, the importance of idioms arises from the fact that they are ubiquitous in the natural language use, and that they pose special challenges for L2 learners. There is a plethora of studies regarding teaching and learning of idioms, idiom processing, and teachers’ and educators’ beliefs.
about the importance of teaching idioms. In the following sections, I reviewed the major lines of researching idioms and discussed numerous experimental studies.

Idioms in education is one of the areas where researchers explored the importance of adopting idiom teaching in educational settings. For instance, Liontas (2002b, 2013, 2017) explored how educators view idiomaticity integration in teacher education programs, and how L2 learners view the notions of idiomaticity and its importance for their overall language proficiency and communication.

Researchers have explored several methods to teach idioms to L2 learners. Some of the approaches include the use of etymological information to help in learning idioms (Boers, Eyckmans, & Stengers, 2007), the use of paired-associate learning to support learning idioms (Steinel et al., 2007), and the use of conceptual metaphors in teaching idioms (Skoufaki, 2008).

Another line of researching idioms is concerned with the processing of idioms. For instance, Siyanova-Chanturia, Conklin, and Schmitt (2011) studied the processing of idioms by native and non-native speakers by examining eye movements. In another study, Cieślicka and Heredia (2017) studied the idiom processing advantages among bilingual speakers with various degrees of language dominance between the L1 and L2.

Using technology to support idiom learning is one of the topics researchers have explored in the field of SLA. Some examples include the use of videos (Abolfazli Khonbi & Sadeghi, 2017), the use of web-based educational games (Müller, Son, Nozawa, & Dashtestani, 2017), and the use of mobile device technologies (Hayati, Jalilifar, & Mashhadi, 2013).
Like research on collocations, research on idioms has taken various forms in the field of SLA. These areas of research include psycholinguistic studies, which are mainly concerned with the processing of idioms by L2 learners, and others, including pedagogical studies focusing on ways and methods of teaching idioms. Furthermore, there are studies which are mainly concerned with integrating idiomaticity in the curriculum of English as a second language for speakers of other languages (ESOL) and teachers’ beliefs and perceptions about teaching idioms and integrating them into ESL/EFL education programs. In the following sections, I presented a review of several recent studies concerning these topics.

**Idioms in L2 Education**

Several studies addressed learners’ perceptions of learning idioms, and teachers’ education and idiomaticity. Liontas (2002b) aimed at discovering L2 learners’ desire to learn idioms, their ability to predict their own performance on various idiomatic tasks, and their beliefs regarding idiomaticity. Liontas employed questionnaires distributed to 60 third-year adult learners of Spanish, French, and German to collect data. The results of data analysis demonstrated several insights about the nature of idiomaticity from the perspectives of the learners. First, it showed that learners demonstrated a desire to include idiomaticity teaching and learning in their language education. Second, the learners demonstrated a considerable ability to predict their knowledge of idioms. Third, the learners had specific beliefs about the importance of idioms.

In another study, Liontas (2013) explored the beliefs and assumptions of L2 teachers, professional specialists, and lecturers regarding teaching and learning idiomaticity. Liontas also
concentrated on the professional training that university instructors receive regarding idiomaticity. In specific, the study was concerned with questions regarding L2 language teachers’ private theories and knowledge when it comes to teaching and learning idioms and to what extent language program directors have systematically addressed the issue of professional training in idiomaticity. The study was a qualitative case study of 16 university instructors and two language program directors. The researcher employed a survey that measured the participants’ beliefs regarding the importance of teaching and learning idiomaticity and the inclusion of these programs in their teaching materials for teacher education. Liontas also conducted a series of semi-structured interviews with three participants. The findings revealed that university L2 instructors and language program directors emphasized the importance of incorporating idiomaticity in language programs and that they have an important role in pushing forward idiomaticity pedagogy through action research.

*Factors Affecting Idiom Acquisition*

Some studies were mainly concerned with the effectiveness of teaching and the factors that affect learning idioms. Liontas (2001a) conducted one of the earliest studies in the field; specifically, he aimed to (a) examine what reading strategies and pragmatic principles L2 learners utilize to find idiomatic phrases and what cognitive-psycholinguistic processes they employ; (b) explore how semantic and pragmatic constraints affect comprehension of idioms either in or out of context; and (c) explore context effects on the interpretation of these idioms when encountered in contexts that support their interpretation. Eleven third-semester college students studying
Modern Greek participated in the study. The results of the study revealed several insights. First, the participants used numerous strategies to detect idioms in context. These strategies included the use of literal meanings if they make sense in the context, translation between L2 and L1, word arrangement, prior knowledge, images of idioms, sounds/feel, metaphorical factors, degree to which the idioms stand out, and description. Second, the results showed that when out of context, the matching idioms (i.e., idioms that are similar across L1 and L2) were processed easier than non-matching idioms. Moreover, the non-matching idioms caused processing problems when the meaning was completely opaque. Third, when idioms were presented within a full context the participants were better able to interpret them.

In a similar fashion, Liontas (2002a) aimed to explore various factors that might affect learning and teaching idioms: (a) how idiom type is a factor in determining the speed and ease of idiom comprehension and interpretation; (b) how idiom understanding is a result of context; (c) what strategies L2 learners use to account for the idiomatic meaning of multiword phrasal units, either in a contextualized or acontextualized reading of texts including idioms; and (d) what cognitive processes might constrain the correct idiomatic mappings between target and domain idioms. Fifty-three adult, third-year university student participants studying Spanish, French, or German as L2s were recruited in the study. The results showed various insights about the nature of learning idioms. First, the findings revealed that context plays a significant role in understanding idioms in both lexical levels (i.e., idioms that are similar across the L2 and L1) and in post-lexical levels (i.e., idioms that are not similar across the L2 and L1). Second, the results showed that the participants had employed translation, guessing, and contextual cues to
construct the meanings of idioms. Third, the findings revealed that factors such as the degree of the transparency of the meaning between the target and domain idioms, vocabulary knowledge, graphophonics, the arrangement of syntactic features, and the literal meanings of idioms have a significant effect in the transference of idiomatic knowledge.

Boers, Eyckmans, and Stengers (2007) conducted a study to explore how using etymological information of idioms (i.e. the origin of the idiom) can facilitate learning idioms. As idiom meanings cannot be derived from the single constituents of the idioms, it has been noted in the study that the meanings of idioms are motivated; that is although the meaning is opaque, the words that constitute the idioms could help in understanding the meaning of the idiom. Recruiting Dutch-speaking participants learning English in an EFL context and employing an experimental design in which etymological information was presented to learners, the authors found that etymological information was helpful in increasing the learners’ awareness of the idioms, and that this method helped in developing deeper processing of idioms. As a result, the learners were able to learn the register of the idioms and comprehend their figurative meanings.

Steinel, Hulstijn, and Steinel (2007) examined the effects of using paired-associate learning (PAL) on idiom retention. The researchers examined the learnability of idioms in either receptive direction (from L2 to L1) or in productive direction (L1 to L2). Furthermore, the researchers explored the effects of imageability (i.e., the ability of the idiom to invoke a specific image) and transparency (i.e., the ability of the idiom to be used either figuratively or literally). The participants in the learning experiment consisted of 129 Dutch university students. The
between-subject factors were direction of learning (L1 to L2) or (L2 to L1) and direction of testing (L1 to L2) vs (L2 to L1), and the within-subjects factors were a pre-test and a post-test. The degrees of transparency and imageability were classified as high, low, or intermediate. The idioms were presented to the participants in classroom learning sessions. In the (L2 to L1) direction, the English idioms were presented first, then Dutch equivalents with some paraphrasing in Dutch. The opposite was presented in the (L1 to L2) direction. The results of the study revealed several insights. First, in the productive test (L1 to L2) direction, the participants performed better than the other participants in (L2 to L1) direction. Second, the participants showed significant gains in the receptive test of (L2 to L1) direction as opposed to the participants in (L1 to L2) direction. The second part was the effect of imageability and transparency. For receptive learners (L2 to L1), low imageability idioms were not efficiently learned, and transparency was considered to have a minor effect in terms of performance; however, transparency was helpful only in the recognition part.

Skoufaki (2008) examined two cognitive-linguistics-inspired methods to learn idioms—presenting idioms and their meanings and encouraging learners to use *conceptual metaphors* (CM) as clues to guess the meanings of idioms. The participants were Greek students. The idioms used were VP idioms selected on the basis of two conceptual domains, morality (e.g., *take the high road*) and comprehension, (e.g., *be clear as mud*). The participants were divided into two groups. One group, the metaphor group, received meaning-focused instruction and the participants saw all items in two texts presented with definitions in Greek and example sentences. Following this they had to answer questions regarding the idioms that were presented
to them. The other group, the metaphor group who employed guessing, were presented the idioms grouped on the basis of their conceptual metaphor, but without definitions and example sentences. The participants were asked to write their guesses as to the meaning of the idioms based on the clues presented by CM categorization. The results showed that when using CM plus guessing, the learners achieved significantly better in cloze tests than the other group, which was given only definitions and example sentences. The results suggest that the extra processing in terms of guessing the meanings led to better results in learning idioms.

Zyzik (2011) examined prior lexical knowledge (i.e., knowledge of words which are constituents of the idioms rather than global vocabulary knowledge, such as vocabulary levels tests) and idiom organization (i.e., the grouping of idioms according to specific features). Zyzik recruited 65 students enrolled in upper-division Spanish linguistics courses in a university in the United States. For the materials, the researchers selected a total of 38 Spanish idioms that were limited to nine high frequency verbs and were categorized into seven thematic clusters, such as friendship/compliments. The participants completed three tests: (a) vocabulary, (b) written production, and (c) a multiple-choice recognition test. The vocabulary test was used to divide the idioms into those with known words and those with unknown words. Students were provided lessons for 10 weeks; in each week there were three to four idioms presented. The results demonstrated that the treatment effect was significant. For prior lexical knowledge, the results showed that idioms with known constituents were better learned than idioms with unknown constituents in the written production test. However, in the recognition test, the results showed no difference. Regarding the question of idiom organization, the results showed that organizing...
idioms into anyone of these categories—formal, thematic, or underlying metaphorical concept—did not result in any difference among them.

Phonological features of idioms have been a focal point in research. Eyckmans and Lindstromberg (2017) aimed to discover the effects of inter-word phonological similarity, especially alliteration (e.g., miss the mark) and assonance (e.g., make a mistake), on delayed recall of English figurative idioms. Specifically, the researchers tried to examine if highlighting the sound patterns in idioms using a simple attention direction task could lead to higher recall of the forms. Furthermore, the researchers aimed to explore whether non-sound-repeating idioms proved to be more difficult to recall. The participants were 50 Dutch-speaking students, aged between 19 and 21 and majoring in English. The materials used included 26 English idioms drawn from L2 learners’ dictionaries. The participants in condition one (without directions of sound patterns) were asked to study idioms presented on sheets. In the other condition, the learners were directed to notice the sound patterns in the idioms using exercises to match a word in terms of sound to another boxed word within the idiom. The learners were told that they would be tested after the instruction to recall the forms of the idioms. Other idioms with no sound patterns were used as a control. The results showed instructional exercises that raised participants’ awareness of the sound patterns helped in the learning of idioms with alliterative and assonant features. However, the participants were also able to recall even idioms that did not have specific sound patterns.
Technology and Learning Idioms

Researchers have looked for various ways of employing technology to promote idiom teaching. Hayati, Jalilifar, and Mashhadi (2013) explored the effects of three types of English idiom instruction on learning. The instructional modes were: (a) Short Messaging Service (SMS) presentation of idioms, (b) contextual learning, and (c) self-study learning. They recruited 60 Persian-speaking learners of English and divided them into three groups. First, the self-study group received a pamphlet containing 80 English idioms and their definitions in English along with sample sentences. Second, the SMS-messaging group had four idioms sent to their cell phones daily, and the idioms were embedded in short passages along with exercises for practicing purposes. The last group received in-class instructions by embedding idioms in texts. The researchers also studied the learners’ perceptions, adopting a post-study survey for the SMS group to elicit some data on their perceptions of using SMS messaging for learning idioms. The results showed that the SMS-message learning group performed significantly better than the other groups in multiple-choice post-treatment idiom tests. The two other treatments showed no difference from each other. The results also suggest that the students were enthusiastic about using their mobile devices for learning.

Abolfazli Khonbi and Sadeghi (2017) examined the use of videos in idiom teaching. Specifically, the researchers explored the effects of teaching idioms using four methods: (a) short movie clip, (b) sentence use, (c) definitions use, and (d) role play. Using a quasi-experimental design, the researchers recruited 47 male and female participants ranging in age from 15 to 22 years. The participants’ mother tongue was Azeri, and their English proficiency level was upper-
intermediate. The participants were divided into four groups according to the teaching method, and they received a pre-experiment test to measure their knowledge of the target idioms. Each group received instructions according to the teaching method. Following the experiment, the students took a post-experiment test to measure idioms learning. The results revealed that there were variations in the effects of each teaching method on learning. The methods, ranked in the order of their effectiveness, were role-play method, movie clip, sentence use, and definitions use.

Web-based games showed significant effects as facilitators of idiom learning. Müller, Son, Nozawa, and Dashtestani (2017) conducted a study to explore the effects of a web-based educational game on learning idioms and to assess the attitudinal factors that contribute to learning idioms using games. Overall, the goal of the study was to explore the effects of the game on learning idioms and the relationship between EFL learners’ attitudes and learning outcomes. The study utilized a game called Idiomatico, and the participants consisted of two groups, one in Japan and the other in Iran. The researchers provided online pre-questionnaires, post-questionnaires, a pre-test, and a post-test to the learners to measure the rate of idiom learning. The two groups filled out pre-questionnaires about their use of video games and their attitudes towards learning English. The participants then played the game—the Iranians for four weeks and the Japanese for 10 weeks. The results showed that the use of web-based games was effective and that the participants gained significant idiom knowledge. In addition, the results showed that attitudes toward learning English was a pivotal factor in the students’ learning achievement. The results also revealed that satisfaction with games and willingness to use games for learning were important factors to consider when designing educational games. As for the
rating of the game, the two groups showed divergent responses and foci in their opinions. The Japanese learners’ feedback focused mainly on the design of the game, while the Iranian students gave feedback focusing on the process of idioms learning.

Regarding idiom knowledge, there is one recent study, conducted by Macis and Schmitt (2017a), concerned with EFL learners’ knowledge of idiomatic collocations. Although the researchers used the term *idiomatic collocations*, I presented this study in the idiom section since it is mainly concerned with the idiomatic meaning of collocations that could be polysemous (i.e., they can be used in both their literal and figurative meanings). Macis and Schmitt (2017a) carried out this study to measure EFL learners’ knowledge of idiomatic expressions and some factors that play major roles in determining the state of idiom knowledge. Chilean, Spanish-speaking adult learners participated in the study by completing meaning-recall idiom tests. The researchers employed non-defining sentences that included the idioms. The results revealed that the knowledge of these idiomatic collocations in general was low. Furthermore, the researchers examined the characteristics of the participants and the idioms. The results revealed that the frequency of idioms and semantic transparency of the idioms were not effective in determining the state of knowledge; however, other factors linked to the participants’ backgrounds did significantly predict idiom knowledge. These factors included year in university, amount of time participants spent in a native English-language country, and reading habits.
Processing of Idioms

Processing idioms is one of the major lines of research in the areas of idiomaticity and idioms. Several researchers have investigated how native and non-native speakers process idioms as opposed to free combinations or novel phrases. Siyanova-Chanturia, Conklin, and Schmitt (2011) studied the eye movements of native and non-native speakers as they read a series of stories. Each story contained one of the following: (a) an idiom used figuratively (at the end of the day – ‘eventually’), (b) an idiom used literally (at the end of the day – ‘in the evening’), or (c) a novel phrase (at the end of the war). Thirty-six native speakers and 36 non-native-speakers-of-English students at college level in Britain participated in the study. The instruments employed included idioms that could be used both figuratively and literally, and other novel phrases based on certain criteria. The criteria included frequently used expressions, idioms used either figuratively or literally depending on context, and novel phrases that resemble idioms in terms of fixedness. The participants were presented with stories that contained idioms and novel phrases. The researchers used eye-trackers to measure eye fixedness while reading each story. The results provided various insights. For the native-speaking participants, the results showed that they processed idioms faster than novel phrases; however, there was no difference between literal and figurative use of the idioms. For the non-native-speaking participants the results showed that idioms and novel phrases were processed at a similar fixation rate, and the processing of figurative idioms was slower than literal ones. Furthermore, while the native speakers showed faster rates of reading overall, they displayed a significantly slower time when
reading novel phrases. In addition, the non-native speakers achieved consistently slower reading times across all the types of expressions presented in the texts.

In another study, Qian (2015) investigated the processing advantages of MWEs over novel phrases with native speakers, and whether they process different types of MWEs in different ways. Qian’s study involved 20 English-speaking university students, aged 18 to 29. The focus of the study was on three types of MWEs (idioms, speech formulae, and written formulae in academic contexts), and matched novel phrases which were created by changing 1 or 2 words from the MWEs to make them as novel phrases. The researcher measured the reaction times and error rates for each type of MWE presented to the participants on computer screens. The participants had to decide whether they were grammatically correct or not. The results showed that the participants processed MWEs faster than novel phrases, and that they produced more errors judging the novel phrases than they did with the MWEs. As for the difference among the various types of MWEs in terms of processing, the participants showed slower processing for idioms, while the written formulae were the fastest in terms of processing as measured by reaction times.

