



# UNIVERSIDAD DE LA RIOJA

## TESIS DOCTORAL

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<b>Relationship among perceptual learning styles, productive vocabulary, and textbooks in English as a foreign language learning</b>
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**TESIS DOCTORAL  
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**Programa de Doctorado en Filología Inglesa**

**RELATIONSHIP AMONG PERCEPTUAL  
LEARNING STYLES, PRODUCTIVE  
VOCABULARY, AND TEXTBOOKS IN ENGLISH  
AS A FOREIGN LANGUAGE LEARNING**

**RELACIÓN ENTRE LOS ESTILOS DE  
APRENDIZAJE DE PERCEPCIÓN,  
VOCABULARIO PRODUCTIVO, Y LIBROS DE  
TEXTO EN EL APRENDIZAJE DE INGLÉS COMO  
LENGUA EXTRANJERA**

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## LIST OF ACRONYMS

<b>ANOVA</b>	Analysis of Variance
<b>AWL</b>	Academic Word List
<b>BLSI</b>	Barsch Learning Styles Inventory
<b>CEFR</b>	Common European Framework of Reference for Languages
<b>CLIL</b>	Content and Language Integrated Learning
<b>DCT</b>	Dual Coding Theory
<b>ECS</b>	English as a Curricular Subject
<b>EFL</b>	English as a Foreign Language
<b>ELT</b>	English Language Teaching
<b>ESL</b>	English as a Second Language
<b>FL</b>	Foreign Language
<b>GLAUR</b>	Applied Linguistics Research Group of the University of La Rioja
<b>GSL</b>	General Service List
<b>L1</b>	First Language
<b>L2/SL</b>	Second Language
<b>L3</b>	Third Language
<b>LFP</b>	Lexical Frequency Profile
<b>LSS</b>	Learning Style Survey
<b>LSSYL</b>	Learning Style Survey for Young Learners
<b>NLP</b>	Neuro Linguistic Programming
<b>PE</b>	Physical Education
<b>OSL</b>	Collaboration Program of the Official School of Languages
<b>PLSPQ</b>	Perceptual Learning Style Questionnaire
<b>PVLT</b>	Productive Vocabulary Levels Test
<b>SAS</b>	Style Analysis Survey
<b>SLA</b>	Second Language Acquisition
<b>TPR</b>	Total Physical Response
<b>UWL</b>	University Word List
<b>VAK</b>	Visual, Aural, Kinesthetic
<b>VARK</b>	Visual, Aural, Read/Write, Kinesthetic
<b>VLТ</b>	Vocabulary Levels Test



## ABSTRACT

Perceptual learning styles have been widely investigated in English as a Foreign Language (EFL). However, less attention has been paid to productive vocabulary and the perceptual activities and words included in English Language Teaching (ELT) textbooks. To our knowledge, the relation among these variables (perceptual learning styles, productive vocabulary, and perceptual activities and vocabulary) has not been studied yet. Therefore, the present doctoral dissertation aims at contributing to narrow this gap in the studies examining perceptual learning styles, productive vocabulary knowledge (controlled productive vocabulary and lexical production/association), and the perceptual activities and vocabulary provided in two ELT textbooks, as well as the relationship among those variables.

For this purpose, a total sample of 60 Spanish EFL learners participated in this investigation. They were enrolled in the second year of non-compulsory secondary education, which is equivalent to the 12th grade, in a public high school in the autonomous community of La Rioja (Spain). 29 students out of 60 were enrolled in a Collaboration Program with the Official School of Languages, whereas the remaining 31 students were enrolled in English as a curricular subject. As for the data collection instruments, the *Learning Style Survey* (Cohen et al., 2009) was administered to the learners to assess their perceptual learning style preferences (visual, auditory, and tactile/kinesthetic). The 2,000-word frequency level (version A+C) of the *Productive Vocabulary Levels Test* (Laufer & Nation, 1995, 1999) was used to measure their controlled productive vocabulary knowledge. Moreover, a lexical availability task which consisted of two traditional prompts ('Town' and 'Hobbies') and six novel prompts related to each perceptual learning style ('Look,' 'Move,' 'Say,' 'Soft,' 'Loud,' and 'Bright') investigated their lexical production. We also analyzed the perceptual activities and the perceptual vocabulary included in the two ELT textbooks the informants used for their EFL classes: *English File* (Collaboration Program with the Official School of Languages) and *Out & About 2* (English as a curricular subject).

The findings of the present investigation revealed that visual was the informants' major perceptual learning style preference, whilst auditory was the least favored. A statistically significant relationship could not be found among perceptual learning styles and the two dimensions of productive vocabulary analyzed in this dissertation: controlled productive vocabulary and lexical production/association through a lexical availability

task. Concerning ELT textbooks, *English File* adapted better to the perceptual learning styles of the informants enrolled in the Collaboration Program with the Official School of Languages. However, the perceptual learning style preferences of these informants and the students enrolled in English as a curricular subject were not equally distributed in their respective textbooks. There were more perceptual words in *English File* than in *Out & About 2*, being tactile/kinesthetic the predominant perceptual words in isolation or the combination of visual and tactile/kinesthetic, when considering multimodal words. A higher number of perceptual activities was encountered in *English File*, being visual and tactile/kinesthetic the most and least represented. At least 80 per cent of the words produced in the six perceptual prompts of the lexical availability task were also included in the two ELT textbooks. Therefore, they had an impact on the lexical production of the informants of this study.

The present doctoral dissertation has pedagogical implications for learning and teaching in foreign language education which can be relevant for researchers, EFL teachers, and textbook designers. Some of those implications could be the following: an additional instruction on EFL vocabulary for an effective communication, a balanced instruction to accommodate to learners' perceptual learning styles, a more learner-centered approach inclusive of all learning preferences, and a careful selection of vocabulary and perceptual words and activities to cater for the different perceptual learning styles.

Keywords: perceptual learning styles, controlled productive vocabulary, lexical production, ELT textbooks, 12th grade.

## RESUMEN

Los estilos de aprendizaje de percepción han sido objeto de numerosos estudios en inglés como lengua extranjera, si bien se ha prestado una menor atención al vocabulario productivo y al vocabulario y actividades perceptuales que aparecen en los libros de texto para enseñar inglés como lengua extranjera. Por lo que sabemos, la relación existente entre estas variables (estilos de aprendizaje de percepción, vocabulario productivo, y vocabulario y actividades perceptuales) no ha sido estudiada hasta la fecha. Por consiguiente, la presente tesis doctoral pretende contribuir a suplir el vacío que existe en la literatura, investigando los estilos de aprendizaje de percepción, el vocabulario productivo (vocabulario productivo controlado y producción léxica), y las actividades y vocabulario perceptuales recogidos en los libros de texto de inglés, así como la relación entre dichas variables.

Con este propósito, se ha realizado un estudio cuya muestra de informantes está formada por 60 estudiantes de inglés como lengua extranjera que cursaban 2º de Bachillerato en un instituto público de la comunidad autónoma de La Rioja (España). 29 de los 60 estudiantes cursaban inglés mediante el Programa de Colaboración de la Escuela Oficial de Idiomas, mientras que los 31 alumnos restantes cursaban inglés como asignatura curricular. En lo que respecta a los instrumentos de recolección de datos, el cuestionario *Learning Style Survey* (Cohen et al., 2009) fue utilizado para analizar los estilos de aprendizaje de percepción (visual, auditivo, y táctil/kinestésico). La versión A+C del denominado *Productive Vocabulary Levels Test* (Laufer & Nation, 1995, 1999) fue implementado para medir el vocabulario productivo controlado sobre las 2.000 palabras más frecuentes. Asimismo, para investigar la producción léxica se utilizó una prueba de disponibilidad léxica que consta de dos categorías semánticas tradicionales ('Town' y 'Hobbies') y seis nuevas categorías semánticas relacionadas con cada uno de los estilos de aprendizaje de percepción señalados anteriormente ('Look,' 'Move,' 'Say,' 'Soft,' 'Loud,' y 'Bright'). De la misma forma, se analizaron las actividades perceptuales y el vocabulario perceptual incluido en los dos libros de texto de inglés que utilizaron los informantes de este estudio en sus clases de inglés como lengua extranjera: *English File* (Programa de Colaboración con la Escuela Oficial de Idiomas) y *Out & About 2* (inglés como asignatura curricular).

Los resultados de esta investigación demuestran que el estilo de percepción visual es el preferido por el alumnado, mientras que el estilo auditivo es el menos utilizado. No

se puede establecer una relación estadísticamente significativa entre los estilos de aprendizaje de percepción y las dos dimensiones de vocabulario productivo analizadas en esta tesis: vocabulario productivo controlado y producción/asociación léxica a través de una prueba de disponibilidad léxica. Respecto a los libros de texto, *English File* resulta ser el que mejor se adapta a los estilos de aprendizaje perceptuales de los alumnos del Programa de Colaboración con la Escuela de Idiomas que utilizan dicho libro. Sin embargo, los estilos de aprendizaje de percepción de estos alumnos y los que estudian inglés como asignatura curricular no están distribuidos equitativamente en sus respectivos libros de texto. Se puede observar la existencia de un mayor número de palabras perceptuales en el libro de texto *English File* que en el libro de texto *Out & About 2*. Además, predominan las palabras relacionadas con el estilo táctil/kinestésico o la combinación visual y táctil/kinestésico, en el caso de las palabras perceptuales multimodales. En lo que se refiere a las actividades perceptuales, el libro de texto *English File* es el que presenta un mayor, siendo las actividades visuales y táctiles/kinestésicas las más y menos representadas respectivamente. Al menos el 80 por ciento de las palabras producidas en las seis categorías semánticas relacionadas con los estilos de aprendizaje de percepción en la prueba de disponibilidad léxicas se encuentran también en los dos libros de texto de inglés. Asimismo, se puede concluir que los libros de texto influyen en la producción léxica de los informantes de este estudio.

De la presente tesis doctoral surgen varias implicaciones pedagógicas para el aprendizaje y enseñanza en la educación de lenguas extranjeras que pueden resultar de gran utilidad para investigadores, equipo docente de inglés como lengua extranjera, y editores de libros de texto. Entre dichas implicaciones destacan el incremento de la enseñanza de vocabulario para lograr una comunicación más efectiva, una instrucción más equilibrada que se adapte a los diferentes estilos de aprendizaje de percepción del alumnado, un enfoque más centrado en el estudiantado que incluya sus diversas preferencias de aprendizaje, y una selección cuidadosa del vocabulario, así como de palabras y actividades perceptuales, que atienda a los diferentes estilos de aprendizaje.

Palabras clave: estilos de aprendizaje de percepción, vocabulario productivo controlado, producción léxica, libros de texto para enseñar inglés como lengua extranjera, 2º de Bachillerato.

## CHAPTER 1. INTRODUCTION

Vocabulary has been acknowledged to be a crucial aspect in foreign language acquisition (e.g., Laufer, 1998; Meara, 1990; Nation, 2013; Webb, 2020), since the knowledge of the vocabulary of a language is the basis for effective communication. Likewise, it is considered as one of the major components of language because “without grammar very little can be achieved, without vocabulary nothing can be achieved” (Wilkins, 1972, p. 111). The field of L2 vocabulary acquisition had been neglected until the end of the 1970s. It was not until the 1980s, with the pioneer work conducted by Meara (1980), when research into second language vocabulary started to gradually acquire relevance and when investigations began to proliferate. Despite the plethora of literature on this field over the last years, several scholars (e.g., Castro García, 2017; Laufer & Nation, 1999; Meara & Miralpeix, 2021) have noted the dearth of investigations on English as a Foreign Language (EFL) productive vocabulary knowledge. In this regard, productive vocabulary involves the production of words in speaking and writing to convey meaning (Nation, 2001). Research into productive vocabulary knowledge would determine the number of words language learners are ready to use for effective communication, as well as their lexical production or association.

In EFL classrooms, L2 vocabulary learning might be affected by learners' individual differences. One of the individual differences that is fundamental in foreign language acquisition is learning styles. They refer to the distinct ways in which language learners learn (Reid, 1995a). Their origin dates back to the 1970s and, since then, they began to be accepted and gained influence in the field of education (Griffiths, 2012). Language learners use different sensory modalities (visual, auditory, or tactile/kinesthetic), also known as perceptual learning styles, to process information and learn vocabulary. They involve the use of the senses to comprehend and store information. Research into perceptual learning styles is crucial for foreign language teachers and researchers as they will reveal the individual preferences students have towards learning a foreign language. Although several scholars (e.g., Hatami, 2018; Kassaian, 2007; Shen, 2010; Yeh & Wang, 2003) have examined the relationship among perceptual learning styles and L2 vocabulary learning, no concluding evidence has been found yet. In fact, to our knowledge, studies into the productive vocabulary knowledge and its relation to the perceptual learning style preferences of EFL learners are lacking in the literature.

In another vein, English Language Teaching (ELT) materials, especially textbooks, are important components in EFL classrooms. Indeed, they are considered to be the major source of vocabulary input in EFL classrooms (e.g., Hutchinson & Torres, 1994; Jiménez Catalán & Mancebo Francisco, 2008; Nordlund & Norberg, 2020). As Milton (2009) observed: “For many foreign language learners, therefore, the principal and sometimes the only source of foreign language vocabulary will be from the language they are exposed to in the classroom; the textbooks and the teacher’s language” (p. 193). Despite its importance, the role of vocabulary in ELT textbooks has lagged behind. There seems to be no consensus as to the amount and type of vocabulary that ought to be introduced in ELT textbooks (Alcaraz Mármol, 2011b). As far as we know, only the study conducted by Canga Alonso and Cifone Ponte (2016) has compared the vocabulary input, in this case, cultural, of a lexical availability task and the vocabulary input of ELT textbooks. Investigating this relation will acknowledge whether language learners are ready to use the vocabulary included in textbooks productively. Similarly, few investigations (Mattheoudakis & Alexiou, 2015; Pänkäläinen, 2012; Šímová, 2011) have explored the representation of perceptual learning styles in ELT textbooks regarding their activities. Having information on the number of perceptual words included in ELT textbooks would reveal whether all perceptual learning styles are catered to in textbooks. However, to our knowledge, this crucial issue has not been examined so far.

The general aim of this dissertation is to explore the relationship among perceptual learning styles, productive vocabulary knowledge (controlled productive vocabulary and lexical production), and the perceptual activities and vocabulary provided in two ELT textbooks. In this respect, the participants of this study were 60 EFL learners enrolled in the second year of non-compulsory secondary education in Spain, which is equivalent to the 12th grade. We intend to accomplish this objective by assessing the perceptual learning style preferences of EFL learners. We will determine their productive vocabulary knowledge by means of a controlled productive vocabulary test and we will ascertain their lexical production/association by means of a lexical availability task. Afterwards, the relationship among perceptual learning styles and controlled productive vocabulary, and among perceptual learning styles and lexical production through a lexical availability task will be examined. The number and type of content words associated with perceptual learning styles, which are included in the two 12th grade ELT textbooks under analysis, will be examined. We will also reveal whether the informants’ favored learning style coincides with the most representative style in their respective textbooks. Then, the



number of type of activities related to each perceptual learning style in the two ELT textbooks will be identified. We will also determine whether the informants' preferred learning styles are equally distributed in terms of words and activities in both textbooks. Finally, a comparison will be made among the perceptual content words that are included in the two ELT textbooks with the perceptual content words retrieved by the informants in a lexical availability task.

The present research aims to contribute to research on L2 vocabulary acquisition, perceptual learning styles, and ELT textbooks. We believe that our results will be useful for EFL teachers, researchers, and textbook designers, as the perceptual learning style preferences and productive vocabulary knowledge of EFL learners will be revealed. The amount of perceptual vocabulary and perceptual activities provided by ELT textbooks will also be shown. This will allow teachers to be cognizant of their students' perceptual learning styles; they will be able to plan their classes accordingly. Furthermore, the strengths and limitations regarding ELT textbooks will be revealed, so textbook designers will be able to consider those results to improve their textbooks in regard with activities and vocabulary input.

This dissertation is structured into nine chapters. After this introductory chapter, Chapter 2 reviews the literature on memory and its different types. It also focuses on describing three theories of human memory which contribute to the learning and teaching of second and foreign languages: Total Physical Response (Asher, 1964), listening comprehension processes (e.g., Mendelsohn, 1994; Nichols, 1948), and Dual-Coding Theory (Paivio, 1969). Chapter 3 gives an overview of learning styles and perceptual learning styles, including several of their definitions and classifications. The chapter ends with a review of the research conducted on the perceptual learning style preferences of EFL learners. Chapter 4 delves into vocabulary, specifically productive vocabulary knowledge and vocabulary input in ELT textbooks. It also includes a revision of studies on controlled productive vocabulary, lexical production, and vocabulary input in ELT textbooks.

Once the theoretical background has been provided, Chapter 5 presents the objectives and research questions of this dissertation. This is followed by Chapter 6 which is devoted to the methodology, data collection instruments and procedures used for analyzing the data, as well as the description of the sample of EFL learners that participated in the present study. This chapter ends with the justification of the methodological decisions and the statistical analyses applied to the data. Chapter 7

presents the results which are followed by their discussion in Chapter 8. The last chapter (Chapter 9) presents a summary of the main findings and acknowledges the limitations encountered. It also discusses their pedagogical implications and suggests directions for further research. This dissertation concludes with a list of the bibliographical references mentioned in the present research. The appendices are compiled in a CD, which is attached at the end of the dissertation.

## CHAPTER 2. MEMORY

### 2.1. Introduction

Chapter 2 aims at setting the first part of the theoretical background of this dissertation. It starts with a brief review of memory and an explanation of its three major types: sensory memory, short-term memory, and long-term memory, following the classification of Atkinson and Shiffrin (1968). It also explains the distinctive characteristics of each type of memory, along with a description of their subtypes. This chapter concludes with a review of three different theories of human memory which contribute to the learning and teaching of second and foreign languages: Total Physical Response (Asher, 1964), listening comprehension processes (e.g., Mendelsohn, 1994; Nichols, 1948), and Dual-Coding Theory (Paivio, 1969). These theories are of paramount importance for this dissertation for two reasons. First, they account for their role in foreign language education. Second, perceptual learning styles, which will be explained in Chapter 3 (p. 47), were developed from these theories. In the following section, a brief review of the role of memory will be given.

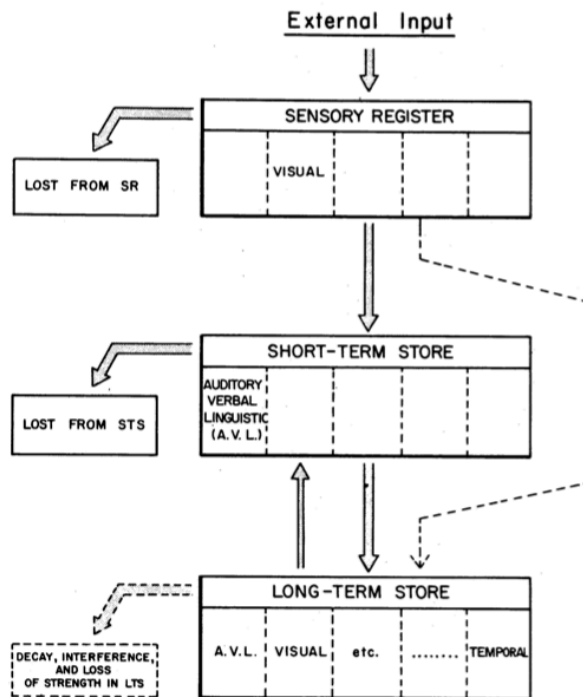
### 2.2. A Brief Review of Memory

The traditional line of thought in memory was that it was a unitary system, which meant that information was stored in only one part of the brain. Even though this was the predominant view until the late 1960s, from that period onwards, it was generally accepted that memory was a multiple system. This is the view that prevails nowadays. We concur with the view of memory as a multiple system, since memory consists of several subsystems which are in turn interrelated.

Several classifications of memory have been proposed (Broadbent, 1958; James, 1890; Norman & Rumelhart, 1970; Tulving, 1983). This dissertation will apply the multiple system of memory model of Atkinson and Shiffrin (1968) (see Figure 1, p. 6), which is also known as modal model. In this model, memory is divided into three different but interconnected parts: sensory memory or sensory register, short-term memory, and long-term memory. In our view, it is one of the most influential models of memory, and it is still widely implemented in research, as can be observed in the recent work conducted by Baddeley et al. (2019), Malmberg et al. (2019), or Sucharitha et al. (2020). In the next section, a description of these will be provided.

Figure 1

The multi-store model on memory



Note. From Atkinson and Shiffrin (1968, p. 93).

### 2.3. Types of Memory

The aim of this section is to describe each type of memory: sensory, short-term, and long-term. In the first place, an outline of their main characteristics will be given, such as the type of information processed, their capacity, and duration. Secondly, several subtypes will be identified and explained for each type of memory.

#### 2.3.1. Sensory Memory

Sensory memory is a store which retains the information perceived through our senses, as Atkinson and Shiffrin (1968) noted. It only processes its physical features depending on the sensory modality: how something looks, feels, smells, sounds, or tastes. According to Sperling (1960) and Purdy et al. (1980), sensory memory has a very large capacity; it can hold a large amount of information. However, this information only lasts a few seconds. Afterwards, part of this information is transferred to the short-term memory, or it decays. There are different types, each corresponding to a different sense. The most common and the ones that are related to the present dissertation are: visual sensory memory, auditory sensory memory, and haptic sensory memory.

Visual sensory memory would later be termed iconic memory by Neisser (1967, 2014). This store holds the information about visual characteristics of a stimulus for a short period of time after the stimulus offset, so that there is enough time for processing (Peterson et al., 1970; Sperling, 1963). Neisser (1967, 2014) was also the first to coin the term echoic memory to refer to auditory sensory memory. Based on Crowder (1982), Cowan (1995), and Neisser (2014), this type of sensory memory holds the auditory information for a short period of time after the stimulus has ended. Echoic memory stores auditory information: it is relevant for the storage of episodes which are kept in long-term memory or permanently. In addition, it lasts a few seconds, a little bit more than iconic memory, and it is independent of attentional processes. Haptic sensory memory has not been as extensively researched as the previous ones. This type of sensory memory refers to the recall of information related to the sense of touch. Like iconic and echoic memory, haptic sensory memory has a large capacity, but it only lasts between one and two seconds (Gallace & Spence, 2009; Hill & Bliss, 1968; Watkins & Watkins, 1974). Now, let us delve into short-term memory.

### **2.3.2. Short-term Memory**

Short-term memory is a temporary storage of information. Following the works of Atkinson and Shiffrin (1968) and Baddeley (1999), control processes select a certain piece of information from sensory memory to be transferred to short-term memory. The information lasts several more seconds than in sensory memory, specifically between 15 and 30 seconds, but it has a limited capacity. Although attention plays a crucial role in the processing and retention of information, the information is sometimes processed and stored unconsciously. There are two types of short-term memory: visual and auditory.

Visual short-term memory is defined as a “system that maintains a record of recently presented visual information” (Hitch et al., 1995, p. 147). This visual information is stored so that it can be used for more processing at a subsequent time. What this system does is to retain and manipulate visual representations that come from what we see and observe in the real world, as suggested by Baddeley and Hitch (1974) and Cowan (2008). Unlike iconic memory (see Section 2.3.1., p. 6), visual short-term memory is highly limited in capacity. Hollingworth and Luck (2008) highlighted that information is maintained for several seconds. This is another difference between iconic and visual short-term memory because, as mentioned earlier, iconic memory lasts less than a second. Auditory short-term memory is described as the “capacity to retain and recall that which

has been perceived through auditory-receptive channel” (Helms, 1966, p. 248). According to Atkinson and Shiffrin (1968), this system oversees storing and retrieving the information that has been heard. Auditory information lasts several seconds; it is also a temporary store.

The term short-term memory is used interchangeably with working memory. The reason for this is that some researchers (Baddeley, 1996; Cowan, 1988, 1995) considered that short-term memory is a part of working memory, whereas others (Baddeley & Hitch, 1974; Engle et al., 1999) viewed them as two different constructs. For example, Atkinson and Shiffrin (1968) asserted that their short-term store acted as a working memory. In the present dissertation, we will use the term short-term memory to be consistent with the selection of the memory model of Atkinson and Shiffrin (1968) (see section 2.2., p. 5) and because it includes both visual and verbal information that comes from the environment. This section has described short-term memory, along with its two subtypes: visual and auditory. In the next section, we will deal with long-term memory.

### **2.3.3. Long-term Memory**

Long-term memory is a permanent store of information. As opposed to the other two stores, information in long-term memory does not decay and it is permanently retained. According to Atkinson and Shiffrin (1968), some information from short-term memory can be transferred to long-term memory through the control processes of association and rehearsal. As these researchers observed: “long-term memory exists in each of the sensory modalities” (p. 104), therefore people can remember smells, taste, among other senses. There are two types of long-term memory: implicit and explicit, which will be explained in the following sections.

**2.3.3.1. Implicit Memory.** Implicit memory is “revealed when performance on a task is facilitated in the absence of conscious recollection” (Graf & Schacter, 1985, p. 501). From past experiences this type of memory has the ability to recall how to do things subconsciously, such as riding a bicycle. Implicit memory includes various types of memory, such as motor skills, perceptual skills and cognitive skills, referred to as procedural; priming, simple classical conditioning, and adaptation level effects (Squire, 1992; Squire et al., 1993; Squire & Zola-Morgan, 1988).

The terms implicit memory and procedural memory are often used interchangeably. Procedural memory is regarded as one of the several brain systems that

constitutes the basis of implicit knowledge; it is a subset of implicit memory (Ullman, 2015). Procedural memory is defined as a system “involved in the acquisition of habits and skills” (Sherry & Schacter, 1987, p. 446). It contains motor, perceptual, and cognitive skills, as well as habit learning (Eichenbaum & Cohen, 2001; Squire & Zola-Morgan, 1988; Tulving, 1983; Ullman et al., 1997). It stores information about how to perform tasks, but it does not have much access to other mental systems because it is “largely informationally encapsulated” (Squire & Zola, 1996, p. 13516). According to Tulving (1985), procedural memory is related to anoetic consciousness, also known as non-knowing, which “refers to an organism’s capability to sense and to react to external and internal stimulation, including complex stimulus patterns” (p. 388). Learning is gradual in this system. Morgan-Short and Ullman (2012) described it as follows: in the beginning, there is a repeated exposure to the stimulus or skill, for example, learning how to ride a bicycle, or how to drive a car. Once the skill or stimulus is learned, it applies automatically every time you encounter it.

**2.3.3.2. Explicit Memory.** Explicit memory, also called declarative memory, is a conscious type of memory, as opposed to implicit memory. It comprises the facts, episodes, lists, and routes of our daily life: “Declarative memory is accessible to conscious awareness, and it includes the facts, episodes, lists, and routes of everyday life [...] it can be [...] brought to mind verbally as a proposition or nonverbally as an image” (Squire, 1986, p. 1614). It is the conscious recollection of facts about the world and events that have been experienced. Learning happens quickly in this system, since only one exposure to the stimulus is needed. The declarative memory system is also essential for learning related information arbitrarily (Ullman, 2001, 2015).

According to Squire et al. (1993), Squire and Zola (1996), and Tulving and Markowitsch (1998), declarative memory is large, its encoding is fast, and it is multimodal. The information stored is cognitive, context sensitive, and representational. Unlike implicit memory, the information learned has access to multiple mental systems; it is not “informationally encapsulated” (Squire & Zola, 1996, p. 13516). Following Ullman (2001), not only does declarative memory store knowledge about facts and events, but also the mental lexicon, that is, “the sounds and meanings of morphologically simple and complex words” (p. 47). Therefore, it stores all arbitrary and idiosyncratic word-specific information, such as the sounds and meanings of words, as well as abstract representations. It includes the representations of simple, complex, and abstract words,

but also of non-compositional forms, for example, bound morphemes, irregular morphological forms, idiomatic phrases, or verb complements (Ullman, 2004).

Declarative memory is divided into two different categories: episodic memory and semantic memory. Having given a description of declarative memory, let us now move to discuss its two types.

**2.3.3.2.1. Episodic memory.** The concept of episodic memory was introduced by Tulving in 1972, but it has undergone several changes throughout time. It was firstly defined as a record of past, personal experiences (Eichenbaum & Cohen, 2001; Tulving, 1972, 1983). Then, it included the idea that a person could relive personal events that occurred in the past, but also imagine their experiences in the future (Suddendorf & Corballis, 1997; Tulving, 1993, 2001; Wheeler et al., 1997).

Episodic memory is a system concerned with “the acquisition, retention, and utilization (conversion) of information and knowledge” (Tulving, 1983, p. 32). In this system, the prototypical unit of information is an event, which was defined as “something that occurs in a particular place at a particular time” (Tulving, 1984, p. 229). Following this author (1972, 1983), episodic memory holds both abstract conceptual and sensory-perceptual information. The latter comes externally from the senses (sensory input), whilst the former stems internally from thoughts, imagination, and other mental processes. The recording of information into the episodic system is experiential; it registers first-hand knowledge. Its organization of information is temporal: “one event precedes, co-occurs, or succeeds another in time” (Tulving, 1983, p. 38). A perceptual event is stored in episodic memory with respect to its perceptible properties and its autobiographical reference to other events. Once information is stored in episodic memory, it can be retrieved. The retrieval of information is prompted by stimuli, questions, or cues; it can change the contents that were previously stored. This retrieval is successful when the person is able to describe its perceptible properties and determine its temporal-spatial relations to other events. Nevertheless, episodic memory is vulnerable to loss of information. This information is usually changed due to the interference caused by the temporal coding of stored events, hence it hinders the access to the information (Tulving, 1972, 1983).



**2.3.3.2.2. *Semantic memory.*** The term semantic memory was first utilized by Quillian (1966) but started to gain importance and be widely employed since the work conducted by Collins and Quillian (1969), according to Tulving (1972). The concept of semantic memory changed considerably. At first, it was defined as an amodal, modular system which stored factual information about concepts (Tulving, 1972, 1983, 1985). The information stored was non-perceptual, so it did not depend on the sensory modalities. From the late 20th century onwards, semantic memory is considered to be founded on sensory, perceptual, and motor systems and an integrated memory system (Barsalou, 1999, 2008).

Semantic memory is a system which stores information about the characteristics of concepts and the processes involved in language: it comprises “stored information about the features and attributes that define concepts and the processes that allow us to efficiently retrieve, act upon and produce this information in the service of thought and language” (Martin & Chao, 2001, p. 194). Tulving (1972, 1983, 1984) distinguished some of the major features of semantic memory. First, in this system, the prototypical units of information are facts, ideas, concepts, or rules. A concept describes entities that have a reference to the world. Contrary to episodic memory (see section 2.3.3.2.1., p. 10), semantic memory is about noetic consciousness, that is, common knowledge of the world; it has nothing to do with personal experiences. Other characteristics are that the source of information comes from both perception and thought, it registers second-hand knowledge, and it is encoded in semantic memory in terms of a structure composed of concepts and their relations. The information stored in semantic memory corresponds to objects, concepts, relations, quantities, events, and propositions; it is information about cognitive referents. As Tulving (1983) declared, concepts are rigidly organized in the semantic memory system: “conceptual organization of semantic memory is tight: individual facts and ideas, once assigned to an appropriate place in the overall semantic structure, do not wander around freely in the structure” (p. 38). Tulving also observed that after the storage of information in episodic memory, retrieval can occur if prompted by stimuli, questions, or cues; it cannot change the previously stored knowledge. A person can also retrieve information that was not directly stored in their semantic memory, which reveals the rich inferential capability of this system. In addition, semantic memory is less vulnerable to the loss of information than episodic memory because most of the information is overlearned, and its organization is tighter. In our opinion, perceptual learning styles (see Chapter 3, Section 3.3.3.3., p. 47) seem to be strongly linked to

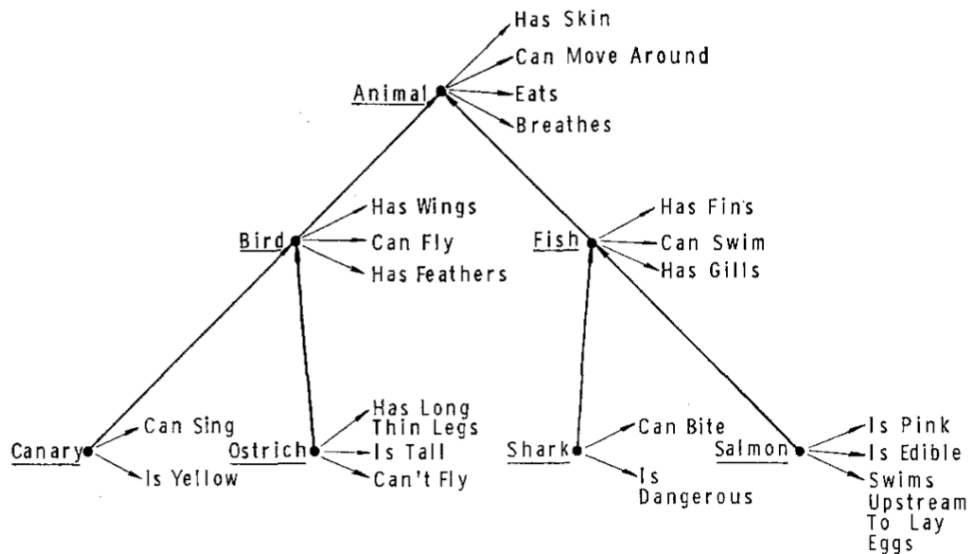
semantic memory. The reasons are that it is based on sensory, perceptual, and motor systems; part of its information comes from perception. What is more, this type of memory is required for language, and, among other language components, it addresses vocabulary, which is another issue of this dissertation (see Chapter 4, p. 69).

Several semantic memory models can be found in the literature. However, only the Hierarchical Network Model and the Spreading Activation Theory of Semantic Processing are included in the present revision. They are the models that sustain what is going to be explained, since the latter seems to be related to lexical availability, a topic that will be discussed in Chapter 4 (see Section 4.4.3.3., p. 92).

The Hierarchical Network Model was propounded by Collins and Quillian (1969) to account for the structure of semantic memory and mental lexicon (see Figure 2, p. 13). It is the neural version of the model for the storage of semantic information in computer memory of Quillian (1967, 1969). Following Collins and Quillian (1969), knowledge is stored in a semantic network, in which concepts are the nodes and there are links to conceptual relations to join those concepts. Concepts are organized hierarchically: superordinate concepts, also called superset, are above and represent general information; subordinate concepts, also called subsets, are below and are related to specific information, as Chang (1986) noted. One example to exemplify these two types of concepts could be the sentence “a daisy is a plant.” In this sentence, the word “plant” is a superset and the word “daisy” is a subset. Collins and Quillian (1969) also recognized some limitations on this model. One of them is that human beings might not categorize well the concepts in the hierarchy. An example these scholars gave is that we tend to categorize the word “dog” as an animal, although the category “mammal” lies between the two. Another limitation concerns the familiarity people have towards the properties they are classifying, which could lead to their storage in more than one level of the hierarchy. However, these limitations related to the typicality and familiarity effects were overcome by the Spreading Activation Theory (Collins & Loftus, 1975).

Figure 2

A hypothetical memory structure for a three-level hierarchy



Note. From Collins and Quillian (1969, p. 241).

Spreading Activation Theory of Semantic Processing was developed by Collins and Loftus (1975) (see Figure 3, p. 14), as a further elaboration of the Hierarchical Network Model (Collins & Quillian, 1969). Both the Hierarchical Network Model and the Spreading Activation Theory have as a foundation the spreading activation theory of semantic processing in computer memory of Quillian (1967, 1969). According to Quillian (1967), his memory model comprises a lot of nodes, which are how concepts are represented in a network; they are joined by associative links and work as pointers. It consists of “running the pointer from every token node for a word meaning to the same type node” (p. 413). In his view, nodes represent properties, not words or sentences. Unlike the model of Collins and Quillian (1969), the Spreading Activation Theory is not hierarchical: “every word is the patriarch of its own separate hierarchy when some search process starts with it” (Quillian, 1967, p. 415). Loftus (1975) explained in detail the process of priming, which consists of activating an association between nodes in memory:

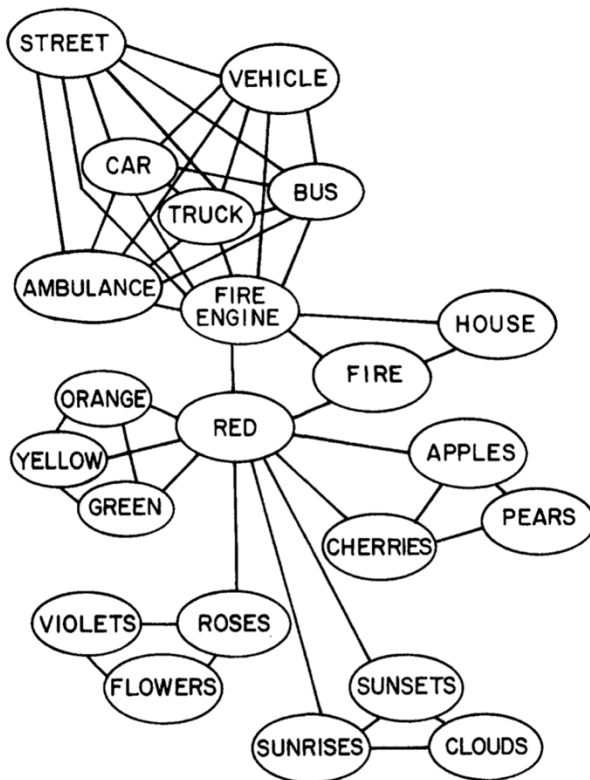
Priming involves the same tracing process that is involved in memory search. When a concept is primed, activation tags are spread by tracing an expanding set of links in the network to some unspecified depth. When another concept is subsequently presented, it has only to make contact with one of the tags left earlier to find an intersection. (p. 236)

Collins and Loftus (1975) made some assumptions about local processing in their theory: (1) “When a concept is processed (or simulated), activation spreads out along the

paths of the network in a decreasing gradient;” (2) “the longer a concept is continuously processed [...], the longer activation is released from the node of the concept at a fixed rate.” However, only one node at a time can be processed; (3) “activation decreases over time and/or intervening activity;” and (4) “with the assumption that activation is a variable quantity, the notion of intersection requires a threshold for firing” (p. 411). The Spreading Activation Theory (Collins & Loftus, 1975) is closely related to lexical availability, which will be later analyzed in Chapter 4 (see Section 4.4.3.3., p. 92). It would explain why words associated with the cue-word, as well as words that have links with other nodes, are activated in a lexical availability task.

Figure 3

*A representation of the Spreading Activation Theory of Semantic Processing*



*Note.* From Collins and Loftus (1975, p. 412).

## **2.4. Contribution of theories of human memory to the learning and teaching of second and foreign languages**

This section addresses three different theories: Total Physical Response (Asher, 1964), listening comprehension processes (Mendelsohn, 1994; Nichols, 1948), and Dual Coding Theory (Paivio, 1969), which are founded on memory and are related to the learning and teaching of second and foreign languages. These three theoretical approaches were chosen because, as we will see in Chapter 3 (p. 33), they all tackle a specific learning style and a combination of them implicitly. A review of their main characteristics, as well as their objectives, limitations, extended versions of some of them, and a discussion of their relationship with perceptual learning styles will be provided.

### **2.4.1. Total Physical Response**

Total Physical Response (TPR) method was developed by Asher (1964). Richards and Rodgers (2014) defined it as “a language teaching method built around the coordination of speech and action; it attempts to teach language through physical (motor) activity” (p. 87). Therefore, this method is closely connected to the kinesthetic learning style (see Section 3.3.3.3., p. 47) because language is learnt through movement.

Based on the research conducted by Asher (1965, 1968, 1981, 1996), the TPR method consists of achieving listening comprehension in a foreign language through the imperative drill. The process begins with the students listening to their teachers' command in silence, so teachers provide them with a great deal of comprehensible input. Teachers perform the command, while their learners watch them do it. After that, teachers utter the command again, their students obey and respond with a physical action. At first, those commands in the imperative form are one-word utterances which are action verbs and concrete vocabulary (e.g., jump, hop, pencil), but then the utterances become more and more complex in terms of morphology and syntax (e.g., walk to the cupboard, take some history books, and bring them to the teacher). Therefore, listening in the form of imperatives is combined with the kinesthetic sensory system by means of physical actions; language is acquired implicitly. According to Asher et al. (1974) and Larsen-Freeman (2000), production is delayed until listening comprehension has been assimilated. This makes students be less stressed towards the learning of the foreign language, which may result in a better recall and long-term retention. Once listening has been internalized and students feel ready, they can start developing the other skills (speaking, reading, and writing), as listening is the basis for them.

Activities based on the TPR method are usually interactive, fun, and their main purpose is to make learners enjoy while learning a foreign language. Nevertheless, they vary from level to level. As Asher (1963, 1996), Asher and Price (1967), and Richards and Rodgers (2014) observed, at the beginner level, children do not know how to write or read in their native language. The activities are mainly action games in which they can perform physically their teachers' commands and where teachers introduce new vocabulary and grammar, such as "Simon Says," songs, rhymes, role-plays, or flashcards. Teenagers are presented with interviews and discussions, along with music; adults learn by doing experiments, projects, or group work. One practical example of the use of TPR in the EFL classroom was given by Canga Alonso (2012). He wanted to explore whether primary education EFL learners could recognize and respond physically to the commands of their teacher after using TPR methodology. These TPR activities consisted of the introduction of commands from the teacher or through songs and rhymes. His findings revealed that the majority of students responded appropriately to the commands studied throughout the course.

Richards and Rodgers (2014), Asher (1996), and Larsen-Freeman (2000) noted some advantages for using the TPR method in foreign language classrooms. It seems to be an enjoyable approach to learn a foreign language, since it implies students being very active in the classroom. This method tries to teach each learning skill at its best, but it predominantly focuses on the listening skill. Moreover, it prioritizes the use of the imperative, and it leads to a rapid understanding and long-term retention of information. It is effective for all learners, no matter what languages they know or what academic level they have. However, we notice some drawbacks with the TPR method. We coincide with Richards and Rodgers (2014) and Larsen-Freeman (2000) when they realized the difficulty to teach abstract vocabulary, complex expressions, tenses, and grammatical structures through actions and body movement. We also consider that foreign language teaching ought to include other methods and techniques, not only one, so that it does not become repetitive for the students, and to avoid them getting either bored in class or tired of learning.

As it will be explained in Chapter 3 (see Section 3.3.3.2., p. 49), the TPR method is mostly associated with the kinesthetic learning style, although it also addresses the visual and auditory learning styles. According to this method, the learning of a second or foreign language is done through physical actions and movement. This way of teaching

a foreign language will mainly benefit kinesthetic learners because they have to perform physically the commands of their teachers which are uttered in the imperative form.

#### **2.4.2. Listening comprehension processes**

Several definitions have been proposed for the concept of listening comprehension. However, there is not a general agreement on an accepted definition of this term. Some scholars claimed that it only involves one component, such as perception (James, 1984; Weaver, 1972), remembering (Bostrom & Waldhart, 1988; Nichols, 1948), attention (Barbara, 1957; Rost, 1994; Tucker, 1927), or interpretation (Brown & Yule, 1983; Carroll, 1972; Chastain, 1971; Mendelsohn, 1994). Others argued that listening comprehension includes more than one element, such as perception and interpretation (Goss, 1982; Lynch & Mendelsohn, 2010; Millar & Millar, 1976; Oxford, 1993), perception, attention, and interpretation (Buck, 2001; Underwood, 1989; Wolvin & Coakley, 1985), perception, attention, interpretation, and remembering (Barker, 1979), discrimination, understanding, interpretation, retention, and socio-cultural context (Vandergrift, 1999), or cognitive, affective, and behavioral processes (Bodie, 2016; Witkin, 1990). All things considered, even though there is not a precise definition of listening comprehension, most scholars (Purdy, 1991; Wolff et al., 1983) concurred with perception, attention, interpretation, remembering, and response as the basic elements of this process. According to the previous elements, the necessary requirements for listening comprehension are: attention to oral stimuli, perception, recognition of the sounds, assignation of meaning to the stimuli, understanding, retention, interpretation of what has been said, and remembrance of all the information gathered (Feyten, 1991; Lynch & Mendelsohn, 2010; Vandergrift, 1999). We also think that cognitive, affective, and behavioral factors, such as personality, attitude, motivation, or the socio-cultural context, might influence the listening comprehension process (Bacon, 1992; Baleghizadeh & Rahimi, 2011; Brunfaut & Révész, 2015; Moyer, 2006; Namaziandost et al., 2018; Serri et al., 2012).

Listening comprehension is a complex (Byrnes, 1984; Field, 2004; Keller, 1960; Vandergrift, 2007) but also a very important skill in both language learning and daily life (Oxford, 1993; Vandergrift, 1999; Winitz, 1981). The reason for this is that it is generally acknowledged that 45 per cent of time is spent in listening (Duker, 1971; Gilman & Moody, 1984; Nichols, 1948; Rankin, 1929). Nichols (1948) claimed that adults spend most of their time listening, followed by speaking, reading, and writing: “of the total time

devoted to communication by adults, 45 per cent is spent in listening, 30 per cent in speaking, 16 per cent in reading, and 9 per cent in writing” (pp. 154-155). Fitch-Hauser and Hughes (1988) considered that the process of listening involves the reception of a sound, its processing, the attribution of its meaning, and its response:

First a sound is received and the brain registers the reception of a stimulus. Then the stimulus seems to be forwarded to the appropriate reception area of the brain - the part of the brain that accepts that type of sound, i.e., language sounds as processed in the left side while music sounds seem to be processed in the right side of the brain. Once the stimulus is forwarded, the brain begins to assign meaning to the sound. Next, the mind initiates the appropriate response to the stimulus. The act of responding involves access to our information or memory banks. (p. 76).

A wealth of studies can be found that have investigated the aspect of L2 listening comprehension. Table 1 (pp. 19-22) provides a summary of studies arranged in chronological order. For the selection of these investigations, all the studies that did not consider English as a second or foreign language were discarded. Only the articles which were indexed in high-impact journals were considered. As there were still many investigations, we prioritized those that were related to some of the objectives of the present dissertation (e.g., learning styles, vocabulary).

*Table 1*

*Review of studies on EFL/ESL listening comprehension*



Study	Informants	Language background	Approach	Method	Main findings
Henning et al. (1983)	Adults (N 485) University (Egypt)	L1: Egyptian FL: English	To assess the validity of a listening test with low proficiency learners.	Listening recall and listening comprehension subsets from an English proficiency test	Listening recall had the highest reliability, validity, discriminability, and test width. It supports the use of listening recall to measure the listening comprehension of low proficiency EFL learners, as well as for high proficiency learners.
Call (1985)	Adults (N 41) Language Institute (USA)	L1: Spanish (N 15), Arabic (N 26) L2: English	To test the short-term memory span for different types of auditory input and how the input contributed to listening comprehension scores.	5 auditory short-term memory tests Michigan Test of Aural Comprehension	Short-term memory for auditory input is an essential aspect of listening comprehension. Memory for syntax was reported to be the best predictor of listening skill. However, memory for random words and digits seemed to explain less the listening scores.
Reves and Levine (1988)	Adults (N 68) University (Israel)	L1: Hebrew FL: English	The relationship between reading and listening comprehension.	Reading comprehension tests Listening comprehension tests	The sub-skills of reading comprehension appeared to be similar to those of listening comprehension. However, findings reported higher scores in reading than in listening comprehension. There seemed to be a gradual improvement in listening comprehension, whilst there was no progress in reading comprehension.
O'Malley et al. (1989)	Adolescents (N 11) High school (USA)	L1: Spanish L2: English	The mental processes and learning strategies used in listening comprehension, and the differences between effective and ineffective listeners.	Reading test of functional vocabulary Reading comprehension test Think-aloud sessions Taped listening passage	Results revealed that the mental processes that ESL learners used in listening matched the three phases of the listening comprehension process (perceptual processing, parsing, and utilization). The difference between effective and ineffective listeners resulted in the use of learning strategies, specifically self-monitoring, elaboration, and inferencing.
Chiang and Dunkel (1992)	Adults (N 360) Chinese Naval Academy (China)	L1: Chinese FL: English	The impact of prior knowledge, speech modification, and listening comprehension proficiency on foreign language listening comprehension.	Comprehensive English Language Test Familiar and unfamiliar lectures Postlecture comprehension tests	Speech modification appeared to be more effective for high proficiency students. They were also reported to achieve higher scores in the postlecture comprehension test. Moreover, prior knowledge led to higher results in the postlecture comprehension test.
Brett (1997)	Adults (N 49) University (UK)	L1: French, German, or Spanish L2: English	The impact of multimedia on listening comprehension.	Listening comprehension texts Comprehension tasks Cloze tests Questionnaire on multimedia	Students seemed to achieve a higher level of comprehension and language recall while completing multimedia comprehension tasks.
Goeh (1998)	Adolescents (N 16) National Institute of Education (Singapore)	L1: Chinese L2: English	To identify the second language listening comprehension processes focusing on listening strategies and tactics.	Secondary Level English Proficiency Test Verbal reports	High-ability listeners were reported to use more comprehension strategies and tactics than low-ability listeners. Nevertheless, both groups of listeners appeared to prefer cognitive strategies and tactics than metacognitive ones.
Bonk (2000)	Adults (N 59) University (Japan)	L1: Japanese L2: English	The relationship between lexical knowledge and listening comprehension.	Listening passages A listening test	Findings indicated a statistically significant relationship between lexical recognition and comprehension ratings. However, the use of listening strategies is needed so that learners can comprehend the texts included in complex texts.
Chung (2002)	Adults (N 188) College (Taiwan)	L1: Not reported FL: English	The impact of two advance organizers (question previewing and vocabulary preteaching) on the listening comprehension of English videotapes.	Listening comprehension test Attitude questionnaire Video episodes	Results showed that the group which received a combination of vocabulary preteaching and question previewing between the two videos surpassed those who only received the vocabulary preteaching or no treatment.
Carrier (2003)	Adolescents (N 7) High school (USA)	L1: Spanish or Albanian L2: English	The effect of listening strategy instruction on listening comprehension.	Listening pretests and posttests Advance organizer Videos	Results showed that strategy instruction led to an improvement in listening, video, and note-taking abilities.
Othman and Vanathas (2004)	Adults (N 34) Tertiary institution (Malaysia)	L1: Not reported FL: English	The effect of topic familiarity on listening comprehension.	Placement test Listening text Comprehension questions Pretests and posttests	Topic familiarity seemed to influence the listening comprehension of EFL learners. These students appeared to obtain higher scores after the treatment sessions.

Study	Informants	Language background	Approach	Method	Main findings
Shang (2005)	Adults (N 63) University (Taiwan)	L1: Not reported FL: English	The impact of the interactions and differences of the components of cognitive operations on the listening comprehension performance.	TOEFL listening test Listening texts Listening comprehension test Self-rating questionnaire	Informants appeared to achieve higher scores in items related to main idea questions than on items related to inference ones. Moreover, results showed that detail questions affected the low listeners' performance in a different way.
Sueyoshi and Hardison (2005)	Adults (N 42) University (USA)	L1: Korean, Japanese, Chinese, Thai or Italian L2: English	The role of gestures and facial cues on listening comprehension.	Video recordings Lecture A listening comprehension task Questionnaire	Findings demonstrated that informants achieved higher scores in a listening comprehension task with visual cues. The advanced learners seemed to achieve higher scores in the audiovisual-face condition, whereas the low-level learners appeared to achieve higher scores in the audiovisual-gesture-face condition.
Chang and Read (2006)	Adults (N 160) College (Taiwan)	L1: Chinese FL: English	The impact of four types of listening support (previewing the test questions, repetition of the input, providing background knowledge about the topic, and vocabulary instruction) on listening comprehension.	TOEIC listening section Listening comprehension test Background information for the topic Word lists for vocabulary instruction Interview	Students appeared to benefit more from the providing background knowledge about the topic listening support, followed by repetition of the input. The previewing the test questions support varied according to the learners' proficiency level. Vocabulary instruction seemed to be the least effective form of listening support.
Chang (2007)	Adults (N 117) College (Taiwan)	L1: Not reported L2: English	The impact of vocabulary preparation before a listening comprehension test on vocabulary performance, listening comprehension, confidence levels, and strategy use.	TOEIC listening test A listening text A vocabulary test A listening comprehension test A post-test questionnaire	Informants appeared to achieve higher scores in vocabulary and listening comprehension when they had more time to prepare them. However, statistically significant differences were only found in the vocabulary test, not in the listening comprehension test. Regarding the confidence level and the strategy use, the group who had 30 minutes of preparation obtained the highest levels of confidence and more strategy use. This group was followed by the one that had one week of preparation.
Ramirez Verdugo and Alonso Belmonte (2007)	Children (N 208) Primary school (Spain)	L1: Spanish FL: English	The impact of digital stories on listening comprehension.	Digital stories Textbook Listening tests	Findings revealed that there were not statistically significant differences between experimental and control groups in their listening comprehension. Nevertheless, the experimental group surpassed the control group in the final listening test.
Stær (2008)	Adolescents (N 88) Secondary school (Denmark)	L1: Danish FL: English	The relationship between vocabulary size and listening, reading, and writing.	Reading test Listening comprehension test Writing test A receptive vocabulary test	Results revealed a strong association between vocabulary size and reading and writing. Nevertheless, that association was moderate regarding listening comprehension. The majority of informants did not have the knowledge of the 2,000 most frequent words in English. However, those informants who did achieved good scores in listening, reading, and writing.
Li (2009)	Adults (N 135) University (China)	L1: Mandarin Chinese FL: English	The impact of the use of advance organizers on listening comprehension.	A placement test Video-Based Listening Comprehension Test An attitude survey A video tape	Informants seemed to achieve better results when they had question preview as an advance organizer before watching the video, followed by the summary of major scenes and cultural background cues.
Stær (2009)	Adults (N 115) Business School (Denmark)	L1: Danish FL: English	The effect of vocabulary knowledge on listening comprehension.	Listening comprehension test Vocabulary Levels Test Depth of Vocabulary Knowledge Test	Results showed a positive correlation between listening comprehension and breadth and depth of vocabulary.
Mehrpour and Rahimi (2010)	Adults (N 58) University (Iran)	L1: Not reported FL: English	The impact of vocabulary knowledge on reading and listening comprehension.	TOEFL A vocabulary test A reading test A listening test	The treatment group seemed to surpass the control group in both the reading and listening comprehension tests. Besides, the knowledge of vocabulary in the reading and listening texts appeared to only influence the reading comprehension test.
Sandoval Zúñiga et al. (2010)	Adults (N 45) University (Chile)	L1: Spanish L2: English	The relationship between metacognitive strategies and listening comprehension.	Listening comprehension tasks Strategy instruction	Findings indicated that L2 learners of English obtained better scores in listening comprehension tasks when using metacognitive strategies.
Baleghizadeh and Rahimi (2011)	Adults (N 82) University (Iran)	L1: Not reported FL: English	The relationship among listening performance, metacognitive strategy use and motivation.	TOEFL listening section Metacognitive Awareness Listening Questionnaire The Academic Motivation Scale	Results revealed that there was a statistically significant relationship between metacognitive strategy use and listening performance, listening performance and intrinsic motivation, and metacognitive strategy use and intrinsic and extrinsic motivation.
Hayati and Mohammadi (2011)	Adults (N 90) University (Iran)	L1: Persian FL: English	The impact of movies (with and without subtitles) on listening comprehension.	English Language Proficiency Test A Documentary Film A comprehension test	Findings indicated that the group who watched the movie with English subtitles obtained higher scores in the listening test, followed by the group who watched it with Persian subtitles and the group who did not use subtitles.

Study	Informants	Language background	Approach	Method	Main findings
Serri et al. (2012)	Adults (N 40) University (Iran)	L1: Not reported FL: English	The relationship between listening comprehension strategies and individual differences.	IELTS listening comprehension test NEO questionnaire Learning styles questionnaire Motivation questionnaire Listening strategy questionnaire	Results indicated a statistically significant relationship between motivation and listening strategies. Apart from motivation, learning styles also had an impact on listening strategies.
Zhang (2012)	Adults (N 56) College (China)	L1: Not reported L2: English	The effect of listening strategy on listening comprehension.	Listening strategy questionnaire Listening tasks Verbal reports	Findings suggested that the use of listening strategy had a positive effect on listening comprehension.
Fahimipour and Hashemian (2013)	Adults (N 60) Language Institute (Iran)	L1: Persian L2: English	The impact of lexical glossing on reading and listening comprehension.	TOEFL test Glosses in Persian and English	The class that received Persian glosses achieved better results in reading and listening comprehension than the class that received English glosses.
Hazrat and Hessamy (2013)	Adults (N 41) Language Institute (Iran)	L1: Not reported FL: English	The effect of oral and written pushed output on listening comprehension, vocabulary learning (active and passive), and vocabulary learning strategy use.	Vocabulary learning strategy use questionnaire A listening test A vocabulary checklist test An active vocabulary test A passive vocabulary test	Results showed that vocabulary learning by means of oral pushed output improved listening comprehension and active vocabulary learning. In general terms, it was found that vocabulary learning by means of written pushed output influenced vocabulary learning strategy use. Nevertheless, there was not a statistically significant difference between passive vocabulary and both types of treatment.
Bozorgian (2014)	Adults (N 30) Language Institute (Iran)	L1: Not reported FL: English	The role of metacognitive instruction on listening skill.	IELTS listening tests Metacognitive Awareness Listening Questionnaire	Findings revealed that informants enhanced their listening skill after being instructed in metacognition. Nevertheless, they were not reported to use metacognitive awareness significantly.
Chien and van Heyst (2014)	Adults (N 175) University (Taiwan)	L1: Chinese FL: English	The role of learning strategies on listening comprehension.	Taiwan General English Proficiency Test Michigan English Placement Test Think-aloud sessions Listening tasks	Good listeners were reported to use more learning strategies than poor listeners. Both good and poor listeners knew when to switch strategies if they did not fulfill their purposes, and both used information to develop a pattern.
Elkbaei et al. (2015)	Adolescents and adults (N 80) Not reported (Iran)	L1: Persian FL: English	The attitude toward taking three modalities of a listening test (visual, pictorial or audio-only).	Audio-only, pictorial and visual listening tests Questionnaire	Informants seemed to dislike the audio-only listening test and the visual modality of listening test. However, they appeared to favor the pictorial listening test.
Wang (2015)	Adults (N 120) University (China)	L1: Chinese FL: English	The relationship between vocabulary knowledge (breadth and depth) and listening comprehension.	Vocabulary levels test Productive levels test CET-4 listening comprehension test	Findings suggested that there was a significant effect of vocabulary knowledge in its two dimensions (breadth and depth) on listening comprehension. In fact, the influence of vocabulary depth was greater. In addition, vocabulary breadth had a gradual increase across listening levels, whereas vocabulary depth did not.
Cheng and Matthews (2016)	Adults (N 250) University (China)	L1: Chinese FL: English	The effect of three measures of vocabulary knowledge (receptive/orthographic, productive/orthographic, and productive/phonological) on listening and reading comprehension.	Vocabulary tests Listening tests Reading tests	Results indicated a strong correlation between productive/phonological dimension and listening, and another strong correlation between productive/orthographic dimension and reading.
Pan et al. (2016)	Adults (N 61) College (Taiwan)	L1: Not reported FL: English	The role of vocabulary support (expanded and unexpanded vocabulary-instruction support) on listening comprehension.	TOEIC Listening test Pre and posttests Vocabulary Levels Test	The group that received expanded vocabulary-instruction support seemed to achieve higher scores and performed better than the group that received unexpanded vocabulary-instruction support. In fact, expanded vocabulary support appeared to benefit low proficiency learners.

Study	Informants	Language background	Approach	Method	Main findings
Inceyy and Kocoglu (2017)	Adults (N 26) University (Turkey)	L1: Turkish FL: English	The impact of multimedia input modality on listening comprehension.	Listening proficiency exam A topic familiarity questionnaire Listening comprehension tests Think-aloud sessions Interview	Audio-video with subtitles seemed to be the mode which achieved the lowest scores in listening comprehension. Informants appeared to prefer the audio with PowerPoint presentation mode. Moreover, they were more used to the audio-only mode owing to their previous experience before university.
Mulyadi et al. (2017)	Adults (N 50) University (Indonesia)	L1: Javanese FL: English	The role of explicit metacognitive collaboration strategy instruction and top-down strategy instruction on listening proficiency and learning styles (visual, auditory, and kinesthetic).	Listening proficiency test VAK questionnaire	Results showed that the group that received metacognitive strategy instruction had an influence on their listening proficiency, whereas the group that received top-down strategy instruction did not. In addition, listening proficiency appeared did not influence the learning styles of informants.
Zarrabi (2017)	Adolescents and adults (N 150) Language Institute (Iran)	L1: Persian FL: English	To determine whether explicit listening strategy instruction influences the listening comprehension of different learners (visual, auditory, tactile, and kinesthetic).	A coursebook First Certificate of English language proficiency test Listening comprehension pretest and posttest Perceptual Learning Style Preference Questionnaire	Findings indicated that listening strategy instruction improved the scores in the listening comprehension of all EFL learners types (visual, auditory, kinesthetic, tactile). However, there was a slightly difference in the improvement of listening comprehension across different learners.
Morilla García and Pavón Vázquez (2018)	Children (N 71) Primary school (Spain)	L1: Spanish FL: English	The relationship between listening comprehension and multiple intelligences in bilingual and traditional education.	Listening test Emotional Intelligence Scale Diaries, reports, and field notes	Results revealed that the bilingual education program which included multiple intelligences benefitted listening proficiency and promoted motivation.
Norellie et al. (2018)	Adolescents and adults (N 197) Secondary school and university (Belgium)	L1: Dutch FL: English	The relationship between vocabulary knowledge and listening comprehension.	Listening comprehension test Receptive vocabulary test	Findings showed a positive correlation between vocabulary knowledge and listening comprehension. In addition, the informants who had better listening comprehension scores were reported to know more words.
Joyce (2019)	Adults (N 443) University (Japan)	L1: Japanese FL: English	The relationship between listening proficiency and aural language proficiency.	Listening proficiency tests A syntactic knowledge test Vocabulary breadth Phonological modification knowledge Working memory capacity Phonological awareness Sentence stress awareness Metacognitive Awareness Listening Questionnaire	Listening comprehension seemed to be mostly related to syntactic knowledge, followed by the recognition of words in connected speech. Low proficient informants appeared to rely more on linguistic and psycholinguistic subskills, whilst high proficient informants benefitted more from the interaction between higher and lower level processing skills.
Li and Zhang (2019)	Adults (N 290) University (China)	L1: Not reported FL: English	The relationship between listening comprehension and vocabulary knowledge (size, depth, and fluency).	Auditory vocabulary size test Auditory vocabulary depth test Auditory vocabulary fluency test IELTS listening section	Findings revealed that the three dimensions of vocabulary knowledge (size, depth, and fluency) were predictors of listening comprehension. In fact, the size of auditory vocabulary appeared to be the strongest predictor of listening comprehension.
Lee and Levine (2020)	Adults (N 195) University (South Korea)	L1: Korean FL: English	The impact of teachers' language of instruction in lexical explanation and proficiency level on the learning of phrasal verbs and listening comprehension.	Listening comprehension test Receptive vocabulary test English phrasal verbs	The instruction on target vocabulary appeared to influence the learning of phrasal verbs. Code-switching condition was the most beneficial for intermediate learners, who were able to achieve similar vocabulary learning and listening comprehension to advance learners.
Du et al. (2021)	Adults (N 288) College (China)	L1: Not reported FL: English	The relationship between aural vocabulary size and listening comprehension.	Listening vocabulary levels test Listening comprehension test Language proficiency test	Results indicated a moderate relationship between aural vocabulary size and listening comprehension. Nevertheless, it did not influence much the listening comprehension of high-proficiency learners. High-frequency and academic words were reported to be predictors of listening comprehension proficiency. However, the aural vocabulary size decreased as the proficiency level increased.
Masrai (2021)	Adults (N 100) University (Saudi Arabia)	L1: Arabic FL: English	The relationship between phonological vocabulary knowledge (receptive and productive) and listening comprehension.	Receptive phonological vocabulary knowledge test Productive phonological vocabulary knowledge test IELTS listening section	Findings suggested a strong correlation between the productive/phonological vocabulary knowledge dimension and listening comprehension, followed by the receptive/phonological vocabulary knowledge dimension.

As can be observed in Table 1 (pp. 19-22), scholars have examined the relationship among listening comprehension and several variables with different informants and in different educational contexts. One of the most researched variables in listening comprehension is vocabulary, specifically vocabulary preparation and performance (Chang, 2007), vocabulary size and knowledge (Bonk, 2000; Cheng & Matthews, 2016; Hazrat & Hessamy, 2013; Li & Zhang, 2019; Mehrpour & Rahimi, 2010; Noreillie et al., 2018; Stæhr, 2008, 2009; Wang, 2015), vocabulary support (Pan et al., 2016), or aural vocabulary size (Du et al., 2021). It is closely related the use of lexical glossing (Fahimipour & Hashemian, 2013) or lexical explanations and phrasal verbs (Lee & Levine, 2020). Another variable which is investigated in EFL or ESL listening comprehension is strategies, specifically learning strategies (Chang, 2007; Chien & Van Heyst, 2014; O'Malley et al., 1989), vocabulary learning strategies (Hazrat & Hessamy, 2013), listening strategies and their instruction (Baleghizadeh & Rahimi, 2011; Carrier, 2003; Goh, 1998; Sandoval Zúñiga et al., 2010; Serri et al., 2012; Zarrabi, 2017; Zhang, 2012), or metacognitive instruction (Bozorgian, 2014; İnceçay & Koçoğlu, 2017). The relationship among listening comprehension and learning styles has also been explored, for example, in the studies conducted by Serri et al. (2012), İnceçay and Koçoğlu (2017), Mulyadi et al. (2017), or Zarrabi (2017). Similarly, multiple intelligences (Morilla García & Pavón Vázquez, 2018), multimedia (Brett, 1997; Hayati & Mohmedi, 2011; İnceçay & Koçoğlu, 2017; Ramírez Verdugo & Alonso Belmonte, 2007), modalities (Elekaei et al., 2015), or gestures and facial cues (Sueyoshi & Hardison, 2005) have also been examined. Other scholars studied the mental processes that occur in listening comprehension (Call, 1985; O'Malley et al., 1989; Shang, 2005). Other language skills were researched to ascertain whether they had a relation with listening comprehension, for example, reading (Cheng & Matthews, 2016; Fahimipour & Hashemian, 2013; Mehrpour & Rahimi, 2010; Reves & Levine, 1988; Stæhr, 2008) or writing (Stæhr, 2008). Other researched variables were prior knowledge and topic familiarity (Chiang & Dunkel, 1992; Othman & Vanathas, 2004), advance organizers (Chung, 2002; Li, 2009), listening support (Chang & Read, 2006), motivation (Baleghizadeh & Rahimi, 2011; Serri et al., 2012), the assessment of the validity of a listening test (Henning et al., 1983), oral and written output (Hazrat & Hessamy, 2013), or proficiency (Joyce, 2019; Lee & Levine, 2020). Despite the abundance of studies on EFL and ESL listening comprehension in the literature, as far as we know, there is a lack of research on the relationship between the auditory

perceptual learning style and productive vocabulary knowledge, which is one of the objectives of the present dissertation (see Chapter 5, p. 113).

On another note, research proves that several factors may affect the listening comprehension process. Regarding personal factors, age (Boyle, 1984; Weaver, 1972), gender (Caffrey, 1955; Irvin, 1954; Nichols, 1948), or background (Boyle, 1984) can influence this process. Psychological factors include motivation (Goh & Taib, 2006; Jalongo, 1995; Vandergrift, 2002, 2005), anxiety (Mills et al., 2006; Vogely, 1999), stress (Eastman, 1991), or attitude (Boyle, 1984). Concerning cognitive factors, those might involve knowledge of components of the language (Carrier, 1999; Carroll, 1977; Faerch & Kasper, 1986), attention and concentration (Boyle, 1984; Carroll, 1977), memory or knowledge of the topic (Boyle, 1984). Behavioral factors, such as social context, sociocultural competence, and social interaction (Carrier, 1999; Faerch & Kasper, 1986; McDevitt, 1990; Rost, 2014) can also be involved. In contrast, Rubin (1994) classified these factors differently into text, interlocutor, task, listener, and process characteristics, but she included all the factors explained above:

- 1) text characteristics (variation in a listening passage/text or associated visual support);
- 2) interlocutor characteristics (variation in the speaker's personal characteristics);
- 3) task characteristics (variation in the purpose for listening and associated responses);
- 4) listener characteristics (variation in the listener's personal characteristics);
- 5) process characteristics (variation in the listener's cognitive activities and in the nature of the interaction between speaker and listener). (p. 199)

In our view, and as it was implied before, the listening comprehension process is significantly affected by personal (e.g., age, gender, background), affective (e.g., motivation, anxiety, attitude), cognitive (e.g., attention, memory or language aptitude), and sociocultural factors (e.g., social context, social interaction, cultural context), which may explain variation in second language performance.