Cieślicka and Heredia (2017) examined idiom processing advantages of bilinguals with varying degrees of language dominance living in the United States. Bilinguals speak two languages; one language is dominant and the degree of that dominance can vary among bilinguals. The major goal of the study was to examine whether there is a processing advantage for idiomatic over non-idiomatic expressions by bilinguals. Furthermore, the researchers examined the processing of idiomatic expressions in terms of the transparency of idioms
meanings and the similarities in idioms between the L2 and L1. Eighty-nine adult, Spanish-English bilinguals enrolled in a university in the United States participated in the study. The participants differed in language dominance in that some participants were dominant in Spanish and others in English. The researchers employed eye tracking techniques to elicit data on the processing of 12 English idioms that could be used either in a figurative or a literal sense. The selection of idioms was based on these criteria: (a) half of them should have the same word-to-word equivalent, and (b) the other half should be dissimilar across English and Spanish. Overall, the idioms included met the criteria of similar transparent, similar opaque and different transparent, different opaque. To measure the processing advantages of idioms, other novel phrases were created as control phrases to be compared with the idioms. The researchers used first pass reading time, gaze duration, total reading time, and fixation count for both idioms and novel phrases as sets of behavior that could elicit data on the processing of idioms. The findings revealed various insights into the processing of idioms by bilinguals with varying dominance of L2 and L1. Spanish-dominant bilinguals took longer to process idioms used figuratively than idioms used literally, as well as novel phrases. For English-dominant bilinguals, opaque idioms were processed in less time than transparent idioms and both types of idioms were processed faster than novel phrases. In addition, the similarity of idioms across languages showed differences. Similar idioms were processed slower than different idioms, which suggests that similar idioms invoke translation from L2 to L1, which slows down the processing.
Summary of Idiom Research

Research on idioms has revealed many insights into idioms in L2 education in general, factors affecting their learning, and the processing of idioms. Here are some of the major findings of studies conducted on idioms in SLA. Second language learners have shown that idioms are an important part of L2 education, and they have certain perceptions of idioms and idiomaticity in their endeavors to learn a new language. Furthermore, educators and language instructors have emphasized the importance of integrating idioms in L2 education in general (Liontas, 2002b, 2013).

A major strand of research on idioms is concerned with the factors that assist in learning idioms. Several studies have shown L2 learners use strategies to interpret the meanings of idioms they encounter throughout language input. Another important finding is that the similarity of idioms across L2 and L1 is a significant factor leading to idiom interpretation. Moreover, presenting idioms in context is a significant factor aiding L2 learners in interpreting L2 idioms (Liontas, 2001a, 2002a). Transparency of idiom meanings and idioms that provoke images are proved to be easier to interpret and understand, relative to other idioms (Steinel et al., 2007). Research has also shown that conceptual organization of idioms helps in their learning. Zyzik (2011) demonstrated that a learner’s knowledge of the words within idioms leads to a better understanding of idioms themselves. Factors directly related to EFL learners, such as age, time spent in a country where is the language is commonly used, and reading habits also affect idiom acquisition in general.
Another strand of research on idioms has shed light on the use of technology to help teaching and learning idioms. Several studies have shown mobile devices and the use of videos and instructional games have provided L2 learners with affordances that facilitate the acquisition of idioms (Abolfazli Khonbi & Sadeghi, 2017; Hayati et al., 2013; Müller et al., 2017).

Researchers have studied idiom processing by native and non-native speakers to understand the extent of the burdens of processing idioms. Some of the major insights are that native and non-native speakers process idioms differently and that non-native speakers process idioms more slowly but do process idioms faster than novel phrases. For a summary of idioms research see Table 4.

**Table 4. Idioms Studies**

<table>
<thead>
<tr>
<th>Study</th>
<th>Purpose of Study</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liontas (2002a)</td>
<td>(1) idiom-type effects on the speed and ease of idiom comprehension and interpretation; (2) contextual effect on idiom understanding; (3) strategies L2 learners use to account for the idiomatic meaning of phrasal units in contextualized and acontextualized readings of texts with idioms; (4) what cognitive processes might constrain the correct idiomatic mappings between target and domain idioms.</td>
<td>Idioms with lexical and post-lexical levels have effects on both context and non-context presentations of idioms. The participants employed translation, guessing, and contextual cues to construct the meanings of idioms. The meaning transparency between the target and domain idioms, vocabulary knowledge, graphophonics, the arrangement of syntactic features, and the literal meanings of idioms have a significant effect in transferring idiomatic knowledge.</td>
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<tr>
<td>Liontas (2002b)</td>
<td>The study seeks to discover the L2 learners’ desire to learn idioms, how they predict their performance on idiomatic tasks, and their beliefs about idiomaticity.</td>
<td>Learners showed a strong desire to learn idioms, a good ability to predict their meanings, and specific beliefs about learning idioms.</td>
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Table 4. (Continued)

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<tr>
<th>Study</th>
<th>Purpose of Study</th>
<th>Findings</th>
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<tbody>
<tr>
<td>Siyanova-Chanturia et al.</td>
<td>The study examined eye-movements while reading a series of stories that contain</td>
<td>The results showed that the native speakers showed faster processing rates for idioms (figurative and literal) than for novel phrases. The non-native speakers showed similar processing speeds for all the types of idioms and novel phrases.</td>
</tr>
<tr>
<td>(2011)</td>
<td>idioms used figuratively, idioms used literally, and novel phrases.</td>
<td></td>
</tr>
<tr>
<td>Qian (2015)</td>
<td>The study examined the processing advantages of different types of MWEs (idioms,</td>
<td>The results showed that MWEs in general were processed faster than novel phrases. Idioms were the slowest in processing compared to the other types of MWEs.</td>
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<tr>
<td></td>
<td>speech FSs, and FSs in academic contexts) over novel phrases by native speakers of English</td>
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**Textual Enhancement**

TE is one of the techniques that can raise L2 learner’s awareness and attention to specific linguistic features in language input (Peter, Mackey, Gass, & Schmidt, 2012; Smith, 1993). A cursory look at the literature shows that input enhancement in general has been a target of research in the field of SLA. Some of the research in the last decade covered topics such as grammar teaching (Lee, 2007), vocabulary learning, and text comprehension (Rott, 2007). Input enhancement was also a topic of review articles and meta-analysis studies as well. For example, Han et al. (2008) conducted a critical analysis of studies on input enhancement within the field of SLA. Lee and Huang (2008) conducted meta-analysis research on input enhancement and grammar to measure the effects of input enhancement on grammar acquisition.
Before discussing the research on the effects of TE on learning collocations and idioms, it is useful to highlight some studies that have addressed input enhancement and grammar. For instance, Leow, Egi, Nuevo, and Tsai (2003) studied how TE could help in the comprehension and detection of certain Spanish tenses, in particular present perfect and the present subjunctive mood. The participants were presented with a textually enhanced passage as well as an unenhanced version. The results showed that TE had a small effect on learners noticing the grammatical forms based on the analysis of think-aloud data.

Lee (2007) conducted a study to understand the effects of TE on noticing passive form errors in texts and learners’ comprehension of the text. Another factor of interest in the study is the effect of topic familiarity on learning language forms. The results demonstrated that the learners were able to learn the target grammatical form. However, learning the grammatical forms came at the expense of comprehending the meanings of the texts. The results also showed that topic familiarity helped in comprehending the texts but did not help in learning the grammatical form.

Simard (2009) investigated which of the different formats of TE are the most effective in helping L2 learners acquire plural markers of English. These different formats include the plural markers highlighted by: (a) italics only, (b) underlining, (c) bold only, (d) color only, (e) capitalized only, (f) the preceding five formats together, (g) bold, capitalized, and underlined together, and (h) no enhancement, which served as a control group variable. The results showed that the groups that received texts with plural form enhanced by capitalization outperformed the
other groups. Furthermore, the group with three formats presented together also showed a significant learning improvement compared to the other groups.

Studying TE within the field of MWEs is a recent research avenue. Several researchers have examined the effects of TE on learning collocations and idioms in particular. In the coming sections, I presented these studies and discussed the factors that better address the techniques of enhancement on learning MWEs.

**Textual Enhancement and Collocations**

Fahim and Vaezi (2011) conducted a study on the effectiveness of visual/textual input enhancement on learning *(verb + noun)* lexical collocations. The researchers employed a quasi-experimental design in which they recruited 128 adult EFL Iranian students ranging in age between 19 and 28 and placed as intermediate in their proficiency level. The participants read passages containing the target collocations and then took a multiple-choice post-test. The participants were divided into three groups, two experimental and one control group. The first experimental group received instruction with collocations enhanced by *bolding* and *capitalization*. The second experimental group received direct teacher-to-student instruction using English and Persian equivalents and exercises to learn the collocations. In the control group, the learners read the texts without enhancement and could ask questions if they encountered difficulties. The results showed that the TE group and the conventional teaching group significantly outperformed the control group who read the passage without any help from the teacher or TE.
Goudarzi and Moini (2012) examined the effects of presenting collocations in different conditions: (a) highlighted versus non-highlighted, (b) highlighted versus L1 glossed, and (c) non-highlighted versus L1 glossed. Sixty Iranian university students majoring in TEFL aged 19 to 24 participated in the study. The students were divided into three groups according to the collocation presentation conditions. The students studied three types of collocation-infused texts. After reading the texts, students were immediately tested with multiple-choice recognition tests. Another delayed test was administered two weeks later to measure the long-term effects. The experiment yielded the following results in the immediate test, ranked from highest to lowest performers: (a) L1 glossed presentation; (b) highlighted presentation; and (c) non-highlighted. The delayed tests showed similar results to the immediate test results.

Sonbul and Schmitt (2013) researched the conditions (enriched, enhanced, and decontextualized) that facilitate implicit and explicit lexical knowledge of collocations. The participants consisted of native speakers of English (NS) and advanced-level non-native speakers (NNS). The results showed that on the explicit side (i.e., form recall and form recognition) the NS students exhibited signs of explicit knowledge. For the implicit knowledge (i.e., using priming of words), the results of the experiment showed that NS students had not developed short- or long-term traces of implicit knowledge. The NNS students, in contrast, showed explicit learning was more effective in acquiring collocations. For the implicit knowledge, the experiment yielded results similar to those of the NS students in which the NNS students had not gained significant implicit knowledge based on the results of lexical priming. The results
suggested that for both types of students, implicit knowledge could not be developed in short-term experiments and needed much more time and exposure to language input to develop.

Boers et al. (2017) examined the effects of TE on learning formulaic sequences. They aimed specifically at examining the effect of enhancement to foster intake and whether enhancement encourages learners to look beyond the enhanced FSs and increase their awareness to other formulaic sequences that were not enhanced. The participants were divided into three groups based on the reading condition: (a) a reading text provided along with several textually enhanced formulaic sequences; (b) a reading text provided with only half of the formulaic sequences enhanced; and (c) a text provided without any textual enhancement of formulaic sequences. The 81 participants were Dutch-speaking university students majoring in English. The researchers used modified texts, which included various types of formulaic sequences (nominal compounds and prepositional phrases). They found that enhancement does affect learning, and that the learners were able to recall the enhanced formulaic sequences significantly. Conversely, enhancing half of the formulaic sequences did not help raise the learners’ awareness of formulaic sequences in general, and the group that had no enhancement outperformed the group with half of the target formulaic sequences enhanced. The results indicate a trade-off effect between attention to textually enhanced formulaic sequences and the non-enhanced formulaic sequences within the texts. However, the results of the comparison were not statistically significant, and the study did not consider the variability in the types of formulaic sequences that were enhanced in the texts.
Choi (2017) conducted a study to understand L2 learners’ attention mechanisms to highlighted collocations by using eye-tracking techniques. The results showed that highlighting helps in attracting the learners’ attention in the form of longer processing times, and that it contributes to collocation learning. However, the other group that had non-highlighted texts performed better in recalling unenhanced collocations, which suggests that highlighting distracted the participants from noticing the non-highlighted collocations.

Table 5. Textual Enhancement Studies: Collocations

<table>
<thead>
<tr>
<th>Study</th>
<th>Purpose of Study</th>
<th>Findings</th>
</tr>
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<tbody>
<tr>
<td>Fahim and Vaezi (2011)</td>
<td>The effects of visual/TE on learning (verb + noun) collocations.</td>
<td>Direct teaching of collocations and textual/visual enhancement presentations of collocations significantly affect the learning of the target collocations.</td>
</tr>
<tr>
<td>Goudarzi and Moini (2012)</td>
<td>The effects of presenting collocations in different conditions (a) highlighted versus non-highlighted; (b) highlighted versus L1 glossed; or (c) non-highlighted versus L1 glossed.</td>
<td>The results in the immediate test showed the following order of performance: (a) L1 glosses presentation; (b) highlighted presentation; and (c) non-highlighted. The delayed tests showed similar results to the immediate test results.</td>
</tr>
<tr>
<td>Sonbul and Schmitt (2013)</td>
<td>How different conditions of presenting collocations (enriched, enhanced, and decontextualized) can facilitate implicit and explicit lexical knowledge of collocation.</td>
<td>In explicit knowledge, the NS students showed signs of explicit knowledge. For the implicit side, the NS students had not developed short or long-term traces of implicit knowledge. The NNS students showed explicit learning is more effective. In the implicit knowledge, the NNS students had not gained significant implicit knowledge.</td>
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Table 5. (Continued)

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<tr>
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</tr>
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<tbody>
<tr>
<td>Boers et al.</td>
<td>The effects of TE of collocations on learning.</td>
<td>Enhancement does affect learning and learners recall the enhanced FSs significantly. Enhancing half of the FSs did not help in raising learners’ awareness of FSs in general, and the group that had no enhancement outperformed the group with half of the target FSs enhanced.</td>
</tr>
<tr>
<td>Choi (2017)</td>
<td>What are attention mechanisms to highlighted collocations using eye-tracking techniques?</td>
<td>Highlighting helps in attracting the learners’ attention in terms of longer processing times and contributes to learning collocations. The second group, which had nonhighlighted texts performed better in recalling unenhanced collocations.</td>
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**Textual Enhancement and Idioms**

Few studies have explored the use of TE in idiom learning. Razmjoo, Songhori, and Bahremand (2016) explored the effectiveness of presenting idioms in two different methods of learning: (a) etymological elaboration method and (b) typographic salience methods. Sixty-two male and female adult students ranging in age from 20 to 30 years participated in the study. All were intermediate-level students in Iran. For the typographic salience group the idioms were highlighted and presented within texts. After the learners finished reading the texts, the teachers explained the meanings of the idioms. The etymological group also received the same text as the typographic salience group, but after reading the texts, the idioms were presented using PowerPoint slides along with explanations of their etymology from a teacher. The learners took
an immediate test and a delayed test. The results demonstrated that the etymological elaboration group outperformed the other two groups in terms of recall and retention of the idioms.

Pam and Karimi (2016) examined the effects of TE on incidental learning of idioms. Forty intermediate-level Iranian students participated in the study. The researchers used a pre-test to evaluate the learners’ previous knowledge of idioms. As for the materials, the study employed target idioms extracted from an idiom textbook. The participants were divided into control and experimental groups. In the experimental group, the learners were presented with idioms that were textually enhanced in texts and were asked to read them and answer the questions that followed. The control group received the same materials; however, the idioms were not enhanced. The results revealed that TE was effective and that the experimental group outperformed the control group significantly.

**Table 6. Textual Enhancement Studies: Idioms**

<table>
<thead>
<tr>
<th>Study</th>
<th>Purpose of Study</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Razmjoo, Songhori, and Bahremand (2016)</td>
<td>The effectiveness of presenting idioms in two different methods on learning, etymological elaboration method, and typographic salience method.</td>
<td>The results demonstrated that the etymological elaboration group outperformed the other two groups in terms of recall and retention of the idioms.</td>
</tr>
<tr>
<td>Pam and Karimi (2016)</td>
<td>The effects of presenting idioms in textually enhanced with meanings, and unenhanced and no meaning presentation.</td>
<td>The results revealed that TE was effective and that the experimental group outperformed the control group significantly.</td>
</tr>
</tbody>
</table>
Summary of Textual Enhancement Studies

As shown in TE studies review, there exists a diversity of research topics relating to TE and learning collocations and idioms. Most of the studies were experimental studies in which the researchers introduced different methods to learn and teach collocations and idioms.

Regarding collocations, previous research has shown that TE is effective in general. Fahim and Vaezi (2011) showed that both TE and direct teaching helped in learning collocations. Goudarzi and Moini (2012) also showed that presenting collocations with L1 glosses (i.e., the meaning of the collocation in L1 is helpful). Sonbul and Schmitt (2013) looked at various perspectives to understand implicit and explicit collocation knowledge gains after three types of presentations. The results showed that explicit knowledge is developed better than implicit knowledge across all types of presentations. Boers et al. (2017) found that highlighting some collocations does not necessarily develop awareness of other collocations not highlighted in texts. However, Boers et al. (2017) used different types of MWEs in their study and did not take into account how the different types vary in learning rates.

Researchers have also found that TE or input enhancement in general is effective for idioms. Razmjoo, Songhori, and Bahremand (2016) showed that etymological information along with TE improves learning. However, the study did not examine the effects of TE alone. Therefore, the study does not necessarily capture the effects of TE. Pam and Karimi (2016) showed TE was an effective method; however, the use of TE was accompanied by the meanings of idioms in the participants’ L1. Presenting the meanings of the textually enhanced idioms implies that it is unclear as to whether the enhancement effect or the presentation of the
meanings caused the difference between the two groups. In this study, I explored the effects of TE on collocations and idioms comprehension. Further, I explored and explained in depth how L2 speakers process the meanings of these collocations and idioms using Lontzas’s (1999, 2002c) Idiom Diffusion Model. I believe it is necessary to study the phenomenon of MWE comprehension by taking both quantitative and qualitative research approaches to reach detailed conclusions.
CHAPTER THREE:
METHODOLOGY

Introduction

In this study, I aimed to explore the effects of textual enhancement (TE) in assisting L2 speakers to comprehend Multiword Expressions (MWEs) and to reach a thorough understanding of how L2 speakers transact the meanings or, in other words, in what ways they reached the meanings of the MWEs embedded in paragraphs. In the first part of the study, I explored the effects of TE on the comprehension of MWEs (collocations and idioms) and whether there were differences in comprehension between the two types of MWEs. In the second part of the study, I followed an explanatory descriptive case study approach to explore the participants’ transactions of the meanings of the collocations and idioms. I described in detail the methodology I adopted to answer the research questions in the following sections.

Design of Study

I employed a mixed methods design; that is, the use of quantitative and qualitative approaches in a single study (Creswell, 2008; Teddlie & Tashakkori, 2010). Mixed methods designs have become popular in the disciplines of social and behavioral sciences in general and have gained popularity in the field of applied linguistics and L2 learning and teaching research in specific.
For instance, Mackey and Gass (2015), in the new edition of their book *Second Language Research: Methodology and Design*, published in 2015, added a whole new chapter on mixed methods research. This reflects the importance these methods are gaining in the field. Mixed methods design is a major research paradigm in addition to solely using quantitative paradigm or qualitative paradigm (Johnson, Onwuegbuzie, & Turner, 2007, p. 112).