However, the listening comprehension process also suffers from some limitations. According to Weaver (1972) and Anderson and Lynch (2003), one of its limitations is that learners are not able to hear everything that is said to them: "we usually listen well below our optimal ability" (Weaver, 1972, p. 21). Another major drawback is the speed of speech (Flowerdew & Miller, 1996; Kalivoda, 1981; Lynch, 2009; Underwood, 1989; Ur, 1984). This refers to the inability to control the pace at which the speaker speaks. For example, in the case of learners learning a second or foreign language: "Many English language learners believe that the greatest difficulty with listening comprehension, as opposed to reading comprehension, is that the listener cannot control how quickly a speaker speaks" (Underwood, 1989, p. 16). Therefore, language learners cannot always

be repeated the speech or the words that they have not heard or understood. This is in line with what Ur (1984) affirmed: “the breaks may or may not occur where the listener needs them” (p. 18). The limited vocabulary listeners may have is also related to this issue, as Anderson and Lynch (2003), Brown (2000), Goh (1999), Kalivoda (1981), Underwood (1989), and Ur (1984) asserted. Listeners can hear the conversation properly, but there might be occasions where they cannot understand a word or phrase and they miss the rest of the conversation. This can occur because they are not very familiar with some words, they have hardly used them, or they have never heard them. In foreign language learning, for Brown (2000) and Cross (2009), difficulties in listening comprehension are caused by idioms, phrasal verbs, slang, or collocations. Another constraint is the lack of exposure to different types of oral discourse (Buck, 2001; Donaldson-Evans, 1981; Field, 2008; Ur, 1984). This is particularly the case of foreign language learners whose main input comes from the foreign language teacher. They get used to their teacher’s accent and way of speaking and cannot understand another person speaking the same language but with other accents. Memory processes may also affect the listening comprehension process (Kalivoda, 1981; Rivers, 1969). Language learners, also native speakers, may have difficulty remembering what they have listened to either because the information was extensive, or because they could not be able to discriminate the important information from the irrelevant one, as suggested by Rivers (1969). It could also be because of the listeners’ lack of concentration at the moment of hearing what might result into problems of interpretation (Anderson & Lynch, 2003; Underwood, 1989; Ur, 1984). Finally, learners have a shorter memory span for the foreign language than for their native language (Call, 1985).

As suggested before, and as it will be explained in Chapter 3 (see Section 3.3.3.2., p. 49), listening comprehension is mostly connected to the auditory learning style. According to this process, the learning and teaching of a second or foreign language is done through communication and interaction, which implies listening and speaking. Therefore, the instruction of a foreign language by means of listening comprehension will benefit auditory learners, since they learn better through the sense of hearing.

### 2.4.3. Dual Coding Theory

Dual Coding Theory (DCT) was proposed by the psychologist Paivio in the late 1960s. As said in his articles (1969, 1979), the DCT is a model of semantic memory which discusses the information processing through our senses; it describes two different systems of mental representation: verbal and nonverbal or imagery (see Figure 4, p. 27). Both function independently from each other; in other words, they are two separate systems but interconnected. This interconnectedness between the two systems entails that the verbal system can be activated by visual stimuli and, the other way round, that the visual system can be activated by verbal stimuli. In fact, the mental representations are modality-specific (Clark & Paivio, 1991; Paivio, 1986, 2007, 2014; Sadoski & Paivio, 2001). Clark and Paivio (1991) revealed that the verbal system is responsible for language; it processes linguistic information. It comprises internal representations, called logogens, which involve “information from the sensory analysis mechanisms concerning the properties of linguistic stimuli and from context-producing mechanisms” (Morton, 1969, p. 165). These logogens are modality-specific, and so, linked to perception, since verbal processes are determined by our perceptual experience (Paivio, 1979, 1986). Furthermore, it is “specialized for dealing with temporally (serially) organized stimulus patterns” (Paivio, 1979, p. 33). The verbal system is also static, and it is in control of processing abstract language.

On the other hand, the nonverbal or imagery system is in charge of visual information. It is composed of internal representations, termed imagens, which are mental images, as Paivio (1979) pointed out. According to Sadoski and Paivio (2001), the internal organization of imagens comes from nonverbal experience, and they are organized as nested sets:

Imagens have a different internal organization that derives from the nature of nonverbal experience. This organization is more synchronous, at least in the case of visual imagens. [...] Mentally, these organizations take the form of nested sets. Each nested part can be separately imaged as a set, and the whole set may be nested in a still larger imaginal set, as a face as part of a head, and a head as part of a body. (p. 51)

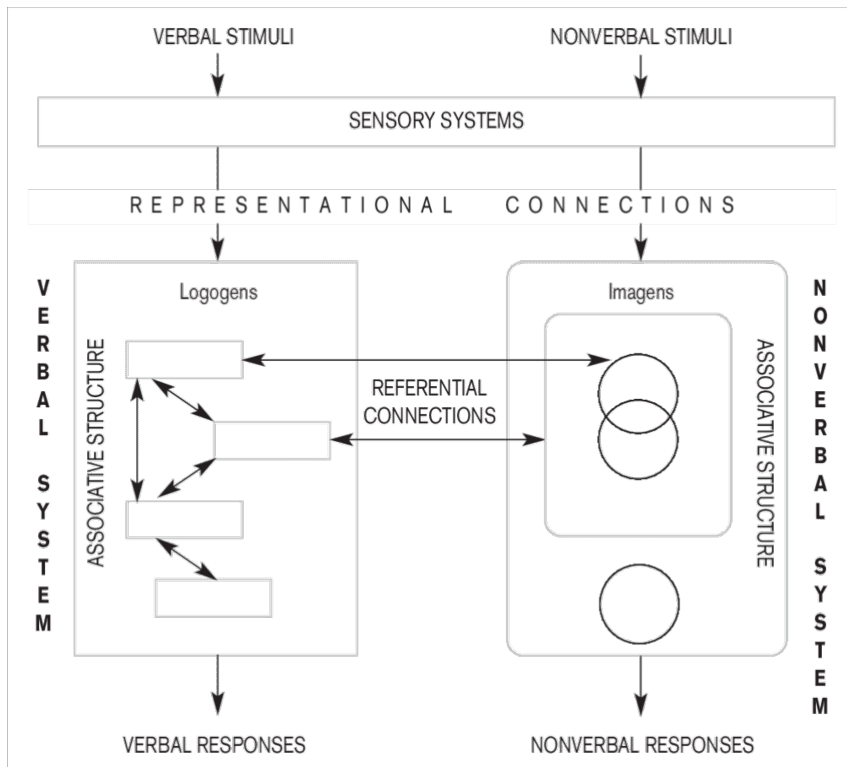
This system is “specialized for the storage and symbolic manipulation of information concerning spatially organized objects and events” (Paivio, 1979, p. 9). As this information is stored as images, these represent concrete objects and events of our perceptual experience in the world. The imagens are modality-specific, which implies that the imagery system is closely related to perception. The mental representation corresponds with the perceptual image, which is generated by the stimulus, as reported



by Paivio (1979, 2007). The imagery system is also a dynamic system, unlike the verbal system. Indeed, imaginal processes are available simultaneously so that they can be easily retrieved.

Figure 4

*The verbal and nonverbal systems*



Note. From Paivio (1990, p. 67)

Concreteness and abstractness are essential notions in the DCT. Concreteness is defined as “the ease with which the stimulus evokes an image of an object or objects, or simply as the ‘picturability’ of a stimulus” (Paivio, 1979, p. 59). Therefore, concreteness is any word that alludes to tangible objects, people, or places. On the other hand, abstractness is defined as “any word that refers to a [...] concept that cannot be experienced by the senses” (Paivio et al., 1968, p. 5). As suggested above, concreteness is mainly associated with the nonverbal or imagery system, whilst abstractness is fundamentally related to the verbal system. However, this is not always the case. For example, concrete words can be stored both verbally in the verbal system and nonverbally in the imagery system: “When one encounters a concrete word, the word initially activates linguistic information, but shortly thereafter it also begins to activate imagistic

information by means of referential links that interconnect the linguistic and image systems” (Holcomb et al., 1999, p. 721). This was also observed by Fiebach and Friederici (2003), Paivio (1979, 2007), Richardson (2003), and West and Holcomb (2000). In line with these authors, concrete concepts have both a verbal and nonverbal representation in memory. In contrast, abstract words are only encoded verbally in the verbal system: “abstract words [...] lack or have many fewer referential connections between systems and predominantly activate linguistic representations” (Holcomb et al., 1999, p. 721). It is very complicated to evoke an image from an abstract concept as they represent general ideas not objects. The fact that concrete words are encoded both in the verbal and nonverbal systems, whilst abstract words are only encoded in the verbal system, is the main reason why concrete words are recalled and retained better than abstract words (Clark & Paivio, 1991; Connell & Lynott, 2012; David, 1998; Fiebach & Friederici, 2003; Holcomb et al., 1999; Sadoski et al., 1993, 1995; West & Holcomb, 2000). This is also related to imagery value because concrete words can evoke a visual mental image of a tangible object (Clark & Paivio, 1991; Paivio et al., 1988; Paivio & Begg, 1971). Imageability is one of the criteria on which we focused to select the prompts for the lexical availability task (see Chapter 6, Section 6.3.4., p. 123). Paivio (1969) pinpointed that if the stimulus items are very concrete, they will evoke more sensory images: “the higher the concreteness of stimulus items, the more likely they are to evoke sensory images that can function as mediators of associative learning and memory” (p. 243).

Another fundamental element in DCT which is also associated with the advantage of concreteness over abstractness is the Conceptual Peg Hypothesis (Paivio, 1969). This hypothesis addresses the influence that imagery has on the recall of information: “mental images can serve to organize and unify information and facilitate recall of that information” (Sadoski et al., 1993, p. 292). Paivio (1969) claimed that it is a mnemonic technique which consists of pairing the word to be remembered with its stimulus: “the stimulus member of a pair serves as a ‘conceptual peg’ [...] to which its associate is hooked during learning trials when stimulus and response members are presented together” (p. 244). This “conceptual peg” is a concrete word that evokes a mental image easily. A compound image is created and every time you encounter the “conceptual peg,” the word to be remembered is recalled: “the imagery value of both stimulus and response would contribute to the formation of a compound image, consisting of images evoked by the individual items when the two are presented together” (Paivio, 1969, p. 244).

DCT is a fundamental theory in education because it emphasizes the need to develop the nonverbal system before learning to speak the language. In order to learn a language, the first stage is having sensorimotor experiences with the world and concrete objects to develop the nonverbal system. Afterwards, these experiences will be the basis for language learning and the development of the verbal system. This theory has been researched in different language skills, such as reading (Sadoski, 1983, 1985; Sadoski et al., 1991; Sadoski & Paivio, 1994), vocabulary (Bridge et al., 1983; Bull & Wittrock, 1971; Rodríguez & Sadoski, 2000; Smith et al., 1987), or writing (Miller, 1994; Sadoski & Goetz, 1998; Tirr et al., 1979). It has promoted the use of visual aids in education, improving the way of teaching of teachers and helping students enhance their learning and comprehension, as Heredia and Altarriba (2014) and Sadoski and Paivio (2001) indicated.

Some extended versions to this theory have been proposed (Mayer & Sims, 1994; Paivio & Desrochers, 1980). We are going to focus on the Bilingual Dual-Coding Theory developed by Paivio and Desrochers (1980), as it is more suitable for the present dissertation. One of the reasons is that the informants of our study are learners of English as a foreign language, so this theory will allow us to acknowledge the processes that occur in their minds. The DCT (Paivio, 1971, 1986) can be distinguished from the Bilingual Dual-Coding Theory (Paivio & Desrochers, 1980), since the latter includes two verbal systems (one for the L1 and the other one for the L2) and a common visual system, which corresponds to world knowledge. As it happened in the former theory, these systems are independent but interconnected:

It means, for example, that bilinguals can perceive, remember, and think about nonverbal objects and events without the intervention of either language system and, conversely, that they can behave or think verbally without constant intervention by the nonverbal system. At the same time, the systems are interconnected at the referential levels, so that verbal activity in either language system can be influenced by the imagery system and vice versa. (Paivio & Desrochers, 1980, pp. 390-391)

The two verbal systems function independently, so one does not influence the other; the connections between them are made through translation equivalents. This theory has been influential in second and foreign language learning because learners produce verbal representations in the L2 which are connected to their L1, along with their relations to the visual system, as Paivio (1986) suggested.

As it will be described in Chapter 3 (see Section 3.3.3.2., p. 49), the DCT is primarily linked to the visual learning style. This theory promotes the development of the nonverbal or imagery system through sensorimotor experiences which will be the basis

for the verbal system. In fact, it advocates the use of visuals and imagery in language learning. Therefore, the instruction of a foreign language following this theory will mainly benefit visual learners, as they prefer to learn through the sense of sight.

## **2.5. Summary of chapter**

The purpose of this chapter has been to give a general overview of memory. In the first section, we have briefly reviewed the evolution of the concept from a unitary system to a multiple system, which is the view that prevails in the present times and the one we support. We have also noted that there are different classifications on memory, but we have selected the memory model of Atkinson and Shiffrin (1968) (sensory, short-term, and long-term memory) for the present dissertation. These three types of memory are closely related to the notion of perceptual learning styles, which will be explained in Chapter 3 (p. 47).

In the second section, we have thoroughly explored the tripartite model on memory of Atkinson and Shiffrin (1968). First, we have described sensory memory and three of its subtypes: visual, auditory, and haptic. Sensory memory provides the basis for perceptual learning styles (visual, auditory, and tactile/kinesthetic) (see Chapter 3 for an explanation, p. 47). Then, we have focused on short-term memory, as well as its subtypes: visual and auditory, which are related to visual and auditory learning styles. Short-term memory also serves as the basis for lexical processing, such as its organization and classification. Finally, we have dealt with long-term memory and its subtypes: explicit and implicit. Afterwards, we have concentrated on the two different types of explicit memory: episodic and semantic. We have explained both types of memory. As mentioned earlier, semantic memory is concerned with perceptual information, which relates to perceptual learning styles (see Chapter 3, Section 3.3.3.2., p. 49), it is essential for language, and it focuses specifically on vocabulary, another topic of the present investigation (see Chapter 4, p. 69). Within semantic memory, we have also accounted for two of its models: the Hierarchical Network Model (Collins & Quillian, 1969) and the Spreading Activation Theory of Semantic processing (Collins & Loftus, 1975). We selected the Spreading Activation Theory of Semantic processing because it is an improved version of the former and it is related to lexical availability, a topic which will be discussed in Chapter 4 (see Section 4.4.3.3., p. 92). All in all, long-term memory and its subtypes are crucial aspects for lexical categorization and they would be reflected in the answers of the lexical availability task. In our view, the three main types of memory

(sensory, short-term, and long-term) can give us an insight into the processes that occur in the minds of language learners when they are learning a foreign language.

In the third section, we have reviewed three theories of human memory which contribute to the learning and teaching of second and foreign languages: Total Physical Response (Asher, 1964), listening comprehension processes (Mendelsohn, 1994; Nichols, 1948), and Dual-Coding Theory (Paivio, 1969). We have analyzed their main characteristics and objectives. We have also discussed their role in foreign language education, the models, advantages and limitations of some of those theories, as well as their relationship with perceptual learning styles. As far as we are concerned, the TPR theory is primarily associated with the kinesthetic learning style because it consists of learning a foreign language by means of physical actions and movement. Listening comprehension is mostly related to the auditory learning style, as this approach promotes the learning of a foreign language by hearing it. Finally, the DCT is mainly connected to the visual learning style, since it advocates the use of visuals and imagery in language learning. These theories and methods can inform us about how EFL learners (visual, auditory, and tactile/kinesthetic) prefer to learn, the activities that might be more suitable for them, and the processes that occur in their minds when they are learning a foreign language.



## CHAPTER 3. LEARNING STYLES

### 3.1. Introduction

This chapter will present the second part of the theoretical background of this dissertation, which will address the concept of learning styles. In the first section, we will provide the definition of the term style, as well as its two types: cognitive styles and learning styles. We will differentiate between these two concepts (cognitive styles and learning styles). The second section will be devoted to the notion of learning styles. A description of their definitions and classifications will be given. Then, we will focus our attention on perceptual learning styles, which is the aim of this dissertation. In this part, we will also offer the definitions and classifications, as well as a review of studies to identify the gap in the literature.

### 3.2. Cognitive styles vs. learning styles

The notion of style is defined as “a pervasive quality in the behavior of an individual, a quality that persists though the content may change” (Fischer & Fischer, 1979, p. 246). It alludes to the preferences an individual has for doing something, as Brown (2000) and Sternberg (1999) indicated. Two main types of styles can be distinguished: cognitive styles and learning styles. Cognitive styles are “consistent individual differences in ways of organizing and processing information and experience” (Messick, 1984, p. 61). This refers to the preferred way of perceiving, remembering, thinking, organizing, processing, and representing information, as noted by Dörnyei (2005), Kogan (1971), and Tennant (1988). On the other hand, learning styles are “cognitive, affective, and physiological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment” (Keefe, 1979, p. 4).

Cuthbert (2005), Desmedt and Valcke (2004), Entwistle (1981), Shipman and Shipman (1985), and Slack and Norwich (2007) used these two terms interchangeably. They believed that both cognitive styles and learning styles are synonyms. In contrast, Das (1988), Dörnyei (2005), Riding and Cheema (1991), and Sadler-Smith (2001) considered them as two different, independent, and separate concepts. Cassidy (2004), Curry (1983), Evans et al. (2010), Irvine and York (1995), James and Gardner (1995), and Leaver et al. (2005) regarded learning styles as an umbrella term which encompasses

cognitive styles, being cognitive styles an element of learning styles. Irvine and York (1995) emphasized that learning styles are the broad term because they include “three distinct styles or substyles: cognitive, affective and physiological” (p. 484).

Several differences between cognitive and learning styles can be identified. Firstly, cognitive style research is based on an objective and analytic approach (Witkin & Goodenough, 1981), while learning style research is based on a phenomenological approach (Boulton-Lewis et al., 2001). Another divergence is that cognitive styles are viewed as stable, innate, and fixed (Messick, 1970; Riding et al., 1993), whilst learning styles are variable and environmentally dependent (Armstrong et al., 2012; Peterson et al., 2009; Sadler-Smith, 2001). Regarding the methodology employed, cognitive style research uses performance-based measures (Sternberg & Grigorenko, 2001; Witkin & Goodenough, 1981), whereas learning style research applies self-report measures (Boulton-Lewis et al., 2001; Kline, 1995). What is more, cognitive styles focus on the mental process itself, whereas learning styles are concerned with the learning process: “the former, in other words, is more restricted to information-processing preferences, while the latter embraces all aspects of learning” (Dörnyei & Skehan, 2003, p. 602). Another difference is the style elements that are taken into consideration in both terms:

Whilst cognitive style is a bipolar dimension, learning style entails many elements and are usually not 'either-or' extremes. One either has or does not have the element in one's style, similarly, the absence of one element does not necessarily imply the presence of the opposite element. (Riding & Cheema, 1991, p. 194)

All in all, we view cognitive and learning styles not as the same concepts but intertwined primarily because one involves the other in a learning context. For learning to occur, not only is information-processing needed, but also all the affective and perceptual elements that influence the processing of information. In this regard, we consider that cognitive styles are a component of learning styles. Therefore, learning styles is going to be the term used throughout this dissertation.

### **3.3. Learning styles**

This section will firstly provide a summary of the broad range of definitions that can be found in the literature about learning styles. We will divide those definitions according to the component or components they refer to, and we will present the definition we are going to use in this dissertation. Then, a brief description of the classifications of learning styles will be given. Secondly, we will focus on perceptual learning styles, explaining what perception and perceptual modality are and the difference



between modality strength and modality preference. We will also account for their definitions and the limitations we can regard on them. Afterwards, we will define the different types of perceptual learning styles and describe the different classifications and instruments. We will review a summary of the studies that can be found in the literature to be able to identify its gaps. This section concludes by ascertaining the relationship among perceptual learning styles, the different types of memory, and the theories of human memory which contribute to the learning and teaching of second and foreign languages, as explained in Chapter 2 (p. 15).

### 3.3.1. Definitions

Several definitions of learning styles have been proposed. Cohen and Weaver (2005), Felder (1996), Felder and Henriques (1995), Pashler et al. (2009), Willing (1993), and Woolfolk (2016) emphasized the perceptual component of learning styles. For example, Reid (1987) defined learning styles as “a term that describes the variations among learners in using one or more senses to understand, organize, and retain experience” (p. 89). Spolsky (1989) used the term learning styles to “describe identifiable individual approaches to learning situations” (p. 109). Reid (1995a) expanded her previous definition and asserted that they are “an individual’s natural, habitual, and preferred way(s) of absorbing, processing, and retaining new information and skills” (p. viii). For Dörnyei (2005), they are “a profile of the individual’s approach to learning, a blueprint of the habitual or preferred way the individual perceives, interacts with, and responds to the learning environment” (p. 121). According to Hsieh et al. (2011), learning styles refer to “one’s preferences in processing external information or internal knowledge and experience” (p. 1195).

A further definition is given by Messick (1984), who only took the cognitive component into consideration: “generalised habits of thought, not simply the tendency towards specific acts... but rather the enduring structural basis for such behavior” (p. 61). Cornett (1983), Gregorc (1979a), and Honey and Mumford (1992) highlighted the behavioral aspect of learning styles. Honey and Mumford (1992) defined them as “a description of the attitudes and behaviors which determine an individual’s preferred way of learning” (p. 1). For Gregorc (1979b), they are “distinctive behaviors which serve as indicators of how a person learns from and adapts to his environment” (p. 234). Similarly, Cornett (1983) argued that learning styles are “a consistent pattern of behavior but with a certain range of individual variability” (p. 9).

On the other hand, Dunn and Griggs (1988) and Reid (1995a) underlined the physiological aspect of these styles. For Dunn and Griggs (1988), learning styles are “biologically and developmentally imposed set of characteristics that make the same teaching method wonderful for some and terrible for others” (p. 3). Reid (1995a) used the term to allude to “internally-based characteristics, often not perceived or consciously used by learners, for the intake and comprehension of new information” (p. ix). Claxton and Ralston (1978) and Sewall (1986) focused on the environmental component. Claxton and Ralston (1978) believed that learning styles are “a student’s consistent way of responding and using stimuli in the context of learning” (p. 7). Likewise, Sewall (1986) stated that they are “an individual’s unique way of interacting with the environment” (p. 3). In contrast, Heinich et al. (1999) stressed their psychological aspect: “a cluster of psychological traits that determine how a person perceives, interacts with, and responds emotionally to learning environments” (p. 406).

All these scholars have only taken into account one component to describe learning styles; other definitions include two or more aspects. Cornett (1983), Keefe (1979), and Orlich et al. (2012) referred to the cognitive, affective, and physiological components. For example, Haring (1985) declared that learning styles “may be categorized based on the cognitive, affective or physiological aspects of the learning process and situation” (pp. 2-3). Smith (1982) substituted the physiological component for the behavioral one and defined them as “individuals’ characteristic ways of processing information, feeling and behaving in learning situations” (p. 24). A further definition is given by Carbo et al. (1986), who included five different elements: “the way that students are affected by their (a) immediate environment, (b) their own emotionality, (c) sociological needs, (d) physical characteristics and (e) psychological inclinations when concentrating and trying to master and remember new or difficult information or skills” (p. 2).

Taking all these contributions into consideration, it can be concluded that there is not a clear-cut definition of learning styles, since no consensus has been reached yet. Scholars use too many components which could be classified into general categories. In our view, the physiological and sensory elements could be grouped into the category of perceptual components, the psychological element into the cognitive component, the environmental element into the social component, and the affective component could include the emotional and personality elements. In this way, the components could be reduced, and it would be easier to classify the definitions. In addition, these definitions

seem to be incomplete, since they do not address other variables that can heavily influence the learning style of an individual, and therefore their second or foreign language learning. For us, some of those variables could be age, culture, gender, learning aptitude, motivation, or proficiency.

Anderson and Adams (1992), Curry (1991), Dörnyei (2005), and Dörnyei and Ryan (2015) noticed that the definitions are confusing: “there is a bewildering confusion of definitions surrounding learning style conceptualizations and there is a wide variation in the scale and scope of learning, school achievement, and other behavior predicted by the various learning style concepts” (Curry, 1991, p. 249). In this vein, Ellis (1994) noted the vague nature of learning style, since it overlaps other individual differences: “the concept of ‘learning style’ is ill-defined, apparently overlapping with other individual differences of both an affective and a cognitive nature” (p. 508). In line with the different categories discussed above, Dörnyei (2005) argued that the inability to give an exact definition of the term can be traced back to its transcendence across different categories:

The problem is that learning—and consequently the related concept of learning styles—is associated at the same time with perception, cognition, affect, and behavior, and a term that cuts across these psychologically distinct categories does not lend itself to rigorous definition. (p. 124)

All in all, for Coffield et al. (2004), Curry (1990), and Dörnyei (2005), learning styles are regarded as a confusing and controversial concept owing to the substantial amount of labels, definitions, models, taxonomies, and instruments that have been proposed and implemented throughout the years. In this respect, Dörnyei (2005) pointed out the bewilderment of this concept:

the area is a real quagmire: There is a confusing plethora of labels and style dimensions; there is a shortage of valid and reliable measurement instruments; there is a confusion in the underlying theory; and the practical implications put forward in the literature are scarce and rather mixed, and rarely helpful. (p. 120)

Riding (2000), a well-known researcher in the field of cognitive styles, claimed that “the area of style research generally has a poor reputation” (p. 316), mainly due to all these confusing notions. This view is also shared by Coffield (2005), who stated that “the field of learning styles suffers from almost fatal flaws of theoretical incoherence and conceptual confusion” (p. 21). This controversy and confusion might have arisen owing to our lack of knowledge on this issue: “the current state of confusion is merely due to our insufficient knowledge rather than the scientific inadequacy of the concept” (Dörnyei & Ryan, 2015, p. 107). We also agree with these researchers when they noted that “there is something genuinely appealing about the notion and, what is more, this intuitive appeal

tends to resonate strongly with the classroom experience of educational practitioners” (p. 107). As far as we are concerned, learning styles are a well-known and fascinating concept for second language and foreign language teachers and researchers. They are an essential issue in second and foreign language learning because they provide with information about how and in which ways individuals learn, what allow us to confirm that students learn in different ways. They are basically the preferences learners have for learning, in this case, a second or foreign language, but it could also be applied to learning in general.

The definition of Reid (1995a) on learning styles: “an individual’s natural, habitual, and preferred way(s) of absorbing, processing, and retaining new information and skills” (p. viii), is the one to be considered in this dissertation. In our view, it is one of the most accurate definitions, and it accounts for the perceptual component of learning styles, which is the aim of the present investigation. In addition, it has been proved to be a standard and enduring definition, as Dörnyei (2005), Dörnyei and Ryan (2015), and Griffiths (2012) revealed. Apart from the perceptual nature of learning styles, we still believe that other individual factors (e.g., age, culture, gender, motivation) ought to be included in this definition as well.

Having offered a summary of the distinct definitions on learning styles, as well as its confusing but appealing nature, the aim of the following section is to deal with their classifications.

### **3.3.2. Classifications**

Similar to their definitions, many learning styles classifications or models can be found in the literature. Coffield et al. (2004) argued that there are more than 71 different learning style models. Not only have these models been implemented in L1 learning, but also in L2 and foreign language learning studies. Table 2 (p. 39) depicts a summary of the most important and influential models arranged in chronological order.

Table 2

*Summary of learning styles classifications*

Author(s)	Learning styles			
Myers and Briggs (1962)	Extraversion-Introversion	Sensing-intuition	Thinking-Feeling	Judging-Perceiving
Witkin et al. (1962)	Field-Dependence	Field-Independence		
Dunn and Dunn (1972)	Environmental	Emotional	Sociological	
	Physiological	Psychological or cognitive		
Riechmann and Grasha (1974)	Independent-Dependent	Participant-Avoidant	Collaborative-Competitive	
Barbe et al. (1979)	Visual	Auditory	Kinesthetic	
Gregorc (1979a)	Abstract-Sequential	Abstract-Random	Concrete-Sequential	Concrete-Random
Curry (1983)	Instructional Preference	Information Processing Style	Cognitive Personality Style	
Kolb (1984)	Convergent	Divergent	Assimilation	Accommodative
Honey and Mumford (1986)	Activist	Theorist	Pragmatist	Reflector
Reid (1987)	Visual	Auditory	Kinesthetic	
	Tactile	Group	Individual	
Felder and Silverman (1988)	Sensing-Intuitive	Visual-Auditory	Inductive-Deductive	
	Active-Reflective	Sequential-Global		
McCarthy (1990)	Imaginative	Analytic	Common Sense	Dynamic
Riding (1991)	Wholist-Analytic	Verbalizer-Imager		
Fleming and Mills (1992)	Visual	Read/Write	Aural	Kinesthetic

The Myers-Briggs Type Indicator (MBTI) personality inventory was put forward by Briggs Myers and her mother Briggs (1962). It is rooted in the theory of psychological types of Jung (1923). The two major objectives of this model are: (1) to identify the basic preferences on the four dichotomies proposed by Jung (1923), and (2) to describe the sixteen personality types that arise from the combination of the preferences (Briggs Myers et al., 1998). As can be regarded in Table 2 (p. 39), it is composed of four dichotomies. As Briggs Myers et al. (1998) expressed, each individual tends to prefer one over the other. The dichotomy Extraversion-Introversion has the same meaning as the one Jung

(1923) attributed to his theory: “Extraverts are oriented primarily toward the outer world; thus they tend to focus their energy on people and objects,” whereas “introverts are oriented primarily toward the inner world; thus they tend to focus their energy on concepts, ideas, and internal experiences” (Briggs Myers et al., 1998, p. 6). The second dichotomy is concerned with the preferred way of perceiving. An individual may depend either on Sensing, in which the senses are included: “attends to observable facts or happenings through one or more of the five senses,” or on Intuition, “which attends to meanings, relationships, and/or possibilities that have been worked out beyond the reach of the conscious mind” (p. 6). The Thinking-Feeling dichotomy involves the preferred way of judging. You can either depend on Thinking, which is impersonal: “to decide impersonally on the basis of logical consequences,” or on Feeling, which is personal: “to decide primarily on the basis of personal or social values” (p. 6). In the theories of Jung and Briggs Myers the terms Thinking and Intelligence do not mean intelligence and emotion respectively. Both intelligence and emotion are addressed separately of psychological typology, according to Briggs Myers et al. (1998). The Judging-Perceiving dichotomy has to do with how an individual handles their extroverted life. The judging process entails thinking or feeling: “A person who prefers using a Judging (J) process typically uses either Thinking or Feeling (the Judging processes) when dealing with the outer world” (p. 6). On the other hand, the perceiving process involves sensing or intuition: “a person who prefers a Perceiving (P) process reports a preference for using either Sensing or Intuition (the perceiving processes) when dealing with the outer world” (p. 6). For Briggs Myers et al. (1998), the Judging-Perceiving dichotomy was implicitly developed in the theory of Jung. From these four dichotomies, sixteen types emerged after the combination of the different preferences.

Another classification is the one designed by Witkin et al. (1962) to account for the field-dependence and field-independence cognitive style, which is a perception theory. This theory stems from the need to research the individual differences found in perceptual and intellectual functioning; the two dimensions are characteristic of cognitive functioning, as Witkin et al. (1979) showed. Field-dependence and field-independence are related to the concepts of global and analytic. Global individuals get a general idea of things; they are identified with the field-dependent cognitive style. Analytic individuals concentrate on small details; they are associated with the field-independent cognitive style:

Perception may be conceived as articulated, in contrast to global, if the person is able to perceive item as discrete from organized ground when the field is structured (analysis), and to impose structure on a field, and so perceive it as organized, when the field has little inherent organization (structuring). (Witkin, 1967, p. 234)

The Dunn and Dunn Learning Style Model was proposed by Dunn and Dunn (1972). They emphasized that each individual has different learning preferences or learning styles that differentiate them. As shown in Table 2 (p. 39), their model is composed of five stimuli and twenty-one elements that come from those stimuli. Dunn (1990) believed that in a learning context learners are influenced by: (1) environmental stimuli (sound, light, temperature, and furniture/seating designs); (2) emotional stimuli (motivation, persistence, responsibility, and structure); (3) sociological stimuli (“learning alone, in a pair, in a small group, as part of a team, with an authoritative or collegial adult, and wanting variety as opposed to patterns and routines”); (4) physiological stimuli (“perceptual strengths, time-of-day energy levels, and need for intake or mobility while learning”), and (5) psychological/cognitive processing stimuli (global/analytic, hemisphericity, and impulsive/reflective) (p. 225). The global/analytic learning styles found in the psychological/cognitive processing stimuli are reminiscent of the field-dependent and field-independent cognitive styles of Witkin et al. (1962), which were explained above.

The Grasha-Riechmann learning style model (1974) was developed by Riechmann and Grasha. This model addresses the attitudes of students in a classroom context and the social interaction with their teachers and classmates. They distinguished three dichotomous learning styles. The Independent learning style refers to learners who prefer to study and work on their own: “[The student] learns the content he feels is important and is confident in his learning abilities” (Riechmann & Grasha, 1974, p. 221). On the contrary, the Dependent learning style involves students who only learn the minimum compulsory content and prefer others to tell them what they have to do: “this style is characteristic of the student who shows little intellectual curiosity and who learns only what is required” (p. 221). The Collaborative learning style alludes to students who like working in groups and interact with their teachers and classmates: “this style is typical of the student who feels he can learn the most by sharing his ideas and talents” (p. 221). On the other hand, the Competitive learning style involves students who just want to excel their classmates and view the learning process as a competition: “this response style is exhibited by the student who learns material in order to perform better than others in the class” (p. 222). The Participant learning style includes students who enjoy taking

part in class and learn as much as they can from the lessons: “this style is characteristic of the student who wants to learn course content and likes to go to class” (p. 222). In contrast, the Avoidant learning style refers to learners who do not want to participate in the classroom and do not care about anything related to the classroom environment: “this response style is typical of a student who is not interested in learning course content in the traditional classroom” (p. 222). We believe that the learning styles of Grasha and Riechmann (1974) are related to the sociological stimuli of the learning style model of Dunn and Dunn (1972).

Barbe et al. (1979) developed a learning style classification based on modality strengths. According to these researchers, modality strengths make reference to the use of different senses in learning. Every individual has a preferred modality of learning. The three learning styles they identified have to do respectively with the senses of sight, hearing, and touch: “The visual modality includes both sight and inward visualization. The auditory modality refers to hearing, and especially to verbalization. And the kinesthetic modality means sensing muscle movements and positions in space, as well as touching with the fingers” (Milone, 1981, p. 2). They also talked about the other senses left, but they stressed that they are not as important in education as the aforementioned ones. In their view, an individual can have a predominant learning style, use two different learning styles for learning, or even three indifferently. We think that this model is related to the “perceptual strengths” element found in the physiological stimuli of Dunn and Dunn (1972).

Gregorc (1979a) devised the Mind Styles Model. He identified two processes for learning: perception, which addresses the ways of grasping information, and ordering, which makes reference to the ways of dealing with information. From these two processes, he differentiated two qualities in each: perception involves the concrete and abstract qualities, and ordering includes the sequential and random qualities. Then, he combined these qualities and formed four different learning styles. The types of learners who prefer the Abstract Sequential learning style like having all the content well-organized; they enjoy reading and listening: “The abstract sequential learning preference is characterized by excellent decoding abilities in the areas of written, verbal, and image symbols” (Gregorc & Ward, 1977, p. 22). The Abstract Random learning style refers to learners who enjoy being involved in the classroom by participating in discussions and activities. They do not mind if the information is unstructured because they like organizing it to achieve their purpose: “The abstract random learner is distinguishable by



his attention to human behavior and an extraordinary ability to sense and interpret vibrations” (p. 22). The Concrete Sequential learning style pertains to kinesthetic learners who prefer doing experiments and touching the material they are learning (e.g., dissecting animals to know their different parts): “The concrete sequential learning preference is characterized by a finely tuned ability to derive information through direct, hands-on experience” (p. 22). The Concrete Random learning style alludes to learners who are independent and like to do everything on their own; they fancy trial-and error activities: “such learners get the gist of ideas quickly and demonstrate the uncanny ability to make intuitive leaps in exploring unstructured problem-solving experiences” (p. 23).

Curry (1983) put forward a learning styles model, which is known as the Onion Model. Curry used the layers of a hypothetical onion to represent the three different learning styles. The outermost layer, termed Instructional Preference and the least stable style, concerns the expectations of students and teachers and their interaction: “refers to the individuals’ choice of environment in which to learn” (p. 8). For us, this style is reminiscent of the Grasha-Riechmann (1974) learning style model because it deals with attitudes and social interaction in a learning context. The middle layer, also named Information Processing Style, has to do with how information is processed: “this is conceived of as the individual’s intellectual approach to assimilating information following the information processing model” (Curry, 1983, p. 8). This style is thought to be more stable than the Instructional Preference because it does not focus on the environment directly. The innermost layer is the Cognitive Personality Style, which refers to the adaptation and assimilation of the information: “the individual’s approach to adapting and assimilating information” (p. 8). This style does not relate to the environment but to personality, which reminds us of the learning style model based on personality types of Myers-Briggs (1962).

Another model was devised by Kolb (1984); it is rooted in experiential learning theory. Experiential learning theory is defined as “a dynamic view of learning based on a learning cycle driven by the resolution of the dual dialectics of action/reflection and experience/abstraction” (pp. 50-51). Kolb distinguished four phases in the learning cycle: Concrete Experience (CE), Abstract Conceptualization (AC), Reflective Observation (RO), and Active Experimentation (AE). For him, there are four learning styles. The convergent learning style “relies primarily on the dominant learning abilities of abstract conceptualization and active experimentation” (p. 114). These types of learners like addressing technical problems, not personal ones, as well as putting ideas into practice.

The divergent learning style is concerned with “imaginative ability and awareness of meaning and values” (p. 115). These learners prefer to observe their surroundings first before acting out. The assimilation learning style involves “inductive reasoning and the ability to create theoretical models” (p. 115). They particularly focus on conceptualization. Finally, the accommodative learning style includes “doing things, carrying out plans and tasks and getting involved in new experiences” (p. 115). These learners solve problems intuitively and they are sometimes viewed as impatient people. Consequently, we believe that the learning style model of Kolb (1984) can be associated with the Information Processing Style of Curry (1983) because he also discussed how learners grasp information.

Honey and Mumford (1986) put forward their learning styles model influenced by the experiential learning model of Kolb (1984). They also divided learning into four phases and identified four learning styles, but they named them differently. Based on their model, the Activist learning style involves learning by doing, so they are learners who like to participate in discussions and role-plays. The Theorist learning style has to do with conceptualization. These types of learners enjoy learning by means of theories and models. The Pragmatist learning style refers to applying what they have learnt in their real life; the Reflector learning style addresses learning by watching and reflecting on issues. These learning styles coincide with the ones put forward by Kolb (1984): accommodative, assimilation, convergent, and divergent learning styles respectively.

As shown in Table 2 (p. 39), Reid (1987) developed a learning styles classification about the preferences learners have for learning. She based her model on the perceptual learning styles of Dunn and Dunn (1972), but she added two social learning styles: group and individual learning styles, which are not perceptual in nature. Therefore, she recognized six learning styles. She defined perceptual learning styles as “the variations among learners in using one or more senses to understand, organize, and retain experience” (Reid, 1987, p. 89). Following Reid (1987), the visual learning style implies learning by means of reading information and taking notes of lectures; the auditory learning style involves listening to teachers or audio materials. The kinesthetic learning style refers to learning through experience (e.g., participating in classroom activities), whilst the tactile learning style makes reference to learning by doing hands-on experiments. The group learning style is associated with working and studying with other classmates, whereas the individual learning style emphasizes working and studying on one’s own. In our view, these perceptual learning styles are also reminiscent of the model

of Barbe et al. (1979), since they dealt with visual, auditory, and kinesthetic learning styles.

Felder and Silverman (1988) devised a learning style model in which they differentiated five dichotomies of learning styles. Regarding the Sensing-Intuitive learning styles, “sensing involves observing, gathering data through the senses,” while “intuition involves indirect perception by way of the unconscious— speculation, imagination, hunches” (p. 676). This dichotomy reminds us of the theory of psychological types of Jung (1923); it is also addressed in the model of Myers and Briggs (1962). The second dichotomy, Visual-Auditory learning styles, is concerned with the perceptual modalities of sight and hearing: “Visual learners remember best what they see [...] auditory learners remember much of what they hear and more of what they hear and then say” (Felder & Silverman, 1988, p. 676). These perceptual learning styles are reminiscent of the models by Dunn and Dunn (1972), Barbe et al. (1979), and Reid (1987), even though Felder and Silverman (1988) only considered the visual and auditory learning styles. In the Inductive-Deductive learning styles, induction involves reasoning from the particular to the general; “a reasoning progression that proceeds from particulars [...] to generalities;” deduction implies inferring consequences: “in deduction one deduces consequences” (Felder & Silverman, 1988, p. 677). Concerning Active-Reflective learning styles, active learners enjoy working in groups: “active experimentation involves doing something in the external world with the information – discussing it or explaining it or testing it in some way” (p. 678). In contrast, reflective learners prefer learning on their own: “reflective observation involves examining and manipulating the information introspectively” (p. 678). The Active-Reflective learning styles remind us of the experiential learning theory of Kolb (1984). The last dichotomy is Sequential-Global learning styles. Sequential learners like learning in a logically and organized way; they do not need to understand all the content, contrary to what happens to global learners (Felder & Silverman, 1988).

McCarthy (1990) proposed the 4MAT System, which is founded on the learning style model of Kolb (1984), to help teachers in the instruction of their learners who have different ways of learning. This model takes into account both learning styles and brain dominance processing preferences. McCarthy (1990) believed that each individual has different learning styles and hemispheric processing preferences. He also argued that teaching to those preferences will definitely improve their learning. For that, four learning styles were described. Imaginative learners learn by their personal experiences:

“imaginative learners perceive information concretely and process it reflectively” (p. 32). On the other hand, Analytic learners enjoy thinking and learning by means of theories: “[they] perceive information abstractly and process it reflectively” (p. 32). Common Sense learners prefer learning and applying the knowledge they have learnt: “[they] perceive information abstractly and process it actively” (p. 32). Dynamic learners enjoy learning by trial and error; they like experiencing new things: “dynamic learners perceive information concretely and process it actively” (p. 32).

Another one is the cognitive style model developed by Riding (1991), in which he differentiated two cognitive style dimensions. The first dimension addresses the way information is organized and processed. Wholist learners process information globally, whilst Analytical learners process information in parts. The Wholist-Analytic styles stem from the theory of field-dependent and field-independent of Witkin et al. (1962), according to Riding (1991). The second dimension involves how information is represented. Verbalizer learners represent information in words, while Imager learners represent information in pictures (Riding & Cheema, 1991). The first dimension reminds us of the field-dependence and field-independence styles of Witkin et al. (1962). Moreover, the second dimension is reminiscent of the Dual-Coding Theory of Paivio (1979) (see Chapter 2, Section 2.4.3., p. 26, for an explanation) because he maintained that there are two mental representation systems: a verbal system and an imagery system.

Fleming and Mills (1992) added a new category to the perceptual modalities found in the model of Barbe et al. (1979). They put forward the VARK model which stands for Visual, Aural, Read/Write, and Kinesthetic learning styles. They emphasized that learners may have a “Visual preference for graphical and symbolic ways of representing information,” or “Read/Write preferences for information printed as words.” The Aural modality is concerned with information that is heard; the Kinesthetic modality is related to “the use of experience and practice” (p. 140). Therefore, the VARK model reminds us of the models proposed by Dunn and Dunn (1972), Barbe et al. (1979), and Reid (1987).

In sum, the perceptual learning styles are the ones to be thoroughly researched in this dissertation for two reasons. First, the perceptual component can be found in the majority of learning style definitions (Haring, 1985; Hsieh et al., 2011; Keefe, 1979; Orlich et al., 2012; Reid, 1995a; Spolsky, 1989) and models (Barbe et al., 1979; Dunn & Dunn, 1972; Fleming & Mills, 1992; Reid, 1987). Second, they are the most significant perceptual modalities that can be found in a second or foreign language classroom, as

Barbe et al. (1979) noted, which are also the object of study of this dissertation. The following section will focus on this notion of perceptual learning styles.

### 3.3.3. Perceptual learning styles

Most of the definitions and models of learning styles explained above remarked the vital role that perception plays in this field. Forgas (1966), Gagné (1970), Keefe (1988), Kelley (1962), and Rosner (1975) have defined and researched the concept of perception. For example, Forgas (1966) took into account the receptive process in his definition of perception: “the process by which an organism receives or extracts certain information about the environment” (pp. 1-2). Similarly, Rosner (1975) focused on the receptive process, but he also added the notion of interpretation, as in his view, the perceiver has to pay attention to the characteristics of the information, set their own values, and interpret it:

1. pays particular attention to certain features of that information; features that he considers to be distinctive in that situation.
2. attaches to those distinctive features his own personal, emotional, physical, and intellectual values.
3. comes to some conclusion, that is, interprets the information. (p. 37)

On the other hand, Keefe (1988) regarded perception as a cognitive process: “the process by which the brain systematically collects information” (p. 1). All in all, perception involves the use of the senses (sight, hearing, touch, smell, and taste), and it is essential for learning, since it is “the process most intimately associated with learning” (Barbe & Milone, 1981, p. 378).

A more accurate term to refer to the senses is perceptual modality. It entails the use of the senses in order to grasp information: “any of the sensory channels through which an individual receives and retains information” (Barbe et al., 1979, p. 1). In this line, Barbe and Milone (1981) and Keefe (1982) differentiated between modality strengths and modality preferences. Modality strengths refer to the better processing of information when using one or more perceptual channels exclusively: “the channels most efficient for processing information” (Barbe & Milone, 1981, p. 378). It is not a fixed quality because a modality strength can change with time and experience. These strengths are assessed through tasks, instruments, or observation, as reported by Barbe and Milone (1981). Unlike modality strength, a modality preference is “a person’s opinion regarding the modality through which he or she learns best” (Barbe & Milone, 1982, p. 2). In this regard, modality preferences are weaker than modality strengths because they are just

preferences; they are assessed through self-reports. However, it might be the case that individuals have a specific modality preference, but their modality strength is completely different, as Barbe and Milone (1981) observed. Individuals can have a dominant modality, which is a “channel through which information is processed most efficiently,” along with a secondary modality, which is not “so efficient as its dominant counterpart” (Barbe et al., 1979, p. 6). Nevertheless, individuals may not have one dominant modality and have “mixed modalities” (p. 6), which implies the use of two or more senses with the same frequency. Learners who have mixed modality preferences would also be referred to as multimodal learners throughout this dissertation. In line with this, perceptual learning styles can also be referred to as modality preferences. Now, let us move on to define the concept of perceptual learning styles.

**3.3.3.1. Definitions.** Several definitions have been put forward of the concept of perceptual learning styles (e.g., Dunn & Dunn, 1979; Gagné, 1970; Kinsella, 1995a; Lethaby & Mayne, 2020; Oxford et al., 1991; Reid, 1987).

As opposed to the definitions of learning styles, scholars appear to coincide more with the definition of perceptual learning styles. For example, Reid (1987), based on the work conducted by Dunn and Dunn (1979) and Dunn (1983), defined perceptual learning styles as “the variations among learners in using one or more senses to understand, organize, and retain experience” (Reid, 1987, p. 89). Likewise, Oxford et al. (1991) described them as follows: “the sensory modality with which the learner is most comfortable and through which most perception is channeled for that individual” (p. 7). For Kinsella (1995a), they are “the senses through which each person takes in and retains new and difficult information” (p. 225). According to Oxford (2001), perceptual learning styles allude to “the physical, perceptual channels with which the student is the most comfortable” (p. 360). Therefore, she held the same view she and her colleagues had in the 1990s. Lethaby and Mayne (2020) described them as “the idea that learners have a preferred way of receiving information (either visually, auditorily or kinesthetically) and, especially the idea that accommodating this preferred mode will enhance learning” (p. 1).

All these researchers agree with the definition of perceptual learning styles, as they are the preferences an individual has for acquiring information. As far as we are concerned, a more accurate definition would include the reasons why learners choose a specific sensory modality to learn, which might be influenced by their gender, motivation,

attitude to learning, personality, among other individual factors. In the next section, we will deal with the classifications of perceptual learning styles.

**3.3.3.2. Classifications.** The same occurs with the classifications of perceptual learning styles, since all scholars coincide with three categories: visual, auditory, and tactile/kinesthetic. However, some of them also included other categories to their classifications, as can be observed in Table 3 (pp. 51-52).

Visual learners prefer to receive information through the sense of sight. Following Dörnyei (2005), these types of learners like reading, seeing charts, images, graphs, diagrams, or objects. Oxford (1995a) highlighted the need of written directions for visual learners: “They must have written directions if they are to function well in the classroom” (p. 35). She also claimed that the lack of visual materials to support oral directions might be bewildering for them: “oral directions without any visual backup can be very confusing” (Oxford, 2003, pp. 3-4). In an EFL classroom, visual learners favor learning from the textbook, as it includes pictures, written activities, and there are different colors and fonts. They prefer activities which ask them to highlight, circle, or underline information (Arnold & Fonseca, 2004; Dörnyei & Ryan, 2015). For example, Dunn et al. (1994) recommended the use of movies as a tool to help visual learners, as well as using the blackboard. These learners enjoy when the lectures of their teachers are supported by visual presentations (e.g., PowerPoint, Prezi) or the use of technology to support those lectures and explanations visually. In addition, they like taking detailed notes of the explanations of their teachers (e.g., grammar) and the use of handouts (Peacock, 2001). Arnold and Fonseca (2004) also remarked that visual learners benefit from using posters, flashcards, and videos. The visual learning style seems to be the preferred modality in a classroom, since, as Oxford (1995a) affirmed, 50 to 80 per cent of learners in a classroom are visual.

Auditory learners like to receive information through the sense of hearing. According to Dörnyei (2005) and Oxford (2003), they enjoy reading aloud and listening to others, as well as talking to their classmates and teachers. In the EFL classroom, they prefer listening to lectures, classroom discussions, repeating words and sentences, oral explanations and instructions, tapes, singing and listening to songs, and they love role-play activities: “[they] want to engage in discussions, conversations, and group work. These students typically require only oral directions” (Oxford, 1995a, p. 36). Therefore, they do not need visual aids, as their visual classmates do. They usually resort to reciting

aloud when they are studying to remember the information better (Dörnyei, 2005). Dunn et al. (1994) also added the use of phonics.

Regarding tactile/kinesthetic learning styles, there is not a general agreement on the terms used to name this category. Lowenfeld (1939) and O'Brien (1989) classified both tactile and kinesthetic under the category haptic, whilst Kinsella (1995a) and Reid (1987) suggested that both tactile and kinesthetic are two separate categories. Mueller (1965) did not differentiate between the two and used either the term kinesthetic to imply both tactile and kinesthetic or the term tactile/kinesthetic. In our view, kinesthetic and tactile learning styles are not the same, even though they are somehow related. The kinesthetic learning style entails body movement in order to learn, whereas the tactile learning style refers to learning through touching or feeling: kinesthetic learning “implies total physical involvement with a learning environment such as taking a field trip, dramatizing, pantomiming, or interviewing,” while tactile learning “suggests learning with one’s hands through manipulation or resources, such as writing, drawing, building a model, or conducting a lab experiment” (Kinsella, 1995b, p. 172). The term tactile/kinesthetic is the one to be used throughout this dissertation, without making a distinction between both categories, to designate those learners who prefer learning by physical movement and touch. They share similar characteristics and the Learning Style Survey, which is the instrument to gather information on perceptual learning styles (see Chapter 6, p. 121), considered both styles together. Tactile/kinesthetic learners enjoy hands-on activities, role-play, drawing, experiments, taking notes, manipulating objects, building models, moving around the classroom, and painting, among other activities, as reported by Dörnyei (2005), Hyland (1993) and Oxford (2003). In an EFL classroom, kinesthetic learners enjoy role-play activities, the use of realia, acting out, drama, and group work (Arnold & Fonseca, 2004; Peacock, 2001). In addition, Dunn et al. (1994) and Andreou et al. (2008) suggested activities related to concrete experience. On the other hand, tactile learners prefer doing hands-on activities, such as writing assignments (e.g., compositions, essays), underlining the words they do not understand, and written instructions (Dörnyei & Ryan, 2015; Peacock, 2001). Regarding technology, they would benefit from using tablets, computers, or interactive smart boards.

All things considered, learners may have a single preference for learning a foreign language (visual, auditory, or tactile/kinesthetic), or they may have a mixed-modality preference if they favor two or three of those learning styles in balance. The latter type of learners is what is referred to in the present dissertation as multimodal. It is believed that



these learners are more successful than learners with a single modality preference (Barbe et al., 1979; Dörnyei, 2005; Kinsella, 1995a). It is essential to mention that we view perceptual learning styles as a general preference for learning. It does not imply that language learners exclusively learn in the preferences they report to have, they might resort to other perceptual learning styles in different learning situations or activities.

Table 3 (pp. 51-52) provides a summary of perceptual learning style classifications. As can be observed, the classifications of Barbe et al. (1979), Bissell et al. (1971), Dunn et al. (1975), Keefe (1979), Kinsella (1995a), Messick (1976), O'Brien (1989), and Oxford (1995b) pertained to the visual, auditory, and tactile/kinesthetic learning styles.

*Table 3*

*Summary of perceptual learning styles classifications*

Author(s)	Perceptual learning styles			
Pitkin (1931)	Eye learner	Manipulative learner	Throat-and-tongue learner	Ear learner
Lowenfeld (1939)	Visual	Haptic		
Bissell et al. (1971)	Visual	Auditory	Kinesthetic	
Dunn, Dunn and Price (1975)	Visual	Auditory	Tactile	Kinesthetic
French (1975)	Print	Aural	Interactive	Visual
	Haptic	Kinesthetic	Olfactory	
Messick (1976)	Visual	Auditory	Kinesthetic	
Barbe et al. (1979)	Visual	Auditory	Kinesthetic/tactile	
Keefe (1979)	Visual/spatial	Auditory/verbal	Kinesthetic/psychomotor	
Cherry (1981)	Print	Aural	Interactive	Visual
	Haptic	Kinesthetic	Olfactory	
Friedman and Alley (1984)	Auditory linguistic	Visual linguistic	Auditory numerical	
	Visual numerical	Audio-visual-kinesthetic	Individual learner	
	Group learner	Oral expressive	Written expressive	
James and Galbraith (1985)	Print	Aural	Interactive	Visual
	Haptic	Kinesthetic	Olfactory	

Reid (1987)	Visual Tactile	Auditory Group	Kinesthetic Individual
Babich et al. (1988)	Auditory language Visual numerical	Visual language Audio-visual-kinesthetic	Auditory numerical
O'Brien (1989)	Visual	Auditory	Haptic
Fleming and Mills (1992)	Visual	Read/Write	Aural Kinesthetic
Felder and Henriques (1995)	Visual	Verbal	Other (tactile, gustatory, olfactory)
Kinsella (1995)	Visual	Auditory	Kinesthetic Tactile
Oxford (1995)	Visual	Auditory	Tactile/kinesthetic

In the early 1930s, Pitkin (1931) distinguished four different types of learners. The eye learner is related to the visual learning style, the ear learner refers to the auditory learning style, while the manipulative learner could be associated with the tactile/kinesthetic learning style. He added the throat-and-tongue learner which, for us, could also be classified under the auditory learning style category. On the other hand, Lowenfeld (1939) classified learners into two categories. He defined visual learners as those whose “impressions coming from other senses are subordinate to those coming from the eye, and when visual impressions are the dominant feature in a percept” (p. 82); he referred to haptic learning as “a world confined to things that can be perceived by means of our senses of touch or bodily sensations” (p. 85). Accordingly, he alluded to the visual learning style and to the tactile/kinesthetic learning style, which he grouped together under the haptic category. Nevertheless, he did not consider auditory as a learning style.

Table 3 (pp. 51-52) also shows that French (1975), Cherry (1981), and James and Galbraith (1985) concurred with their perceptual learning style classifications and identified seven perceptual learning styles. They differentiated two types of what was previously termed visual learning styles: print and visual. The difference between both terms is that print refers to grasping information by printed words, whereas visual refers to grasping information by seeing pictures, images, objects, and activities. The aural and interactive categories could be classified as auditory learning style, since, for these researchers, the aural alludes to receiving information through listening, whilst interactive alludes to receiving information through discussion. Similarly, they differentiated between haptic and kinesthetic learning styles. Haptic would be associated with our

definition of tactile learning style given at the beginning of this section, as it implies receiving information through the sense of touch. Their kinesthetic learning style is related to our definition because they also take into account the body movement. In addition, they added the olfactory learning style, which entails using the sense of smell to grasp information.

In the same vein, Friedman and Alley (1984) and Babich et al. (1988) coincided with some of their categories. In their view, auditory linguistic/language students are those who enjoy learning through the spoken word, whereas visual linguistic/language learners like learning by seeing words in books, on the blackboard, charts, or graphs. Auditory numerical students learn from hearing numbers and oral explanations, while visual numerical learners prefer seeing the numbers written. The auditory-visual-kinesthetic learning styles are a combination of the three modalities. Notwithstanding, Friedman and Alley (1984) included the individual, group, oral expressive, and written expressive learning styles. For these scholars, individual learning styles refer to those students who prefer working and learning on their own, whereas group learning styles allude to those students who prefer working and learning with other classmates. Oral expressive learners enjoy sharing their knowledge orally, whilst written expressive learners prefer sharing their knowledge in the written form.

Reid (1987) added two social learning styles: group and individual, to her classification of perceptual learning styles. Fleming and Mills (1992) also included a new category to the perceptual modalities. They put forward the VARK model which stands for Visual, Aural, Read/Write, and Kinesthetic learning styles (see Section 3.3.2., p. 38, for an explanation). On the other hand, Felder and Henriques (1995) took into consideration all the sensory modalities and classified learning styles into three categories. They claimed that the other category is not relevant for language learning and teaching: “the third category (touch, taste, smell) plays at most a marginal role in language instruction” (p. 23).

In short, the visual, auditory, and tactile/kinesthetic perceptual learning styles are the ones to be considered in this dissertation. We agree with Barbe et al. (1979) and Dunn and Dunn (1979) in that they are the most relevant modalities found in a foreign language classroom, which is the context where this study was conducted.

**3.3.3.3. Instruments.** A few instruments to measure SL/FL perceptual learning styles have been developed throughout the years. The Perceptual Learning Style Preference Questionnaire (PLSPQ) was proposed by Reid (1987). It was the first instrument that measured L2 learning styles, according to Dörnyei (2005), since it was intended for ESL learners. This instrument is still widely employed in the L2/FL field (e.g., Asadipiran, 2016; Saud, 2018; Sun & Teng, 2017; van Vu & Tran, 2020). It assesses four perceptual learning styles (visual, auditory, kinesthetic, and tactile) and two social learning styles (group learning preference and individual learning preference). It is a self-reporting questionnaire which consists of 30 items organized at random; there are five statements for each learning style. Based on their behavioral preferences, learners are required to express their level of agreement on a five-point Likert scale which ranges from 1 “strongly agree” to 5 “strongly disagree”. To identify language learners’ major, minor, and negligible learning styles, Reid (1995b) established fixed scores: 38 to 50 for a major learning style, 25 to 37 for a minor learning style, and 0 to 24 for a negligible learning style. Therefore, learners’ major learning style was considered their most favored style. As Dörnyei (2005), Shen (2010), and Wintergerst and DeCapua (2001) indicated, some advantages of implementing this instrument are: its short length, since it is only composed of 30 items; its time-saving nature, and its easiness to administer and score. Even though this instrument was designed for L2 learners, its items are not L2-specific because they “do not mention any subject matter” (Dörnyei & Ryan, 2015, p. 128). In the same vein, Peacock (2001) also recognized a limitation on the wording of the items, as they were too general and failed to provide any specific examples. According to Reid (1987), it had been proved to be a valid and reliable instrument as the split half method was applied. Nevertheless, some questions have been posed regarding its validity and reliability (e.g., Peacock, 2001; Wintergerst et al., 2001; Wintergerst & DeCapua, 2001). Reid (1990) encountered several difficulties while trying to achieve acceptable internal consistency for the scales in the PLSPQ. In fact, Wintergerst et al. (2001) declared that the reliability estimates for the perceptual learning style scales in the PLSPQ were low, as the Cronbach’s alpha for those scales were: .53 for the visual scale, .48 for the auditory scale, .69 for the kinesthetic scale, and .59 for the tactile scale.

Another well-known instrument in the L2 context is the Style Analysis Survey (SAS) by Oxford (1995b). The aim of this questionnaire is to measure learners’ general approach to learning and working, and their overall learning style preferences. It assesses 11 learning styles, which are classified into five dimensions, totaling a number of 110

items. Those five dimensions are: (1) How I use my physical senses to study or work, which measures the visual, auditory, and hands-on learning styles; (2) How I deal with people (extrovert vs. introvert); (3) How I handle possibilities (intuitive-random vs. concrete-sequential); (4) How I approach tasks (closure-oriented vs. open); and (5) How I deal with ideas (global vs. analytic). Therefore, the first part addresses sensory/perceptual learning styles (visual, auditory, and hands-on), whilst the four remaining parts address personality styles (extroverted vs. introverted, intuitive-random vs. concrete-sequential, closure-oriented vs. open), and cognitive styles (global vs. analytic). This self-reporting instrument uses a four-point scale which ranges from “never” to “always.” It has also been implemented in SL or FL studies (e.g., Psaltou-Joycey & Kantaridou, 2009, 2011; Young, 2010), but it is lesser-known and less applied than the PLSPQ. Similar to the PLSPQ, as Cohen and Dörnyei (2002) and Dörnyei (2005) noted, the SAS was designed for L2 language learners, and it is also easy to administer and score. Unlike the PLSPQ, the SAS is considerably longer because the former only has 30 items. According to Dreyer (1998) and Young (2010), it has been proved to have a high reliability, since the Cronbach’s alpha for the first part of the questionnaire was 0.92, as well as content and concurrent validity.

Ehrman and Leaver (2003) developed the E&L Construct as an innovative approach to measure and understand styles in language learning. This model comprises a superordinate construct, termed synopsis-ectasis, which alludes to “the degree of conscious control of learning desired or needed” (Ehrman & Leaver, 2003, p. 395). They designed the Learning Styles Questionnaire (Ehrman & Leaver, 2003) to gather individual information about how learners learn, which is composed of the synopsis-ectasis construct and ten subscales: (1) field dependent-field independent; (2) field sensitive-field insensitive; (3) random (non-linear) vs. sequential (linear); (4) global-particular; (5) inductive-deductive; (6) synthetic-analytic; (7) analogue-digital; (8) concrete-abstract; (9) levelling-sharpening; and (10) impulsive-reflective. This instrument consists of 30 items and uses a nine-point semantic differential scale format. Nevertheless, it has not been as widely implemented as other instruments. For Dörnyei and Ryan (2015), this might be because of its limited availability or the complex interpretations of the results.

The Learning Style Survey (LSS) was designed by Cohen, Oxford, and Chi (2009) to assess students’ general approach to learning and their learning style preferences. This instrument consists of 11 parts which assess different learning style dimensions: Part 1.

How I use my physical senses measures the perceptual learning styles (visual, auditory, and tactile/kinesthetic) (30 items); Part 2. How I open myself to learning situations: extraverted or introverted (12 items); Part 3. How I handle possibilities: random-intuitive or concrete-sequential (12 items); Part 4. How I deal with ambiguity and deadlines: closure-oriented or open-oriented (8 items); Part 5. How I receive information: global or particular (10 items); Part 6. How I further process information: synthesizing or analytic (10 items); Part 7. How I commit material to memory: sharpener or leveler (6 items); Part 8. How I deal with language rules: deductive or inductive (6 items); Part 9. How I deal with multiple inputs: field-independent or field-dependent (6 items); Part 10. How I deal with response time: impulsive or reflective (6 items); and Part 11. How literally I take reality: metaphoric or literal (4 items). Each part consists of different behavioral statements, depending on the number of items each specific part measures. Considering their behavior in learning, informants have to circle their answer based on a five-point Likert scale (0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always). At the end of the questionnaire, a table to self-score the total points for each part and an explanation of the characteristics of the different learning styles that this instrument measures are included. The LSS instrument is based on the SAS (Oxford, 1995b). The format of this questionnaire, which comprises different sections and uses a Likert-scale ranging from never to always, is similar to the SAS. The difference lies in that the SAS used a four-point scale, while the LSS used a five-point scale. Some of the parts in which it is divided and some of its items are based on it as well. Nevertheless, the wording of some parts and items are written differently. In the SAS, the survey is composed of five parts, whilst the LSS consists of 11 parts. They both measure the perceptual learning styles (visual, auditory, and tactile/kinesthetic), and the extrovert or introvert, random-intuitive or concrete-sequential, closure-oriented or open-oriented, and global or analytic dimensions. However, the global-analytic dimension was changed for the global-particular dimension. Cohen et al. (2009) included more dimensions: synthesizing or analytic, sharpener or leveler, deductive or inductive, field-dependent or field-independent, impulsive or reflective, and metaphoric or literal. In addition, some of these additional dimensions and the wording of some items are also founded on the E&L Construct and the Learning Styles Questionnaire (Ehrman & Leaver, 2003), as Dörnyei (2005), Dörnyei and Ryan (2015), and Tight (2010) observed.

There is also a version for young learners, entitled Learning Style Survey for Young Learners (LSSYL) which was developed by Cohen and Oxford (2001). As the

LSS, this instrument assesses students' general approach to learning and, more specifically, their learning styles. It is a shorter version of the LSS, as this one is composed of 51 items. It comprises four parts, which are similar to those of the LSS: Part 1. How I use my physical senses: visual, auditory, and tactile/kinesthetic (23 items), Part 2. How I expose myself to learning situations: extraverted or introverted (10 items), Part 3. How I deal with tasks: closure-oriented or open (8 items), and Part 4. How I receive information: global or particular (10 items). Another difference with the LSS is that the LSSYL uses a three-point Likert scale ranging from often or always (three points) to never or rarely (one point). At the end of the questionnaire, a part of self-scoring the total points for each learning style and an explanation of the different learning styles that this instrument measures are also included.

As it will be explained in Chapter 6 (p. 121), the instrument that is going to be used throughout this dissertation is the Learning Style Survey (LSS) (Cohen et al., 2009). Having defined the concept of perceptual learning styles and provided different classifications and instruments to assess them, the aim now is to review the studies that have been conducted on this issue.

**3.3.3.4. Review of empirical studies.** The perceptual learning styles of EFL learners have been thoroughly examined in the literature. Table 4 (pp. 58-59) provides a summary of studies from the 1980s to 2021. The articles that were indexed in high-impact journals, researched the three perceptual learning styles (or four in the classification of Reid, 1995b) and included the mean values for each perceptual learning style were selected. However, all the Master and PhD dissertations, the investigations that did not research the three perceptual learning styles that are object of this study, as well as all the studies that did not explore English as a second or foreign language and did not include the mean values for each perceptual learning style were removed.