Creswell (2008) defined the mixed methods approach in *The Sage Encyclopedia of Qualitative Research Methods* as “research in which the inquirer or investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or a program of study” (p. 526). Creswell continued that mixed methods designs were acknowledged systematically in the late 1970s and that they have been evolving since then (p. 527). Researchers have made use of mixed methods research designs as an answer to triangulation—locating information from a variety of sources to better answer research questions.

Mixed methods design in general provides the tools to use both quantitative and qualitative methods to deepen the understanding of the phenomena of interest. There are several forms and degrees of mixing both quantitative and qualitative approaches in research designs (Creswell, 2014b). Collecting quantitative and qualitative data simultaneously and combining the data to create interpretation is known as concurrent design. Another form is exploratory sequential design in which the researcher collects qualitative data on an issue to develop quantitative ways of data collection to be used in later stages of research. Another form is
*explanatory sequential design* in which researchers set off collecting data quantitatively and later find explanations for the results in the analysis of the qualitative data.

Figure 2. Mixed Methods Research Steps: Explanatory Sequential Design

To address the questions of this study I used an *explanatory sequential design*. Although the collection of both the quantitative and qualitative data was concurrent, the analysis part was sequential. That is, in the experimental part, the participants had to qualitatively describe how they had reached the meanings of the MWEs embedded in texts. I analyzed the experimental data first, then I analyzed the qualitative data. At the end, I came to interpret and discuss the results considering both the quantitative and qualitative analysis. This design created a proper framework to understand the data and produced more explanations of the experiment results on the effects of TE on comprehending MWEs meanings and how the participants transact the meanings of MWEs (see Figure 2).
Research Questions

Three questions guided the study, two in the experimental (quantitative) section (1. Does textual enhancement help the participants to comprehend different types of Multiword Expressions? 2. Is there a difference in comprehension between collocations and idioms?) and one in the qualitative section (In what ways do the participants describe their experiences of processing and understanding Multiword Expressions?). In the experimental part, participants read texts and answered MWE comprehension questions. In the qualitative part, participants described how they had transacted MWE meanings.

Experimental Study Design

I followed a post-test only design in the experimental part of the study. In this design, I divided the participants randomly using online randomization tools into an experimental and a control group. The experimental group received the instruments of the study with the MWEs textually enhanced. For the control group, the MWEs were not textually enhanced.

I selected a post-test only design to avoid the effects of history and maturation that could happen in pretest post-test designs. According to Creswell (2014), in the time between a pretest and a post-test (history), participants could discuss or use other treatments besides the experiment treatment which may affect the results in post-tests. Regarding maturation, during the time of the experiment, participants could develop or change in the time of the experiment, these changes may cause effects on post-tests that cannot be attributed directly to the main treatment in the experiment.
Previous knowledge of the participants is considered an asset in this study. When people read in general they come with various experiences and schematic knowledge about the world (Liontas, 2002c). This knowledge is a significant factor in assisting comprehension in general, and MWEs in particular. In this study, if previous knowledge is a factor it should appear in the qualitative phase of the study. As prior knowledge is one of the tenets of idioms comprehension as postulated in the Idiom Diffusion Model (Liontas, 1999, 2002c).

**Study Variables**

There were various variables in this study. I conducted comparisons between the experimental and control groups for each type of MWE (collocations and idioms). For both types of MWEs, the between-subjects variable (the independent variable) was *the use of Textual Enhancement* (TE), and the within-subjects variable (the dependent variable) was *the MWEs comprehension scores* the students achieved after they read the texts with embedded MWEs (see Table 7).

*Independent Variables*— The use of TE was the independent variable including two levels. The first level was the group who received materials with textually enhanced MWEs embedded in authentic texts (experimental), and the second level was the group who received materials with non-enhanced MWEs embedded in the texts (control).

*Dependent Variables*— The dependent variable was the scores of MWE comprehension tests. This variable was the outcome of the experiment and I evaluated each participant by the total scores he/she obtained in each type of MWE comprehension tests (see Table 7 for a summary of the variables).
Table 7. Study Variables

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Control (no TE)</th>
<th>Experimental (TE applied)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Collocation Comprehension Test Scores</td>
<td>Collocation Comprehension Test Scores</td>
</tr>
<tr>
<td></td>
<td>Idiom Comprehension Test Scores</td>
<td>Idiom Comprehension Test Scores</td>
</tr>
</tbody>
</table>

Note. There was an independent comparison for each type of MWE (collocations and idioms).

Instruments

The instruments were a survey, collocations, idioms, and reading paragraphs I selected to make up the instrument of this study. I selected a total of twenty MWEs, (ten collocations) and (ten idioms), and a total of twenty paragraphs derived from authentic sources, which were mostly online newspapers and magazines.

Survey. There was a brief survey including different questions to collect data regarding the participants’ demographic information and experiences with the English language and MWEs. The survey includes the following items (see Appendix C):

1. Age
2. Gender
3. Current university standing
4. Years of studying English
5. Years of studying in a college in English
6. Time spent in a foreign country
7. Fluency in English
8. Ease of understanding and interpret English language texts
9. Study collocations and idioms
10. Rate the importance of MWEs
11. Confidence in pointing out MWEs in texts
12. Confidence in comprehending MWEs in isolation
13. Confidence in comprehending MWEs in context.

**Collocations.** I selected the target collocations based on the list identified by Gyllstad and Wolter (2016). The lists of collocations are considered restricted collocations according to the Howarth continuum, in which

One component . . . used in its literal meaning, while the other is used in a specialized sense . . . [t]he specialized meaning of one element can be figurative, delexical or in some way technical and is an important determinant of limited collocability at the other. (Howarth, 1996, p. 47)

Examples of these collocations include *break a promise, thorny issue, carry the burden,* and *easy money* (for a complete list, see Appendix A). The collocations I selected were of two types: (1) collocations that are composed of (verb + noun) such as *draw conclusion* and *cast doubt,* and (2) collocations that are composed of (adjective + noun) such as *thorny issue.*
**Idioms.** Macis and Schmitt (2017a) have identified idioms classified as figurative idioms on Howarth’s continuum. The idioms were limited to items that consist of two major words. A sample of these idioms includes *hit the roof, dark horse, hold the line,* and *red flag.* A cursory look at the idioms shows that these expressions can be used in a literal sense, however, I have embedded these idioms in texts that carry their idiomatic meanings (see Appendix A). Additionally, the idioms I used in this study were idioms that comprise mostly two major constituents (words): (1) idioms that are composed of (verb + noun) such as *hit the roof, hold the line,* and *bend one’s knee* and (2) idioms that are composed of (adjective + noun) such as *red flag* and *cold feet* (see Appendix A).

**Reading Materials.** I employed authentic paragraphs in which examples of these idioms and collocations were embedded. The reading materials were authentic paragraphs extracted from online magazines and newspapers. Each paragraph contained only one of the target idioms and collocations. There were ten paragraphs for collocations and ten paragraphs for idioms. To ascertain that the level of reading was within the participants’ proficiency levels, I conducted a readability analysis of the reading texts. The readability level is “an estimate of [text] level of difficulty or complexity. Readability measures usually consider the difficulty of the vocabulary words and the difficulty or complexity of the sentences” (Kress & Fry, 2015, p. 79). The texts I used in this study fall under the threshold of grade 13 and lower based on Fry’s readability level scale (Fry, 1977). The average readability level of all the paragraphs was grade 10.3, with a maximum of grade 13 and a minimum of grade 8.
Participants

Twenty-six participants volunteered for this study. The participants were speakers of English as a second language (ESL). They were students in a major Southeastern university in the United States who speak Arabic as their first language (L1). The important factor unifying the characteristics of the participants was their levels of proficiency and being adult students in university academic programs.

The reading proficiency level of the participants was not lower than upper-intermediate levels. To ensure the participants’ proficiency levels were not lower than upper-intermediate, I included in the instruments a reading-proficiency level test. The test is based on the practice tests of the International English Language Testing System (IELTS) available for free. IELTS is an international standardized English language test used by universities around the world to ensure students can meet the language requirements to pursue their studies in majority English-speaking countries such the United States and the United Kingdom.

The age range of the participants varied between 25 and 40, and the average age was 30.58. There were 21 male participants (80.77%), and 5 female participants (19.23%). Most of the participants were in graduate school. That is, 24 (92.31%) participants were graduate students, and 2 (7.69%) participants were undergraduate students, specifically in the junior level (third year).
Procedures

I collected the data in this study in three major steps. In the first step, I called for participation through an advertisement on a Facebook page dedicated to Arabic-speaking students who were involved in a Southwestern university in the United States of America. I received 32 emails from those who showed interest in participation in the study. The participants were all Arabic-speaking students in academic programs in the university. In the second step, after I received all the emails of the potential participants, I randomly assigned them into control and experimental groups using online randomization tools. However, in the end, only 26 participants completed all the tasks of the study.

All the instruments and tasks of the study were in one online link for each group directing the participants to three tasks. The tasks the participants had to complete were

a. an online reading proficiency test,

b. an online survey to collect demographic information and experiences with English language and MWEs in general, and

c. the experiment materials in the form of texts with enhanced idioms and collocations for the experimental group and experiment materials without textual enhancement for the control group.

In the experimental part, the participants read the instructions and began reading the paragraphs. After each paragraph they had to answer a multiple-choice comprehension question containing four choices about the meaning of the target MWE. The participants were not allowed
to go back to the paragraph. This was to ensure that the participants did not reverse back to texts for further consulting with the factors that might lead them to comprehend the MWEs other than TE. The estimated time to complete each text was 2–3 minutes, allowing the participants to read and answer the MWE comprehension question.

Finally, after each multiple-choice question, there was an open-ended question where the participants had to fill out their answers in a blank box to describe how they had reached the meaning of the MWE embedded in the text (see Figure 3 for a summary of the procedures).

Figure 3. Study Procedures

The participants used their computers to access the experiment online. I used Qualtrics Online Survey service to present the paragraphs, MWE comprehension tests, and the open-ended questions to describe the meaning making transactions. Qualtrics provides templates in which I can add a passage and various forms of questions, such as *fill-in-the-gap questions*, *multiple choice questions*, and *essay questions* (see Appendix B for a sample of the questions ln Qualtrics).
Qualitative Phase

I adopted an explanatory sequential design as the major design of this study. I used the qualitative phase to gain deeper insights into how the participants processed and transacted the meanings of the MWEs embedded in the texts. Qualitative research provides rich insights into issues researchers cannot uncover using quantitative approaches. When employing quantitative approaches in research problems, the researchers often end up with questions regarding the outcomes of their experiments. Qualitative methods can adequately address these questions. The major question for the qualitative phase is

*In what ways do the participants describe their experiences of processing and comprehending Multiword Expressions?*

Explanatory Descriptive Case Study Research Approach

I followed an explanatory descriptive case study approach to delve into the participants’ descriptions of the meaning making processes they used while reading the paragraphs. Yin (1984) defined case study research as “as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used” (p. 23). In addition, Blatter (2008) defined case study research as “a research approach in which one or a few instances of a phenomenon is studied in depth” (p. 68). Zainal (2007) states that using case study research can help researchers to explore the complexities of research problems that go beyond the limitations of the quantitative research methods. Furthermore, case study research can help
researchers to find answers through the ‘actors’ perspectives’, in other words, the participants’ perspectives. Researchers adopting a case study approach are also concerned with describing in detail “the specific mechanisms and pathways between causes and effects rather than revealing the average strength of a factor that causes an effect” (Blatter, 2008, p. 69).

Case study approaches, like other qualitative research approaches, come in various forms to suit the nature of the phenomena under exploration. Yin (1984) identified three categories of case studies: exploratory, descriptive, and explanatory. Each category addresses the research problems as proper to the specific research questions and the nature and objectives of research. The first of these categories is exploratory case study. It is a strategy researchers use to research an unexplored area by asking general questions that seek to explore if specific issues are available in a specific context, and usually researchers adopting this strategy do not have specific questions to answer (Streb, 2010; Yin, 1984; Zainal, 2007). The second category, explanatory case studies, are studies in which researchers explore the data in depth to explain a phenomenon. Harder (2010) noted “explanatory case studies not only explore and describe phenomena but can also be used to explain causal relationships and develop theory” (p. 370). The third type, descriptive case studies, are studies in which researchers employ a strategy to describe a natural phenomenon. Specifically, the goal of the researcher is mainly to describe the data as they occur (Yin, 1984; Zainal, 2007). In another explanation of descriptive case study, Tobin (2010) noted that “the main goal of the descriptive case study is to assess a sample in detail and in depth, based on an articulation of a descriptive theory” (p. 288).
Case study research is more flexible than the other qualitative research approaches. According to Meyer (2001), case study research does not require rigid guiding requirements; as a result, this flexibility “is a strength because it allows tailoring the design and data collection procedures to the research questions” (pp. 329–330). Taking advantage of this flexibility, I used a combination of explanatory and descriptive case study to explore the participants’ descriptions of the MWE meaning transactions that took place in the experimental part.

Adopting an explanatory descriptive case study is proper for this study for several reasons. First, I aimed to explain the results of the experimental part. Second, I used Smith’s Input Enhancement hypothesis (Smith, 1993) and Liontas’s Idiom Diffusion Model (Liontas, 1999, 2002c) as the major theoretical frameworks to understand the results of the study. Using the data to explain the outcomes of the experimental part within a specific theoretical framework led me to use both the explanatory and the descriptive case study approaches to reach a comprehensive answer to the research questions.

**Application of Explanatory Descriptive Case Study Approach**

In this study, I used an explanatory descriptive case study (EDCS) approach to understand in depth how the participants describe the transactions of the MWE meanings. The descriptive theoretical framework proposed by Liontas’s (1999, 2002c) Idiom Diffusion Model functioned as the framework that helps to understand the strategies, processes, and the ways the participants used to comprehend the meanings of the MWEs. In addition, EDCS helps to learn how textual
enhancement is a factor in triggering the participants to further process and comprehend the meanings of the MWEs ultimately.

**Data Sources**

There were two major data sources in this study: (1) information boxes where the participants wrote their descriptions of transacting the meanings of MWEs and (2) the results from the experimental part that I used to provide further evidences to the qualitative phase. The participants provided data in the form of descriptions of the transactions or methods they employed in their interactions with the texts that contain the MWEs. Following each multiple-choice question, there was a blank box created for text entry. In these boxes the participants had to fill in brief descriptions of how they had reached the meaning of one MWE embedded in the previous paragraph. The data the participants provided in these boxes constitute the basic units I used to delved deeper into the processes and strategies the participants employed under the framework of the Idiom Diffusion Model (Liontas, 1999, 2002c).

**Data Analysis Procedures**

I employed a variety of data analysis strategies and techniques to discover the themes in the qualitative data. The two major strategies I used were *text analysis* and *thematic analysis*. Along with the data from the survey and the experimental part, I used text analysis and thematic analysis to comprehensively understand the results of the study in detail as required in case study approach.
**Text Analysis.** I used text analysis to look for major words and ideas co-occurring in the descriptions of the participants. It is a useful tool to take a snapshot of the major co-occurring statements or ideas in the data and provide a rough conception of the data. I used *Word Clouds* available in MaxQDA software that present the most common words in a colorful figure with different colors, and various sizes. I conducted a text analysis for each group separately.

**Thematic Analysis.** Thematic analysis is one of the data analysis strategies that is useful for a descriptive case study. In this strategy, a researcher attempts to locate themes or major patterns in data through the iterative processes of sifting through and organizing the data. Themes are “groupings or outcomes of coding/conceptualizing; abstract constructs; and analytic patterns” (Grbich, 2013, p. 261). Furthermore, thematic analysis, according to Braun and Clarke (2006), is “a method for identifying, analyzing and reporting patterns (themes) within data. It minimally organizes and describes your data set in (rich) detail” (p. 79). To find the themes in the data, I used *coding* which I explained in detail in the section that follows.

**Coding.** Coding is a fundamental step of data analysis. Codes are “labels that assign symbolic meanings to the descriptive or inferential information compiled during a study” (Miles, Huberman, & Saldaña, 2014, p. 71). The coding process can take several cycles and various applications. For instance, there is “first cycle coding” and “second cycle coding” processes that can be associated with the notion of *constant comparison* analysis.
Among the coding techniques I found to be useful for an EDCS data is the use of *in vivo* coding. I used in vivo coding to capture words or phrases uttered by the participants and then I labelled these phrases with words derived from the words of the participants themselves. In vivo coding was proper because the qualitative data consist mainly of brief descriptions the participants wrote following each comprehension question. In vivo coding can also capture *processes*, an idea based on *process coding* which aims to capture “actions intertwined with the dynamics of time, such as things that emerge, change, occur in particular sequences or become strategically implemented” (Miles et al., 2014, p. 75). There are various types of coding in the first cycle stage that are linked to the researcher’s approach and topic. The second cycle of coding is usually a follow up to the first cycle, within which the researcher identifies the patterns in the first cycle codes. At the end, a researcher can determine to what extent these codes reveal insights on the participants’ experiences.

**Summary**

In this study, I adopted a mixed methods research design to understand the effects of TE on learning idioms and collocations embedded in authentic texts. I included a brief survey to collect important information regarding demographics and experience with the English language and MWEs in particular. The next stage of research was the experimental part. I recruited participants in and beyond the threshold of higher-intermediate ESL speakers. The participants read authentic paragraphs in which idioms and collocations were embedded. In the experimental group, the idioms and collocations were enhanced using *bolding* and *coloring* to attract attention.
After each paragraph, there was an MWE comprehension question and an open-ended question where the participants described their transactions of the MWE meanings.

The second phase of the study was the qualitative exploration of the participants’ transaction of the meanings of the MWEs they encountered in the paragraphs. I employed an explanatory descriptive case study to explore the experiences of the participants in transacting the meanings of the MWEs embedded in texts. Finally, the findings from both the quantitative and qualitative phases were linked in the results sections to form a comprehensive understanding of the research outcomes and the effects of using TE in comprehending idioms and collocations.
CHAPTER FOUR:
RESULTS AND DISCUSSION

Introduction

In this chapter, I present the results and discussions of the study findings. The data I collected included both quantitative and qualitative data. First, I discuss the results of the quantitative data which consist of the results of the brief survey about the demographic information, experience with English in general and with Multiword Expressions MWEs in particular. The quantitative data also include the results of the experimental part; that is, the scores of collocations comprehension and the scores of idioms comprehension, and the hypothesis testing results. Second, I present the findings of the explanatory descriptive case study analysis in the forms of text analysis and thematic analysis.

Reading Proficiency Levels

I used a reading proficiency test developed by IELTS for practice purposes. The test is developed as a diagnostic test for those who are interested in knowing their reading proficiency levels. The IELTS test scores are expressed in the form of a band score starting from 0 to 9. Table 8 displays the descriptive statistics of all the participants in the study. The average reading proficiency score was 6.13 and a standard deviation of 0.95. The minimum score was 6 and the
maximum score was 8.5. This suggests that there was no large variation in the overall scores among all the participants in both groups.

**Table 8.** Descriptive Statistics of the IELTS Band Scores of all Participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Median</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>IELTS scores</td>
<td>6.13</td>
<td>0.95</td>
<td>5.00</td>
<td>8.50</td>
<td>6.00</td>
<td>26</td>
</tr>
</tbody>
</table>

*Note.* The total score for the reading proficiency test is 9.

In addition to the overall average of the two groups of the participants, and since the data of the two groups were normally distributed, I conducted a *t*-test to determine if there was a statistically significant difference in proficiency levels between the two groups and to ensure that the participants in both groups were similar. Table 9 shows the descriptive statistics for both the control and experimental groups. The control group achieved an average of \((M = 5.85, SD = 0.66)\), and the experimental group achieved an average of \((M = 6.42, SD = 1.13)\).

**Table 9.** IELTS Band Scores for Reading Proficiency Test for Each Group

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Std Err</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>13</td>
<td>5.846</td>
<td>0.658</td>
<td>0.182</td>
<td>5.00</td>
<td>7.00</td>
</tr>
<tr>
<td>Experimental</td>
<td>13</td>
<td>6.423</td>
<td>1.134</td>
<td>0.314</td>
<td>5.00</td>
<td>8.50</td>
</tr>
</tbody>
</table>

*Note.* The total score for the reading proficiency test is 9.

The *t*-test (Table 10) shows no significant difference at (.05) alpha level between the control group and the experimental group in the reading proficiency levels \((t(24) = -1.59, p =\)
The overall results demonstrated the participants were similar in their reading proficiency levels, and the experiment could be valid to detect the differences between the two treatments.

**Table 10. T-test for the Difference Between the Groups in IELTS Scores**

| Method         | Variances | DF   | t Value | Pr > |t| |
|----------------|-----------|------|---------|------|--|
| Pooled         | Equal     | 24   | -1.59   | 0.126|
| Satterthwaite  | Unequal   | 19.257| -1.59   | 0.129|

*Note. No significant results at (p < .05) alpha level.*

Most of the participants were in or beyond the threshold of *Intermediate High* level according to the American Council on the Teaching of Foreign Languages (ACTFL) standards, and *Independent User* according to Common European Framework of Reference for Language (CEFR) standards. Based on these standards the minimum band score of (4.5) or CEFR scale of (B1.1) was used (ACTFL, n.d.; Council of Europe, n.d.).

According to the Council of Europe descriptions of the CEFR levels, (B1) in reading means the participants “can understand texts that consist mainly of high frequency every day or job-related language. They can understand the description of events, feelings and wishes in personal letters” (p. 6).

Despite the threshold of 4.5, the participants in this study had an average of \(M = 6.13, SD = 0.95\). The CEFR framework describes the participants in this level as follows:

Can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialization. Can
interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options (Council of Europe, n.d., p. 5)

Therefore, I assumed the participants in this study were able to read the texts, understand the contextual factors, and express their ideas in the descriptions of the MWE meanings transactions.

**Years of Exposure to English**

The participants have varying levels of exposure to the English language. This includes their time studying either in the United States or in their countries of origin. The average years of exposure to English is 6.52 years with a minimum of 1.5 and a maximum of 22 years (Table 11).

Table 11. Years of Exposure to English

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Median</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years of exposure to English</td>
<td>6.52</td>
<td>5.06</td>
<td>1.50</td>
<td>22.00</td>
<td>5.00</td>
<td>26</td>
</tr>
</tbody>
</table>

**College Years in English**

I posed this question to collect information on the participants’ years of studying courses at the college level with English as the main language of instruction. This could be either in the United State or their countries of origin. The average years of studying with English as the main
language is 4.65 years with a standard deviation of 5.06, and a maximum of 10 years and a minimum of 4 years (Table 12).

**Table 12.** College Years in English

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Median</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>College years in English</td>
<td>4.65</td>
<td>2.68</td>
<td>1.00</td>
<td>10.00</td>
<td>4.00</td>
<td>26</td>
</tr>
</tbody>
</table>

**Time Spent in an English-Speaking Country**

As seen in Table 13, twenty (76.92%) participants have spent more than 3 years in an English-speaking country, and 6 (23.08%) participants have been in an English-speaking country from one to three years.

**Table 13.** Time Spent in an English-Speaking Country

<table>
<thead>
<tr>
<th>Answers</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 3 years</td>
<td>6</td>
<td>23.08</td>
</tr>
<tr>
<td>More than 3 years</td>
<td>20</td>
<td>76.92</td>
</tr>
</tbody>
</table>

**Self-Rating of English Language Fluency**

The participants provided a self-evaluation of their English language proficiency. As seen in Table 14, 13 (50%) of the participants have average fluency, 9 (34.62%) participants have high fluency, 1 (3.85%) participant has near-native fluency, and 3 (11.54%) participants have some fluency. Most of the participants considered themselves to have average or high fluency. These results mostly conform to the results of the reading proficiency test.
Table 14. Self-Rating of Fluency in the English Language

<table>
<thead>
<tr>
<th>Fluency</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Fluency</td>
<td>13</td>
<td>50.00</td>
</tr>
<tr>
<td>High Fluency</td>
<td>9</td>
<td>34.62</td>
</tr>
<tr>
<td>Near-native Fluency</td>
<td>1</td>
<td>3.85</td>
</tr>
<tr>
<td>Some Fluency</td>
<td>3</td>
<td>11.54</td>
</tr>
</tbody>
</table>

Ease of Understanding English Texts

Table 15 shows 16 (61.54%) participants demonstrated understanding English texts is easy, 9 (34.62%) participants demonstrated it was marginally easy, and finally, 1 (3.85%) participant expressed that it was very easy to read and understand English texts. Given the self-evaluations and the reading proficiency test scores, the paragraphs I selected as the instrument for this study were within the threshold of grade 13 (freshman college level) according to Fry’s readability levels (Fry, 1977; Kress & Fry, 2015). As the participants were mostly adults and all of them were college level students, the texts I selected for the instruments should be proper for their proficiency levels and their status as college-level students.

Table 15. Ease of Understanding English Texts

<table>
<thead>
<tr>
<th>Level</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy</td>
<td>16</td>
<td>61.54</td>
</tr>
<tr>
<td>Marginally Easy</td>
<td>9</td>
<td>34.62</td>
</tr>
<tr>
<td>Very Easy</td>
<td>1</td>
<td>3.85</td>
</tr>
</tbody>
</table>
Experience with Multiword Expressions

In this section, there were several questions I included to gather information on the experiences of the participants with MWEs in general. The first question was whether the participants had ever studied collocations and idioms. Table 16 shows that 15 (57.69%) participants had studied MWEs before, and 11 (42.31%) participants had not studied MWEs. The answers reveal almost half of the participants had not studied MWEs formally.

Table 16. Participants’ Exposure to MWE Formal Instruction

<table>
<thead>
<tr>
<th>Answer</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>11</td>
<td>42.31</td>
</tr>
<tr>
<td>Yes</td>
<td>15</td>
<td>57.69</td>
</tr>
</tbody>
</table>

Another question was concerned with the participants’ perceptions of the importance of the MWEs in their language learning. Table 17 shows that 7 (62.92%) participants perceived learning MWEs as very important, 15 (57.69%) participants as important, 3 (11.54%) participants neutral, and only 1 (3.85%) participant perceived MWEs to be slightly important. The results also suggest that the participants were interested in learning MWEs, and that MWEs, in general, are important to learn. This conforms with Liontas (in press, 2002b) who posited that L2 learners appreciate the role of MWEs, including idioms and collocations, in learning and using language.
Table 17. Importance of Learning MWEs

<table>
<thead>
<tr>
<th>Answer</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slightly important</td>
<td>1</td>
<td>3.85</td>
</tr>
<tr>
<td>Neutral</td>
<td>3</td>
<td>11.54</td>
</tr>
<tr>
<td>Important</td>
<td>15</td>
<td>57.69</td>
</tr>
<tr>
<td>Very important</td>
<td>7</td>
<td>26.92</td>
</tr>
</tbody>
</table>

Table 18 in the following page presents a summary of the participants’ responses to several questions about MWEs. The questions addressed the participants’ self-reported ability to point out MWEs and confidence in comprehending MWEs in isolation and in context. For Question 1 about confidence of pointing out MWEs in texts, the results demonstrate that 14 (53.85%) participants were confident in pointing out MWEs in texts, 10 (38.46%) participants were marginally confident, 1 (3.85%) participant was not confident, and finally, only 1 participant considered herself/himself to be very confident.

For Question 2 about confidence in comprehending the meanings of MWEs isolated from texts, Table 18 shows that 15 (57%) participants were marginally confident, 9 (34.62%) participants were confident, and 2 (7.69%) were not confident. The results imply that most of the participants have confidence in comprehending the meanings of MWEs without a context. Given the participants’ high-intermediate reading proficiency levels, the results may not be surprising.

However, when the participants read a MWE in a paragraph or in a context, the participants demonstrated better confidence about understanding its meaning. Table 18 displays that 16 (61.54%) participants were confident, 7 (26.92%) participants were marginally confident,
2 (7.69%) were very confident, and only 1 (3.85%) participant showed no confidence in understanding the meaning of MWEs in contexts.

Table 18. Experiences with MWEs

<table>
<thead>
<tr>
<th>1. Confidence in pointing out MWEs in texts</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Confident</td>
<td>1</td>
<td>3.85</td>
</tr>
<tr>
<td>Confident</td>
<td>14</td>
<td>53.85</td>
</tr>
<tr>
<td>Marginally Confident</td>
<td>10</td>
<td>38.46</td>
</tr>
<tr>
<td>Not Confident</td>
<td>1</td>
<td>3.85</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Confidence in comprehending MWEs in isolation</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Confident</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Confident</td>
<td>9</td>
<td>34.62</td>
</tr>
<tr>
<td>Marginally Confident</td>
<td>15</td>
<td>57.69</td>
</tr>
<tr>
<td>Not Confident</td>
<td>2</td>
<td>7.69</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Confidence in comprehending MWEs in context</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Confident</td>
<td>2</td>
<td>7.69</td>
</tr>
<tr>
<td>Confident</td>
<td>16</td>
<td>61.54</td>
</tr>
<tr>
<td>Marginally Confident</td>
<td>7</td>
<td>26.92</td>
</tr>
<tr>
<td>Not Confident</td>
<td>1</td>
<td>3.85</td>
</tr>
</tbody>
</table>

Reflections on Survey Results

The survey findings revealed important information about the participants. The participants took part in the study online. Therefore, I used the survey to gather detailed information about the participants’ backgrounds. After showing all the results of the reading proficiency levels and the
survey data, I think it is necessary to reflect on the outcomes and how they serve the purpose of this study.

The participants’ average reading proficiency was higher-intermediate to advanced level. To understand the effects of TE, it was important that the participants had the minimum capabilities to understand the texts presented to them. Otherwise, it would not be possible to draw solid conclusions if the participants were not able to understand the major concepts of the texts or the contextual factors because of their low English proficiency levels (Hu & Nation, 2000). Relating to the proficiency levels, I also ensured that the paragraphs were within the participants’ levels by conducting Fry’s readability analysis on the texts. All the paragraphs I included were appropriate according to the readability level, for students in grade 13 (freshman level) and lower. Since all the participants were college students, the paragraphs should be within their reading levels.

According to the demographic data, the participants were adult students who were very likely able to express their metacognitive processes better than younger students, or those who are not familiar with second language learning in general. Additionally, the participants demonstrated various levels of experiences with the English language and MWEs in general. Almost half of the participants mentioned they had studied collocations and idioms. This piece of information suggested that MWEs are still not fully appreciated in second language L2 teaching practices, at least with the participants in this study. This issues is important given that MWEs are important for various reasons such as fluency and faster processing of language, not to mention that formulaic and figurative language, in general, are widely used in the language we
hear in our everyday lives (e.g., Conklin & Schmitt, 2008; Henriksen, 2013; Liontas, in press; Schmitt, 2004).

One of the questions in the survey was about how many years of experience a participant has had with English. The results of this question varied. The average years of experience all the participants have had with English was 6.25 and a standard deviation of 5.06. This large variation in the answers might suggest that every participant had a different interpretation of the question. For example, in some countries students start to learn English at an early level in elementary schools, and others in intermediate (middle) schools. Nevertheless, the variation is smaller in studying or using English at a college level. The average years of using English in college was 4.65 and a standard deviation of 2.86. This means the participants have had relatively lengthy periods of using English at college levels. These results are also strongly related to their status as adult students at a university level. In the end, this could have a significant impact on their background knowledge of the MWEs presented in the paragraphs. I highlighted these issues because Macis and Schmitt (2017a) found that years spent in a country where the target L2 is widely used is one of the factors in the students’ knowledge of idioms.

To conclude, the results of the survey are important to provide information necessary to provide rich and thick descriptions of the participants, which is a step recommended in an explanatory descriptive case study research approach (Dawson, 2010). After all, one of the primary purposes of the study is to understand in depth the dynamics of processing and comprehending MWEs.
Experiment Results: Research Questions 1 and 2

The research questions in the experimental phase were:

1. Does textual enhancement help the participants to comprehend different types of Multiword Expressions?

2. Is there a difference in comprehension between collocations and idioms?

In this section, I presented the answers to the research questions based on the results of the experiment. Because there were two types of MWEs in this study (collocations and idioms), I separated the presentation of the results between these two types. Thus, there were two dependent (outcome) variables for each group (i.e., the scores for collocations and the scores for idioms). In addition, as I present the results of the experimental phase in this section, I will thoroughly discuss the results in detail after the findings of the qualitative data to achieve a better understanding of the experiment considering all the factors to reach an accurate interpretation of the results.

Descriptive Statistics

Table 19 shows the descriptive statistics of the collocations and idioms scores for both the control and experimental groups. As seen in Table 19, for collocations, both groups have roughly similar means: control ($M = 8.69, SD = 0.94$) and experimental ($M = 8.76, SD = 1.48$). In contrast, the means for idiom scores vary between the two groups: control ($M = 6.76, SD = 1.78$) and experimental ($M = 8.30, SD = 1.18$).
Table 19. Descriptive Statistics for Collocation and Idiom Scores

<table>
<thead>
<tr>
<th>Outcome Variables</th>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Median</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collocation Scores</td>
<td>Control</td>
<td>13</td>
<td>8.69</td>
<td>0.94</td>
<td>9.00</td>
<td>7.00</td>
<td>10.00</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>13</td>
<td>8.76</td>
<td>1.48</td>
<td>9.00</td>
<td>5.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Idiom Scores</td>
<td>Control</td>
<td>13</td>
<td>6.76</td>
<td>1.78</td>
<td>8.00</td>
<td>4.00</td>
<td>9.00</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>13</td>
<td>8.30</td>
<td>1.18</td>
<td>8.00</td>
<td>6.00</td>
<td>10.00</td>
</tr>
</tbody>
</table>

*Note.* The total score for the collocations is 10, and the total score for idioms is 10.

Assumption of Normality

I intended at the beginning to use *t*-test as a parametric statistical test to compare the two groups; however, the data violated the assumption of normality of distribution as shown in Table 20. The normality of the data is an important factor to draw accurate inferences from the results (Bluman, 2008; Howell, 2002).

Table 20. Tests for Normality of Data Distribution

<table>
<thead>
<tr>
<th>Groups</th>
<th>Test</th>
<th>Statistic</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collocations Control</td>
<td>Shapiro-Wilk</td>
<td>0.886</td>
<td>0.0868</td>
</tr>
<tr>
<td>Collocations Experimental</td>
<td>Shapiro-Wilk</td>
<td>0.808</td>
<td>0.0085*</td>
</tr>
<tr>
<td>Idioms Control</td>
<td>Shapiro-Wilk</td>
<td>0.815</td>
<td>0.0105*</td>
</tr>
<tr>
<td>Idioms Experimental</td>
<td>Shapiro-Wilk</td>
<td>0.934</td>
<td>0.3857</td>
</tr>
</tbody>
</table>

* Significant at (*p* < .05) alpha level.

Table 20 shows the collocations scores of the experimental group were not normal (*W* = 0.81, *p* = .009), and the idiom scores of the control group were not normal as well (*W* = 0.82, *p* = .010).
However, the scores of the control collocations and the experimental idioms were normally distributed. Therefore, I decided to conduct Wilcoxon–Mann–Whitney Sum of Ranks test as the proper nonparametric statistical test for non-normally distributed data. Wilcoxon-Mann-Whitney test is used to test the difference between two groups. It is the non-parametric equivalent to the parametric t-test (Field & Miles, 2010). In cases of normality violations in data, researchers should consider nonparametric statistical tests to infer accurate results. In addition, I added Exact statistical methods for the relatively small sample size in this study (Field & Miles, 2010). The central tendency measurement used in the Wilcoxon–Mann–Whitney test is the median instead of the mean. According to Bluman (2008), “the median is the halfway point in a data set” (p.109).

Results of Wilcoxon–Mann–Whitney Tests

To answer the first research question, “Does textual enhancement help the participants to comprehend different types of Multiword Expressions?”, I conducted a series of Wilcoxon–Mann–Whitney tests for the collocation and idiom scores of both the control and the experimental groups. I present the results of the collocations first then the idioms.

Collocations. Table 21 shows the descriptive statistics for the ranks sum. The results show that the control group achieved 163 sum of rank scores, and the experimental achieved 188. The scores of the sum of ranks do not show a big difference between the two groups.
However, to test the hypothesis, it was necessary to conduct the Wilcoxon–Mann–Whitney test to detect the real differences between the two groups.

**Table 21.** Wilcoxon–Mann–Whitney Test Rank Sums for Collocations

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Sum of Scores</th>
<th>Expected Under H0</th>
<th>Std Dev Under H0</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>13</td>
<td>188.0</td>
<td>175.50</td>
<td>18.735</td>
<td>14.46</td>
</tr>
<tr>
<td>Control</td>
<td>13</td>
<td>163.0</td>
<td>175.50</td>
<td>18.735</td>
<td>12.54</td>
</tr>
</tbody>
</table>

*Note.* Average scores were used for ties.