Table 4

*Summary of studies on the most and least preferred perceptual learning styles*

Study	Informants' background	Instrument	Most preferred	Least preferred
Reid (1987)	Adult ESL students (N 1,234) USA	PLSPQ	Kinesthetic	Visual
Melton (1990)	University students (N 331) China	PLSPQ	Tactile	Visual
Hyland (1993)	University students (N 405) Japan and New Zealand	PLSPQ	Auditory	Visual
Park (2000)	Secondary school students (N 738) USA	PLSPQ	Kinesthetic	Visual
Park (2001)	Secondary school students (N 1,896) USA	PLSPQ	Kinesthetic	Visual
Peacock (2001)	University students (N 206) Hong Kong	PLSPQ	Kinesthetic	Visual
Wintergerst and DeCapua (2001)	University, college students (N 32) USA	PLSPQ	Kinesthetic	Tactile-visual
Park (2002)	Secondary school students (N 857) USA	PLSPQ	Tactile	Visual
Isemonger and Sheppard (2003)	University students (N 710) South Korea	PLSPQ	Kinesthetic	Visual
Lincoln and Rademacher (2006)	Adult ESL students (N 69) USA	VARK	Read/write	Visual
Abdollahzadeh and Amiri (2009)	Adult EFL students (N 196) Iran	PLSPQ	Kinesthetic	Auditory
Chen (2009)	Secondary school students (N 451) Taiwan	PLSPQ	Kinesthetic	Tactile
Kim (2009)	Secondary school students (N 974) South Korea	LSSYL	Visual	Kinesthetic
Chen et al. (2010)	University students (N 236) Taiwan	PLSPQ	Auditory	Visual
Shen (2010)	University students (N 145) Taiwan	PLSPQ	Kinesthetic	Visual
Aliweh (2011)	College students (N 51) Egypt	PLSPQ	Visual	Auditory
Kim and Kim (2011)	Secondary school students (N 495) South Korea	LSS	Visual	Kinesthetic
Psaltou-Joycey and Kantaridou (2011)	University students (N 1,616) Greece	SAS	Visual	Auditory
Seifoori and Zarei (2011)	University students (N 110) Iran	PLSPQ	Tactile	Auditory
Shoostari (2011)	University students (N 95) Iran	PLSPQ	Visual	Tactile
Tuan (2011)	University students (N 172) Vietnam	PLSPQ	Kinesthetic	Visual
Yang and Kim (2011)	Secondary school students (N 330) China, Japan, South Korea, Sweden	LSS	Visual	Kinesthetic
Ding and Lin (2012)	University students (N 172) The Netherlands	PLSPQ	Auditory	Visual
Khmakhien (2012)	University students (N 162) Thailand	PLSPQ	Auditory	Visual
Li (2012)	University students (N 92) China	PLSPQ	Tactile	Auditory
Obralčić and Akbarov (2012)	University students (N 34) Bosnia and Herzegovina	PLSPQ	Visual	Auditory
Phantharakphong (2012)	University students (N 311) Thailand	VARK	Kinesthetic	Visual
Sadeghi (2012)	University students (N 250) Iran	SAS	Visual	Hands-on
Suh and Kim (2012)	Secondary school students (N 97) South Korea	PLSPQ	Auditory	Tactile
Liu et al. (2013)	University students (N 146) China	Not reported	Hands-on	Auditory
Muniandy (2013)	University students (N 92) Malaysia	PLSPQ	Kinesthetic	Visual
Naserieh and Sarab (2013)	University students (N 138) Iran	PLSPQ	Kinesthetic	Visual
Zhang and Evans (2013)	University students (N 466) China	SAS	Visual	Auditory
Kim and Kim (2014)	Primary and secondary school students (N 2,239) South Korea	Adaptation LLS and Kinsella's	Visual	Kinesthetic
Siddique et al. (2014)	University students (N 330) Pakistan	PLSPQ	Tactile	Kinesthetic
Viriya and Sapsirin (2014)	University students (N 150) Thailand	PLSPQ	Auditory	Visual
Chen and Hung (2015)	University students (N 1,105) Taiwan	PLSPQ	Kinesthetic	Tactile
Hsu (2015)	University students (N 341) Taiwan	PLSPQ	Visual	Kinesthetic
Moayyeri (2015)	University students (N 300) Iran	VARK	Read/write	Visual
Zhang (2015)	Primary and secondary school students (N 1,667) China	Adaptation	Visual	Kinesthetic
Asadipiran (2016)	Secondary school students (N 60) Iran	PLSPQ	Visual	Kinesthetic
Lee et al. (2016)	University students (N 401) Hong Kong	PLSPQ	Visual	Auditory
Ou-Yang and Wu (2016)	University students (N 108) Taiwan	PLSPQ	Tactile	Auditory
Zarei and Pourghasemiar (2016)	University students (N 134) Iran	PLSPQ	Visual	Tactile
Jayanama (2017)	University students (N 425) Thailand	PLSPQ	Auditory	Tactile



Table 4

*Summary of studies on the most and least preferred perceptual learning styles (continued)*

Study	Informants' background	Instrument	Most preferred	Least preferred
Mulyadi et al. (2017)	University students (N 50) Indonesia	VAK	Kinesthetic	Visual
Zarrabi (2017)	Adult EFL students (N 135) Iran	PLSPQ	Auditory	Tactile
Çiftlikli (2018)	University students (N 154) Cyprus	PLSPQ	Kinesthetic	Auditory
Derakhshan and Shakki (2018)	University students (N 120) Iran	PLSPQ	Tactile	Auditory
Hatami (2018)	University students (N 108) Iran	LSS	Visual	Kinesthetic
Huang et al. (2018)	University students (N 329) China	LSS	Visual	Kinesthetic
Kim and Kim (2018)	University students (N 283) South Korea	Adaptation of LSS	Visual	Kinesthetic
Natividad and Batang (2018)	University students (N 163) Philippines	PLSPQ	Auditory	Visual
Swartz and Ye (2018)	Secondary school students (N 113) Thailand	PLSPQ	Kinesthetic	Visual
Banisaeid and Huang (2019)	University students (N 371) China and Iran	PLSPQ	Kinesthetic	Tactile
Gholam-Shahbazi (2019)	University students (N 200) Iran	VAK	Auditory	Visual-kinesthetic
Mahmud et al. (2019)	University students (N 30) Indonesia	PLSPQ	Auditory-kinesthetic	Visual
Aslaksen et al. (2020)	University students (N 248) Norway	BLSI, LSS	LSS: Visual BLSI: Visual	LSS: Kinesthetic BLSI: Auditory
Dao et al. (2020)	University students (N 20) Vietnam	PLSPQ	Visual	Kinesthetic-tactile
Meguro (2020)	Secondary school students (N 37) Japan	LSS	Visual	Tactile/kinesthetic
Nge and Eamoraphan (2020)	Adult EFL students (N 155) Myanmar	PLSPQ	Kinesthetic	Tactile
Payaprom and Payaprom (2020)	University students (N 472) Thailand	VARAK	Kinesthetic	Visual
Van Vu and Tran (2020)	University students (N 385) Vietnam	PLSPQ	Kinesthetic	Visual
Arif et al. (2021)	University students (N 79) Indonesia	PLSPQ	Kinesthetic	Visual

As shown in Table 4 (pp. 58-59), scholars mostly explored the perceptual learning styles of secondary and university ESL/EFL learners in the Asian continent. The majority of studies (Abdollahzadeh & Amiri, 2009; Arif et al., 2021; Banisaeid & Huang, 2019; Chen & Hung, 2015; Chen, 2009; Çiftlikli, 2018; Isemonger & Sheppard, 2003; Mahmud et al., 2019; Mulyadi et al., 2017; Muniandy, 2013; Naserieh & Sarab, 2013; Nge & Eamoraphan, 2020; Park, 2000, 2001; Payaprom & Payaprom, 2020; Peacock, 2001; Phantharakphong, 2012; Reid, 1987; Shen, 2010; Swartz & Ye, 2018; Tuan, 2011; van Vu & Tran, 2020; Wintergerst & DeCapua, 2001) coincided with kinesthetic as the most preferred perceptual learning style. All of them were conducted in different countries of the Asian continent (South Korea, Iran, Taiwan, Malaysia, Thailand, Vietnam, China, Indonesia, Myanmar), except for a few which took place in North America (Park, 2000, 2001; Reid, 1987; Wintergerst & DeCapua, 2001) and Europe (Çiftlikli, 2018). The educational level of the informants also showed the disparity in these studies. Most of them accounted for university EFL learners (Arif et al., 2021; Banisaeid & Huang, 2019; Chen & Hung, 2015; Çiftlikli, 2018; Isemonger & Sheppard, 2003; Mahmud et al., 2019; Mulyadi et al., 2017; Muniandy, 2013; Naserieh & Sarab, 2013; Payaprom & Payaprom, 2020; Peacock, 2001; Phantharakphong, 2012; Shen, 2010; Tuan, 2011; van Vu & Tran,

2020; Wintergerst & DeCapua, 2001). However, Park (2000, 2001) researched North American, Chen (2009) Taiwanese, and Swartz and Ye (2018) Thai secondary school respondents. Wintergerst and DeCapua (2001) focused on college students, Reid (1987) on adult ESL students, and Abdollahzadeh and Amiri (2009) and Nge and Eamoraphan (2020) on EFL learners. They also differed in the data collection instrument (see Table 4, pp. 58-59). Most scholars employed the Perceptual Learning Style Preference Questionnaire (PLSPQ) (Reid, 1995b), which measured ESL or EFL learners' four perceptual learning styles (visual, auditory, tactile, and kinesthetic) and two social learning styles (group, and individual). Mulyadi et al. (2017), Payaprom and Payaprom (2020), and Phantharakphong (2012) implemented the VARK (Fleming & Mills, 1992) and VAK (Chislett & Chapman, 2005) questionnaires. These instruments assessed three learning styles: visual, auditory, and kinesthetic. Nevertheless, the VARK questionnaire also included the read/write modality.

Along the same lines, Derakhshan and Shakki (2018), Li (2012), Melton (1990), Ou-Yang and Wu (2016), Park (2002), Seifoori and Zarei (2011), and Siddique et al. (2014) purported that tactile, and hands-on for Liu et al. (2013), was the most favored perceptual learning style. As it has been stated in the previous section, although they are not exactly the same, the terms kinesthetic, tactile, hands-on, and haptic are going to be referred to as tactile/kinesthetic in this dissertation to unify them. As Table 4 (pp. 58-59) depicts, most of the aforementioned research was conducted in the Asian continent with university students, but for Park (2002), which focused on secondary school North American informants. Likewise, they implemented the PLSPQ (Reid, 1995b) questionnaire, except Liu et al. (2013) who adapted a questionnaire which was not reported.

In contrast, Aliweh (2011), Asadipiran (2016), Aslaksen et al. (2020), Dao et al. (2020), Hatami (2018), Hsu (2015), Huang et al. (2018), Kim (2009), Kim and Kim (2014, 2018), Kim and Kim (2011), Lee et al. (2016), Meguro (2020), Obralić and Akbarov (2012), Psaltou-Joycey and Kantaridou (2011), Sadeghi (2012), Shooshtari (2011), Yang and Kim (2011), Zarei and Pourghasemian (2016), Zhang and Evans (2013), and Zhang (2015) proved that visual was the perceptual learning style preference of their respondents. These studies were mostly conducted in the Asian continent, specifically, in South Korea, Iran, China, Japan Taiwan, and Vietnam. However, other investigations were found in Africa (Aliweh, 2011) and Europe (Aslaksen et al., 2020; Obralić & Akbarov, 2012; Psaltou-Joycey & Kantaridou, 2011; Yang & Kim, 2011). As

shown in Table 4 (pp. 58-59), the educational level also varied. Most of them comprised EFL university students (Aslaksen et al., 2020; Dao et al., 2020; Hatami, 2018; Hsu, 2015; Huang et al., 2018; Kim & Kim, 2018; Lee et al., 2016; Obralić & Akbarov, 2012; Psaltou-Joycey & Kantaridou, 2011; Sadeghi, 2012; Shooshtari, 2011; Zarei & Pourghasemian, 2016; Zhang & Evans, 2013). However, Asadipiran (2016), Kim (2009), Kim and Kim (2014), Kim and Kim (2011), Meguro (2020), Yang and Kim (2011), and Zhang (2015) concentrated on secondary school informants. Nevertheless, a minority of them comprised Egyptian college students (Aliweh, 2011) and South Korean and Chinese primary school learners (Kim & Kim, 2014; Zhang, 2015) respectively. Another divergence was the data collection instrument employed. Most investigations implemented the first part of the Learning Style Survey (LSS) (Cohen et al., 2009) or its version for young learners Learner Style Survey for Young Learners (Cohen & Oxford, 2001). These two instruments measured three perceptual learning style preferences: visual, auditory, and tactile/kinesthetic. The PLSPQ was also one of the most used (see Table 4, pp. 58-59). A few studies (Psaltou-Joycey & Kantaridou, 2011; Sadeghi, 2012; Zhang & Evans, 2013) employed the Styles Analysis Survey (SAS) (Oxford, 1995b), which measured different style dimensions, among them perceptual styles (visual, auditory, and hands-on). However, Aslaksen et al. (2020) implemented the Barsch Learning Style Inventory (BLSI) (Barsch, 1991), which also assessed the visual, auditory, and kinesthetic perceptual learning styles.

Similarly, the studies conducted by Lincoln and Rademacher (2006) and Moayyeri (2015) in the USA and Iran reported that their adult ESL and university informants respectively preferred the read/write perceptual learning style. In these cases, the instrument used was the VARK (Fleming & Mills, 1992). As commented before, the read/write modality was associated with the visual perceptual learning style that is used in this dissertation.

On the other hand, Chen et al. (2010), Ding and Lin (2012), Gholam-Shahbazi (2019), Hyland (1993), Jayanama (2017), Khmakhien (2012), Mahmud et al. (2019), Natividad and Batang (2018), Suh and Kim (2012), Viriya and Sapsirin (2014), and Zarrabi (2017) indicated that auditory was the most favored perceptual learning style. As it happened before, most studies were undertaken in the Asian continent, above all, in the following countries: Japan, Taiwan, Thailand, South Korea, Indonesia, Philippines, and Iran. On the other hand, Hyland (1993) and Ding and Lin (2012) conducted their investigations on Oceania and Europe, respectively. Concerning the educational level of

the informants, a great number of studies researched EFL university students (Chen et al., 2010; Ding & Lin, 2012; Gholam-Shahbazi, 2019; Hyland, 1993; Jayanama, 2017; Khmakhien, 2012; Mahmud et al., 2019; Natividad & Batang, 2018; Viriya & Sapsirin, 2014). Nevertheless, Suh and Kim (2012) and Zarrabi (2017) focused their research on secondary school and adult EFL learners, respectively. All these scholars also coincided with the instrument employed, the PLSPQ (Reid, 1995b) except for Gholam-Shahbazi (2019), who implemented the VAK (Chislett & Chapman, 2005) questionnaire.

The visual perceptual learning style was reported to be the least favored by ESL/EFL learners (Arif et al., 2021; Chen et al., 2010; Ding & Lin, 2012; Gholam-Shahbazi, 2019; Hyland, 1993; Isemonger & Sheppard, 2003; Khmakhien, 2012; Lincoln & Rademacher, 2006; Mahmud et al., 2019; Melton, 1990; Moayyeri, 2015; Mulyadi et al., 2017; Muniandy, 2013; Naserieh & Sarab, 2013; Natividad & Batang, 2018; Park, 2000, 2001, 2002; Payaprom & Payaprom, 2020; Peacock, 2001; Phantharakphong, 2012; Reid, 1987; Shen, 2010; Swartz & Ye, 2018; Tuan, 2011; Van Vu & Tran, 2020; Viriya & Sapsirin, 2014; Wintergerst & DeCapua, 2001). As can be observed in Table 4 (pp. 58-59), these studies differed in the continent where they were conducted, the educational level of their informants, and the data collection instruments. The majority of them were conducted in the Asian continent, mainly in China, Japan, South Korea, Taiwan, Vietnam, Thailand, Malaysia, Iran, and Philippines. Other investigations took place in North America (Lincoln & Rademacher, 2006; Park, 2000, 2001, 2002; Reid, 1987; Wintergerst & DeCapua, 2001), Oceania (Hyland, 1993), and Europe (Ding & Lin, 2012). Regarding the educational level, most of them accounted for university learners (Arif et al., 2021; Chen et al., 2010; Ding & Lin, 2012; Gholam-Shahbazi, 2019; Hyland, 1993; Isemonger & Sheppard, 2003; Khmakhien, 2012; Mahmud et al., 2019; Melton, 1990; Moayyeri, 2015; Mulyadi et al., 2017; Muniandy, 2013; Naserieh & Sarab, 2013; Natividad & Batang, 2018; Payaprom & Payaprom, 2020; Peacock, 2001; Phantharakphong, 2012; Shen, 2010; Tuan, 2011; Van Vu & Tran, 2020; Viriya & Sapsirin, 2014; Wintergerst & DeCapua, 2001). Notwithstanding, other samples comprised secondary school informants (Park, 2000, 2001, 2002; Swartz & Ye, 2018), college students (Wintergerst & DeCapua, 2001), and adult ESL learners (Lincoln & Rademacher, 2006; Reid, 1987). Although most of these studies implemented the PLSPQ (Reid, 1995b) instrument, other investigations (Lincoln & Rademacher, 2006; Moayyeri, 2015; Payaprom & Payaprom, 2020; Phantharakphong, 2012) used the VARK (Fleming

& Mills, 1992); the rest (Gholam-Shahbazi, 2019; Mulyadi et al., 2017) employed the VAK (Chislett & Chapman, 2005).

On the contrary, other research (Asadipiran, 2016; Aslaksen et al., 2020; Dao et al., 2020; Gholam-Shahbazi, 2019; Hatami, 2018; Hsu, 2015; Huang et al., 2018; Kim, 2009; Kim & Kim, 2014, 2018; Kim & Kim, 2011; Siddique et al., 2014; Yang & Kim, 2011; Zhang, 2015) demonstrated that kinesthetic was the preferred perceptual learning style of their respondents. All of these investigations were located in the Asian continent, apart from Yang and Kim (2011) and Aslaksen et al. (2020) which were undertaken in Sweden and Norway, respectively, among other countries in the case of the first one. Table 4 (pp. 58-59) displays that university students were the most researched informants (Aslaksen et al., 2020; Dao et al., 2020; Gholam-Shahbazi, 2019; Hatami, 2018; Hsu, 2015; Huang et al., 2018; Kim & Kim, 2018; Siddique et al., 2014). Kim and Kim (2014) and Zhang (2015) focused on primary, and Asadipiran (2016), Kim (2009), Kim and Kim (2014), Kim and Kim (2011), Yang and Kim (2011), and Zhang (2015) on secondary school students. On this occasion, the LSS (Cohen et al., 2009) and its version for young learners LSSYL (Cohen & Oxford, 2001) were the most implemented instruments (Aslaksen et al., 2020; Hatami, 2018; Huang et al., 2018; Kim, 2009; Kim & Kim, 2018, 2014; Kim & Kim, 2011; Yang & Kim, 2011). Kim and Kim (2014) also used an adaptation of Kinsella (1995a), Aslaksen et al., (2020) also implemented the BLSI (Barsch, 1991), whereas Zhang (2015) employed an adaptation, but he did not report which one. Another widely used instrument was the PLSPQ (Reid, 1995b) (Asadipiran, 2016; Dao et al., 2020; Hsu, 2015; Siddique et al., 2014).

Research revealed that tactile (Banisaeid & Huang, 2019; Chen & Hung, 2015; Chen, 2009; Dao et al., 2020; Jayanama, 2017; Nge & Eamoraphan, 2020; Shooshtari, 2011; Suh & Kim, 2012; Wintergerst & DeCapua, 2001; Zarei & Pourghasemian, 2016; Zarrabi, 2017), tactile/kinesthetic (Meguro, 2020), and hands-on (Sadeghi, 2012) were the least favored perceptual learning styles. As it has been previously mentioned, these terms were unified into the term tactile/kinesthetic in this dissertation. As shown in Table 4 (pp. 58-59), the majority of investigations were undertaken in the Asian continent, except for Wintergerst and DeCapua (2001), which was conducted in North America. Similarly, most of them focused on university students (Banisaeid & Huang, 2019; Chen & Hung, 2015; Dao et al., 2020; Jayanama, 2017; Sadeghi, 2012; Shooshtari, 2011; Wintergerst & DeCapua, 2001; Zarei & Pourghasemian, 2016). The rest of investigations researched secondary school (Chen, 2009; Meguro, 2020; Suh & Kim, 2012), college

(Wintergerst & DeCapua, 2001) and adult EFL (Nge & Eamoraphan, 2020; Zarrabi, 2017) learners. They all implemented the PLSPQ (Reid, 1995b), but for Sadeghi (2012) and Meguro (2020) who used the LSS (Cohen et al., 2009) and the SAS (Oxford, 1995b) instruments, respectively.

The auditory modality appeared to be the least preferred perceptual learning style by some scholars (Abdollahzadeh & Amiri, 2009; Aliweh, 2011; Aslaksen et al., 2020; Çiftlikli, 2018; Derakhshan & Shakki, 2018; Lee et al., 2016; Li, 2012; Liu et al., 2013; Obralić & Akbarov, 2012; Ou-Yang & Wu, 2016; Psaltou-Joycey & Kantaridou, 2011; Seifoori & Zarei, 2011; Zhang & Evans, 2013). These investigations were mainly undertaken in the Asian continent, but also in Africa (Aliweh, 2011) and Europe (Aslaksen et al., 2020; Çiftlikli, 2018; Obralić & Akbarov, 2012; Psaltou-Joycey & Kantaridou, 2011). They also differed in the educational level of their respondents. The majority accounted for university students (Aslaksen et al., 2020; Çiftlikli, 2018; Derakhshan & Shakki, 2018; Lee et al., 2016; Li, 2012; Liu et al., 2013; Obralić & Akbarov, 2012; Ou-Yang & Wu, 2016; Psaltou-Joycey & Kantaridou, 2011; Seifoori & Zarei, 2011; Zhang & Evans, 2013). Nevertheless, Abdollahzadeh and Amiri (2009) and Aliweh (2011) investigated the perceptual learning styles of adult EFL and college learners, respectively. Even though most of the studies employed the PLSPQ (Reid, 1995b), Psaltou-Joycey and Kantaridou (2011) and Zhang and Evans (2013) implemented the SAS (Oxford, 1995b); Aslaksen et al. (2020) used both the LSS (Cohen et al., 2009) and the BLSI (Barsch, 1991) instruments.

In sum, most of the studies were conducted in the Asian continent, only a few were undertaken in Europe (Aslaksen et al., 2020; Çiftlikli, 2018; Ding & Lin, 2012; Obralić & Akbarov, 2012; Psaltou-Joycey & Kantaridou, 2011; Yang & Kim, 2011). To our knowledge, not a single study has been published in which the perceptual learning styles of Spanish EFL learners in the 12th grade have been explored. This dissertation aims at covering this research niche.

Taking everything into account, in our view, some aspects of the learning style theory are reminiscent of some of the theories explained in Chapter 2 (p. 5). Perceptual learning styles (visual, auditory and kinesthetic) are related to sensory memory, more specifically, its three types: visual (iconic), auditory (echoic), and haptic. It is through our senses (sight, sound, touch, smell, and taste) how information about our perception of the world enters our brain and is stored for a brief period of time in sensory memory, according to Davis (2007) and Sprenger (2003). Therefore, perceptual learning styles are

associated with our sensory perceptions. The studies undertaken by Bahar and Hansell (2000), Graf et al. (2007, 2008), and Hadwin et al. (1999) concluded a relationship among learning styles and working memory. For them, learners who have a low working memory capacity tend to have active, sensing, visual, global, and convergent learning styles. However, learners who have a high working memory capacity tend to have reflective, intuitive, sequential, and divergent learning styles. According to the research of Bahar and Hansell (2000), learners who have a low working memory capacity tend to be field-dependent, whereas learners who have a high working memory capacity tend to be field-independent. Regarding perceptual learning styles, for these scholars, visual learners are inclined to have a low working memory capacity, while verbal learners are inclined to have a high working memory capacity.

The Total Physical Response method (see Chapter 2, Section 2.4.1., p. 15) is related to the kinesthetic learning style because in this approach a foreign language is learned through physical actions. When teachers give commands, learners perform them physically. Most of the games used include body movements to learn a language, such as “Simon Says,” mimic, or role-playing. We believe that this is a practical way for kinesthetic students to learn vocabulary and grammatical structures, since they learn best by moving. Notwithstanding, although in a minor way, visual and auditory learning styles can also be regarded in this method. For example, teachers issue commands orally, so auditory learners benefit from listening to the teacher. Likewise, teachers execute the actions, so visual learners take advantage of watching their teachers do them. In later stages, teachers begin to use flashcards to show their students how the words they are teaching are written; at the same time, they utter those words, and finally they perform the action. In our view, the interplay of visual, auditory, and kinesthetic learning styles implies a better learning and understanding of the foreign language. In our opinion, listening comprehension processes are strongly related to the auditory learning style because these types of learners retain oral information better (see Chapter 2, Section 2.4.2., p. 17). As stated before, listening is an essential skill in foreign language education, since it provides the input to learn the language. In a foreign language classroom, auditory learners benefit from listening to the teacher, tapes, and videos. They process the information better when it comes from the auditory channel. On the other hand, the Dual-Coding Theory (see Chapter 2, Section 2.4.3., p. 26) can be mostly associated with the visual learning style. This theory advocates that the use of visuals and imagery will result in a better recall and learning of visual information, in contrast to verbal information, as

Cuevas and Dawson (2018) noted. However, we think that it can also be partially related to the auditory learning style because it is involved in the development of the verbal system. Similarly, a sensorimotor stage is encouraged at the beginning of learning to have experiences with the world around us and concrete objects, according to Clark and Paivio (1991). As far as we are concerned, this could be linked to the kinesthetic learning style.

This section has offered a review of learning styles and one of their types: perceptual learning styles. We have realized how complex and bewildering is the concept of learning styles by all the definitions, differing views, and classifications that have been developed. Nevertheless, we strongly agree with Dörnyei and Ryan (2015) about how necessary researching this issue is for foreign language education, since it allows us to determine how students learn. The notion of perceptual learning styles appears to have reached an agreement, although we have suggested that other individual factors (e.g., age, culture, gender, motivation) ought to be considered as well because we think that they also influence learning. We have also provided different classifications on perceptual learning styles and we have decided to use the visual, auditory, and tactile/kinesthetic classification owing to its relevance and presence in foreign language education. Afterwards, we have done a review of studies on these styles, which have mainly been conducted in the Asian continent with secondary and university ESL/EFL learners. According to the results of these studies, kinesthetic appeared to be the most preferred perceptual learning style, whilst visual seemed to be the least favored. However, we have identified a gap in the literature concerning Spanish EFL learners in the 12th grade. Lastly, we have accounted for the relationship among perceptual learning styles, the types of memory, and theoretical approaches discussed in Chapter 2 (p. 5).

### **3.5. Summary of chapter**

In this chapter, we have thoroughly reviewed the broad concept of learning styles, from its more general aspects to the specific ones. In the first section, we have provided the definition of style and described its two types: cognitive styles and learning styles. We have provided the different views scholars had towards these two concepts. Some authors used both terms interchangeably, while others believed they are different notions. In fact, other researchers regarded cognitive styles as a component of learning styles. We are in agreement with the latter view, since, for us, learning styles is an umbrella term which includes the notion of cognitive styles.



The second section has dealt with the notion of learning styles. We have revised the many different definitions that can be found in the literature, concluding the disagreement scholars had with them along with the confusing nature of learning styles. For us, the most accurate definition was the one put forward by Reid (1995a), although we included other individual factors (e.g., gender, motivation, age) which ought to be taken into consideration as well. Then, we have explained some of the most significant classifications of learning styles and decided to follow the perceptual learning style classification. We selected this classification because the majority of definitions and classifications addressed the perceptual component, and it is present in the foreign language classroom. For this reason, we have examined perceptual learning styles in detail. We have defined what perception and perceptual modality are; we have given the definitions proposed in the literature. Unlike learning styles in general, scholars appeared to agree more with the definition of perceptual learning styles. However, we have also found some limitations on these definitions, as they left behind other essential factors (e.g., gender, attitude, personality) that might also influence learning, similar to what occurred with the definitions of learning styles. Following, we have described several classifications on perceptual learning styles. We have selected the visual, auditory, and tactile/kinesthetic learning styles as the perceptual modalities to research in this dissertation due to its key presence in the foreign language classroom. Then, we have described several instruments which measure perceptual learning styles. We have anticipated that we will use the Learning Style Survey (Cohen et al., 2009). Finally, we have provided a summary of the numerous studies on perceptual learning styles. Most of these investigations were undertaken in the Asian continent and mainly researched secondary and university ESL and EFL learners. The overall results showed that kinesthetic was the preferred perceptual learning style, whereas visual seemed to be the least favored perceptual modality. Notwithstanding, one of their limitations was that few studies were conducted in Europe, and, as far as we know, no study investigated the perceptual learning styles of Spanish EFL learners in the 12th grade, which is the context of our investigation. We have also explained the relationship among perceptual learning styles, the different types of memory, and theoretical approaches described in Chapter 2 (p. 5).

On the whole, in the context of second and foreign languages, we believe that perceptual learning styles refer to the preferred sensory modality or modalities (visual, auditory, tactile/kinesthetic) of language learners to gather information and be able to

learn a second or foreign language. The preference for one or several sensory modalities might be influenced by individual factors, such as gender, motivation, attitude to learning, or personality.

## CHAPTER 4. VOCABULARY

### 4.1. Introduction

Chapter 4 aims at setting the third part of the theoretical background of this dissertation. It starts with an overview of definitions to describe the notion of word, including some important features, how words are stored and organized in the L2 mental lexicon, and what is actually counted as a word. The second section provides a description of two vocabulary knowledge dimensions proposed throughout the years: Richards (1976) and Nation's (1990, 2001, 2013) word knowledge frameworks. The third section is devoted to productive vocabulary, which is one of the objectives of the present dissertation. In the first place, we will define this term. A description of the different tests, tasks, and tools that measure productive vocabulary knowledge will be provided. Afterwards, we will address the notion of word production and association. We will define word association and we will focus on production/associations tasks, explaining word association tasks, along with their characteristics. We will concentrate on the lexical availability task, including what lexical availability is, as well as its theoretical assumptions and characteristics of this type of task. Finally, we will do a review of studies on productive vocabulary knowledge, including both controlled productive vocabulary and lexical availability. The fourth section will be dedicated to the vocabulary input included in ELT textbooks. We will start by highlighting the importance of vocabulary in second and foreign language learning and its scarcity in ELT textbooks. Several definitions on the notion of input will be given, along with an explanation of its types. We will also study ELT textbooks and their role in EFL learning by providing some definitions, how they have evolved throughout the years, and a debate about its usefulness in education. This chapter concludes with a review of studies on the vocabulary input contained in ELT textbooks, which is another objective of this dissertation.

### 4.2. What a word is and how it is measured

#### 4.2.1. Definitions of word

Many scholars, among them, Carter (1987), Sinclair (2004), Lyons (1968), and Seashore and Eckerson (1940), have tried to give a definition of what a word is, but a consensus does not seem to have been reached yet. To clarify this issue, Dóczy and Kormos (2016) proposed a classification of definitions based on three characteristics:

formal, semantic, and psycholinguistic. Regarding its formal definition, a word can be described as “a string of letters separated by spaces” (p. 3). This description brings to mind the definition of an orthographic word proposed by Lyons (1968) and Carter (1987) almost forty years earlier. These authors focused on the form of the word and defined it as a sequence of letters delimited on either side by a space or a punctuation mark. In this sense, “wouldn’t” will be counted as one word, whereas “would not” will be considered as two different words. Several problems arise from this definition. First, any sequence of letters would be regarded as a word even if they are not meaningful (Dóczy & Kormos, 2016). Therefore, the orthographic definition of a word does not consider the different meanings a word might have or its grammatical function, as Carter (1987) noted. Another issue is that there are some languages (e.g., Chinese or Japanese) which do not use spaces or marks to delimit each word (Lyons, 1968), so it would be difficult to know whether we are dealing with one or two words. Concerning its semantic definition, a word is viewed as a lexical unit, which is defined as “one or more words that together make up a unit of meaning” (Sinclair, 2004, p. 281). In this way, lexical phrases, such as “once upon a time,” would be counted as one word. With reference to its psycholinguistic definition, a word is considered as a lemma, which is the “basic unit of lexical storage and representation” (Dóczy & Kormos, 2016, p. 5). Following Read (2000), lemmas include the base form of the word and its inflections. Nevertheless, there are two conflicting views on whether lemmas comprise both semantic and syntactic information. On the one hand, for scholars who consider that vocabulary and grammar are two different components of a language, a lemma consists of the basic form of a word (e.g., sun) and irregular inflected forms (e.g., bought). On the other hand, those researchers who believe in the relationship between vocabulary and grammar claim that inflected forms of high frequency verbs and nouns are regarded as one word. In our view, the psycholinguistic approach appears to be a more inclusive way of defining what a word is because it does not focus on form or meaning exclusively, it also considers other components of language. Moreover, it is related to the storage and retrieval of words in the mental lexicon, which will be explained in Section 4.2.3. (p. 72). Having defined the notion of word, in the following section we will discuss several of its features.

### 4.2.2. Word features

A wealth of features concerning words can be distinguished, such as dispersion, frequency, concreteness-abstractness, imageability, number of syllables, part of speech, semantic relatedness, word form, word length, or word position. We will only focus on those which are related to the objectives of this doctoral dissertation (see Chapter 5, p. 113, for an explanation of the objectives): grammatical vs. lexical words, high-frequency, mid-frequency, and low-frequency words, concrete vs. abstract words, and imageability.

Words are traditionally classified into two types: grammatical and lexical words. Following Carter (1987), Lyons (1968), Read (2000), Schmitt (2010), and Kyle (2020), grammatical words, also referred to as functional, empty, or form words, pertain to a closed class which consists of pronouns, articles, auxiliary verbs, prepositions, and conjunctions. These words carry little meaning and belong to the grammar of a language. On the other hand, lexical words, also termed full or content words, constitute an open class which comprises nouns, adjectives, verbs, and adverbs. Unlike grammatical words, lexical words convey a lot of meaning.

Another distinction is based on frequency: high-frequency and low-frequency words. According to Nation (2013), Schmitt (2010), and Webb and Nation (2017), high-frequency vocabulary comprises the words that occur more frequently in a language. They tend to be basic and important for understanding and being able to communicate effectively in a language. On the contrary, low-frequency vocabulary includes words that do not occur that regularly in a language. Milton (2009) contended that function words would be classified under the category of high-frequency words because of their frequent occurrence in a language, while content words would pertain to the category of low-frequency words. Schmitt (2010) and Schmitt and Schmitt (2014) decided to incorporate another category between high-frequency and low-frequency words: mid-frequency words. It consists of those words that are slightly frequent, but they cannot be considered under the category of high-frequency words.

Words can also be classified into concrete and abstract. As it was explained in Chapter 2 (see Section 2.4.3., p. 26), concrete words are those which can be tangible, whereas abstract words are those which cannot. According to de Groot (1989) and Spätgens and Schoonen (2020), concreteness and imageability are terms which are sometimes used interchangeably. Schmitt (2010) claimed that imageability “refers to how easy it is to imagine a concept” (p. 53). Following de Groot (1989), Schmitt (2010) and Peters (2020), among other scholars, concrete words seem to be easy to imagine, while

abstract words appear to be more difficult to imagine. This is related to the following section, in which we will define what the mental lexicon is and describe the main factors that contribute to its storage and organization. An explanation of the different types of associations among words will also be provided.

#### **4.2.3. The L2 mental lexicon: structure and organization**

The mental lexicon is defined as “a person’s mental store of words, their meaning and associations” (Richards & Schmidt, 2002, p. 237). Jarema and Libben (2007) described it as “the cognitive system that constitutes the capacity for conscious and unconscious lexical activity” (p. 2). These definitions imply that the mental lexicon is a system which stores words and associations, or where conscious or unconscious lexical activity happens. For Jarema and Libben (2007), the mental lexicon makes possible the processes of language comprehension and production. Therefore, research on the mental lexicon is essential in second or foreign language learning because it would allow us to acknowledge how words are stored, the associations that occur, and how language is processed.