Table 22 shows the results of the Wilcoxon–Mann–Whitney test. The collocations scores of the experimental group did not significantly differ from the control group at (.05) alpha level, \((\text{Mdn} = 9, Ws = 188.00, z = .6405, p = .528)\), and an effect size of \((r = 0.18)\). Additionally, the Exact test in Table 22 which is more accurate for relatively small sizes showed no significant difference between the control group and the experimental group at (.05) alpha level.

**Table 22.** Wilcoxon–Mann–Whitney Test: Collocations

<table>
<thead>
<tr>
<th>Statistic (S)</th>
<th>188.0000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Normal Approximation</strong></td>
<td></td>
</tr>
<tr>
<td>(Z)</td>
<td>0.6405</td>
</tr>
<tr>
<td>One-Sided (Pr &gt; Z)</td>
<td>0.2609</td>
</tr>
<tr>
<td>Two-Sided (Pr &gt;</td>
<td>Z</td>
</tr>
<tr>
<td><strong>Exact Test</strong></td>
<td></td>
</tr>
<tr>
<td>One-Sided (Pr \geq S)</td>
<td>0.2579</td>
</tr>
<tr>
<td>Two-Sided (Pr \geq</td>
<td>S - \text{Mean}</td>
</tr>
</tbody>
</table>

*Note.* \(Z\) includes a continuity correction of 0.5.
Figure 4 displays a visual representation of the distribution of the data. The experimental group had a larger spread of the data as compared to the control group. The diamonds in the middle of the squares in the boxplots showed where the central points of scores of ranks are. As seen in Figure 6, the diamonds were approximately at the same level suggesting no big differences between the two groups.

![Graph showing distribution of Wilcoxon–Mann–Whitney test scores for collocations.](image)

**Figure 4.** Distribution of Wilcoxon–Mann–Whitney test Scores for Collocations

Overall, the results show the participants were able to understand the meanings of the collocations equally in both the textually enhanced and unenhanced conditions. Although the effect size favors the experimental group, it is still small and could not be considered significant.
**Idioms.** For the idioms, the results revealed some differences from the results for collocations. Table 23 shows the descriptive statistics of the ranks sum score for the two groups. The control group score is 133. In contrast, the sum of ranks for the experimental group is 218. These results show there was a large difference between the two groups favoring the experimental group.

**Table 23.** Wilcoxon–Mann–Whitney Test Rank Sums for Idioms

<table>
<thead>
<tr>
<th>group</th>
<th>N</th>
<th>Sum of Scores</th>
<th>Expected Under H0</th>
<th>Std Dev Under H0</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>13</td>
<td>218.0</td>
<td>175.50</td>
<td>18.828</td>
<td>16.769</td>
</tr>
<tr>
<td>Control</td>
<td>13</td>
<td>133.0</td>
<td>175.50</td>
<td>18.828</td>
<td>10.231</td>
</tr>
</tbody>
</table>

*Note.* Average scores were used for ties.

In Table 24, the Wilcoxon–Mann–Whitney test showed the experimental group have significantly achieved higher scores than the control group at (.05) alpha level, \( W_s = 218.00, z = 2.231, p=0.028 \), and a large effect size of \( r = 0.62 \). Also, the Exact test showed a significant difference at (.05) alpha level.
Table 24. Wilcoxon–Mann–Whitney Test: Idioms

<table>
<thead>
<tr>
<th>Statistic (S)</th>
<th>218.0000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Approximation</td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>2.2307</td>
</tr>
<tr>
<td>One-Sided Pr &gt; Z</td>
<td>0.0129*</td>
</tr>
<tr>
<td>Two-Sided Pr &gt;</td>
<td>Z</td>
</tr>
<tr>
<td>Exact Test</td>
<td></td>
</tr>
<tr>
<td>One-Sided Pr &gt;= S</td>
<td>0.0118*</td>
</tr>
<tr>
<td>Two-Sided Pr &gt;=</td>
<td>S - Mean</td>
</tr>
</tbody>
</table>

Note. Z includes a continuity correction of 0.5.
* Significant at (p < .05) alpha level.

Figure 5 displays the boxplots of the distributions of ranks sum scores across both groups. The dots in the boxplots showed the experimental group’s central points are relatively higher than the central points of the control group. Conforming with the descriptive statistics and the results of the Wilcoxon–Mann–Whitney test, the boxplots showed the level of the data spread and where most of the score were clustered. The larger the box the larger the spread, and the whiskers out of the boxes represent the extreme values occurring in the data.
To conclude, the statistical tests showed TE was a factor in leading the participants to achieve better with idioms. In contrast, for the collocations, the statistical tests showed no significant differences. To understand the results in depth, in the following sections, I presented the results of the explanatory descriptive case study. As described earlier, the qualitative data should reveal details about the processing, strategies, and other ways that helped the participants to determine the meanings of the MWEs, not to mention the qualitative data’s help in interpreting the experimental results for an accurate interpretation.

**Figure 5.** Distribution of Wilcoxon–Mann–Whitney Test Scores for Idioms
Qualitative Data Analysis

In this section, I present the results of my analysis of the qualitative data the participants wrote to describe their strategies of transacting the meanings of the MWEs. I analyzed the data for each group by itself as a first step. Later, I looked for the differences and similarities between the two groups to reach a comprehensive understanding of the data. The *a priori* question for the qualitative data is this: In what ways do the participants describe the experiences of processing and understanding multiword expressions (MWEs)?

To answer this question, I included an open-ended question, “*How did you reach the meaning of the MWE?*”, after each multiple-choice question about the meanings of the MWEs. The participants were asked in the instructions to write all the information including the processes and strategies they had employed to comprehend the MWEs embedded in the texts.

I employed a contrasting strategy; that is, I began analyzing the control group data, then I drew the comparisons while analyzing the experimental group data. Figure 6 shows the steps of the qualitative data analysis.

![Data Analysis Steps](image)

**Figure 6.** Data Analysis Steps
Text Analysis Results

Text analysis helps to find frequent words and ideas throughout the data. As a first step, it was useful to take a snapshot of the overall frequent ideas in the qualitative data. To conduct the text analysis, I used a text file for every group, and I deleted all the words not written by the participants. Furthermore, I excluded functions words such as prepositions and pronouns. I used MaxQDA because it features the capabilities and the tools to help researchers conduct qualitative data analysis such as coding, text analysis, and other qualitative analysis strategies.

Figure 7. Control Group Word Cloud

For the control group who received the materials including the reading paragraphs and the MWEs without Textual Enhancement, Figure 7 displays the most common words in the participants’ descriptions. These words include “context,” “guess,” and “guessing”, followed by “sentence,” “word,” and “meaning”. Although the word “context” is the biggest, which represents the most frequent, “guessing” as a concept is mentioned twice in the word cloud.
which indicates guessing was a common recurring idea for the control group. Other words in the cloud provide hints related to the concept of context such as word, meaning, and sentence.

For the experimental group, the results of the text analysis showed some differences from the control group. Figure 8 shows the word “context” was the most frequently occurring word in the experimental group answers. Other words include “meaning,” “reading”, “whole,” “paragraph,” and “through.” Most of the words revolve around the concept of context. In contrast to the control group, guessing was not mentioned as a common idea or word throughout the participants’ descriptions of the MWE meanings transactions, at least at the text analysis level.

**Thematic Analysis Results**

After the text analysis, I conducted a thematic analysis of the participants’ descriptions. Thematic analysis, according to Braun and Clarke (2006), is “a method for identifying, analyzing and reporting patterns (themes) within data. It minimally organizes and describes your data set in (rich) detail” (p. 79). I employed an inductive approach in which I coded small bits of data in a bottom-up manner to reach a comprehensive understanding of the data. According to Patton (1990), the themes a researcher finds in the data should be closely connected to the data.

Braun and Clarke (2006) provided a step by step guide to conduct a thematic analysis: (1) familiarize yourself with your data, (2) search for themes, (3) review themes, (4) define and name themes, and (5) produce the report (see Figure 9).
In the thematic analysis, I discovered several strategies the participants used to transact the MWEs meanings. With different degrees of occurrence between the two groups, the themes common in both groups were contextual factors, guessing, background knowledge, the constituent words of the MWEs, and the MWEs’ distance from the participants’ first language equivalents. Figure 10 presents the MWE comprehension strategies participants employed in both groups. For example, the participants in the control group exhibited more frequent use of guessing compared to the participants in the experimental group. Contrary to the control group, the participants in the experimental group showed consistent employment of the contextual factors compared to the participants in the control group.
Figure 10. Meaning Transaction Strategies Participants Used

**Control Group.** The control group was the group who received the materials including texts and unenhanced MWEs. The blue bars in Figure 10 show the percentage of strategies and factors found in the control group data. The various strategies in the data include guessing, background knowledge, context, and similarities with the first language (L1). In the following section, I elaborate more on the themes I discovered in the qualitative data, which I organized based on their weight of occurrence in the data.
1. Contextual factors. The context was an important factor the participants employed to transact the meanings of the MWEs. Figure 10 shows the participants in the control group drew on contextual factors to reach the MWE meanings 19% of the times compared to the other factors and strategies. The participants used several expressions to describe the context. They wrote words such as “context,” “from the sentence,” “general meaning,” “reading,” “reading the passage,” and other expressions. One participant wrote the following about the collocation *seize the opportunity*: “the context encourages for taking opportunity” suggesting the overall topic of the paragraph supports her/his hypothesis of the meaning. Another participant described her/his transaction of the meaning of *cast doubt*, “… another word that made me think about this choice is "sad". the word "sad " encourage me to not consider the final choice ‘believe something will happen’”. Another participant described transacting the meaning of *serve a purpose* by writing, “the opposite side of the context ‘keep quite if that not serve a purpose’.” In my understanding, the participant explained that *serve a purpose* refers to something positive, and the context of the paragraphs suggested the opposite of the idea of *positive* is to keep quiet. Therefore, the context in this case helped the participant to understand *serve a purpose* means to have a positive effect on relationships. In another example, one of the participants wrote, “because the description of the paragraph is about how to achieve a successful relationship,” therefore *serve a purpose* suggests something positive. One of the participants wrote the following about the collocation *break a promise*: “the context said, you cannot keep your promise , which is clarify the meaning.” Another participant wrote the following about the collocation *fall a victim*: “being identify or card theft.” The participant in this example hypothesized that the negative experiences
of identity or card theft suggests fall a victim means to be attacked or robbed by someone, as in the multiple-choice question.

Regarding the idioms, one participant wrote about the idiom red flag, “from the context.. the following sentences explain that certain type of tattoos is a representation of dangerous people.” Another participant wrote about the idiom old hat, “the passage show the new tech coming, which indicates the old hat meaning is no more useful soon”.

It is worth mentioning some participants chose the wrong answers for some MWEs and they linked their choices to contextual factors in several cases. For instance, a participant chose this answer for the idiom thick skin: “using big size gives the meaning of thick skin to me. ”

Overall, although the MWEs were not textually enhanced in the control group, the context was still a factor given the fact that the MWEs were embedded in paragraphs and they were not isolated.

2. Guessing. The participants in the control displayed a heavy use of guessing strategies in their transactions of the MWEs. Figure 10 shows the participants used this strategy (15%) percent of the times. Most of the participants simply described the process by saying only the words “guess,” “guessing,” or “I guessed it” without further clarifications. The participants used this strategy for both types of the MWEs (collocations and idioms). However, it appears that using the “guessing” strategy was based on some assumptions the participants found in the paragraphs. For example, a participant said, “I guessed based on the context.” Another
participant said about the paragraph containing easy money, “there was a description about struggling financially, so I guessed they need a quick solution to get some money.”

Overall, guessing reveals an important fact that guessing may connote uncertainty. For example, in several instances, the participants guessed the MWEs wrong, such as the collocations cast doubt, serve a purpose, carry the burden, and seize the opportunity. Furthermore, a participant in this group said, “not really sure… I guess.” It is important to clarify that the participants did not provide detailed descriptions of the process of guessing. This is not surprising given the fact when the participants were not certain, they may not be able to provide rich descriptions.

3. Background knowledge. Background knowledge plays an important role in transacting the meanings of MWEs. Some forms of background knowledge include previous encounters with the MWEs and cultural knowledge. Participants could have previous encounters with the MWEs in different types of media such as the TV, radio, and movies. One participant simply wrote the following about collocation easy money: “known.” Another participant mentioned one of the collocations was known. One participant wrote she/he reached the meaning of the MWEs due to “common sense.” Another participant wrote the collocation easy money, “it is common”, and that he/she was able to confirm her/his knowledge of the word from the word “quick” preceding the expression. Another participant wrote she/he had come across this expression before. Another participant wrote about the collocation carry the burden, “I really don’t know, I read, or listen to that somewhere.” Another participant wrote about carry the burden, “I learned
that before”. One of the participants also expressed her/his previous knowledge by saying, “close to my background knowledge: to reach to the edge of something.” For the cultural background factors, some participants described that the symbolic meanings of the words comprising the idioms provide cues to understand the overall meaning. For example, a participant explained the word *horse* in the idiom *dark horse* usually refers to strength and power. Another participant wrote, “red always connected with danger thing.”

It is important to mention that participants who expressed their previous encounters with some MWEs did not seem to fully grasp their meanings. For example, one of the participants wrote about the idiom *hit the roof*, “I hear it a lot in movies,” but she/he did not choose the correct answer. And another participant wrote about the idiom *hold the line*, “Maybe I read that somewhere,” and she/he also chose the wrong answer.

4. Constituents of the MWEs. One of the themes I found in the control group data is the use of the constituents of the MWEs themselves. The participants found the constituents of the MWEs to be helpful in (3.7%) of the time compared to the other factors and strategies. In several cases, the participants wrote that the words in the MWEs had helped them to reach the overall meanings of the MWEs. For example, to fully understand the collocation *cast doubt* a student may only need to know what the word *doubt* means because the word itself is used in its literal sense in the paragraph. One participant said, “word doubt gives some hint for something not true,” another participant said, “doubt is related to something not confident about.” and another said, “meaning of the two words.” For the collocation *serve a purpose*, a participant simply
wrote she/he comprehended the meanings by knowing “the word serve.” Additionally, for the collocation *break a promise*, one participant wrote, “from the word ‘break,’ which usually means ‘fail’.” One participant wrote about *carry the burden*, “burden is associate with responsibilities.” One of the participants wrote that “the world hold” in the idiom *hold the line* helped in reaching its overall meaning.

5. **Similarities with the L1.** The last theme and lowest in weight in the data for the control group is the lexical distance of the MWEs between the second and first languages of the participants. The participants in the control group showed the use of this factor in only around (1%) of the time. For instance, one participant said, “there is a similar meaning in Arabic” for the collocation *hold a meeting*, and another participant wrote about *break a promise*, “similar meaning in Arabic,” and another wrote, “it's globally known even in my mother language” about *red flag*. For the idiom *dark horse*, one participant said, “we have the same expression in my mother language.”

Finally, in Table 25, I present the strategies and the factors the participants used to comprehend the meanings of the MWEs, as written by the participants themselves. It shows a listing of the participants’ comments of the MWE transaction processes, including strategies and factors that helped them to reach the meanings of these MWEs.
**Table 25. Participants’ Metacognitive Comments (Control Group)**

<table>
<thead>
<tr>
<th><strong>Strategy</strong></th>
<th><strong>Excerpts</strong></th>
</tr>
</thead>
</table>
| **Contextual Factors** | “the context encourages for taking opportunity”  
“… another word that made me think about this choice is "sad". the word "sad " encourage me to not consider the final choice ‘believe something will happen’”.  
“the opposite side of the context ‘keep quite if that not serve a purpose’ “  
“because the description of the paragraph is about how to achieve a successful relationship”  
“the context said, you cannot keep your promise, which is clarify the meaning”.  
“being identify or card theft”  
“from the context.. the following sentences explain that certain type of tattoos is a representation of dangerous people”  
“the passage show the new tech coming, which indicates the old hat meaning is no more useful soon”. |
| **Guessing** | “I guessed it”  
“I guessed based on the context”  
“not really sure… I guess” |
| **Background Knowledge** | “Known”  
“common sense”  
“it is common”  
“I really don’t know, I read, or listen to that somewhere”  
“red always connected with danger thing”  
“horse usually refers to strength and power” |
| **MWE Constituents** | “word doubt gives some hint for something not true”  
“the word serve”  
“from the word ‘break’, which usually means ‘fail’”  
“the word hold” |
| **Similarities with L1** | “there is a similar meaning in Arabic”  
“it's globally known even in my mother language”.  
“similar meaning in Arabic”,  
“we have the same expression in my mother language” |
**Experimental group.** The participants in the experimental group showed various ways and strategies to reach the meanings of the MWEs. Figure 10 displays the major themes I found in the experimental group data. Contextual factors and background knowledge were among the major factors that helped the participants to reach the MWE meanings. Other factors include constituents of the MWEs, similarities with the L1, and finally guessing. It is worth mentioning that the participants in the experimental group provided more and richer data than the participants in the control group. This is not surprising given that the MWEs were textually enhanced in the paragraphs. TE may have helped to trigger the participants to describe with more details and be aware of the cognitive processes involved in reaching the meanings of the MWEs.

1. **Contextual factors.** Throughout the participants’ descriptions, I found the contextual factors to enjoy a quite large weight compared to other factors and strategies. Figure 10 shows the participants in the experimental group used contextual factors to reach the MWEs meanings in approximately (29%) of the time, making this factor the most important and critical for comprehension. It appears that the use of TE helped to draw the participants’ attention to the contextual factors available in the texts. Compared to the control group, the participants in the experimental group showed heavy use of context as a tool or guidance to help them comprehend the meanings of the MWEs.

As there were some detailed descriptions, many of the participants simply wrote they comprehended the meaning from the context without further elaborations. The participants used various words which I relate to contextual factors in general. Here are some excerpts from some descriptions the participants wrote about the collocation *thorny issue*: “from the reading,” “I get
the meaning of [thorny issue] from the general meaning of the content,” “I was able to understand it from the context of the sentence,” “through reading the whole paragraph,” “based on the context of the passage,” “reading,” and “by understanding the paragraph after it.”