According to de Groot (1995), Palmberg (1990), Schmitt (2010), and Vilkaitė-Lozdienė and Schmitt (2020), one of the most important factors that affects the storage and retrieval of L2 words and the organization of the mental lexicon is word frequency. As stated in the previous section (see 4.2.2., p. 71), the main difference among high-frequency, mid-frequency, and low-frequency words lies in their occurrence. As high-frequency words tend to be encountered more often, they are very familiar to learners; their knowledge is necessary for successful communication. There has been a debate on the number of words that are to be included in each category. At first, Nation (1990), Read (2000), and Schmitt (2000, 2010), among other scholars, stated that the high-frequency category consisted of the 2,000 most frequent word families. Later on, Schmitt and Schmitt (2014) suggested the figure of 3,000 word families for the category of high-frequency words; this is the number that has been generally accepted, according to Vilkaitė-Lozdienė and Schmitt (2020). Following Schmitt and Schmitt (2014), the mid-frequency category ranges from the fourth to the ninth most frequent 1,000 word families; the low-frequency category comprises the words beyond the ninth most frequent 1,000 word families. An important issue regarding word frequency is its relationship with word retrieval and learning. For example, Bybee and Hopper (2001), Ellis (2002), and Spätgens and Schoonen (2020) determined that high-frequency words were processed faster than

low-frequency ones. Likewise, language learners appeared to acquire high-frequency words before low-frequency ones (Milton, 2009; Read, 1998; Schmitt, 2010; Schmitt et al., 2001). In fact, Conklin (2020) asserted that the increase in frequency resulted in a faster processing. We believe that the repeated encounter of more frequent words might be one of the reasons why high-frequency words tend to be more assimilated in the L2 mental lexicon and they are also retrieved faster.

In a similar vein, concreteness and imageability are other factors that influence the acquisition of words. Some studies, such as de Groot (2006), de Groot and Keijzer (2000), Ellis and Beaton (1993), or Lawson and Hogben (1998), revealed that concrete words tend to be learnt faster and recall more easily than abstract words. Ellis and Beaton (1993) and de Groot (2006) maintained that more imageable words are generally learnt more quickly than less imageable words. The fact that concrete or more imageable words are retrieved faster might be because these words are not difficult to imagine (they are tangible). Another reason is that these types of words are encountered more often, which increases the exposure to them. Indeed, Baddeley (1990) argued that repetition and repeated exposure are deciding factors which affect the retrieval of words. In his view, after hearing or seeing a word form, L2 learners retrieve all the information they know about its meaning, which might have been assimilated from previous and present encounters.

As it was explained in Chapter 2 (p. 5), words are connected to other words in the mental lexicon by way of different types of associations, such as semantic, formal, and encyclopedic. Semantic associations are based on the meaning of words and can be further divided into syntagmatic and paradigmatic relations. Syntagmatic refers to “the relationship that a linguistic element has with other elements in the stretch of language in which it occurs” (Palmer, 1976, p. 93). Following Leech (1974), Lyons (1977), and Palmer (1976), syntagmatic relations are functional and involve that the stimulus word and the response complete a phrase or syntactic structure; they usually belong to a different word class. For example, a syntagmatic response to the stimulus word “sun” could be “yellow.” The stimulus word is a noun, whereas the response is an adjective. On the contrary, paradigmatic alludes to “the relationship it has with elements with which it may be replaced or substituted” (Palmer, 1976, p. 93). In paradigmatic relations, the stimulus word and the response belong to the same word class (e.g., Leech, 1974; Lyons, 1977; Palmer, 1976). Paradigmatic relations are also referred to as sense relations, since they can be related to other words in terms of meaning in the vocabulary of a language

(McCarthy, 1990). A paradigmatic response to the word stimulus “sun” could be “summer.”

Formal associations, as its name suggests, are based on the form of the words, rather than on meaning, as it was the case of semantic associations. These types of associations are also known as “clang associations” (Ellis, 1988; Fitzpatrick, 2006; Meara, 1978; Roux, 2013; Schmitt & Meara, 1997). They are defined as “responses that are phonetically related to the stimulus word, but fail to have any clear semantic connection with it” (Meara, 1980, p. 14). Some types of clang associations include rhyming responses, assonance, responses with the same initial sounds as the stimulus, or a similar prominent consonant cluster (Meara, 1983). For example, a clang response to the word stimulus “coat” could be “boat.” These words are phonologically and orthographically related, but there is not a semantic relationship between them.

Encyclopedic associations link “words to the world, and bring [...] in origins, causes, effects, histories, and contexts” (McCarthy, 1990, p. 41). These associations are based on our experience and knowledge of the world. McCarthy (1990, p. 42) gave an example of his knowledge of the word “war,” in which he included his reading and personal memories of different wars he has read, documented, and experienced throughout the years. This type of association is based on declarative memory, specifically, episodic and semantic memory (see Section 2.3.3.2., p. 9, for an explanation) because it has to do with our conscious recollection of facts about the world and events that we have experienced. Having explained the structure and organization of the L2 mental lexicon, we move on to address the different ways in which words can be measured.

#### **4.2.4. How words are counted**

Scholars (e.g., Nation, 2013; Read, 2000; Schmitt, 2010; Singleton, 1999; Webb & Nation, 2017) have proposed several notions to measure words, such as flemmas, lemmas, lexemes, morphemes, tokens, types, or word families. This section will only consider those that are closely related to the objectives of the present dissertation: tokens, types, lemmas, and word families.

Tokens, also referred to as running words, are the total number of word forms that can be found in a text (e.g., Nation, 2013; Read, 2000). For example, the sentence “The girl that ate the cake left a few hours ago” consists of 11 tokens. This means that all the words are counted even if they occur more than once, in this case, the article “the.” For



these scholars, types refer to the total number of different words that can be found in a text. Therefore, the above sentence contains 10 types. In this case, if a word occurs more than once, it is only counted as one type. Another important term, which was already introduced (see Section 4.2.1., p. 69), is the lemma, defined by Francis and Kučera (1982) as “a set of lexical forms having the same stem and belonging to the same major word class, differing only in inflection and/or spelling” (p. 1). According to Bauer and Nation (1993), the English inflections include the plural form, the third person singular of the present tense, the past tense, the past participle, -ing forms, the comparative, the superlative, and the possessive. In this respect, “visit,” “visits,” “visited,” and “visiting” constitute one lemma. Finally, a word family comprises “a headword, its inflected forms, and its closely related derived forms” (Nation, 2001, p. 11). The difference between a lemma and a word family is that the latter includes its common derivatives. In this regard, “visit,” “visits,” “visiting,” “visitor,” and “visitant” constitute a word family. In the next section, we will examine two influential vocabulary knowledge dimensions that scholars have proposed throughout the years.

### **4.3. Vocabulary knowledge dimensions**

The present dissertation focuses on Richards’ (1976) word knowledge framework (see Section 4.3.1., p. 75) because he was the pioneer in this debate, and Nation’s (1990, 2001, 2013) word knowledge framework (see Section 4.3.2., p. 77), which at present is considered to be the most complete and covering productive vocabulary knowledge, one of the objectives of the present dissertation.

#### **4.3.1. Richards’ (1976) word knowledge framework**

As shown in Table 5 (p. 76), Richards (1976) proposed eight assumptions about knowing a word. For him, the following are types of word knowledge: syntactic behavior, word frequency, limitations on use, form and derivations, associations, semantic value, and meaning. In his first assumption, he underlined the differences between syntax and vocabulary in terms of their development. The development of syntax seems to end around the age of 12, whilst vocabulary continues to be developed through adult life. However, he highlighted the difficulty of measuring vocabulary: “measurement of vocabulary is difficult and only approximate” (p. 78). The second assumption refers to the notion of word frequency. He distinguished among “frequent,” “moderately frequent,” and “not frequent” words (p. 79), which reminds us of the classification into

high-frequency, mid-frequency, and low-frequency words explained in Section 4.2.2. (p. 71). Not only did this scholar focus on word frequency, but he also mentioned the idea of word association. In his third assumption, Richards (1976) acknowledged the limitations of function and situation regarding word choice. He alluded to six constraints on register: temporal variation, geographical variation, social variation, social role, field of discourse, and mode of discourse (p. 79). The fourth assumption concentrated on syntax, specifically the structural and grammatical characteristics of words. In his fifth assumption, the emphasis was given to word forms and derivations: “When we learn a word we also learn the rules that enable us to build up different forms of the word or even different words” (pp. 80-81). The focus of his sixth assumption was on word association, which was partly noted in his second assumption. Richards (1976) claimed that the ability to know and understand the meaning of words is owing to their relationship with other words. He alluded to word association tests as a way of researching the connection between words and the vocabulary of individuals. His seventh assumption addressed the semantic features of words, which can give an insight into the structure of the mental lexicon (p. 82). Finally, the last assumption concentrated on the meaning of words.

*Table 5*

*Richards' (1976) word knowledge framework*

Assumptions	Description
Assumption 1	The native speaker of a language continues to expand his vocabulary in adulthood, whereas there is comparatively little development of syntax in adult life.
Assumption 2	Knowing a word means knowing the degree of probability encountering that word in speech or print. For many words we also know the sort of words most likely to be found associated with the word.
Assumption 3	Knowing a word implies knowing the limitations imposed on the use of the word according to variations of function and situation.
Assumption 4	Knowing a word means knowing the syntactic behavior associated with the word.
Assumption 5	Knowing a word entails knowledge of the underlying form of a word and the derivations that can be made from it.
Assumption 6	Knowing a word entails knowledge of the network of associations between that word and other words in the language.
Assumption 7	Knowing a word means knowing the semantic value of a word.
Assumption 8	Knowing a word means knowing many of the different meanings associated with a word.

In our view, the main strength of this framework is that it attempts to include several aspects of lexical knowledge (e.g., morphology, syntax, associations with other words, word frequency). Notwithstanding, Qian (2002) claimed that even though this approach encompasses important elements, Richards (1976) did not mention anything about pronunciation, spelling, and collocations. In addition, Richards' (1976) assumptions have been criticized for being just a description instead of a framework of word knowledge:

it is not really an attempt to provide a systematic account of what it means to know a word. And far less an attempt to provide a systematic framework for describing and accounting for this knowledge (Meara, 1996, p. 2).

Regardless of this criticism, some researchers have considered Richards' (1976) assumptions as a framework of vocabulary knowledge and they have based on them to develop their own models, as it happened to Nation (1990), for example. Let us now move on to explain Nation's (1990, 2001, 2013) word knowledge framework.

#### 4.3.2. Nation's (1990, 2001, 2013) word knowledge framework

Nation (1990) distinguished four types of word knowledge: form (spoken and written), position (grammatical patterns and collocations), function (frequency and appropriateness), and meaning (concept and associations) (see Table 6, p. 77-78).

Table 6

*Nation's (1990) word knowledge framework*

Form	Spoken form	Receptive	What does the word sound like?
		Productive	How is the word pronounced?
Position	Written form	Receptive	What does the word look like?
		Productive	How is the word written and spelled?
	Grammatical patterns	Receptive	In what patterns does the word occur?
		Productive	In what patterns must we use the word?
Function	Frequency	Receptive	How common is the word?
		Productive	What words or types of words can be expected before or after the word? What words or types of words must we use with this word?

		Productive	How often should the word be used?
	Appropriateness	Receptive	Where would we expect to meet this word?
		Productive	Where can this word be used?
Meaning	Concept	Receptive	What does the word mean?
		Productive	What word should be used to express this meaning?
	Associations	Receptive	What other words does this word make us think of?
		Productive	What other words could we use instead of this one?

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According to this scholar, the receptive and productive knowledge of these four types is required in order to know a word and use it appropriately. This does not mean that the mastery of the four types is needed at once, since some aspects are usually learnt before others (e.g., grammar, meaning), as noted by Schmitt (2000) and Schmitt and Meara (1997). In comparison to Richards' (1976), Nation's approach appears to be more complete. It includes the aspects of phonology, spelling, and collocations, which were not incorporated before. Nevertheless, Nation did not explore the problems of morphology, as Richards (1976) did, and he did not consider polysemous words either, as Bogaards (2000) observed. Despite this objection, it is considered one of the first influential frameworks of word knowledge, according to Schmitt (2002).

Nation (2001, 2013) (see Table 7, p. 79) updated his word knowledge framework proposed in 1990. Instead of consisting of four aspects, lexical knowledge is divided into three: form (spoken, written, and word parts), meaning (form and meaning, concepts and referents, and associations), and use (grammatical functions, collocations, and constraints on use). In this latter version, he added word parts in the form word knowledge, form and meaning and concepts and referents regarding meaning, and the constraints on use in the use part. He still maintained the receptive and productive knowledge dimensions in each aspect of lexical knowledge.

Table 7

*Nation's (2001, 2013) word knowledge framework*

Form	Spoken	Receptive	What does the word sound like?
		Productive	How is the word pronounced?
	Written	Receptive	What does the word look like?
		Productive	How is the word written and spelled?
Word parts	Receptive	What parts are recognisable in this word?	
	Productive	What word parts are needed to express meaning?	
Meaning	Form and meaning	Receptive	What meaning does this word form signal?
		Productive	What word form can be used to express this meaning?
	Concepts and referents	Receptive	What is included in the concept?
		Productive	What items can the concept refer to?
	Associations	Receptive	What other words does this word make us think of?
		Productive	What other words could we use instead of this one?
Use	Grammatical functions	Receptive	In what patterns does the word occur?
		Productive	In what patterns must we use the word?
	Collocations	Receptive	What words or types of words occur with this one?
		Productive	What words or types of words must we use with this one?
	Constraints on use	Receptive	Where, when and how often would we meet this word?
		Productive	Where, when and how often can we use this word?

The aim of his framework was to pinpoint that in order to master a word, the receptive and productive knowledge of the nine aspects mentioned above is required. However, some aspects (e.g., form, meaning) are usually learnt before others (e.g., register, collocations), since vocabulary learning is incremental, as shown by Schmitt (2000) and Schmitt and Meara (1997). To notice the differences between receptive knowledge (necessary for listening and reading) and productive knowledge (necessary for speaking and writing, see Section 4.4., p. 80, for an explanation), Nation (2001, 2013) gave an example of what entails to know the word “underdeveloped” in terms of both

receptive and productive knowledge and use. Concerning receptive knowledge and use, knowing the word “underdeveloped” implies:

- being able to recognise the word form when it is heard;
- being familiar with its written form so that it is recognised when it is met in reading;
- recognising that it is made up of the parts under-, -develop- and -ed and being able to relate these parts to its meaning;
- knowing that underdeveloped signals a particular meaning;
- knowing what the word means in the particular context in which it has just occurred;
- knowing the concept behind the word which will allow understanding in a variety of contexts;
- knowing that there are related words like overdeveloped, backward and challenged;
- being able to recognise that underdeveloped has been used correctly in the sentence in which occurs;
- being able to recognise that words such as territories and areas are typical collocations; and
- knowing that underdeveloped is not an uncommon word and is not a pejorative word. (Nation, 2013, pp. 48-50).

Regarding productive knowledge and use, knowing the word “underdeveloped” implies:

- being able to say it with correct pronunciation including stress;
- being able to write it with correct spelling;
- being able to construct it using the right word parts in their appropriate forms;
- being able to produce the word to express the meaning ‘underdeveloped’;
- being able to produce the word in different contexts to express the range of meanings of underdeveloped;
- being able to produce synonyms and opposites for underdeveloped;
- being able to use the word correctly in an original sentence;
- being able to produce words that commonly occur with it; and
- being able to decide to use or not use the word to suit the degree of formality of the situation. (At present developing is more acceptable than underdeveloped which carries a slightly negative meaning.) (Nation, 2013, p. 50).

Milton (2013) noted some limitations of the model proposed by Nation (2001, 2013). He argued that even though all forms of knowledge are described, they are not accurately defined. Likewise, he pointed the equivocal nature of the word parts aspect: “it is unclear at what point the additions and changes to a word will form a new word rather than a derived form of an existing one” (Milton, 2013, p. 59). He also missed an explanation about the frequency a word has to co-occur with another one. Regardless of these constraints, Nation’s framework overcomes the limitations observed on Richards’.

#### **4.4. Productive vocabulary**

In this section, we will discuss the notion of productive vocabulary. First, we will define this term and explain its two main types. We will explain how productive vocabulary can be measured, and we will focus on controlled productive vocabulary. Afterwards, we will deal with word production and association, as well as production/association tasks. Finally, a review of studies on productive vocabulary

knowledge will be included, considering both controlled productive vocabulary and lexical availability.

#### **4.4.1. Definition of productive vocabulary**

The receptive and productive vocabulary knowledge distinction has been widely acknowledged by most scholars (e.g., Laufer & Nation, 1999; Melka Teichroew, 1982; Webb, 2008). Learning vocabulary productively is considered to be more demanding than learning it receptively, for Nation (1990, 2001) and Waring (1997a), even native speakers understand more words than they actually produce. For many scholars, receptive and productive vocabulary are seen as either a continuum (e.g., Faerch et al., 1984; Henriksen, 1999; Nation, 2013) or a dichotomy (Meara, 1990). In our opinion, receptive and productive vocabulary knowledge are a continuum, since in order to produce a word, it has to be known receptively first. It appears to be complicated to use a word in context to communicate effectively if that word is not understood in the first place.

The focus of this dissertation is on productive vocabulary. Three main types of productive vocabulary can be distinguished: controlled, free, and production/association. Following Laufer (1998), controlled productive vocabulary involves the production of words when required by a task as, for example, to complete the following sentence “the garden was full of fra \_\_\_\_\_ flowers” with the word “fragrant” (p. 257). On the contrary, free productive vocabulary implies “the use of words at one’s free will, without any specific prompts for particular words, as is the case of free composition” (p. 257). In this regard, words are not prompted, but used by the learner out of choice, for example, in a writing or oral task. Another type of productive vocabulary is the production/association of words that can be assessed through word association tests and lexical availability tasks (see Section 4.4.3., p. 89, for an explanation).

#### **4.4.2. How productive vocabulary is measured**

Following the definition of productive vocabulary as controlled, free, and production/association, in this section we will revise the tests, tasks, and tools that focus on controlled productive vocabulary.

**4.4.2.1. Productive Vocabulary Levels Test (PVLТ).** A widely employed instrument to measure L2 productive vocabulary knowledge is the Productive Vocabulary Levels Test (PVLТ) developed by Laufer and Nation (1995, 1999). This test addresses

two aspects of lexical competence: partial productive word knowledge and word frequency. According to Nation (2013), Mochizuki (2012), and Moreno Espinosa (2010a, 2010b), it is a quantitative measure that explores controlled vocabulary growth by analyzing discrete, selective, and context dependent vocabulary. The PVLT is a discrete-point test because it only concentrates on measuring vocabulary knowledge, as Nation (2013) and Schmitt (2010) noted. The structure and format of the PVLT is based on the Vocabulary Levels Test (VLT), which measures receptive vocabulary (Nation, 1983, 1990).

The theoretical and methodological foundations of this test can be found in frequency. The PVLT test comprises five word frequency levels founded on frequency of occurrence: 2,000, 3,000, the University Word List (UWL), 5,000, and 10,000 words. Following Nation (1983), the 2,000 and 3,000 word levels involve high-frequency words, the University Word List consists of specialized vocabulary, the 5,000 word level is a boundary between high-frequency and low-frequency words, and the 10,000 word level involves low-frequency words. Each level contains 1,000 words, except the University Word List which consists of 836 words (Laufer & Nation, 1999). According to Nation (1983), all the words included in each level were chosen from the Thorndike and Lorge (1944) list and compared with the *General Service List* (West, 1953) and the *Computational Analysis of Present Day American English* (Kučera & Francis, 1967). He gave some reasons for this selection of word lists. First, he decided to compare it with the Kučera and Francis' (1967) list to prevent outdated words from the Thorndike and Lorge's (1944) list. Second, he contrasted it with the *General Service List* (West, 1953) because several English courses, reading materials, and investigations were based on it. The 2,000-word frequency level includes the second 1,000 most frequently used word families; the same happens to the following frequency bands until the least frequently used words (Nation, 2001). These word frequency bands are independent from one another, so the whole test or only specific frequency levels can be selected to be administered, depending on the purpose of the study. In the 2,000 word level, Laufer and Nation (1999) declared that in order to master this level, 15 or 16 items out of the 18 of the test should be correct. Therefore, only less than 150 words would not be available to use them productively.

Regarding the relationship between coverage and frequency bands, Laufer and Nation (1999) claimed that the most frequent 10 words represent the 25 per cent of the running words in written and spoken texts. The first 1,000 words represent the 75 per cent



of the running words in a written text and the 84 per cent in spoken texts. Nevertheless, the tenth 1,000 most frequent words represent less than one per cent of the running words in both written and spoken texts. These figures coincide with the ones Nation (2006) proposed in written and spoken coverage per each word frequency level (see Table 8, p. 83). The table shows that the amount of coverage, both written and spoken, is reduced from one frequency level to the following one. It also reveals that the knowledge of the first 1,000 words provides an average coverage of 80 per cent in both written and spoken texts. Vilkaitė-Lozdienė and Schmitt (2020) argued that this might be because of the great number of function words which are included in the first word frequency band. According to Milton (2009), once you know the first 2,000 most frequent words, which are the most useful when learning a language, the effort to learn the next most frequent words is minimal and only seven or eight per cent of more coverage is gained.

*Table 8*

*Average coverage in each word level*

Levels	Written coverage	Spoken coverage
1st 1,000	78-81 per cent	81-84 per cent
2nd 1,000	8-9 per cent	5-6 per cent
3rd 1,000	3-5 per cent	2-3 per cent
4th-5th 1,000	3 per cent	1.5-3 per cent
6th-9th 1,000	2 per cent	0.75-1 per cent
10th-14th 1,000	< 1 per cent	0.5 per cent
Proper nouns	2-4 per cent	1-1.5 per cent
Not in the lists	1-3 per cent	1 per cent

*Note.* Adapted from Nation (2006, p. 79).

Researchers have investigated the number of words that are necessary to understand both written and spoken texts in a foreign language. However, a consensus has not been reached yet. For example, Schmitt and Schmitt (2014) indicated that the knowledge of 3,000 word families would make language learners understand 98 per cent of reading texts and 95 per cent of speech. This view is also shared by Webb and Rodgers (2009) and Webb and Nation (2017). In the case of listening, van Zeeland and Schmitt (2012) also suggested the knowledge of 2,000 to 3,000 words to be able to comprehend 95 per cent coverage of spoken texts. On the contrary, Laufer and Ravenhorst-Kalovski (2010) recommended the knowledge of 8,000 to 9,000 words to be able to read with ease

for a 98 per cent of coverage. Nation (2006) suggested 6,000 to 9,000 words for this coverage.

Unlike the VLT, the PVLT is a cued recall test; items are elicited in 18 short sentences at each frequency level. In each sentence, meaningful context and only the first letters of the target word are provided to avoid the production of other words that might not fit in the sentence. Following Laufer (1998) and Laufer and Nation (1999), the number of letters selected for each sentence was based on the minimal number that could disambiguate the target word. Moreover, the size of the underlined space at the end of the incomplete word does not indicate the number of letters needed to complete the word, it has the same length in all sentences. The PVLT is scored in terms of correct (one point) or incorrect/blank (zero points) words. However, the scoring of the PVLT differs among researchers. For example, for Laufer (1998) and Laufer and Paribakht (1998), a target word is considered correct if it is semantically correct, as well as if it is grammatically wrong (e.g., wrong tense), or if it has a spelling error that does not distort the target word. Incorrect words include those that do not exist or do not fit in the sentence context, acknowledging partial word knowledge. On the other hand, Waring (1997b) gave half a point to words that have a minor spelling or grammatical error, that is, partial word knowledge, whereas one point is given for full word knowledge. Laufer and Nation (1999) claimed that the score of 15 or 16 words out of 18 in the 2,000-word frequency level, for example, implies the mastery of that level. All in all, informants need to have a broad knowledge of meaning, form, phonology, and collocations to complete each target word. Regarding the test validity and reliability, this instrument has been proved to be a “reliable, valid, and practical measure of vocabulary growth” (Laufer & Nation, 1999, p. 44). The PVLT is short and easy to administer, score, and interpret. Nonetheless, some researchers have criticized this instrument. Meara (2005), Meara and Bell (2001), and Meara and Fitzpatrick (2000) considered that each word-frequency level consists of a limited number of items (18) to deduce informants’ productive vocabulary size. Beglar and Nation (2014), Fitzpatrick and Meara (2004), Meara and Fitzpatrick (2000), and Read (2000) argued that it can be regarded as a test of receptive knowledge because the production of the target word involves the receptive understanding of the sentence context and the letters given to acknowledge whether the word fits in the sentence. Following Walters (2012), it might also be the case that test takers choose a word to complete the sentence that might be less frequent than the one the sentence assesses, which would imply a broader productive vocabulary knowledge. Or they could know a more infrequent

word for the target word they are being tested (Meara & Fitzpatrick, 2000). Another issue that Webb (2008) highlighted is that the presence of partial information could be sufficient to recognize the target word, since it is a test of cued recall. Some items might require more word knowledge than others owing to the number of letters provided (Read, 2000; Schmitt, 2010), which might make it difficult to guess the word (Webb, 2008). As Read (2000) pinpointed, other times most of the word stem is provided to elicit the target word in order to disambiguate.

**4.4.2.2. Translation tests.** Translation tests have also been used to measure productive vocabulary knowledge. For Milton (2009), the advantage of using translation tests is that they are quick and easy to design, administer, and correct. For example, Webb (2008) used a translation test to estimate the L2 productive vocabulary. This test consists of 30 questions, being 90 the total of items. The target words are taken from three frequency levels: (i) Word band 1: the 701 to 1,900 most frequent words, (ii) Word band 2: the 1,901 to 3,400 most frequent words, and (iii) Word band 3: the 3,401 to 6,600 most frequent words in English. Informants have to write the L2 translation of the L1 meanings provided for each 90 items. Webb (2008) proposed two systems of scoring productive vocabulary knowledge based on partial and full knowledge of the written form: sensitive and strict. In the sensitive scoring system, “words with spelling errors were marked as correct if the overall shape of the response was a close approximation of the target word” (p. 84). Notwithstanding, they are marked as incorrect if those spellings resemble real words. On the other hand, in the strict scoring system, words are marked as correct if they are spelled correctly. Grammatical form errors are marked as correct in both scoring systems (Webb, 2008).

**4.4.2.3. Lex30.** Lex30 (Meara & Fitzpatrick, 2000) is both a controlled productive and a word association test (see Section 4.4.3.2., p. 91 for its explanation as a word association test), which assesses discrete, comprehensive, and content-independent vocabulary (Moreno Espinosa, 2010b). This task consists of 30 highly-frequent stimulus words in English as an L2, and respondents have to write four (three in the first version) L2 words. The allotted time to complete this test is 15 minutes, being 30 seconds the time to respond to each prompt, as noted by Fitzpatrick and Meara (2004) and Meara and Fitzpatrick (2000). As these scholars (2000) claimed: “There is no predetermined set of response target words for the subject to produce, and in this way, Lex30 resembles a free

productive task” (p. 22). Those 30 words are included in Nation’s (1984) first 1,000 most frequent content words in English; they are carefully selected with the aim of not eliciting common responses, but a variety of infrequent vocabulary (Fitzpatrick, 2012; Meara, 2009; Meara & Fitzpatrick, 2000). After the data collection, all the word responses are lemmatized. To score those lemmatized words, a program classifies them into four different frequency levels: (i) Level 0 comprises high frequency grammatical words, proper names, and numbers; (ii) Level 1 words consists of the 1,000 most frequent words; (iii) Level 2 includes the second 1,000 most frequent words; (iv) Level 3 is composed of words that are not included in the previous lists. Words that belong to Levels 2 and 3 get one point, whilst words that belong to Levels 0 and 1 get zero points, following Meara and Fitzpatrick (2000). Meara (2009) affirmed that the higher the scores in the Lex30, the larger the productive vocabulary, as more infrequent words are known. Considering the criticism received, Fitzpatrick and Meara (2004) demonstrated the reliability and validity of this instrument in a series of experiments. Lex30 is reported to have several advantages. For Fitzpatrick and Clenton (2010) and Meara and Fitzpatrick (2000), it is a tool which is easy to administer, requires 15 minutes to complete, and a computer program scores the responses. Moreover, the vocabulary retrieved is diverse, very little receptive knowledge is required, and several conceptual fields can be activated. As opposed to free productive vocabulary tasks (e.g., LFP), the words elicited in the Lex30 are very dense because most of them are content words, as suggested by Fitzpatrick and Meara (2004). However, Jiménez Catalán and Moreno Espinosa (2005) observed that the program sometimes does not recognize words into their appropriate levels and the researcher has to allocate them subjectively. Another issue that these researchers highlighted is that when the wordlist of Nation (1984) was replaced by the JACET (2003) list, some words did not belong to the same frequency levels in both wordlists. This test requires informants to recall words rather than using the words in context (Read & Nation, 2009). Results are not easy to interpret as estimates of productive vocabulary size, as Meara and Olmos Alcoy (2010) concluded.

**4.4.2.4. Lexical Frequency Profile (LFP).** The Lexical Frequency Profile (LFP) (Laufer & Nation, 1995) has been extensively used in L2 vocabulary studies (e.g., Fitzpatrick & Clenton, 2017; Ibrahim et al., 2019; Laufer & Paribakht, 1998; Muncie, 2002) to assess free production and use of vocabulary. As Read and Chapelle (2001) pointed out, it measures free productive vocabulary size; it is a discrete, comprehensive,

and content dependent approach to vocabulary knowledge. This instrument consists of writing a composition of around 300-400 words about one of the two topics given (Laufer & Nation, 1995). Once data are collected and lemmatized, the texts are typed in the Range program. Following Laufer (1995), based on the word types, tokens, and families, the Range program classifies the words into four frequency levels: (i) the most frequent 1,000 English words; (ii) the second 1,000 most frequent words; (iii) the University Word List (UWL); and (iv) words that are not included in any of the previous lists. It assesses the frequency of occurrence of words written in compositions and divides those words into low and high frequency words, being the higher number of infrequent words retrieved an indication of a larger productive vocabulary, as Laufer and Nation (1995) indicated. To edit the test takers' responses before entering them into the program, Laufer and Nation (1995) decided to correct the spelling errors that did not distort the word, while they omitted proper nouns, incorrectly used, and semantically incorrect words. Nevertheless, Coniam (1999) disagreed with this editing process and claimed that only words that showed full knowledge ought to be considered. Laufer and Nation (1995) also demonstrated the validity and reliability of the LFP. However, Meara (2005) questioned its validity and reliability through computer simulations. The LFP has several advantages. According to Laufer and Nation (1995), it discriminates between undergraduate learners at different proficiency levels; it is topic independent, since it assesses two compositions written by the same learner and provides stable results. Besides, it assesses lexical richness, it acknowledges the different words that informants retrieve based on frequency levels, and it is a reliable measure. Walters (2012) maintained that the LFP does not restrict respondents because, even though the topic is given, it is a free writing task. Notwithstanding, this instrument has also been criticized. For example, Meara and Fitzpatrick (2000) found this measure problematic because it is context limited. As the topic is assigned, they argued that learners are restricted in the sense that they cannot show the rich variety of vocabulary they might know. These scholars also believed that a composition of around 300 words is not representative of informants' vocabulary owing to its limited length. Moreno Espinosa (2010a) argued that this tool has only been used to assess the productive vocabulary of undergraduate learners, leaving behind learners that pertain to lower levels. Schmitt (2010) also underlined that with the frequency levels it can also be an indicator of the language level of the participants, since a higher production of low-frequency words will reveal that the participant is an advanced learner.

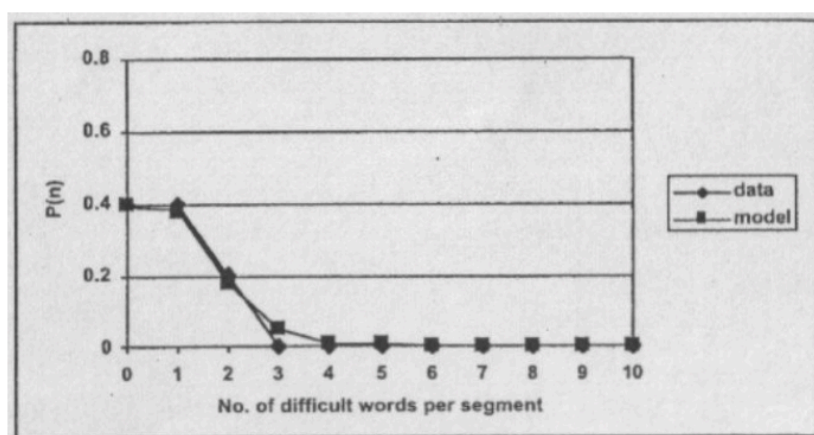
**4.4.2.5. P\_Lex.** Similar to the LFP, Meara and Bell (2001) designed P\_Lex as a measure of lexical complexity of short texts for L2 learners of English; it provides an index with the occurrence of difficult words in a text. According to these scholars, it is based on frequency lists and on the assumption that a large vocabulary size implies a greater use of low-frequency words. Unlike LFP, it divides the text into ten-word segments and it identifies the words beyond the 2,000 level. According to these authors, the first 1,000 words are considered easy, whereas the rest are labelled hard words. Afterwards, the amount of infrequent words is counted in each segment. Here is an example they provided:

- 1: I come from Japan. My home town is Okinawa. Is 0
- 2: in the south of Japan, and there is a very 0
- 3: big American air-base. My father is engineer at home. I 2
- 4: come to Swansea to study engineering, like my father did. 1
- 5: But he is teaching engineer and I want to be real 1
- 6: scientist. My teacher wants me to work on a 1
- 7: new kind of protein found only in seaweed. You have 2
- 8: lots of this seaweed in Swansea, so this is a 1
- 9: good place for me to come. My journey was very 0
- 10: long, and I am very tired now. I have been 0 (Meara and Bell, 2001, p. 5)

Based on this example, there are four segments which do not have any hard words, four segments include one hard word, and two segments include two hard words. This generates a curve, with a lambda value of .92 (see Figure 5, p. 88). Lambda values usually range from 0 to 4.5. Meara and Bell (2001) stressed that these values are less text sensitive than the scores of LFP. A high P\_Lex score indicates a large vocabulary size of the test-taker.

Figure 5

*P\_Lex curve*



Note. From Meara and Bell (2001, p. 6)

Several studies have been undertaken using this instrument. For example, Miralpeix and Celaya (2002) investigated the compositions written by one group of primary and two groups of secondary school Spanish students who were learning English as an L3. Their results indicated that the higher the educational level, the higher the production of less frequent words. Moreno Espinosa (2005) examined the written production of 4th grade Spanish EFL learners. Her results suggested that this instrument was not appropriate for measuring the lexical richness of L2 young learners. Kojima and Yamashita (2014) analyzed the reliability of four measures of lexical richness, among them P\_Lex. Their findings revealed that P\_Lex was independent of the text length, and it was among one of the most reliable measures. Having described the tests, tasks, and tool to measure controlled productive vocabulary, the aim now is to discuss word production and association.

#### **4.4.3. Word production and association**

Word association is defined as “the links that connect or relate words in some manner in a person’s mind” (Schmitt & Meara, 1997, p. 19). In the mental lexicon, words are linked to one another; this affects the learning and recall of those words, as Richards and Schmidt (2010) stressed. The investigation that promoted the research in this field in L2 was undertaken by Meara (1982). It was considered “an important leap forward in L2 word association research” (Fitzpatrick, 2009, p. 39), as it provided insights into how the L2 mental lexicon was organized and how it differed from native speakers. Since the 1990s, Meara (1992, 2004) and Wilks (2009) began to investigate lexical networks.

Research on word association is important because it reveals the relationships among words in the mental lexicon, as well as how the lexicon is organized, stored, and developed, as many scholars observed (e.g., Deese, 1962; Fitzpatrick, 2006; Meara, 1978; Roux, 2013). As stated by Zareva and Wolter (2012), word association gives information on concept building, their connections, and their strength: “concept building, the type of connections they maintain [...] and how the strength of these connections develops and changes over time” (p. 42). It would also give an insight into the mental processes that occur in association, as asserted by de Groot (1989) and Roux (2013), and into the acquisition of L2 in general, as Fitzpatrick (2006, 2007) claimed. Having defined the notion of word association and its importance, the aim now is to consider production/association tasks.

**4.4.3.1. Word association tasks.** The relationship among words can be investigated by means of a word association task. It consists of producing the first word that comes to mind, in spoken or written form, in response to a stimulus word (also referred to as cue-word or prompt), in a given amount of time (e.g., Fitzpatrick, 2007; Meara, 1978; Schmitt, 1998). The assumption of word association tasks is that the immediate responses are words which are strongly connected with the prompt in the lexicon of the informants: “automatic responses that have not been thought out will consist of words that have the strongest connections with the stimulus word in the subjects’ lexicon” (Schmitt, 2000, p. 38). In line with this, Clark (1970) argued that the time allotted to complete the word association task affected students’ responses. For example, this scholar claimed that if the participants were given as much time as they wanted to respond to the stimulus word, those responses would be more idiosyncratic than if they had to respond very quickly, which would imply more superficial responses and related to the prompt. Idiosyncratic word responses refer to words that have only been produced by a particular participant; they are unique to them. Another factor that might influence their responses is the word class of the stimulus word. It has been proved in L1 and L2 word association studies that the word class of the stimulus prompted responses that belonged to the same class (e.g., Clark, 1993; Deese, 1962; Entwisle, 1966; Fitzpatrick, 2006; Nissen & Henriksen, 2006). To put it in other words, if the cue-word is a noun, it is very likely that the responses would be nouns. Apart from word class, some scholars (e.g., de Groot, 1989; Fitzpatrick, 2007; Nissen & Henriksen, 2006) noticed that frequency, concreteness, and imageability might also affect the responses. Traditionally, as Schmitt (1998) noted, once the teacher or researcher gathered all the responses of the learners, they were contrasted with a list of norm responses made by native speakers. If those L2 responses were found on the native word list, then it could be concluded that the response was native-like. We agree with Fitzpatrick et al. (2015) in that it is not worth comparing the responses of native speakers with L2 learners because language learners do not usually have the same proficiency in their native than in their second or foreign language. As these scholars suggest, it would be better to compare the responses among second or foreign language learners to overcome this issue and see whether any trend emerges. Similarly, it would be interesting to know whether second or foreign language learners coincide with their responses to the same cue-words because it would give us information on the associations formed in the mental lexicon and the process of learning different foreign languages. Nevertheless, several limitations can be encountered. For



example, Aitchison (1987), Doró (2009), Schmitt (1998), and Sökmen (1993) argued that traditional studies only considered the first response to the stimulus word, so it is not plausible to determine the relationship among words in the mental lexicon. For Doró (2009), looking at the subsequent responses would give a more accurate picture of the mental lexicon. Another constraint that Fitzpatrick (2006, 2009), Meara (1983), and Zareva and Wolter (2012) found is that it does not seem to be clear how many and what type of words can be used as prompts. Most of those cue-words are high-frequency words, what makes responses to be more predictable, according to Meara (1982).

**4.4.3.2. Lex30 as an association task.** As stated before, Lex30, developed by Meara and Fitzpatrick (2000), is also a word association task. It consists of 30 highly-frequent stimulus words in English as an L2, and respondents have to write the first four (three in the first version) L2 words that come to their mind related to each stimulus word in 30 seconds. Afterwards, a corpus is created with the responses. These allow researchers the identification of the types of words retrieved and the patterns of associations among words. According to Meara and Fitzpatrick (2000), one of the advantages of Lex30 is that the vocabulary that test-takers produce tends to be more varied. To ensure this variety, these scholars chose stimulus words that would elicit a wide range of responses and infrequent words instead of common stimulus words, such as black or dog, which would activate predictive responses (e.g., white, cat). Several investigations have been conducted using this instrument. For example, Doró (2009) researched the word production of Hungarian EFL university learners through Lex30. Regarding non-shared responses, findings indicated that most of them were diverse. The types of associations among words were reported to be heterogenous and differences among proficiency levels were also found. Moreno Espinosa (2010a) analyzed the word production of 4th, 5th, and 6th grade Spanish EFL learners by means of this instrument. Her results revealed that not only did the informants produce a higher number of words as proficiency increased but also infrequent words were in increase. Concerning the type of content words retrieved, nouns were the most frequent word class, followed by verbs, adjectives, and adverbs. Furthermore, results suggested a higher number of syntagmatic and paradigmatic responses. A high number of shared responses could also be found. Similarly, Walters' (2012) study showed that in the sample of Turkish EFL university learners the number of word responses increased according to their proficiency level. However, although in the research conducted by Alejo González and Piquer Píriz (2016) with 9th and 10th grade

Spanish EFL learners the number of words increased with the educational level, statistically significant differences were obtained only in the vocabulary growth of low-level learners in comparison with high-level learners.

**4.4.3.3. Lexical availability.** Another alternative to investigate the productive vocabulary of L2 learners and the relationship among words is through a lexical availability task. Lexical availability is a dimension of lexical competence (Faerch et al., 1984) and, according to López Morales (1995, p. 245), it is defined as the vocabulary flow used in a communicative situation. It is a component of our mental lexicon, and it is always available; however, these words only come to mind when the topics related to the daily life and the communicative situation require them, as López Morales (1995) observed.

In line with Hernández Muñoz (2005), a lexical availability task is a semantic or category fluency task in which informants have to write as many words as come to their mind in response to a stimulus word (center of interest) in two minutes, thereby the task elicits not only the words in association but also vocabulary production related to the stimulus. For Jiménez Catalán and Fitzpatrick (2014, p. 95), lexical availability tasks are based on three theoretical assumptions:

- (i) the first word responses are most available in the learners' lexicon; (ii) the responses provided by the learner reflect the organization of the learners' mental lexicon; (iii) these responses are words related to daily situation.

By means of the stimulus word, informants activate the nodes in their mental lexicon and refresh those words that are related to the prompt, as Bartol Hernández (2010) expressed. This is closely related to the Spreading Activation Theory of Semantic Processing (Collins & Loftus, 1975) (see Chapter 2, Section 2.3.3.2.2., p. 11, for an explanation). These scholars argued that words tend to be organized by means of a network in which interrelations occur. Therefore, this theory would allow us to determine how words are organized and activated in the mental lexicon, as well as the associations among words.

Lexical availability has traditionally been used in Spanish as L1 (e.g., Bartol Hernández, 2006; López Morales, 1973; Samper Padilla & Samper Hernández, 2006), and Spanish as L2 or FL (e.g., Carcedo González, 1998; Kajan, 2012; Samper Hernández, 2014; Sandu, 2012). Some investigations have been conducted in English as L2 or FL, most of them in the Group of Applied Linguistics of the University of La Rioja (GLAUR)

(e.g., Canga Alonso, 2021; Jiménez Catalán et al., 2014; Jiménez Catalán & Fernández Fontecha, 2019; Jiménez Catalán & Montero-SaizAja, 2020). The difference among studies on Spanish as L1 or L2 and English as a FL resides in their main objective. In Spanish as L1 or L2, investigations focus on identifying the vocabulary of a given community of speakers in response to traditional cue-words related to daily life issues. For this, they deal with several measures, such as frequency, cohesion, or lexical availability index. On the other hand, the investigations conducted within the GLAUR group analyze the number of words informants elicit in two minutes in response to semantic categories. They focus on the productivity of the prompts, that is, whether informants retrieve more words according to the given prompt. They consider the mean average of the words retrieved by each informant and as a group, as well as the production of words in response to each prompt. They also determine whether some variables (e.g., age, culture, gender, motivation) influence word production. This latter viewpoint is the one adopted in the present dissertation.

The 16 semantic categories that have traditionally been used in L1 Spanish are the following: (1) ‘Parts of the body;’ (2) ‘Clothes;’ (3) ‘Parts of the house (without furniture);’ (4) ‘House furniture;’ (5) ‘Food and drink;’ (6) ‘Objects laid on the table for a meal;’ (7) ‘The kitchen and its utensils;’ (8) ‘The school: furniture and materials;’ (9) ‘Heating, lightning, and means of airing a space;’ (10) ‘Town;’ (11) ‘Countryside;’ (12) ‘Means of transport;’ (13) ‘Farm and garden work;’ (14) ‘Animals;’ (15) ‘Games and entertainment;’ and (16) ‘Professions’. However, not all these 16 prompts have always been used. Some researchers have reduced the number of traditional prompts (e.g., Akbarian et al., 2020; Germany & Cartes, 2000), or they have used some of the traditional ones and included new ones in line with the specific aims of their studies (e.g., Fernández Orío & Jiménez Catalán, 2015; Ferreira & Echeverría, 2010). This is what we will do in the present study, using two traditional prompts and six novel ones related to perceptual learning styles, one of our objectives.

Some studies have investigated the associations among the prompts and the words retrieved in a lexical availability task to account for the structure and organization of the mental lexicon in L2 (e.g., Agustín Llach, 2022; Akbarian et al., 2020; Fernández Fontecha et al., 2021). Although some of the following investigations have also studied other variables or they have done other qualitative and quantitative analyses, we are only going to focus on the associations among words. For example, Ferreira and Echeverría (2010) analyzed the semantic networks of the words elicited in a lexical availability task

with Spanish university EFL learners and English native speakers who were high-school students. They focused on the prompts ‘Body parts’ and ‘Pollution and the environment’. Considering EFL learners, the results revealed a lack of organization of their lexicon because words were not always related to subcategories within a given category. They concluded that this lack of organization was attributed to a superficial knowledge of words. López González (2014) studied the relationship among words produced in a lexical availability task (16 traditional prompts) with pre-university Polish students who learnt Spanish as a FL. His results showed a variety of associations among words, such as hypernymy, hyponymy, meronymy, antonymy, or contiguity. Santos Díaz (2017) looked at the associative relations among words elicited in a lexical availability task (traditional prompts) in Spanish as L1 and English and French as FL with university Spanish native speakers. In the foreign languages, the most frequent associations were meronymy and spatial organization. There was also phonological priming, as well as a lot of clusters. Similar to Ferreria and Echeverría (2010), Santos Díaz (2017) found that words were better organized in lexical subgroups in the native than in the foreign languages. There were a fewer number of associations in English and French as a foreign language than in Spanish as a native language. Palapanidi and Agustín Llach (2019) researched the associations among the words elicited in a lexical availability task in response to the prompt ‘Celebrations and feasts.’ Their sample consisted of Spanish L1 university students and Greek university students who learnt Spanish as a FL. Their findings indicated the different lexical organization between native speakers and foreign language learners, being the vocabulary of the former richer and more varied. The study of Palapanidi (2019) analyzed the patterns clusters and switches retrieved by Greek university students who were learners of Spanish as a FL, but with two different language levels (B1, C1) in response to the prompt ‘Food and drink.’ For the sake of clarity, a cluster refers to the organization of words into subcategories which are related in terms of semantics or phonetics. On the other hand, a switch is defined as the transitions among clusters in order to look for a new subcategory (Fernández Fontecha et al., 2021). Palapanidi’s results revealed that more advanced learners produced a higher number of clusters and switches. The majority of the clusters were semantic in both language levels. They differed in the second and third types, being phonetic and other types for the B1 level and the other way round for the C1 level. Among the semantic clusters, the hypernym-hyponym relation prevailed. The most frequent phonetic clusters were those in which their first letters were similar or because they rhymed. Regarding the other type

of clusters, the cultural relation was the predominant. Agustín Llach and Palapanidi (2021) explored the type of associations (semantic, formal, and encyclopedic) produced in a lexical availability task (traditional and non-traditional prompts) by Spanish L1 university students and Greek university students who learnt Spanish as a FL in two different language levels (B1 and C1). The traditional prompts were ‘Food and drink,’ ‘The house,’ ‘Professions,’ ‘The countryside,’ and ‘The town;’ non-traditional prompts were ‘Celebrations and feasts,’ ‘To love,’ ‘Everyday actions,’ and ‘Beautiful/pretty.’ Considering FL learners, C1 informants produced more associations than the B1 group. Semantic (both syntagmatic and paradigmatic), formal, and encyclopedic associations were more frequent in C1 learners than in B1 learners. Agustín Llach (2022) examined the organization of the elicited words in the mental lexicon of 10th and 12th grade Spanish EFL learners. The prompts used were ‘Food and drink,’ ‘Hobbies,’ ‘Animals,’ ‘Town,’ and ‘Countryside.’ Her results revealed the different organization of words in the mental lexicon of these two groups of informants. The semantic associations of 10th graders tended to be among frequent words, whilst 12th graders also made associations among non-frequent words.

In short, a lexical availability task enables us to identify the association among words, not only their connection to the cue-word but also among the other words retrieved, and thus how the mental lexicon is organized and stored. It also provides information on word production of the informants both quantitatively and qualitatively. The next section will include a review of studies on productive vocabulary knowledge, specifically controlled productive vocabulary and lexical availability.

#### **4.4.4. Review of studies on productive vocabulary knowledge**

One of the objectives of the present dissertation (see Chapter 5, p. 113, for an explanation of the objectives) is to measure the productive vocabulary knowledge of EFL learners by means of a controlled productive vocabulary test and word production by means of a lexical availability task. We decided to investigate productive vocabulary rather than some of the other types of vocabulary because it would make foreign language teachers and researchers cognizant of the language learners’ level of controlled productive vocabulary knowledge in the 2,000 word frequency band, as well as the number and the characteristics of words they produce per prompt in two minutes in a lexical availability task. As mentioned earlier, it is more challenging to learn vocabulary productively than receptively; productive vocabulary encompasses receptive knowledge,

as one cannot produce words appropriately in context and communicate effectively if those words are not comprehended. We believe it would be useful to research the productive vocabulary knowledge of EFL learners and compare our results with other studies to notice whether any trend emerges.

**4.4.4.1. Relationship among individual variables and controlled productive vocabulary.** There has been a wealth of research on the controlled productive vocabulary knowledge of university EFL learners world-wide. However, studies on secondary education, specifically the 12th grade, are scarce. To the best of our knowledge, only two investigations have been conducted on 12th grade EFL learners: Laufer and Nation (1999) and Montero-SaizAja (2021). To select the studies for this review, we only included those investigations that analyzed English as a second or foreign language and that used the 2,000-word band level of the Productive Vocabulary Levels Test (PVLТ) (Laufer & Nation, 1995, 1999), since it was the instrument employed in the present dissertation (see Chapter 6, p. 122, for an explanation).

Laufer and Nation (1999) conducted investigations across different educational levels. One of those educational levels was the 12th grade. Their informants comprised 18 EFL learners. However, they did not report the country in which this study was performed. The 2,000 word-frequency level of the PVLТ was the data collection instrument to measure controlled productive vocabulary. Their findings showed that 16.2 was the mean average of correct items. Nevertheless, they did not report the number of words known out of the second 1,000 most frequent ones. Montero-SaizAja (2021) investigated the gender-based differences in the language learning strategies and the controlled productive vocabulary knowledge of EFL learners in Spain. The sample of test-takers were 51 students who were enrolled in the 12th grade. To assess this type of vocabulary, she distributed the 2,000 word-frequency level of the PVLТ (version A+C). According to her results, 15.21 was the mean average of correct items. 12th graders appeared to have a productive vocabulary knowledge of roughly 1,014 words.

Moving on to the relationship between perceptual learning styles and controlled productive vocabulary, which is one of the objectives of the present dissertation (see Chapter 5, p. 113, for an explanation of the objectives), as far as we know, no study has researched it. In addition, we observe scarcity of research in the relation of perceptual learning styles and vocabulary learning. Shen (2010) examined the effect of perceptual learning style preferences on L2 lexical inferencing with EFL university students in

Taiwan. Before inferencing strategy instruction, results indicated that group learners outperformed their peers in the lexical inferencing test, followed by individual, kinesthetic, tactile, auditory, and visual learners. However, in the lexical inferencing post-test after receiving instruction, auditory and visual learners outperformed the other participants. Similarly, Tight (2010) researched the relationship among perceptual learning style matching and the acquisition and retention of 36 L2 Spanish concrete nouns with American university students. Findings revealed that mixed modality instruction was the most beneficial for the acquisition and retention of L2 vocabulary. Regardless of their perceptual learning styles, students were successful in the acquisition and retention of vocabulary. Nevertheless, style matching seemed to result in a greater retention than style mismatching. Other studies found that the relationship among L2 vocabulary learning and perceptual learning styles was not effective. Yeh and Wang (2003) studied whether the perceptual learning styles of Taiwanese EFL university students influenced the effectiveness of three types of vocabulary annotations (text annotation only, text plus picture, and text plus picture and sound). Results suggested that the second type of vocabulary annotations (text plus picture) was the most effective. However, perceptual learning styles did not appear to influence the effectiveness of vocabulary annotations. These EFL learners tended to prefer visual to auditory annotations. Likewise, Kassaian (2007) explored whether matching the instructional method (visual or aural) with the perceptual learning styles (visual or auditory) of Iranian EFL university students enhanced their vocabulary acquisition and retention. Findings indicated that the words which were presented visually were acquired and retained better than auditory ones, despite being visual or auditory learners. Results also showed that perceptual learning styles did not have an effect on the retention of the instructed material. In the same vein, Hatami (2018) analyzed whether there was a relationship between L2 incidental vocabulary acquisition and retention through reading and the perceptual learning styles of Iranian EFL university students when matched to their input mode. Significant differences between the reading group and incidental vocabulary acquisition and retention were not found. Findings also revealed that perceptual learning style matching did not influence incidental word learning through reading. In the same vein, Akbarian et al. (2019) examined the relationship among perceptual learning style preferences and vocabulary depth in Iranian EFL university students. Their results showed that kinesthetic learning styles were the predominant, followed by visual, auditory, and tactile. However, a statistically significant relationship was not found, except for the tactile learning style.

On the other hand, the research undertaken by Pouwels (1992) showed mixed results. He investigated the impact of perceptual learning styles on a vocabulary test using pictorial, verbal, and pictorial-verbal aids in L2 university students in the United States. His results confirmed that parity learners obtained higher scores in the vocabulary test, followed by visual and auditory learners. In addition, a statistically significant positive correlation was observed between visual learners and the combination of picture and verbal aids; the correlation was negative with auditory learners. As it can be inferred from this review of studies, no concluding evidence has been found so far to support the relationship among perceptual learning styles and L2 vocabulary learning. Furthermore, these studies only investigated intentional (Kassaiian, 2007; Pouwels, 1992; Tight, 2010) and incidental (Hatami, 2018) L2 vocabulary acquisition, vocabulary depth (Akbarian et al., 2019), lexical inferencing (Shen, 2010), or vocabulary annotations (Yeh & Wang, 2003).

**4.4.4.2. Vocabulary production of EFL learners as elicited in lexical availability research.** The present dissertation focuses on lexical availability in English as a Foreign Language. As it will be explained in Chapter 6 (p. 123), in the investigation of this dissertation we included two traditional prompts and six non-traditional to identify the production of EFL learners in each prompt and the relation of this production to the perceptual learning styles under investigation (visual, auditory, and tactile/kinesthetic). In the following review of studies, we will only focus on those which investigated 12th grade EFL learners and which have considered any of our objectives (see Chapter 5, p. 113) to be able to compare our results in the discussion. Likewise, our review will also be based on the prompts ‘Town’ and ‘Hobbies’ because, as it will be explained in the Methodology section (see Chapter 6, p. 123), these were the two traditional prompts included in our study as a framework of comparison with previous research.

As far as we know, all the investigations on the lexical production of 12th grade Spanish EFL learners by means of a lexical availability task have been conducted in Spain, specifically within the Applied Linguistics Research Group of the University of La Rioja (GLAUR). It is important to point here that the studies undertaken by Agustín Llach (2017), Canga Alonso (2017), Jiménez Catalán and Canga Alonso (2019), Jiménez Catalán and Fernández Fontecha (2019), Jiménez Catalán and Montero-SaizAja (2020), and Agustín Llach (2022) used the same sample of informants. Nevertheless, they differed in the variables analyzed: age and L2 proficiency (Agustín Llach, 2022), bilingualism (Agustín Llach, 2017; Jiménez Catalán & Fernández Fontecha, 2019),



conceptualization (Jiménez Catalán & Montero-SaizAja, 2020), gender (Jiménez Catalán & Canga Alonso, 2019; Jiménez Catalán & Montero-SaizAja, 2020), or language profiles (native vs. EFL learners) (Canga Alonso, 2017). According to these studies, the prompt ‘Town’ appeared to be more productive than ‘Hobbies.’ Regarding frequency, most of the words retrieved pertained to the off-list, followed by the first 1,000 most frequent words and the 2K band. Their results also showed that nouns were the predominant word class, followed by verbs and adjectives. The combination of noun and verb was also one of the most frequent. With another sample of 12th graders, Fernández Fontecha (2021) examined the relationship between creativity and lexical production. Her results revealed that nouns were more frequent than adjectives or verbs. Furthermore, a statistically significant and positive relationship was found between creativity and lexical production. Fernández Fontecha et al. (2021) investigated the lexical production and organization strategies of two groups of EFL learners: EFL as L2 and EFL as L3. Similar to previous research, nouns prevailed over the other word classes, followed by adjectives or verbs (depending on the linguistic profile), the combination of noun and verb, and the combination of noun and adjective.

Moving on to the focus of this dissertation, the relation of perceptual learning styles and productive vocabulary in L2, few studies have examined the relationship among lexical availability and perceptual learning styles, and lexical availability and controlled productive vocabulary, as measured by the PVL. Concerning perceptual learning styles, Domínguez Pelegrín (2019) analyzed the relationship among learning styles and lexical availability in university Slovene students who were learners of Spanish as a foreign language. Not only did he focus on perceptual learning styles, but also on other types of learning styles (e.g., cognitive styles). Nevertheless, we will only deal with his research on perceptual learning styles because it is one of the variables which is object of study in this dissertation. To measure perceptual learning styles, he distributed the Perceptual Learning Style Preference Questionnaire (PLSPQ) (Reid, 1995b) and the Learning Style Survey (LSS) (Cohen et al., 2009). His lexical availability task was constituted by the following non-traditional cue-words: ‘Individual: physical dimension,’ ‘Individual: perceptive and psychological dimension,’ ‘Health and hygiene,’ ‘Leisure,’ ‘Geography and nature’ and ‘Travel, housing and transport.’ According to the PLSPQ, his informants preferred the auditory learning style, followed by kinesthetic, visual, and tactile. Regarding the LSS, their informants favored the visual learning style, followed by auditory and tactile/kinesthetic. His findings only indicated a positive and statistically

significant correlation between the visual learning style (measured by the LSS) and the available lexicon of informants. This study investigated learners of Spanish as a foreign language, whilst the aim of the present dissertation is EFL learners. To our knowledge, no research has investigated the relationship among lexical availability, perceptual learning styles, and controlled productive vocabulary, which are the main variables of the present dissertation. This relationship will give an insight into the EFL learning process, specifically learning preferences and productive vocabulary knowledge: whether the perceptual learning styles that informants report to have affect their productive vocabulary knowledge (both controlled and available lexicon), whether the words they produce in a lexical availability task are related to their perceptual learning style preferences, or whether their highest scores in controlled productive vocabulary depend on their perceptual learning modalities. In the following section, we will discuss the vocabulary input included in ELT textbooks.

#### **4.5. Vocabulary input in ELT textbooks**

Vocabulary is of vital importance in the foreign language learning and teaching process. Despite the proliferation of studies on vocabulary since the 1980s and 1990s, the same importance has not been given to the role of vocabulary in textbooks, as Alcaraz Mármol (2011a, 2011b) noted. She argued that “despite the development of syllabi over the years, vocabulary issues still lag behind – much more so than in other aspects” (Alcaraz Mármol, 2011a, p. 78). In a similar vein, Folse (2004) asserted that “except for the few vocabulary textbooks that explicitly cover vocabulary, most ESL textbooks do not systematically deal with vocabulary” (p. 162-163). In fact, there seems to be no indication as to the volume and choice of vocabulary that ought to be included in textbooks, a prevailing view among scholars (e.g., Alcaraz Mármol, 2011a, 2011b; Alsaif & Milton, 2012; Aziez & Aziez, 2018; Milton, 2009). Vocabulary in textbooks can be found in the form of lists and activities, such as dialogues, narrations, songs, texts, and grammar explanations, as Alcaraz Mármol (2009) and Thornbury (2002) reported. Brown (2010) contended that the activities in textbooks ought to incorporate the nine aspects of vocabulary knowledge developed by Nation (2001, 2013), as explained in Section 4.3.2. (p. 77), in order to ensure their learning. López-Jimenez (2014) suggested different techniques for the introduction of vocabulary in textbooks: synonyms, antonyms, L1 translation equivalents, written explanations, definitions, contextualized examples, and visual support (p. 165).

This lack of consensus between textbooks and vocabulary research might have emerged owing to a number of problems. According to Alcaraz Mármol (2011a), one of the problems might be that textbook designers do not take into consideration the results obtained in vocabulary research. She also believed that it is a business issue, since “the competition found between different publishing houses can invalidate the real aim of didactic materials” (Alcaraz Mármol, 2011a, p. 84). Another reason she gave is that as there is a vast body of research on foreign language vocabulary, textbook designers might feel overwhelmed and unsure as to which approach ought to be followed. However, Alcaraz Mármol (2011b) concluded that “[n]owadays there is no excuse to design but good-quality teaching materials. The question is whether designers really take research findings into account or just play lip-service to them” (p. 11). This minor role given to vocabulary in textbooks is attributed to an absence of coordination, solid design criteria (Alcaraz Mármol, 2011a), and systematicity (López-Jiménez, 2009). Having given an overview of the role of vocabulary in ELT textbooks, let us now consider the notion of input.

#### **4.5.1. Definitions and types of input in SLA**

Input plays a crucial role in Second Language Acquisition (SLA). It is viewed as a fundamental element in the acquisition process because it is vital for learning and enhancing vocabulary knowledge, as noted by Gass (1997) and Gass and Alvarez Torres (2005). Nevertheless, scholars have adopted different perspectives when addressing input in SLA. One of the earliest definitions of input was provided by Corder (1967), describing it as “‘what goes in’ not what is available for going in” (p. 165). Krashen (1982, 1985) put forward the Input Hypothesis to define input. He contended that this hypothesis is central to the acquisition of a language; language is acquired by means of understanding messages (“comprehensible input” in Krashen’s words) which are one stage beyond the current language level, he termed it “ $i + 1$ ” (Krashen, 1982, p. 21). For him, comprehensible input is an essential component of language acquisition. Although this theory has been widely accepted, it has also attracted criticism among SLA researchers and prompted the emergence of new theories (e.g., Ellis, 2002; Long, 1991; Swain, 1985). Sharwood Smith (1993) regarded input as any “potentially processable language data which are made available by chance or by design, to the language learner” (p. 167). To put it in other words, the language learner might process the language consciously or subconsciously. This researcher also stressed the importance of previous world

knowledge and non-linguistic input for the interpretation and understanding of language. Gass and Mackey (2006) described input as “language that is available to the learner through any medium (listening, reading, or gestural in the case of sign language)” (p. 5). We agree with the idea that not all the input will be eventually processed because there might be some times in which language learners do not pay attention consciously or unconsciously, or they might not understand it, hence that knowledge will not be learnt, as VanPatten (1990), de la Fuente (2014), and Kormos (2020) argued.

Regarding the mode of input, three types can be distinguished: oral, written, and multimodal. These three types of input modalities are reminiscent of the perceptual learning styles explained in Chapter 3 (see Section 3.3.3., p. 47). Oral input is defined as “second language (L2) vocal utterances the learner has heard and comprehended, including his own, regardless of whether these utterances have been produced correctly by L2 native speakers, or incorrectly by other non-native speakers of the L2” (Flege, 2009, p. 175). Ellis (1995) stressed that this kind of input works as a major source of information when learning a second or foreign language, above all, in the early stages of language learning. Following this researcher, oral input can be encountered in SL or FL classrooms because learners listen to their teachers’ explanations, classmates, or recordings, they interact with their teachers and classmates, they do role-play activities, among other activities. This is how language learners learn their second or foreign language through oral input. On the other hand, written input is also important in SL and FL learning, which mainly comes from reading. According to Laufer (2011), reading “provides comprehensible input which is the key to language acquisition, first and second, grammar and vocabulary” (p. 3). In line with Kormos (2020), learning vocabulary through written input appears to be more enduring than by oral input, which is usually temporary. She described how the processing of written and oral input works:

When words are presented in the written mode, they first need to be processed orthographically, i.e., the letters need to be recognized. This is followed by phonological processing, which involves the conversion of letters into sounds, the combination of sounds into syllables, and finally phonological activation of the word form. (p. 211)

Multimodal input is becoming increasingly popular among SL and FL researchers, as it is believed that it improves the acquisition of second and foreign languages, makes input more comprehensible (Plass & Jones, 2005), and enhances vocabulary knowledge (Kormos, 2020). Multimodal input refers to the combination of oral and written input. This reminds us of Paivio’s (1969) Dual Coding Theory, explained in Chapter 2 (see

Section 2.4.3., p. 26), since he emphasized the interaction between verbal and non-verbal systems to improve learning.

In our opinion, and as Kormos (2020) highlighted, comprehending oral, written, and multimodal input also depends on the individual differences of language learners (e.g., learning styles, culture, personality, motivation), as well as the context in which the learning is taking place, the medium of instruction (e.g., textbooks), and the characteristics of their teachers and instructors, to name a few. We also believe that multimodal input gives language learners more opportunities to learn in different ways, as one day you might feel like learning through oral input, whilst the next day you might prefer learning through written input. In this regard, both types of input will be considered overcoming this issue.

#### **4.5.2. ELT textbooks and their role in EFL learning**

Some definitions have been proposed to define the concept of textbook. Sheldon (1988) argued that textbooks “represent for both students and teachers the visible heart of any ELT programme” (p. 237). Similarly, Hutchinson and Torres (1994) defined them as “providers of input into classroom lessons in the form of texts, activities, explanations, and so on” (p. 317). For Richards and Schmidt (2010), a textbook is a:

book on a specific subject used as a teaching/learning guide, especially in a school or college. Textbooks for foreign language learning are often part of a graded series covering multiple skills (listening, reading, writing, speaking, grammar) or deal with a single skill (e.g. reading). (p. 595)

Ahour and Ahmadi (2012) claimed that they are “the main sources that can convey the knowledge and information to the learners in an easy and organized way” (p. 195). These researchers concurred with the concept of textbook as a guide to language learning and teaching. They emphasized the role of textbooks in education because they are the main tool both teachers and learners use on a daily basis. On the other hand, Jiménez Catalán and Mancebo Francisco (2008) defined a textbook as “a container of vocabulary input as well as an important resource for language learning and teaching” (p. 148). Apart from considering the textbook as a guide to language learning and teaching as Ahour and Ahmadi (2012), Hutchinson and Torres (1994), Richards and Schmidt (2010), and Sheldon (1988), they viewed it as a container of vocabulary. This latter viewpoint is somehow shared by Hutchinson and Torres (1994) who described textbooks as providers of input. A further definition is given by Shannon (2010), who claimed that they are:

enduring repositories of knowledge that enable students to move past their daily experiences in order to grasp the possibilities encoded in the textbooks' articulation of history, the sciences, mathematics, language, the arts, and other topics deemed to be important. (p. 397)

The Cambridge online dictionary (2022) described a textbook as “a book about a particular subject, written for students.” In the same vein, the Macmillan online dictionary (2022) stated that it is “a book containing information about one subject.” According to the Merriam-Webster online dictionary (2022), it is “a book used in the study of a subject.” The Oxford online learner’s dictionary (2022) defined it as “a book that teaches a particular subject and that is used especially in schools and colleges.” Shannon (2010) and these four dictionaries regarded the textbook as an object or a tool to study a subject. For Tyson and Woodward (1989), textbooks “are the messengers, not the message” (p. 14). Therefore, these researchers pinpointed that textbooks are a means to an end, that is, vehicles of information.

Taking all these definitions into consideration, we are going to adopt the one proposed by Jiménez Catalán and Mancebo Francisco (2008), since it seems to be the most complete and it considers vocabulary input and language learning and teaching, which goes hand in hand with the present dissertation. In fact, one of our objectives is to analyze the vocabulary input of two ELT textbooks (see Chapter 5, p. 113, for an explanation of the objectives).

Regarding foreign language learning and teaching, the shift in education of the 1840s gave rise to new foreign language teaching methods, such as the Grammar-Translation Method, the Direct Method, or the Audiolingual Method. Textbooks consisted of readings, grammatical descriptions, pictures, dialogues, tapes, bilingual word lists, and translations from the target language to the mother tongue, among other activities (Celce-Murcia, 2014; Richards & Rodgers, 2014). The most important approach to foreign language teaching was the Communicative Language Teaching, which appeared in the 1970s and still persists today. Textbooks consisted of activities which “reflect[ed] the real life situations and demands” (Celce-Murcia, 2001, p. 8). From the 1990s onwards, textbooks included information-gap tasks, role play, songs, reading texts, writing tasks, listening activities, grammatical exercises, vocabulary exercises, games, among others, as Hutchinson and Torres (1994) observed. They started to be sold in packages which contained supplementary materials, such as workbooks, teachers’ guides, tests, audio cassettes, among others (Littlejohn, 1992). Nowadays, textbooks are regarded as multimodal resources, since information is presented through different ways, such as

text, pictures, audio, and videos. Apart from containing CD-ROMs and videos, they even include the textbook and workbook in digital form, e-books, and online activities to practice the content learnt in class.