Regarding the collocation easy money, a participant explained, “she said they were financially struggling but her mom job was a good idea for quick money,” and another participant wrote, “from the context and the colorful words.” One participant explained transacting the collocation carry the burden meaning by writing, “this [collocation] refers to many meanings depending on the text. I think in the passage means to carry responsibility for being white/male.” Further, a participant wrote about the collocation seize the opportunity, “reading the whole sentence and try to make sense of what it could mean.” One participant explained reaching the meaning of the collocation draw conclusion saying, “reading the full statement to understand because translating each word alone did not make sense.” Furthermore, the same participant described in detail how she/he reached the meaning of old hat, “I read the previous sentence and the next sentence and tried to figure the connection. the previous sentence talked about old technology and the next sentence talked about a future technology.”

The participants were not allowed to go back to the paragraphs after reaching the multiple-choice questions, TE might have helped the participants to study the context thoroughly before proceeding to the questions. The TE technique most likely helped to trigger the participants to study the entire context to infer the meanings of the MWEs. The experiment results showed the participants in the experimental group achieved higher scores in idiom comprehension than their counterparts in the control group. These findings reveal that the idioms
require further exploration and confirmation with the context to fully comprehend their meanings because of their higher opacity levels compared to the collocations. Furthermore, the results in the experimental part indicate the participants could understand them by simply studying the constituents without extending the process to further study the context carefully to comprehend their meanings.

2. Background knowledge. Throughout the data obtained from the experimental group, the participants described that their background knowledge had helped them to comprehend some of the MWEs. They expressed their background knowledge in different forms. The recurring forms were either familiarity, or cultural and pragmatic knowledge. Some participants wrote, “previous knowledge”, “it is a well-known idiom”, “I know the meaning that money is easy to get”. One participant wrote about break a promise, “I heard this idiom frequently in movies”, about hold a meeting, “this [collocation] appears in news frequently and it means to arrange a meeting”, and she/he wrote about fall a victim, “this idiom appears in news which means become a victim”. One of the participants wrote about the idiom dark horse, “I am a soccer fan so I know the meaning”, and another participant wrote about the same idiom, “well-known for many languages”.

Some participants refer to the symbolic meanings of some words in the idioms. A participant wrote, “red flag represents dangerous”, another participant wrote an interesting comparison, “red flag represents dangerous e.x. Red flag on a beach meaning it is dangerous to swim”. Another participant wrote, “usually red means danger”. Also, for red flag, one participant
wrote, “it is a metaphor used for many languages”. For the idiom small potato, one of the participants wrote, “potato refers to something below average”. A participant wrote about dark horse, “word dark is associated with sad thing”. Finally, one participant wrote some humorous description of the idiom fat cat, “cats eat from trash and become fat”.

The excerpts of the participants’ descriptions reveal several insights into the processing of the MWEs. For example, knowledge of the topics of the paragraphs were an important factor. Knowledge of topics such as sports led some participants to figure out the meaning of the idiom dark horse as it is common in the language of sports. Further, background knowledge also plays a role in understanding the symbolic indications of some words.

3. Guessing. The participants in the experimental did not rely on guessing as much as the participants in the control group. Compared to the control group who used guessing in almost (15%) of the times, the experimental group used guessing in almost (6%) of the times. It is important to note that the participants did not elaborate much in their use of guessing strategies. As in the control group, guessing connotes uncertainty and the participants could not provide detailed descriptions of their guessing processes. Further, the participants showed similar use of guessing in both types of the MWEs in this study.

The fact that the guessing strategy came after the contextual factors and the background knowledge indicate that the participants in the experimental group made use of the TE to look for meanings cues in the contexts surrounding the MWEs. In contrast, the participants in the control group were most likely not able to attend to the contextual factors in the absence of TE.
Therefore, the participants in the control group resort to guessing as a solution after exhausting their search in their background knowledge.

4. Constituents of the MWEs. One important factor that led the participants to comprehend the meanings was the constituents of the MWEs. In several cases, the participants wrote that knowing one of the words in the MWEs led them to understand or comprehend their overall meanings. For instance, a participant wrote about the collocation *thorny issue*: “from the word thorn”, and another participant wrote: “thorny means complexity”. Other participants wrote about the collocation *cast doubt*: “I know the word doubt”, and “doubt is feeling”. Another participant wrote, “I used the meaning of each word alone to understand what it means. For example cast means throw and doubt means questionable”. One of the participants described about the collocation *break a promise*, “the word break helps of knowing the meaning”. For the idioms, a participant explained knowing *old hat*, “old hat means it is not contemporary”, another participant wrote about *hold the line*, “knowing that hold usually means stop”.

Regarding *serve a purpose*, one participant wrote, “words separately serve the meaning and don’t cause ambiguous [ambiguity]”, another participant wrote, “it is very obvious from the idiom [collocation] itself”. One participant wrote about *hold a meeting*, “easy to figure it out”. One of the participants also expressed similar ideas about the collocation *draw conclusion*, “obvious from its words”. One participant wrote, “figured the literal meaning of the words and then tried to see how it would fit the sentence” about the idiom *thick skin*. 
5. Similarities with L1. The participants have expressed in several instances that the MWEs have similar or equivalent expressions in their L1 which is in this case Arabic. One of the participants wrote about the collocation *thorny issue*, “the meaning of thorny issue is very near to Arabic”. Two other participants wrote the collocation *carry the burden*, “translate it in Arabic in my head and we have a similar saying.”, “the meaning is same to Arabic”. For the collocation *seize the opportunity*, a participant wrote, “same in Arabic”. Other collocations that some participants indicated to be similar to Arabic MWEs include, *fall a victim, dark horse, and bend his knee*.

Therefore, the lexical distance of the English MWEs from their Arabic equivalents can play an important role in their transacting of the meanings of the MWEs. Some of these MWEs are equivalent to Arabic in the lexical level and semi-lexical level according to Liontas’ categories of lexical distance between L1 and L2 MWEs.

It appears that the MWEs the participants mentioned to be similar to Arabic in the experimental group is based on more careful processing compared to what many participants wrote in the control group. I, as a researcher whose first language is Arabic, was able to find the matching MWEs in Arabic. *Thorny issue* and *fall a victim* have Arabic equivalents in the lexical level. Regarding *dark horse* and *bend his knee*, they are similar in the semi-lexical level. The Arabic equivalent to *dark horse* is “black horse” and *bend his knee* is to only say “to bend” without extending to knees. For a summary of the participants’ descriptions of MWEs meanings, (see Table 26).
### Table 26. Participants’ Metacognitive Comments (Experimental Group)

<table>
<thead>
<tr>
<th><strong>Strategy</strong></th>
<th><strong>Excerpts</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contextual Factors</strong></td>
<td>“from the reading”,</td>
</tr>
<tr>
<td></td>
<td>“I get the meaning of [thorny issue] from the general meaning of the content”</td>
</tr>
<tr>
<td></td>
<td>“I was able to understand it from the context of the sentence”</td>
</tr>
<tr>
<td></td>
<td>“through reading the whole paragraph”</td>
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<tr>
<td></td>
<td>“she said they were financially struggling but her mom job was a good idea for quick money”</td>
</tr>
<tr>
<td></td>
<td>“this [collocation] refers to many meanings depending on the text. I think in the passage means to carry responsibility for being white/male”</td>
</tr>
<tr>
<td></td>
<td>“reading the full statement to understand because translating each word alone did not make sense”</td>
</tr>
<tr>
<td></td>
<td>“I read the previous sentence and the next sentence and tried to figure the connection. the previous sentence talked about old technology and the next sentence talked about a future technology”</td>
</tr>
<tr>
<td><strong>Background Knowledge</strong></td>
<td>“previous knowledge”,</td>
</tr>
<tr>
<td></td>
<td>“it is a well-known idiom”,</td>
</tr>
<tr>
<td></td>
<td>“I know the meaning that money is easy to get”</td>
</tr>
<tr>
<td></td>
<td>“this [collocation] appears in news frequently and it means to arrange a meeting”</td>
</tr>
<tr>
<td></td>
<td>“this idiom appears in news which means become a victim”.</td>
</tr>
<tr>
<td></td>
<td>“I am a soccer fan so I know the meaning”</td>
</tr>
<tr>
<td></td>
<td>“red flag represents dangerous e.x. Red flag on a beach meaning it is dangerous to swim”</td>
</tr>
<tr>
<td><strong>Guessing</strong></td>
<td>“I guessed the answer”</td>
</tr>
<tr>
<td></td>
<td>“guessing”</td>
</tr>
<tr>
<td></td>
<td>“I just guessed :(“</td>
</tr>
<tr>
<td></td>
<td>“I guess it is about not believing in a situation so you doubt about it”</td>
</tr>
<tr>
<td></td>
<td>“colorful words and more guessing”</td>
</tr>
<tr>
<td></td>
<td>“I don’t know what this idiom represents so I am assuming”</td>
</tr>
<tr>
<td><strong>MWE Constituents</strong></td>
<td>“from the word thorn”</td>
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<tr>
<td></td>
<td>“I know the word doubt”</td>
</tr>
<tr>
<td></td>
<td>“I used the meaning of each word alone to understand what it means.”</td>
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<td></td>
<td>For example cast means throw and doubt means questionable”</td>
</tr>
<tr>
<td></td>
<td>“the word break helps of knowing the meaning”</td>
</tr>
<tr>
<td></td>
<td>“words separately serve the meaning and don’t cause ambiguous [ambiguity]”</td>
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<tr>
<td></td>
<td>“obvious from its words”</td>
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</tbody>
</table>
Table 26. (Continued)

<table>
<thead>
<tr>
<th>Similarities with L1</th>
<th>“the meaning of thorny issue is very near to Arabic”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>“same in Arabic”</td>
</tr>
<tr>
<td></td>
<td>“translate it in Arabic in my head and we have a similar saying”</td>
</tr>
<tr>
<td></td>
<td>“the meaning is same to Arabic”</td>
</tr>
</tbody>
</table>

Discussion of Findings

In this section, I present a thorough discussion of the results of the study linking the quantitative phase findings with the findings from the qualitative phase. I followed a mixed methods research strategy in the form of explanatory sequential design. In the qualitative phase of the study, I employed an explanatory descriptive study approach to understand the results of the experimental part on the effects of TE on comprehending MWEs, and the ways participants employed to transact their meanings.

For the main research questions concerning the effect of TE on learning MWEs (collocations and idioms), the two research questions were:

1. Does textual enhancement help the participants to comprehend different types of Multiword Expressions?

2. Is there a difference in comprehension between collocations and idioms?

According to the results of the experimental part, Textual Enhancement (TE) exerts different levels of influence on the participants to comprehend the MWE meanings. For collocations, TE did not exhibit a substantial effect on the participants to comprehend the collocations meanings. The results showed the collocation scores between the two groups were
not significantly different based on Wilcoxon–Mann–Whitney test. In contrast, for the idioms, the Wilcoxon–Mann–Whitney test revealed a statistically significant difference between the experimental group and the control group. Additionally, the effect size of TE was large, showing a significant effect of TE in assisting to comprehend idioms.

These results revealed various insights into the nature of MWEs. I included in this study only two types of MWEs (collocations and idioms). The collocations in this study were overall transparent with some limitations on substitution according to the phraseological approach (Howarth, 1996, 1998). This means that one word in the collocations is used in a non-literal or a special meaning. For the idioms, I selected idioms identified by Macis and Schmitt (2017a). These idioms consist of two words that have a complete figurative meaning based on the Howarth continuum.

The results of collocations which are described as overall transparent suggests that the participants might have found them easier to comprehend than idioms if they know the literal meanings of each word in the collocation, or if they know at least one word in the collocation. In several cases, the participants from both the control and experimental groups explained that they reached the meanings of some collocations by knowing the meaning of at least one word from the whole collocation.

In contrast, the idiom meanings were not transparent. Therefore, it was not easy to comprehend their meanings from the literal meanings of the individual words of the expression. In this case, the participants had to carefully read the paragraphs and look for cues in the context to help them reach the meanings of the idioms. In this situation, it appears that TE assisted the
participants in the experimental group to notice, study the contextual factors, apply more cognitive processing, and reach their meanings eventually. The findings of the explanatory descriptive case study show that the participants mostly used the strategy of studying the contextual factors available in the texts to comprehend the meanings of idioms.

One of the most recurring strategies I found in the qualitative data was that the participants in the control group resorted frequently to the *guessing* strategy in their transactions of MWEs meanings. This suggests that in the absence of clear indicators and attention-grabbing techniques for the contextual factors, the participants had no choice but to depend on guessing in cases where background knowledge and the constituents of the MWEs did not help in the idiom comprehension process. In contrast, the success of the participants in the experimental group in comprehending idioms can be related the contextual factors they were able to locate as a result the TE assistance.

**Linking with the Idiom Diffusion Model (Liontas, 1999, 2002c)**

These findings are consistent with Liontas’s (1999, 2002c) Idiom Diffusion Model (IDM) derived from his Transactional Idioms Analysis framework (Liontas, 2002a, 2002c, 2002d). The major construct of the Idiom Diffusion Model is that there are two phases an L2 learner goes through to understand idiomatic expressions. These phases are (a) prediction phase, and (2) confirmation or replacement, reconstruction phase. The IDM posits that L2 learners start with the individual words in the MWEs as a major source of prediction. Some of the factors that help in the prediction stage are the distance of the semantic/image opacity from the idiom domain and
the ability of L2 learners to process information given the nature of tasks. In the confirmation, replacement, or reconstructing phases, L2 learners depend on contextual factors, attention mechanisms, and graphophonetic, semantic, and pragmatic and cultural factors for inferring the meanings of idioms.

In applying the model to the findings in this study, I was able to understand the dynamics and the factors that facilitate or impede MWE comprehension. For collocations, I found that TE did not make a practical impact for better comprehension. This suggests that transparency of the lexical items in the collocations made the process of comprehension easier. Furthermore, these findings suggest the participants might be able to reach the meanings without further confirmation from the contextual factors available in the texts around collocations, and they were able to reach their meanings by merely depending on their background knowledge of the literal meanings of the constituents (words) of the collocations. Contrary to collocations, idiom meanings are opaque (not transparent); there is a large distance between the literal meanings of the idioms’ constituents and their figurative meanings. As a result, L2 speakers without contexts and without matching between MWEs in L1 and L2 may struggle to reach the meanings of these idioms.

Consequently, the tasks I designed by embedding MWEs in paragraphs and using the technique of TE should have provided facilitating conditions for the participants to comprehend the idioms. As Liontas (2002a) has stated, “even in context, learners are often not capable of attending to all the information available in the input. Some of it becomes the object of focused or selective attention, while other parts are attended to only peripherally” (p. 182). In these
circumstances, I can safely infer that the technique of TE assisted in focusing the participants’ attention on the contextual factors to process the meanings of idioms successfully.

Moreover, according to the IDM, the graphophonetic, semantic, and pragmatic/cultural factors also played a significant role in leading the participants to the meanings of the MWEs. The participants, being higher-intermediate to advanced English language readers, might be able to surpass the graphophonetic, semantic, lexico-grammatical levels. However, many of the participants showed significant use of pragmatic/cultural factors (Liontas, 2002c). For example, several participants referred to the fact that knowledge of the symbolic meanings of some words led them to learn the meanings of the MWEs, such as the examples of “horse” in *dark horse* and “red” in *red flag*.

In other examples, the participants’ showed that L1 plays an important role in comprehending the MWEs. This indicates that the lexical/semantic distance between their first language (Arabic) and the English expressions helped them process the meanings of the MWEs. These findings conform to the lexical/image continuum proposed by (Liontas, 1999, 2002d), which classifies most MWEs across language on three levels: (a) lexical-level, (b) semi-lexical level, and (c) post-lexical level. The participants were able to match some of the English MWEs with their equivalents, especially at the lexical level. For example, there are Arabic expressions similar to *thorny issue* (Mas’alah Shaekah) and *fall a victim* (yaqa daheya).

Finally, these findings also conform with Smith’s (1993) Input Enhancement hypothesis that language features should be enhanced or highlighted in order to increase the probability of their acquisition. In the case of MWEs, the results showed input enhancement (TE in this study)
helped the participants to comprehend the MWEs, as also hypothesized a key finding in the Liontas’s (1999) study.

**Linking with Previous Studies**

I found the results of this study to confirm many findings of previous studies in several respects. Some of the ideas confirming the results of previous studies are the TE effects and the factors that assist reaching successful processing and comprehension. Regarding collocations, the results confirm that TE helped L2 learners to comprehend collocations, which is consisted with the findings in Boers et al. (2017), Fahim and Vaezi (2011), Goudarzi and Moini (2012), and Sonbul and Schmitt (2013). In addition, the results suggest that TE triggers more processing of the meanings of MWEs as described in the participants reports of their MWE meaning transactions. This conforms with Choi (2017), who found that *highlighting* draws L2 learners’ attention and triggers them for longer processing times. It is also important to clarify that most of the researchers in the previous studies were concerned with the use of TE to enhance noticing the links between the constituents of the collocations. In my study, I was more concerned with the comprehension aspect.

In more detail, the results confirm the findings of Pam and Karimi (2016), who found that TE was helpful in helping L2 speakers learn idioms incidentally. Furthermore, the results of this study confirm the findings of Liontas (2002a), who found contextual factors were crucial for vivid phrasal idiom comprehension. One of the factors participants in my study used in their cognitive processing was matching the MWEs they read in the texts with their equivalents in the
Arabic language. The lexical distance between the MWEs across the L1 and the L2 was an important factor in helping participants understand the meanings of MWEs, which was consistent with findings in Liontas (2002c, 2015b).

The findings of this study also conform with those of Nesselhauf (2003), who found German students produce English language collocations accurately if they are close in the lexical level to their L1, which is German. The results of this study also confirm the findings of Yamashita and Jiang (2010), who found that Japanese students learn congruent collocations (i.e., collocations that are similar in English and Japanese) better than incongruent ones. Adding to that, I found congruency and similarities with L1 to be a factor in idiom comprehension.

**Summary**

In this chapter, I presented the results of the quantitative data and the qualitative data. First, I presented the results of the brief survey on the participants’ demographic information and experience with MWEs. Then, I presented the results of the experimental phase of the study, which showed textual enhancement helped the participants to comprehend the idioms. However, the results demonstrated textual enhancement was not a critical factor to help the participants comprehend the meanings of the collocations.

Then, I presented the results of the qualitative data analysis. Adopting an explanatory descriptive case study approach, I found there were similarities and differences regarding the strategies and the processes the participants in both groups employed to construct the meaning of MWEs. First, I conducted a text analysis of the MWE comprehension descriptions by
participants in each group. Second, I conducted a thematic analysis for each group. Overall, the
analysis revealed several insights into the participants’ experiences of transacting MWE
meanings. I discovered that contextual factors, background knowledge, and the constituents of
the MWEs are among the major factors that assisted the participants to comprehend the
collocations and idioms I presented in this study. Drawing on evidence from both the
experimental part and the case study, I discovered TE was helpful in drawing the participants’
attention to the contextual factors especially with idioms that are highly opaque compared to the
collocations. The study confirms the Input Enhancement hypothesis, especially for idioms, and
supported the notion that the Idiom Diffusion Model accurately described the outcomes of the
study.
CHAPTER FIVE:
CONCLUSION AND PEDAGOGICAL IMPLICATIONS

Introduction
In this study, I followed an explanatory sequential mixed methods design to explore the effects of TE in helping L2 speakers to comprehend the meanings of collocations and idioms. Along with the effects of TE, the qualitative phase of the study provided in-depth analysis of the techniques the participants employed to comprehend the meanings of the MWEs. This chapter is the conclusion of the dissertation. In this chapter, I provided a summary of the results, the pedagogical implications, limitations, suggestions for future research, and, finally, reflections on my journey with this research and my explorations as a researcher and a Ph.D. student.

Summary of Findings
The main purpose of this study was to explore the effects of Textual Enhancement (TE) on comprehending MWEs (collocations and idioms). The results of the experimental part showed that TE was effective in the case of idioms. This suggests that when there are opaque MWEs (idioms), TE helped L2 learners to further study the contextual cues available in texts to reach their meanings. For collocations which are semantically transparent compared to idioms, TE did
not show a difference and L2 learners were able to comprehend their meanings without heavily relying on contextual factors available in texts or attention guidance from the technique of TE.

The results in general conform to the tenets of the Lontas’s (1999, 2002c) Idiom Diffusion Model framework. That is, transparency and what the participants bring into the reading process such as cultural and pragmatic knowledge were also effective factors helping L2 learners to comprehend the meanings of MWEs. This was evident in the use of the constituents of the MWEs and the knowledge of the cultural and symbolic meanings of some words I discovered in the participants’ descriptions of their meaning-making processes. The lexical/image distance of MWEs between the L2 (English) and the L1 (Arabic) was a factor leading the participants to comprehend the MWEs meanings. To conclude, when the overall MWE is opaque in meaning, TE can help to direct L2 learners to employ cognitive processes to comprehend the meanings based on the contextual and cultural/pragmatic factors.

**Pedagogical Implications**

Second language (L2) teachers may find the results of this study useful to improve their language teaching practices. The implications basically revolve around the following ideas: the need to teach MWEs, the need to use technology to teach MWEs, the need to address attention as a pivotal condition for successful L2 acquisition, the need to encourage cognitive processing of language input, training L2 learners to use strategies to understand MWEs, and the need of curriculum designers to highlight MWEs in L2 textbooks.
Second language educators, teachers, and L2 learners should appreciate the importance of formulaic language in general. Recently, several researchers and linguistic theorists have placed words and the MWEs in the center of the language system opposing the works that put words at the periphery (e.g., Chomsky, 1957; Hoey, 2005; Pinker, 1994). Mastering the different types of MWEs can play a substantial role in increasing L2 learners’ fluency and accuracy in language use (Henriksen, 2013). L2 speakers in many circumstances fail to communicate effectively because they lack knowledge of idiomatic expressions, or they are inefficient in combining the right words together. In addition, the benefits of mastering MWEs are not only limited to improving communication capabilities of everyday life; rather, learning MWEs can facilitate better cognitive processing. Learning MWEs could help L2 learners to achieve faster processing and reserve their limited cognitive resources to better utilize their cognitive capabilities in general (e.g., Conklin & Schmitt, 2012; Henriksen, 2013; Matsuno, 2017).

Input enhancement can be a practical and useful technique to highlight MWEs as found in this study and in others, including Boers et al. (2017), Choi (2017), Fahim and Vaezi (2011), and Pam and Karimi (2016). Input Enhancement in general triggers better processing of language in the levels of grammar (Lee & Huang, 2008) and vocabulary (Rott, 2007). This helps to guide L2 learners to notice, process, and ultimately comprehend these expressions. Input enhancement can take many forms such as textual enhancement, video enhancement, animated enhancement, or many other forms depending on the creativity of the teachers. Therefore, I encourage teachers to use the different forms of input enhancement to develop their L2 students’ abilities to process MWEs and think critically to reach their meanings. For example, a teacher can guide students to
think about the MWEs by providing them in isolation and in contexts, so the students can use the various strategies and exploit factors such as the use of context to infer the meanings, studying the individual words, and analyze the image/semantic features of the MWEs.

L2 learners come with a rich history of L1 and other schematic knowledge about the world (Liontas, 2002c). Motivating L2 learners to exploit knowledge they possess about the world and their first languages will lead to exciting experiences, and it will ultimately lead to learning. For example, Liontas (1999, 2002c) showed that most of the idioms across languages come in three levels of lexical/image distance: (a) lexical level, (b) semi-lexical level, and (c) post lexical level. Teachers can encourage L2 learners to reflect, analyze, and detect the differences and similarities in the MWEs across their target language and mother languages. This training can also improve the understanding of the cultural aspects of learning a new language.

Training L2 students to use strategies and techniques to decipher MWEs can assist L2 learners to successfully learn without assistance from teachers or dictionaries. Acquiring a new language is not (and should not be) limited to classrooms and school buildings. In addition, L2 teachers are not available all the time to guide their students. People study foreign or second language for various purposes, including those that are academic, cultural, and/or adaptive. A common and an important goal of L2 learners is to learn the language in a fast and efficient manner. Therefore, training L2 learners to use strategies can significantly help them achieve these goals. Furthermore, teachers need to be trained on how to create independent L2 learners that can take advantage of their cognitive capabilities to process and learn new languages in general and MWEs in particular.
Curriculum developers should also address the importance of MWEs. Traditionally, L2 learning textbooks encourage learning individual vocabulary items by providing materials that do not take into account the formulaic characteristics of natural languages (Tsai, 2014). Words are bounded by rules of grammar and, above all, by restrictions of use. Developing materials that address issues related to vocabulary and expand learning from an individual-word focus to a comprehensive study of vocabulary patterns as they happen in MWEs can significantly benefit L2 learners because it accounts for what is natural in language use (Hoey, 2005).

Technological advances can also be an important factor in learning other languages in general and MWEs in particular. Understanding attention mechanisms and visual/audio technologies may be a critical factor in developing learning materials that are beneficial for L2 learners. Teachers and language technology specialists can take advantage of online tools and platforms to better implement programs for learning MWEs. Providing texts with creative ways of enhancing the textual qualities can encourage L2 learners to indulge in simultaneous learning of content and language. TE can be an easy technique to apply to texts. L2 learners can develop sensitivity to point out MWEs in texts, sharpen their skills to use in guessing, search for contextual factors, and expand their repertoire of other strategies, involving interactive tasks, to learn other languages in general and different types of MWEs in particular.

Among the factors that may lead to a better implementation of materials is the use of authentic materials involving either spoken or written texts and presenting interesting topics and themes targeting the specific needs of the learners. Authentic texts represent authentic events and matters with which L2 learners can connect. Providing interesting topics to L2 learners can be a
significant factor in leading the participants to learn. Topics that interest L2 learners will trigger their excitement and enthusiasm to explore, talk, write, and discuss. Interesting topics can afford L2 learners opportunities to acquire the language they endeavor to learn in a fun and motivating way. L2 teachers may help in developing teaching materials derived from authentic sources of language. For example, YouTube or other social media platforms, and online newspapers and magazines can be a rich source of authentic use of language (Cesarano, 2018). In these sources, L2 learners and teachers can find topics that are hot and new and address the current events of the world around us.

**Limitations**

As with all research in the fields of social and human studies, it is a challenge to manage all the variables, participants, and other necessities to conduct a sound research study. This study is not an exception. There were some limitations in this study that are worth discussing. Some areas of limitations in this study were the sample size in the quantitative phase, the type of questions presented to the participants, and issues related to the qualitative data.

The sample size of the study was relatively small in terms of quantitative methodology. It took the participants two to three hours to complete the tasks of the study. Many of the participants who started the participation did not complete all the tasks. The small sample size can be a limitation for various reasons. First, it is hard to achieve higher statistical power because that depends on large sample sizes. Second, a small sample size may limit the researchers from generalizing beyond the sample she/he has to a larger population. Building or testing hypothesis
or theories requires large samples to be able to generalize the findings. Third, it is difficult to
control the extraneous variables. For example, for a researcher to control other variables, there
are many statistical procedures to take such as multivariate analysis, multiple regression, path
analysis, and other techniques. Adding more variables (parameters) to the study might be
important for better understanding of the outcomes such as the language proficiency levels, texts
readability levels, and years of studying the language or years of using English in college. Every
parameter a researcher wishes to control in the study may require approximately 15 more
participants to reach a proper statistical power using multiple regression, or other complex
models to understand quantitative data (Pituch & Stevens, 2015).

I adopted a multiple-choice format of questions to measure the understanding or learning
of the meanings of MWEs in texts. This format may have influenced the participants in that they
may have guessed the meanings only from the choices offered in each question. Furthermore, it
may require further validation and reliability testing, which are considered long processes and
could take several tests and retests to confirm and modify if required.

The participants did not provide detailed descriptions in the qualitative phase of the
study. The qualitative data in this study was collected through answering an open-ended question
in a blank box after each multiple-choice question. In many instances, they provided short
answers. For example, many of them described the impact of contextual factors in
comprehending the MWEs by simply writing “context”. Face-to-face interviews may lead to
richer answers and more detailed descriptions of the methods the participants employed to reach
the MWE meanings. In addition, the fact the tasks were all online and the participants had to use

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computers may not have been favorable due to the anxieties related to using computers or digital devices in general.

Finally, research data in the disciplines of educational and social sciences in general can be interpreted differently. Many factors affect our views of the world such as culture, education, personal experiences, and hermeneutic considerations. In this study, I employed an experiment and an explanatory descriptive case study to research the topic of the effects of TE. These methods draw on premises of different schools of thoughts and paradigms of research. The combination of research methods in one study is an attempt to address the shortcomings of each type of research. After all, my background as an L2 learner myself in some stages of my life, being a researcher, and being a human can affect my biases, interpretation and understanding of the results.

Future Research Recommendations

In this research study, I discovered significant knowledge about the effects of TE on learning MWEs. However, by the end of this research endeavor, I found several questions and other research topics that can be further explored. Some of the topics and research strategies include the ways of measuring comprehension, research strategies, variables to control, and questions to answer.

This study was limited to measure the effects of TE in improving the participants’ capabilities to comprehend the meanings of collocations and idioms. Knowledge of vocabulary in general and MWEs in particular can be measured in terms of comprehension and in terms of
productive use (Alsakran, 2011; Barcroft et al., 2011; Nation, 2001). Receptive knowledge usually revolves around comprehension. After all, one of the goals of studying a new language is to be able to interact either in receptive skills or productive skills in writing or speaking. I suggest to researchers to develop methods that can measure productive knowledge of MWEs. Researchers can conduct this type of research by providing tasks that trigger L2 learners to provide answers without any help from the options available in multiple choice formats. Researchers can, for example, use tasks such as to writing the meanings instead of choosing an option from a list of answers. Researchers may also develop methods that can measure productive knowledge by providing contexts and encourage the participants to come up with the right MWEs.

Future studies could also use in-depth interviews. The qualitative data I collected were brief descriptions of the methods the participants had employed to reach the meanings of MWEs. In-depth interviews may provide richer information and discussions that can clarify ambiguous answers or provide further details of the participants’ experiences with learning MWEs.

Researchers can include bigger samples and control for variables that may affect the results. Variables such as years of studying English, proficiency levels, reading habits, and interests may provide deeper insights into the experiences of the participants. Researchers can include participants’ academic backgrounds as well because the different disciplines require different language proficiency levels. Using data modeling techniques such as mixed effects modeling or crossed random effect modeling can overcome the problems related to the
characteristics of the participants or the types of language materials researchers select in their studies.

Researchers may also add more learning conditions. In this study, I added the MWEs in contexts in both the control and the experimental groups. The only difference was that the experimental group had the MWEs textually enhanced. Providing a third condition such as presenting MWEs in isolation may provide insights into how L2 learners process MWEs in isolation.

Beside the abovementioned recommendations I provided as possible research follow-ups, there are several questions that are pertinent for future research. Some of these questions can be an extension of this dissertation, while others may be topics of research by themselves. These questions include the following:

- Does textual enhancement improve the L2 learners’ productive use?
- In what ways do contextual factors help to learn MWEs?
- How does the lexical/image distance between the first language and second language of learners affect their comprehension?
- How does a lack of MWE knowledge affect reading/listening comprehension?
- Does TE of MWEs interfere with L2 learners’ ability to understand the overall content?
- Do the factors of language proficiency, readability levels, and experiences with MWEs affect idiom comprehension?
Final Reflections

My experience as a Ph.D. student is a process worth sharing. The various elements of the Ph.D. program have transformed me in many ways. Among the experiences that have had an impact on me personally and intellectually are a set of courses from different disciplines, qualifying examinations, research practices, and, finally, embarking on the adventure of conceiving a topic for the dissertation, collecting data, analyzing, and discovering new findings.

One of the greatest achievements in being a Ph.D. student is to reach a level of linking theory to practice, philosophical ideas into the observed behavior of the world and its people. I have realized that research is not only about reaching answers. It is to face many challenges, including time, space, and intellectual obstacles. Above all, it involves new ways of thinking.

I was not sure how the mixed methods approach might be helpful in research, and how mixing two different paradigms and philosophical foundations could lead to developing insights from the data. As I was in the process of analyzing the data, I put all the theories aside and looked at the results as the data emerged. When I first conducted the statistical analysis for the collocations, I was surprised that textual enhancement did not make a difference and that both groups were similar! Then I analyzed the idiom scores, and I was wondering why the idioms were different! It was like a puzzle. However, I continued analyzing the qualitative data; again, I completely ignored the theoretical framework. The themes I found in the qualitative data led to some insights into how the participants were thinking. However, I still did not know why the experiment did not help for collocations. I went back to the Liontas’s (1999, 2002c) Idiom Diffusion Model, and at that moment, I said: “here we go!” When I reached Chapter 4 to discuss
the results, I found it amazing to see the clouds had cleared and I had discovered knowledge. I was amazed to see how the theoretical framework (the IDM) could predict and explain the behavior I had found in this experiment.

This also has led me to think about my experience as a researcher. I cannot deny the fact that before enrolling in USF as a Ph.D. student, I was not competent in qualitative research practices. I used to take the results of the quantitative studies for granted. I thought that real research is when there are numbers and complicated statistical terminologies. I still do believe each approach has its advantages and disadvantages. Throughout my studies at USF and studying in qualitative research courses, I discovered qualitative research is appealing. This dissertation made me think about this question: what if I haven’t taken a mixed methods approach!? I would end up with numbers, and I would try with all my effort to interpret the results. There is nothing like reaching answers for those who are involved in research. There, I discovered qualitative research can add very valuable insights into our lives. Above all, qualitative methods added a whole new perspective to me; that is, to think, explore, explain and reflect on the world!

Now, I feel I have been transformed from being an L2 teacher to an observer, critical thinker, a futurist looking for better ways of teaching students, training teachers, and advancing research and knowledge. Ultimately, I look forward to inspiring others accomplish more, and to create a better world. My goal is to get people closer to each other—to help them break the language barriers. I will work to enhance L2 teaching practices because learning new languages should bring people of different worlds together, spread knowledge, and encourage appreciation of diversity.
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APPENDICES
Appendix A: Collocations and Idioms

Notice. Appendix A includes: the paragraphs in which the collocations or idioms will be embedded. In one version there will be enhanced MWEs and the other version will not have the MWEs enhanced. MWE Question: This is the comprehension question after each paragraph.

Collocations

<table>
<thead>
<tr>
<th>#</th>
<th>Collocation</th>
<th>Context</th>
<th>Fry Readability Level</th>
</tr>
</thead>
</table>
| 1 | Thorny issue | In the past, trees in Seoul have been cut down too easily, in the same way that buildings were completely demolished for redevelopment projects. A more careful approach needs to be adopted,” a Seoul government official said.  
The treatment of trees on redevelopment project sites has been a *thorny issue*, mainly for financial reasons.  
Though some redevelopment projects do propose plans to protect trees nearby, most of them end up as broken promises, as many associations of redevelopment projects often find the cost too burdensome to begin with. | 13                    |
|   | Adapted from | http://koreabizwire.com/trees-a-thorny-issue-for-redevelopment-projects/102763                                                                                                                             |                       |
|   | MWE Question | a. A book edition that has thorns.  
b. A difficult situation.  
c. An easy situation.  
d. A problem that has no solution.                                                                                           |                       |
<p>| 2 | Easy money   | My mom was a single mother, and she, you know - she was a freelance journalist and worked occasionally. But we were always struggling financially, so it was kind of just a good idea for some quick, easy money, I don't think there were grand plans for me to have a career as an actress, and I certainly don't think I was even really aware of what that meant. | 8                     |
|   | Adapted from | <a href="http://wunc.org/post/i-never-set-out-be-actor-says-transparent-star-gaby-hoffmann">http://wunc.org/post/i-never-set-out-be-actor-says-transparent-star-gaby-hoffmann</a> 57.813.6                                                                                                                 |                       |</p>
<table>
<thead>
<tr>
<th>MWE Question</th>
<th>Cast doubt</th>
<th>Serve a purpose</th>
<th>Carry the burden</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MWE Question</strong></td>
<td>Fernando Alonso has appeared to cast doubt over his future in Formula 1, calling it &quot;demanding&quot; and insisting the current direction of the sport is &quot;sad&quot;. The Spaniard says he will not decide on his plans for 2019 until after F1's August summer break. The McLaren driver is combining his F1 duties with racing in the World Endurance Championship with Toyota this season and won on his debut last weekend at the Six Hours of Spa.</td>
<td>&quot;In most cases, you have to weigh if your total honesty will serve a purpose in the relationship,&quot; Bennett says. &quot;If sharing a thought is going to cause more problems than it solves or hurt your partner’s feelings, then it’s probably best to keep quiet.&quot; While you should be able to comfortably share most things with your partner, that doesn't mean everything.</td>
<td>“I grew up in a single-family home, I am poor, I was bullied as a kid.” Somehow, they believe that experiencing adversity takes away their white privilege. And lastly, they say, “Yes, I have privilege, but that isn’t my fault. I didn’t choose to be white, why do I have to pay the price? Why do I have to carry the burden of privilege?” Now, go back above and replace “white” with “male.”</td>
</tr>
<tr>
<td><strong>MWE Question</strong></td>
<td>a. Money that is easy to count. b. Money that is difficult to get. c. Money that you get without much effort. d. Money that you spend on unnecessary stuff.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MWE Question</strong></td>
<td>a. To feel that something is not true. b. To believe that something is true. c. To lie about something. d. To believe something good will happen.</td>
<td>a. To have a positive effect on relationships. b. To have negative effect on relationships. c. To provide a plan for a good relationship. d. To deliberately cause a bad effect on relationships.</td>
<td></td>
</tr>
<tr>
<td>Adapted from</td>
<td><a href="https://www.huffingtonpost.com/entry/a-womens-response-to-straight-black-men-are-the-white_us_59c3cf05e4b0c87def8835c8">https://www.huffingtonpost.com/entry/a-womens-response-to-straight-black-men-are-the-white_us_59c3cf05e4b0c87def8835c8</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| MWE Question | a. To take the responsibility for something difficult.  
b. To not take care of important matters.  
c. To hold heavy things with your hands.  
d. To be at fault for doing something wrong. |
| Hold a meeting | Now, after just as abruptly canceling the summit meeting, Mr. Trump has — wittingly or not — set in motion a more normal set of discussions to lay the groundwork for an agreement about North Korea’s nuclear weapons program ahead of a decision on whether to hold a meeting between the two leaders after all. |
| MWE Question | a. To arrange for two people or groups to discuss matters in front of each other.  
b. To have some people in your hands.  
c. To cancel a meeting.  
d. To make someone wait until you are free. |
| Seize the opportunity | The next time you’re presented with an opportunity, don’t hesitate. No one else is going to pave the way for you to reach your dreams, and even when one dream slips away, there are still opportunities to reinvent yourself. Don’t be lackadaisical with your life, and don’t squander precious opportunities. Get over yourself to find courage to seize the opportunity. It is the surest path forward - no matter what you want in life. |
| MWE Question | a. To take the chance to do something.  
b. To hold a chance with hands.  
c. To fail to take a chance to do something.  
d. To see a chance in the future. |
<table>
<thead>
<tr>
<th>8</th>
<th>Break a promise</th>
<th>Growing up, the lesson was that we should never, ever <strong>break a promise</strong>. As leaders, we hear messages that affirm that lesson – “you’re only as good as your word,” or DWYSYWD (Do What You Say You Will Do). Of course, these are very good principles to abide by. But what about those times when it simply is not possible to keep a promise you’ve made? The absolute moral imperatives don’t give us any latitude, nor any instruction, about how to handle situations when a promise made will not be a promise kept.</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Adapted from</td>
<td><a href="https://blog.peoplefirstps.com/connect2lead/honorable-way-break-promise">https://blog.peoplefirstps.com/connect2lead/honorable-way-break-promise</a></td>
</tr>
<tr>
<td>10</td>
<td>Fall victim</td>
<td>When people <strong>fall victim</strong> to identity or card theft, they can request that their credit card provider (a.k.a., the issuing bank) work on their behalf to reverse the fraudulent charges. In the traditional online commerce model, with a buyer and a single seller, the issuing bank would typically hold the seller or “merchant” liable for any fraudulent charges made on the website.</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Draw conclusions</td>
<td>Whether you’re reading a novel, short story, flash fiction piece, newspaper article or anything other work of literature, the most efficient and reliable way to <strong>draw conclusions</strong> while reading is to justify your claims with evidence from the text. The better you’re able to back up your conclusions with concrete evidence from the text, the stronger and more valid your conclusions will be.</td>
</tr>
<tr>
<td></td>
<td>Adapted from</td>
<td><a href="https://education.seattlepi.com/draw-conclusions-reading-1545.html">https://education.seattlepi.com/draw-conclusions-reading-1545.html</a></td>
</tr>
</tbody>
</table>
| | MWE Question | a. To separate something into parts.  
| | | b. To fail to keep your word to do something.  
| | | c. To lie to someone about a future job.  
| | | d. To make something not useful anymore. |
| MWE Question | a. To drop down from above.  
|             | b. To be attacked or robbed from someone else.  
|             | c. To catch a thief.  
|             | d. To take advantage of others. |
## Idioms

<table>
<thead>
<tr>
<th>#</th>
<th>Idiom</th>
<th>Context</th>
<th>Fry Readability Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red flag</td>
<td>Tattoos or pierced body parts have long been considered a <strong>red flag</strong> for pediatricians who found them on their patients. Physicians who came across an inked symbol or a navel ring while examining an adolescent or young adult were taught to probe for other dangerous behaviors, including drug use, weapons carrying, risky sexual activity, and self-injury.</td>
<td>12</td>
</tr>
</tbody>
</table>
|    | MWE Question| a. A flag that is painted red.  
   b. A sign of something dangerous.  
   c. A sign for zodiac.  
   d. A type of tattoo.                                                                                                                                  |                       |
| 2  | Old hat     | Personalized email driven by machine learning? Ho hum. Birthday greetings and emails triggered by life events? It’s **old hat**. The next true development in email is interactivity — the ability to let consumers give as well as receive. For example, as we have reported, QwkBuy is in a partnership with SendGrid to let people purchase directly through an email via their smartphones, instead of having to go to a website. And it is about to start embedding videos right into emails. Email thus becomes a push as well as a pull medium. | 10                    |
|    | MWE Question| a. A head cover that existed for a long time.  
   b. A technology that is no more useful.  
   c. An old person.  
   d. A new computer system.                                                                                                                                  |                       |
| 3  | Thick skin  | “And I’ve been on the flip side of those kinds of things myself. People would make fun of how big my shoes were or the clothes I was wearing because they were not in fashion because of my size. I’ve seen both sides of it. I tried to let those things roll off of me, I’ve got pretty thick skin, but I was the target of a lot of jokes and teasing when I was in school.” | 9                     |

187
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<th>Adapted from</th>
<th><a href="https://www.postandcourier.com/sports/anti-bullying-campaign-started-by-former-forest-dorchester-high-school/article_54ef4de8-e507-11e7-93c6-e759a5c58681.html">https://www.postandcourier.com/sports/anti-bullying-campaign-started-by-former-forest-dorchester-high-school/article_54ef4de8-e507-11e7-93c6-e759a5c58681.html</a></th>
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| MWE Question | a. A part of body that is wide.  
   b. A feeling of not being easily offended or upset from others.  
   c. A sad feeling that you have when others criticize you.  
   d. A feeling of strength and confidence. |
| Cold feet    | North Korea might have cold feet over the planned talks between leader Kim Jong Un and Donald Trump set for June, saying they will abandon the summit if the U.S. forces them to submit to nuclear disarmament. The regime also isn’t happy with U.S.-South Korea war exercises, and has canceled a high-level meeting with the South. |
| Adapted from | https://www.collegemedianetwork.com/wednesday-morning-scoop-summit-trouble/ |
| MWE Question | a. To feel not brave enough to agree to do something.  
   b. To feel that your feet are cold from low temperature.  
   c. To refuse an offer.  
   d. To walk to place on feet. |
| Small potato | As council members grapple with the snail’s-pace progress toward their vision for Thousand Oaks Boulevard, they’ve turned to Raimi & Associates, an urban planning firm, to come up with all the ingredients for whipping up a winning recipe for a thriving downtown.  
   Berkeley-based Raimi is no small potato—the firm has worked with Santa Monica, East Palo Alto, West Hollywood and Hermosa Beach. But neither is its price tag: $200,000 to create a plan for just two city blocks. |
| Adapted from | https://www.toacorn.com/articles/council-calls-on-consultant-to-solve-downtown-riddle/ |
| MWE Question | a. A potato that is small in size.  
   b. An important company or person.  
   c. An unimportant person or company.  
   d. A little quantity of food. |
| 6 | Fat cat | “I don’t understand why any senator, let alone my senator, Senator Heller, would think that this is a good idea—why throwing hundreds of thousands of Nevadans, like me, off their health insurance is a good plan so some fat-cat billionaires can make a few extra dollars,” she continued. “What is the reasoning behind that?” |
| 7 | Dark horse | Inter Milan (a soccer club) is emerging as a **dark horse** for the Serie A title. noodles, Roma Club and perhaps AC Milan Club were expected to present the toughest challenges to Juventus’ Club bid for a seventh straight league title. But after beating Roma Club comprehensively in the Italian capital as well as collecting victories over Fiorentina club and Spal Club, Inter Milan could pose a serious threat. |
| 8 | Hit the roof | It was during this time that Lita, whom Matt had been dating for a few years, began an affair with Edge. Travelling all year long must be hard and I’m certainly not making excuses for Lita or Edge because I find cheating on someone pretty abhorrent, but when you’re together with someone ad nauseum, sparks can fly, and emotions can get the better for you. Lita had found someone new and it was one of Matt’s best friends. Needless to say, when he found out, he **hit the roof**. |
|-------------|--------------------------------------------------------------------------------|
| MWE Question | a. To hit the top of a room with your head.  
   b. To be very angry.  
   c. To hit something hard.  
   d. To run away. |
| Hold the line | The administration so far has been able to **hold the line** on taxes for 2018 as well as avoid layoffs, even after arbitrators in a Nov. 30 award letter granted firefighters raises that the mayor did not include in his initial 2018 budget proposal.  
   George froze 2018 wages for all city employees except police officers, who will receive 3 percent raises effective Jan. 1 based on a contract negotiated during former mayor Tom Leighton’s administration. |
| MWE Question | a. To temporarily stop doing something.  
   b. To carry a thin robe in the air.  
   c. To arrange people in a line behind each other.  
   d. To continue a plan despite some difficulties. |
| Bend one’s knee | Anyone whose racing memory goes back 15 years will be aware that the Irishman horse has won it before but his Be My Royal horse, first past the post in 2002, was eventually disqualified over a finding of morphine in his system, the result of contaminated feed.  
   For all his affability, Mullins is not a man to **bend his knee** to authority. Outraged by the verdict and insistent that there should be an allowed threshold for morphine, he engaged in a protracted legal battle that ended at the High Court four years later, the judges declining to interfere with the Jockey Club’s ruling. |
| MWE Question | a. To submit to the will of others.  
   b. To sit down. |
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<tr>
<td>c.</td>
<td>To get angry.</td>
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<tr>
<td>d.</td>
<td>To oppose the orders of authority.</td>
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Appendix B: Online Instruments

Experiment Instructions

Instructions

Thanks for participating in this research study. First, please complete the reading proficiency test.

After finishing the reading proficiency test, complete answering the following questions.
Paragraph (1)

"In the past, trees in Seoul have been cut down too easily, in the same way that buildings were completely demolished for redevelopment projects. A more careful approach needs to be adopted," a Seoul government official said.

The treatment of trees on redevelopment project sites has been a thorny issue, mainly for financial reasons.

Though some redevelopment projects do propose plans to protect trees nearby, most of them end up as broken promises, as many associations of redevelopment projects often find the cost too burdensome to begin with.
A Question Display Sample

What is the meaning of **thorny issue**?


b. A difficult situation.

c. An easy situation.

d. A problem that has no solution.

How did you reach the meaning of **thorny issue**?
Appendix C: Survey Questions

Demographics

Name or Nickname

Gender:
- Female
- Male

Age:

Current university standing:
- Freshman
- Sophomore
- Junior
- Graduate

Foreign/Second Language Experience

How many years have you had with English? (Enter number)

How many college years have you had in English language? (Enter number)

How much time have you spent in an English-speaking country?
- More than 3 years
- 1 to 3 years
- Less than a year

How fluent are you in English?
- Near native fluency
- High fluency
- Average fluency
- Some fluency
- No fluency
How easy is it for you to understand and interpret English language texts?

- Very easy
- Easy
- Marginally easy
- Not easy

Experience with Multiword Expressions

Have you ever studied collocations and idioms?

- Yes
- No

On a scale of 1 to 5 (with 1 being the least important and 5 the most important), how would you rate the importance of students learning collocations and idioms in the foreign language classroom?

1. Not important
2. Slightly important
3. Neutral
4. Important
5. Very important

If you were to read a foreign language text and point out idiom or collocation, how confident would you be in doing so successfully?

- Very confident.
- Confident
- Marginally confident
- Not confident

If you were to read an idiom or a collocation in isolation, how confident would you be in telling what it means?
• Very confident.
• Confident
• Marginally confident
• Not confident

If you were to read an idiom or a collocation in a paragraph, how confident would you be in telling what it meant?
• Very confident.
• Confident
• Marginally confident
• Not confident
Appendix D: IRB Forms

Letter of Approval

7/30/2018

Adel Abohalima
Teaching and Learning
Tampa, FL 33620

RE: Exempt Certification
IRB#: Pro00034013
Title: The Effects of Textual Enhancement on Processing and Learning Multisyllabic Expressions

Dear Mr. Abohalima:

On 7/29/2018, the Institutional Review Board (IRB) determined that your research meets criteria for exemption from the federal regulations as outlined by 45CFR46.101(b):

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
(i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and
(ii) any disclosure of the human subjects’ responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects’ financial standing, employability, or reputation.

As the principal investigator for this study, it is your responsibility to ensure that this research is conducted as outlined in your application and consistent with the ethical principles outlined in the Belmont Report and with USF HRPP policies and procedures.

Please note, as per USF HRPP Policy, once the Exempt determination is made, the application is closed in ARC. Any proposed or anticipated changes to the study design that was previously declared exempt from IRB review must be submitted to the IRB as a new study prior to initiation of the change. However, administrative changes, including changes in research personnel, do not warrant an amendment or new application.

Given the determination of exemption, this application is being closed in ARC. This does not limit your ability to conduct your research project.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

Mark Ruiz, PhD, Vice Chairperson
USF Institutional Review Board
A Call of Participation in a Research Study

As part of an important language learning study:

- Are you over 18 years of age?
- Are you a student in an academic program in a college level?
- Is your first language Arabic?

If your answer is yes to these questions, you may be eligible to participate in this research study about the effects of textual enhancement on learning multword expressions.

The purpose of this research study is to examine the effects of using textual enhancement to promote comprehension and learning multword expressions that are important for language fluency and use. You will only need your computer and online access to be able to read online paragraphs and answer specific questions.

You will be tested to measure your reading proficiency level and then complete the experimental part. The time commitment for this study is expected to be 2-3 hours.

This research study is being conducted online through Qualtrics Online Survey System.

Please note that there may be no direct potential benefits to participate in this research, your participation will add to the general knowledge of language learning. Also, there is no compensation or reimbursement in return for your participation.

Please call Adel Aileshkin at (813) 570-0055 or email aileshkin@mail.usf.edu for more information.

Your participation is highly appreciated!

IRB Protocol #: 00004913

University of South Florida, Tampa, FL
Certificate of Social/Behavioral Investigators and Key Personnel Course

This is to certify that:

Adel Alshaikhi

Has completed the following CITI Program course:

Human Research
Social / Behavioral Investigators and Key Personnel
2 - Refresher Course

Under requirements set by:

University of South Florida

Verify at www.citiprogram.org/verify/?w337e6c54-7dc4-4f30-8fd1-b474ec454e16-22264778
Informed Consent to Participate in Research
Information to Consider Before Taking Part in this Research Study

Pro # 00024013

Researchers at the University of South Florida (USF) study many topics. To do this, we need the help of people who agree to take part in a research study. This form tells you about this research study. We are asking you to take part in a research study that is called: The Effects of Textual Enhancement on Processing and Learning Multiword Expressions. The person who is in charge of this research study is Adel Z. Alshaikhi. This person is called the Principal Investigator.

Purpose of the Study
The purpose of the study is to examine the effects of textual enhancement on processing and learning multiword expressions. These multiword expressions are important for fluency and accuracy of language use. This study is an attempt to find better ways to teach and learn them in an effective manner.

Why are you being asked to take part?
We are asking you to take part in this research study because you are an Arabic-speaking student in an academic program in a US university.

Study Procedures
If you take part in this study, you will be asked to access an online reading proficiency level test through Qualtrics Online Survey System. Also, you will access online survey, reading paragraphs and answer multiple-choice questions, and describe how you have reached the meanings of the multiword expressions. You can use your computer to access the online materials at your convenient place and time. The data is collected anonymously. The expected time duration to complete this research study is approximately 2-3 hours.

Alternatives / Voluntary Participation / Withdrawal
You have the alternative to choose not to participate in this research study. You should only take part in this study if you want to volunteer; you are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in this study. Your decision to participate or not to participate will not affect your student status, course grade, recommendations, or access to future courses or training opportunities. You have the alternative to choose not to participate in this research study.
Benefits and Risks
We are unsure if you will receive any benefits by taking part in this research study. This research is considered to be minimal risk. However, there is a potential risk of breach of confidentiality.

Compensation
We will not pay you for the time you volunteer while being in this study.

Privacy and Confidentiality
We must keep your study records as confidential as possible. It is possible, although unlikely, that unauthorized individuals could gain access to your responses because you are responding online.

Certain people may need to see your study records. By law, anyone who looks at your records must keep them completely confidential. The only people who will be allowed to see these records are the Principal Investigator, the University of South Florida Institutional Review Board (IRB).

- It is possible, although unlikely, that unauthorized individuals could gain access to your responses. Confidentiality will be maintained to the degree permitted by the technology used. No guarantees can be made regarding the interception of data sent via the Internet. However, your participation in this online survey involves risks similar to a person’s everyday use of the Internet. If you complete and submit an anonymous survey and later request your data be withdrawn, this may or may not be possible as the researcher may be unable to extract anonymous data from the database.

- We will do our best to keep your records private and confidential. We cannot guarantee absolute confidentiality. Your personal information may be disclosed if required by law.

Contact Information
If you have any questions about your rights as a research participant, please contact the USF IRB at (813) 974-5638 or contact by email at RSCH-IRB@usf.edu. If you have questions regarding the research, please contact the Principal Investigator, Adel Z. Alshaikhli at (813) 507-0055 or contact by email at ALSHAIKHI@usf.edu.

We may publish what we learn from this study. If we do, we will not let anyone know your name. We will not publish anything else that would let people know who you are. You can print a copy of this consent form for your records.

I freely give my consent to take part in this study. I understand that by proceeding with this survey that I am agreeing to take part in research and I am 18 years of age or older.