There has been a heated debate about the usefulness of textbooks in education, and in foreign language teaching and learning specifically, which has given rise to two opposing views. On the one hand, supporters (e.g., Nordlund, 2016; Sheldon, 1988; Tomlinson, 2001; Yazici & Hayta, 2021) argue that textbooks are an essential component of the learning and teaching process and a helpful tool which provides support to both teachers and learners. On the other hand, opponents (e.g., Brumfit, 1979; Clarke & Clarke, 1990; Graves, 2000) claim that textbooks restrict teachers' innovation and do not fulfill the students' needs. Regardless of this criticism, we consider that textbooks play a major role in foreign language learning and teaching, a view which is also held by many scholars (e.g., Hutchinson & Torres, 1994; Jiménez Catalán & Mancebo Francisco, 2008; Mishan, 2021; Nordlund & Norberg, 2020). However, we believe that the same prominence ought to be given to textbooks, teachers, and language learners because they all constitute crucial and necessary components in language learning and teaching. The interaction of the three components is what makes language learning and teaching effective. We do not agree with the viewpoint that textbooks are the only source of learning and teaching and that teachers have to blindly follow the textbooks. We advocate the use of textbooks in language education, since they provide language learners with a lot of input and activities to learn the foreign language. Nevertheless, they ought to be complemented with supplementary materials, such as videos and audios recorded by native speakers of the language, speaking activities related to daily life situations, more exercises to practice and overcome their weaknesses, among others. The aim is to provide language learners with authentic input apart from the one included in textbooks. It is true that this might lead to a lack of eagerness and motivation to learn the foreign language. This limitation could be overcome through the suggested supplementary materials with up-to-date topics and real-life situations which give students authentic language input and it might also motivate them. Having explained the role of textbooks in second and foreign language learning, let us now do a review of studies on the vocabulary input of ELT textbooks.

### 4.5.3. Review of studies on vocabulary in ELT textbooks

There is a wealth of studies on the role of vocabulary in ELT textbooks, especially in secondary and tertiary education. Nonetheless, research seems to be scarce regarding the ELT textbooks used in the 12th grade. Therefore, we decided to select those which were related to our objectives (see Chapter 5, p. 113. for an explanation of the objectives) and those which addressed textbooks whose main purpose was to teach EFL as a curricular subject. To our knowledge, only six studies (Criado, 2009; Criado & Sánchez, 2009; Larsson, 2017; Aziez and Aziez, 2018; Coxhead et al., 2020; Rahmat and Coxhead, 2021) investigated the vocabulary input in 12th grade ELT textbooks. They were conducted in countries of the Asian and European continents. Table 9 (pp. 106-107) provides a summary of studies on frequency arranged in chronological order, including the number of tokens, types, and type-token ratio, frequency levels, and word families.

Table 9

*Review of studies on the vocabulary contained in ELT textbooks*

Study	Textbook(s)	Background	Tokens and types	Frequency level	Word families
Criado (2009)	<i>Valid Choice 2</i>	12th grade Spain	Tokens: 25,687 Types: 3,225 TTR: not reported	Not reported	K1: 113; K2: 434; K3: 187; Off-list: not reported; Total: 734
Criado and Sánchez (2009)	<i>Valid Choice 2</i>	12th grade Spain	Tokens: 25,687 Types: 3,225 TTR: not reported	Not reported	K1: 113; K2: 434; K3: 187; Off-list: not reported; Total: 735
Larsson (2017)	<i>Viewpoints 3 Blueprint C</i>	12th grade Sweden	Tokens total: 22,030 Types total: 4,634 TTR: 0.21	K1: 17,030; K2: 1,782; K3: 1,222; K4: 372; K5: 216; K6-K25: 602; Off-list: 805	Total: 2,762
Aziez and Aziez (2018)	<i>Developing English Competencies</i>	12th grade Indonesia	Tokens: 7,081 Types: 1,770 TTR: not reported	Not reported	Not reported
Coxhead et al. (2020)	<i>Buku Bahasa Inggris Kelas XII</i>	12th grade Indonesia	Not reported TTR: not reported	AWL: 5.99%	274



Rahmat and Coxhead (2021)	<i>Textbook 3</i>	12th grade Indonesia	Tokens: 32,725 Types: not reported TTR: not reported	K2: 79.29%; K3-K9: 10.59%; K10-K25: 0.52%	Not reported
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*Note.* TTR stands for type-token ratio.

In Indonesia, Aziez and Aziez (2018) conducted a study on the lexical input of ELT textbooks and national examination texts. Nevertheless, we only considered the part devoted to textbooks because national examinations texts are not going to be covered in the present investigation. They found that textbooks belonged to the fourth and fifth 1,000 most frequent words level, which might pose difficulties for EFL learners. Coxhead et al. (2020) researched the academic vocabulary and multiword units of two corpora of Indonesian and Chinese ELT textbooks. However, only one of the Indonesian books addressed the 12th grade. Although they employed other word lists (Academic Vocabulary List, Academic Collocation List, and Academic Formulas List), we only focused on the Academic Word List (AWL) (Coxhead, 2000), since it is the one to be used in the present dissertation. Findings indicated that the AWL coverage in the textbook seemed to be low; a limited number of academic words could be found in it as well. Rahmat and Coxhead (2021) researched the lexical coverage and load of ELT textbooks. These scholars reported that 3,000-4,000 word families were necessary to reach 95 per cent coverage and 5,000-6,000 word families to achieve 98 per cent coverage.

Moving onto Europe, Larsson (2017) analyzed ELT textbooks from a lexical standpoint and whether the lexical input available coincided with their national curriculum and CEFR levels in Sweden. Findings revealed that the vocabulary contained in the textbooks seemed to be appropriate for the English level assigned by the national curriculum and the CEFR. Several investigations on the vocabulary input of ELT textbooks have also been conducted in Spain. For example, Criado (2009) examined the lexical input of an ELT 12th grade textbook, considering frequency, distribution, rehearsal and repetition, and vocabulary activities. Her results showed that the vocabulary contained in the textbook did not correspond with the most frequent words of English frequency lists. Moreover, words were not repeated that often in texts and activities to ensure the vocabulary acquisition of learners. A similar study was conducted by Criado and Sánchez (2009), who reached the same conclusion regarding vocabulary presentation and distribution.

Some of the objectives for the present dissertation concerning the analyses of ELT textbooks were to identify the type of content words included, the type of input provided, and their representation of perceptual learning styles. Therefore, in this paragraph and in the following ones we will revise some studies which addressed these issues, not only in the 12th grade but also in other courses and levels to trace any trend. Regarding the number of content words found, Jiménez Catalán and Mancebo Francisco (2008) researched the textbooks pertaining to primary and secondary education in the Spanish educational system. They found the predominance of grammatical words over content words in both educational levels. The majority of those content words were verbs and nouns when they analyzed the 50 most frequent words. Similarly, the studies conducted by Nordlund (2015a, 2015b), and Nordlund and Norberg (2020) on Swedish ELT primary school textbooks showed that nouns were the most frequent content words encountered in ELT textbooks, followed by verbs and adjectives.

Concerning input, Donzelli (2007) compared the oral input used in the classroom from an EFL teacher with the written input of ELT secondary school textbooks in Italy. Results revealed that the vocabulary produced by oral input from the teacher was almost twice the vocabulary input contained in the textbook. On another note, Abu Ellif and Maarof (2011) researched the number of oral communicative exercises in ELT secondary school textbooks in Saudi Arabia. Their results revealed that there appeared to be a lack of these activities in ELT textbooks. Similarly, Bueno-Alastuey and Luque Agulló (2015) performed a study on the oral competence included in the 12th grade ELT textbooks in Spain. Their findings pointed at an appropriate quantity of activities for developing oral competence. Nevertheless, more activities were devoted to develop the written skills than the oral skills. Therefore, these researchers suggested an increase in oral activities in ELT textbooks. Some researchers (e.g., Chen, 2010; Liu & Qu, 2014; Yu & Chang, 2019) explored multimodality in ELT textbooks, delving into their multimodal characteristics and tasks, as a way of improving EFL learning. Other scholars (e.g., Elmiana, 2019; Moghtadi, 2013; Roohani & Sharifi, 2015) only focused on the use of visuals (e.g., pictures, illustrations, images, drawings) in ELT textbooks. They all concluded with the essential role they play in enhancing foreign language learning.

Multiple intelligence has also been a widely researched variable in ELT textbooks, and it is related to the notion of perceptual learning styles explained in Chapter 3 (p. 47). In this review, we only considered the findings concerning visual/spatial, verbal/linguistic, and bodily/kinesthetic intelligence because they could be compared to

visual, auditory, and tactile/kinesthetic learning styles. Most of the studies conducted (e.g., Maharma, 2021; Razmjoo & Farmer, 2012; Talebpour, 2017) obtained the same results: the verbal/linguistic intelligence seemed to be the most representative in ELT textbooks, followed by visual/spatial and bodily/kinesthetic intelligences. Notwithstanding, the investigation of Rahayu (2019) revealed that the bodily/kinesthetic intelligence was found more frequent in ELT textbooks, followed by verbal/linguistic and visual/spatial intelligences.

Moving on to the relationship between the vocabulary input in ELT textbooks and controlled productive vocabulary, to our knowledge, no studies have explored this relation. Concerning the vocabulary in textbooks and lexical availability, as far as we know, only the study conducted by Canga Alonso and Cifone Ponte (2016) compared the cultural input provided by a lexical availability task ('Food and drink' and 'Countryside') and ELT 12th grade textbooks in the Spanish educational system. Their findings revealed that around 50 per cent of the cultural types retrieved in a lexical availability task were also found in the ELT textbooks under analysis. As far as we know, no study has researched whether the most frequent words retrieved in each prompt (both traditional prompts and prompts related to perceptual learning styles) in a lexical availability task coincided with the most frequent words available in ELT textbooks. This would allow us to recognize whether the vocabulary learnt from the textbooks were included as responses to the lexical availability task. Following this relationship between the input of textbooks and learners' written production, Tsai (2015) investigated the collocation use of three ELT textbooks used in Taiwan, and the collocations encountered in the essays written by both Taiwanese EFL university learners and native speakers of English. This scholar found that EFL learners elicited a large number of collocations but with very small variations, which indicated that they tended to write the collocations they were more familiar with instead of the producing other collocations that they had learnt from the ELT textbooks. Unlike Canga Alonso and Cifone Ponte (2016), Tsai's (2015) results revealed that a very low number of collocations retrieved in EFL essays coincided with the collocations included in ELT textbooks. Regarding primary school EFL learners, Milton and Vassiliu (2000) researched whether the vocabulary input provided in Greek ELT textbooks coincided with the learners' production of words on a vocabulary test based on the vocabulary learnt in their EFL classes. These researchers concluded that learners had learnt around 50 per cent of the words contained in their textbooks.

Likewise, to our knowledge, no research has been conducted on the representation of perceptual learning styles on ELT textbooks in the 12th grade, and few studies have been conducted on other grades. The only examples we are aware of are Šímová (2011), Pänkäläinen (2012), and Mattheoudakis and Alexiou (2015), which for their relevance for the present dissertation are reviewed in the following paragraph.

Šímová (2011) investigated whether the activities found in primary education textbooks in the Czech Republic catered for all perceptual learning styles. Findings indicated that the majority of activities were appropriate for visual and auditory learners, whilst there seemed to be few activities which were suitable for tactile/kinesthetic learners. Similarly, Pänkäläinen (2012) examined the impact of perceptual learning styles on EFL Finish primary education based on the views of teachers and textbook analysis. Results revealed that teachers advocated the support of different perceptual learning styles in the EFL classroom. According to the responses of teachers, they agreed that all the learning styles were represented in the textbooks, except for the tactile learning style. Considering the textbook, visual, auditory, and individual activities were more frequent than tactile, kinesthetic, and group activities, which were scarce. Mattheoudakis and Alexiou (2015) studied the representation of perceptual learning styles on ELT primary school textbooks in Greece. Their findings indicated that most of the activities found on both ELT textbooks were visual, whilst there were fewer activities for auditory and kinesthetic learners. To our knowledge, no study has explored the activities related to each perceptual learning style in the textbooks used in the 12th grade in the Spanish educational system. As far as we are aware, the number of perceptual words contained in ELT textbooks has not been investigated either. This research would allow us to acknowledge whether the activities and the perceptual words found on textbooks are representative of all the different perceptual learning styles of learners.

#### **4.6. Summary of chapter**

Considering the review of the literature written throughout this chapter, it can be concluded that more research into the productive vocabulary and vocabulary input included in ELT textbooks is necessary. We believe that productive vocabulary, both controlled and word production, is of vital importance because foreign language learners will be able to master the foreign language they are learning by using words in context and being able to communicate effectively. Foreign language teachers and researchers would be able to be aware of their language learners' level of controlled productive

vocabulary knowledge in the 2,000 word frequency band and acknowledge whether more instruction on vocabulary is needed. They would also be able to identify the number and characteristics of the words they elicited in a lexical availability task, the associations among words, and how the L2 mental lexicon is organized, stored, and developed. However, we noticed a lack of investigations on the relationship among perceptual learning styles and controlled productive vocabulary, one of the objectives of the present dissertation. We have also found another gap in the literature concerning the relationship among perceptual learning styles, controlled productive vocabulary, and lexical availability, which would be of considerable significance for acknowledging the foreign language learning process. We will ascertain the level of controlled vocabulary in the 2,000 word-frequency band and the number and types of words produced in a lexical availability task in a sample of 12th graders. It will allow us to determine whether more instruction on EFL vocabulary is required at that specific educational level.

In our view, it is an essential issue to consider the quantity and type of vocabulary and the vocabulary activities that ought to be included in ELT textbooks for an effective learning and instruction. As it has been explained in the last section of this chapter, textbooks are one of the main sources of vocabulary input for EFL learners. They are going to learn the vocabulary provided in them. Therefore, a careful selection of vocabulary to include in ELT textbooks is more than needed. In addition, we have noted the debate on the usefulness of textbooks in education; we have adopted the view of the supporters, as we believe that they are crucial elements in foreign language learning. However, we have also suggested that the same importance should be given to textbooks, teachers, and language learners. On another note, we have found some gaps in the literature concerning the relationship among controlled productive vocabulary and the vocabulary of textbooks, lexical availability with perceptual prompts and the words available in textbooks, and the activities related to perceptual learning styles and perceptual vocabulary in ELT textbooks. These investigations would be of paramount importance for foreign language learning because they would acknowledge whether the vocabulary learners produce is similar to the vocabulary contained in their ELT textbooks, and whether that vocabulary and the activities included in textbooks are related to their perceptual learning styles.



## CHAPTER 5. OBJECTIVES AND RESEARCH QUESTIONS

### 5.1. Introduction

This chapter will present the objectives and the research questions addressed in this doctoral dissertation. We will identify (i) its major goals, (ii) pose the research questions to try to accomplish those objectives, (iii) examine each research question separately to contextualize them in previous research, and (iv) present the outcomes we expect to achieve.

### 5.2. Objectives

Students and textbooks are two crucial components of an EFL classroom. As it has been stated in Chapter 4 (see p. 69), the acquisition of vocabulary in a FL is fundamental to be able to communicate in that language. However, there are several different ways in which vocabulary can be learnt. Students have their own individual preferences for learning vocabulary. Moreover, textbooks seem to be the primary medium of instruction in EFL, and they contain substantial input to be able to achieve FL proficiency. Therefore, the present doctoral dissertation has as its main objective to investigate the relationship among perceptual learning style preferences, the productive lexicon of learners, and the activities and vocabulary contained in ELT textbooks. Perceptual learning styles (visual, auditory, tactile/kinesthetic, and mixed-modalities) give an indication of the preferences students have for learning EFL, and these styles together with their productive vocabulary knowledge might be influenced by the type of activities and vocabulary contained in the textbooks. Nevertheless, based on the literature review provided in Chapters 3 (p. 33) and 4 (p. 69), there appears to be a scarcity of research with regards to the relationship among perceptual learning styles, productive lexicon, and the perceptual activities and vocabulary provided in ELT textbooks. In addition, there is not much research into EFL education in the Spanish educational system, specifically concerning EFL vocabulary, ELT textbooks, and EFL learners in the second year of Spanish non-compulsory secondary education (equivalent to the 12th grade). They are students who are between the stages of adolescence and early adulthood, and in the last year of education in the high school, some of them about to apply for university. Considering the aforementioned objectives, the present doctoral dissertation will provide insights into the EFL learning processes that take place in a FL classroom,

as well as the existing limitations that could be overcome to enhance learners' FL proficiency and FL vocabulary acquisition specifically.

### **5.3. Research questions**

According to the objectives formulated in the previous section, this investigation aims at answering the following research questions:

RQ1. What are the perceptual learning style preferences of 12th grade EFL learners?

The purpose of this research question is to determine the learning preferences (visual, auditory, tactile/kinesthetic, or multimodal) of EFL students enrolled in the 12th grade. Based on the review of studies given in Chapter 3 (see Section 3.3.3.4., p. 57), we expect that tactile/kinesthetic will be the most preferred perceptual learning style, followed by auditory and visual modalities (Isemonger & Sheppard, 2003; Mulyadi et al., 2017; Muniandy, 2013; Park, 2000; Payaprom & Payaprom, 2020; Peacock, 2001; Reid, 1987; Shen, 2010; Swartz & Ye, 2018; Tuan, 2011).

RQ2. Is there a relationship among perceptual learning styles and productive vocabulary dimensions?

The goal of this question is to ascertain whether there is a statistically significant relationship among perceptual learning styles and two productive vocabulary dimensions: controlled productive vocabulary and lexical production/association measured by a lexical availability task. As far as we know, no investigation has been conducted on the relationship among perceptual learning style preferences and these two vocabulary dimensions in EFL learning.

RQ2.1. Is there a relationship among perceptual learning styles and controlled productive vocabulary size?

The aim of this research question is to examine whether there is a statistically significant relationship among perceptual learning styles and controlled productive vocabulary. In the first place, we will ascertain our informants' controlled productive vocabulary. On the basis of the review of studies provided



in Chapter 4 (see Section 4.4.4.1., p. 96), we predict that the vocabulary size of 12th grade EFL learners will be around 1,000 words, since this was the finding obtained in research conducted on the same grade (Montero-SaizAja, 2021). Second, we will analyze the relationship among each perceptual learning style and controlled productive vocabulary. Finally, through this question we will address whether having a predominant learning style modality or modalities implies a larger size of productive vocabulary. For that, we will compare the size of vocabulary in each perceptual learning style and determine whether a specific modality obtains a higher controlled productive vocabulary knowledge. As mentioned in Chapter 4 (see Section 4.4.4.1., p. 96), to our knowledge, no study has investigated the relationship among perceptual learning styles and controlled productive vocabulary size. According to the literature, no concluding evidence has been found to support the relationship among perceptual learning styles and L2 vocabulary learning, specifically vocabulary annotations (Yeh & Wang, 2003), intentional (Kassaian, 2007), incidental (Hatami, 2018), and vocabulary depth (Akbarian et al., 2019). Although these studies did not focus on productive vocabulary but on other dimensions of vocabulary knowledge, with caution we might predict that there will not be a statistically significant relationship among perceptual learning styles and controlled productive vocabulary knowledge.

RQ2.2. Is there a relationship among perceptual learning styles and lexical production in a lexical availability task?

This research question aims to explore whether there is a statistically significant relationship among perceptual learning styles and lexical production. Firstly, we intend to determine the mean average of words retrieved in the whole lexical availability task, for each prompt, and for each group of prompts (visual, auditory, tactile/kinesthetic, and traditional). Based on lexical availability studies in EFL (see Chapter 4, Section 4.4.4.2., p. 98), we predict that more words will be retrieved in the prompt ‘Town’ than in ‘Hobbies,’ as in the studies conducted by Canga Alonso (2017), Jiménez Catalán and Canga Alonso (2019), and Jiménez Catalán and Fernández Fontecha (2019) with the same sample of 12th graders. Regarding the novel prompts, we presume that more words will be produced in the prompts ‘Look’ (frequency 3,1303) and ‘Say’ (3,631), whereas a fewer

number of words are expected to be retrieved in the prompts ‘Soft’ (1,9127) and ‘Loud’ (1,4722). We base our prediction on the frequency of these words (Bird et al., 2001). According to Bird et al. (2001), the frequency of use of a word can predict the speed to which that word is expressed. They also argued that high-frequency words are usually learnt earlier than low-frequency ones.

Regarding lexical production, we also expect that more words will be produced in response to traditional prompts than to perceptual prompts, following the results achieved in the studies conducted by Fernández Orío and Jiménez Catalán (2015) and Jiménez Catalán and Dewaele (2017) with traditional and non-traditional prompts. However, we should take this assumption with caution because these scholars did not research perceptual prompts and their informants were of different grades (10th and 6th grades, respectively).

Finally, we will attempt to determine whether there is a relationship among perceptual learning styles and lexical production. According to previous research in Spanish as a Foreign Language (Domínguez Pelegrín, 2019), we assume that this relationship will not be statistically significant following the only study, as far as we know, that investigated this relationship. Nonetheless, our results may be different since this scholar analyzed first year university students instead of 12th grade EFL learners. His informants had a B1 level of Spanish and had been learning Spanish as a foreign language for an average of four years. In our study, the sample of informants were also reported to have a B1 level of English, but they had been learning English for eleven years at least.

RQ3. To what extent are the perceptual learning styles represented in ELT textbooks?

By means of this research question, we aim to ascertain whether perceptual learning styles are represented in ELT textbooks. On account of this, we will analyze the number and type of content words which can be associated with each perceptual learning style. We will also identify the number and type of activities contained in ELT textbooks that can be associated with each perceptual learning style.

RQ3.1. How many content words related to each perceptual learning style are included in ELT textbooks?

The first sub-question will focus specifically on the content words contained in the textbooks, as explained before. We will calculate the tokens, types, and type/token ratio. Considering the studies on the same grade (12th grade) conducted by Aziez and Aziez (2018), Criado (2009), Criado and Sánchez Pérez (2009), Larsson (2017), and Rahmat and Coxhead (2021), we predict that the average number of tokens will be around 22,000 words; the number of types will be around 3,000 words. On another note, following the aforementioned studies, we expect that words will belong to the mid frequency level. To the best of our knowledge, there is no research on the perceptual content words contained in ELT textbooks. Based on the studies conducted on the role of visuals in ELT textbooks (e.g., Elmiana, 2019; Moghtadi, 2013; Roohani & Sharifi, 2015), we may predict with caution that visual words will prevail. We also believe that multimodal words will also predominate owing to the emergence of multimodal texts, tasks, and activities in EFL classrooms (e.g., Chen, 2010; Liu & Qu, 2014; Yu & Chang, 2019). On the other hand, we predict that auditory words will be the least encountered in both textbooks, since there seems to be a lack of oral input in ELT textbooks (e.g., Abu Ellif & Maarof, 2011; Bueno-Alastuey & Luque Agulló, 2015).

RQ3.2. How many activities related to each perceptual learning style are included in ELT textbooks?

The main objective of this second sub-question is to identify the number and type of activities in ELT textbooks. First, we will determine the total number of perceptual activities. Second, we will classify those activities based on the perceptual learning style they refer to. Considering the results of Mattheoudakis and Alexiou (2015), Pänkäläinen (2012), and Šimová (2011), our prediction is that visual activities will be the predominant, followed by auditory and tactile/kinesthetic.

RQ4. Is there a relationship among perceptual content words included in ELT textbooks and the perceptual words retrieved by EFL learners at 12th grade in a lexical availability task?

The aim of this research question is to ascertain whether the perceptual words that the informants, who are enrolled in two English instructional programs (Collaboration Program with the Official School of Languages and English as a curricular subject), produce in a lexical availability task match the perceptual words included in their respective textbooks (*English File* and *Out & About 2*). To our knowledge, there is no research in this respect. With caution, our prediction on possible findings will be based on research that has investigated the relation of learners' vocabulary production or vocabulary size and input in ELT textbooks. Following the studies conducted by Canga Alonso and Cifone Ponte (2016) and Milton and Vassiliu (2000), we assume that around 50 per cent of the words included in the two ELT textbooks will coincide with the words elicited in the lexical availability task.

#### **5.4. Summary of chapter**

In this chapter, we have formulated the objectives to be achieved throughout this doctoral dissertation after identifying the gap in the literature based on the review of studies presented in Chapters 3 and 4. There seems to be research undertaken on perceptual learning styles, controlled productive vocabulary size, lexical production, and activities and vocabulary contained in textbooks. Nevertheless, there are very few studies on the perceptual learning styles of 12th grade EFL learners. What is more, there appears to be a lack of research into the relationship among perceptual learning styles and the two aforementioned productive vocabulary dimensions, the relationship among perceptual learning styles and the perceptual words included in ELT textbooks, and the relationship among the perceptual words retrieved in a lexical availability task and the perceptual words contained in ELT textbooks. Taking into account the research gaps in the literature, we have raised four research questions that will be investigated in this dissertation. We have contextualized them according to the studies available in the literature, which support the possible outcomes we expect to find in our investigation. In sum, our main objective with these four research questions is to account for the relationship among those variables (perceptual learning styles, controlled productive vocabulary, lexical production, perceptual vocabulary, perceptual activities) to shed some light on the EFL learning process, specifically in the 12th grade, a pivotal year in the Spanish educational system.

## CHAPTER 6. METHODOLOGY

### 6.1. Introduction

Chapter 6 aims at describing the methodology adopted in the original research conducted in this dissertation. It starts with the description of the sample of informants and the context of this study. The second section is devoted to a detailed justification of the different research instruments used to assess the variables that are object of our study: a perceptual learning styles questionnaire, a productive vocabulary test, a lexical availability task, and ELT textbooks. The third section is concerned with the procedure adopted before and after distributing the questionnaires, tests, and tasks to students. This chapter concludes with a comprehensive explanation of the methodological decisions and the descriptive and statistical analyses applied to the data.

### 6.2. Informants

The sample of informants comprised 60 English as a Foreign Language (EFL) learners distributed into 23 males (38.33 per cent) and 37 females (61.67 per cent); their mean age was of 17.1. They were enrolled in the 12th grade, which is the last course of Spanish post-secondary education, in a state school in the autonomous community of La Rioja. 61.67 per cent of students belonged to the Humanities and Social Sciences Baccalaureate, whereas 38.33 per cent belonged to the Sciences and Technologies Baccalaureate. However, participants differed in the languages they spoke. The majority of them (78.33 per cent, 47 students) had Spanish as their L1, but the rest (21.67 per cent, 13 students) had other languages as their mother tongue, which were only spoken at home because their parents were not born in Spain. Nevertheless, they used Spanish at school with both their classmates and teachers, and to socialize outside it. Their L1 was Arabic (10 per cent), Bulgarian (1.67 per cent), Macedonian (3.33 per cent), and Romanian (6.67 per cent). The L2 of these bilingual students was not the same either. Out of the 13 bilingual informants, Spanish was the L2 of the majority (69.23 per cent), followed by German (15.38 per cent), Berber (7.69 per cent), and Russian (7.69 per cent). Five of these informants reported to have an L3, which was Spanish (80 per cent) and Italian (20 per cent). Moreover, 46.67 per cent of participants reported to have attended English private classes outside school, while the remaining 53.33 per cent had never attended them. Almost half of the informants (48.33 per cent) had learnt other languages outside

school, specifically Arabic (6.90 per cent), French (82.75 per cent), German (6.90 per cent), and Italian (3.45 per cent).

The sample of students also differed in the English instructional programs they had enrolled throughout secondary education. 41.67 per cent of learners had studied English with a Collaboration Program of the Official School of Languages (OSL), 6.67 per cent had taken Content and Language Integrated Learning (CLIL), and the remaining 51.67 per cent had learnt English as a curricular subject (ECS). Accordingly, the number of hours of instruction in English as a Foreign Language varied. The English with a Collaboration Program of the Official School of Languages and the English as a curricular subject groups had accumulated 1,546 hours of English after six years of primary education (equivalent to the 1st-6th grade), four years of compulsory secondary education (equivalent to the 7th-10th grade), and two years of non-compulsory post-secondary education (equivalent to the 11th-12th grade). Although both groups had received the same hours of exposure to EFL, the difference lies in that the Collaboration Program with the Official School of Languages gave particular attention to the preparation of students for their exams. On the other hand, the CLIL group had received a total amount of 2,989 hours of exposure to English after six years of primary education (equivalent to the 1st-6th grade), four years of compulsory secondary education (equivalent to the 7th-10th grade), and two years of non-compulsory post-secondary education (equivalent to the 11th-12th grade). This group had received the same hours of instruction in EFL (1,546) as the English with a Collaboration Program of the Official School of Languages and English as a curricular subject groups. The difference lies in that the CLIL group had studied other subjects in English, whereas their peers of the other two groups had studied them in Spanish. In the 7th grade, the CLIL group had four hours a week of Social Sciences and two hours of Physical Education in English. In the 8th grade, they studied four hours a week of Geography and History, and three hours of Music. In the 9th and 10th grade, Mathematics was taught in English for four hours a week. In the 9th grade, they had three hours a week of Technology, whilst in the 10th grade those three hours were of Philosophy. In the 11th and 12th grade, they had four hours a week of Mathematics, and two and three hours respectively of Communication and Information Technologies. In the 12th grade, which was the course they were enrolled in at the time of the data collection, there were only two English instructional programs: English as a curricular subject and English with a Collaboration Program of the Official School of Languages. 51.67 per cent of learners (31) were enrolled in English as a curricular subject

and 48.33 per cent (29) studied English with a Collaboration Program of the Official School of Languages.

### **6.3. Instruments**

The instruments used in this doctoral dissertation were as follows: background questionnaire, perceptual learning style instrument, productive vocabulary test, a lexical availability task, and the two ELT textbooks that were the medium of instruction of our sample. Each of them is described and justified its selection in the following subsections.

#### **6.3.1. Background questionnaire**

A paper-based questionnaire was administered to the sample of EFL learners to collect general background information about them. It included 11 items (see Appendix 1) from which information was gathered on the following aspects: (i) age; (ii) gender; (iii) nationality; (iv) mother tongue; (v) whether the learners had received any extra tuition in English outside school; (vi) the reason why they had received extra tuition in English outside school; (vii) stay/s in any English speaking country; (viii) stay/s in summer camps to learn English; (ix) knowledge of other foreign languages; (x) type of Baccalaureate; and (xi) the program from which they learnt or had learnt English in their school (e.g., Content and Language Integrated Learning (CLIL), Collaboration Program with the Official School of Languages (OSL), or English as a Foreign Language (ECS)). This background questionnaire was developed by the Applied Linguistics Group of the University of La Rioja (GLAUR) and used in studies conducted by the group.

#### **6.3.2. Perceptual learning style instrument**

Considering all the perceptual learning style instruments explained in Chapter 3 (see Section 3.3.3.3., p. 54), the first part “How I use my physical senses” of the Learning Style Survey instrument (Cohen et al., 2009) was selected to measure the perceptual learning styles for several reasons. First, it is based on the Style Analysis Survey (Oxford, 1995b) and it is an improved version of this latter questionnaire. Moreover, it is a widely employed questionnaire in the L2 context (e.g., Hatami, 2018; Huang et al., 2018; Kim & Kim, 2011; Meguro, 2020). Unlike the PLSPQ (Reid, 1987, 1995b) and the SAS (Oxford, 1995b), the items in the LSS are more L2 specific, as “it contains some L2-learning-specific items, mixed with non-subject-specific ones” (Dörnyei, 2005, p. 146). Therefore, it is an instrument which pays more attention to L2 learning issues. Following

Dörnyei (2005) and Tight (2010), it is practical, easy to administer and score, and students can even self-assess their own learning styles. Finally, it has been proved to be a valid and reliable measure of perceptual learning styles because the test-retest reliability of its first part has been reported to be .74, which indicates an acceptable reliability, as remarked by Tight (2010). Therefore, the informants of the present study were only asked to complete “Part 1: How I use my physical senses” of the LSS (Cohen et al., 2009) (see Appendix 2), since it pertains to the perceptual learning styles (visual, auditory, and tactile/kinesthetic), which are the object of study of this dissertation. This first part consists of 30 behavioral statements: 10 conform to the visual (items 1-10), 10 to the auditory (items 11-20), and 10 to the tactile/kinesthetic modalities (items 21-30). Considering their behavior in learning, informants have to circle their answer based on a five-point Likert scale (0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always). For example, item one reads as follows: “I remember something better if I write it down” (Cohen et al., 2009, p. 1).

### **6.3.3. Productive vocabulary test**

Considering the instruments on productive vocabulary knowledge explained in Chapter 4 (see Section 4.4.2., p. 81), the Productive Vocabulary Levels Test (PVLTL) (Laufer & Nation, 1995, 1999) was the instrument used to measure the controlled productive vocabulary knowledge of the informants in this study. We decided to administer this instrument for several reasons. Firstly, our main aim was to explore controlled productive vocabulary, instead of free productive vocabulary which is what the LFP measures. Secondly, Laufer and Nation (1999) found it to be a reliable and valid measure of productive vocabulary size. It seemed appropriate for Spanish post-secondary school students (12th graders) because they are used to doing gap filling exercises in EFL since their first courses of English in primary school education. In addition, the PVLTL has been used in research with secondary school informants (e.g., Canga Alonso & Arribas García, 2014; Castro García, 2017; Laufer, 1998; Moreno Espinosa, 2010b; Sundqvist, 2019). It is also a practical and short instrument which is easy to administer, mark, and interpret the results. The 2,000-word parallel version (form A + form C) (see Appendix 3) was selected, as the knowledge of the 2,000 most frequent words enables learners to communicate both orally and in written form in a foreign language (Nation, 1993; Nation & Waring, 1997). In this version, test-takers have to complete the missing word that appears in 30 different sentence contexts. For that, they are provided with the



first letters of the target words to avoid the production of non-target words that might fit in the sentence context. For example, it would be to complete the following sentence “He was riding a bic \_\_\_\_\_” with the word “bicycle” (Laufer & Nation, 1999). Finally, the reliability of the punctuations for the 2,000-word frequency band Form A and Form C were reported to be .51 and .80 respectively (Laufer & Nation, 1999).

#### **6.3.4. Lexical availability task**

A lexical availability task was chosen in our study to measure lexical production/association because it is not as restricted as Lex30. A lexical availability task is characterized by having open lists of words, so informants can write as many words as they can within two minutes; in comparison, learners’ retrieval is limited to four words per prompt in Lex30. In addition, Lex30 comprises the same 30 prompt words in each task, whereas lexical availability is more flexible, as researchers can either use the 16 traditional prompts or introduce new ones according to their research objectives. The lexical availability task used in the present study included eight prompts: ‘Look’, ‘Town’, ‘Move’, ‘Say’, ‘Hobbies’, ‘Soft’, ‘Loud’, and ‘Bright’ (see Appendix 1). Two prompts (‘Town’, and ‘Hobbies’) have been traditionally used in previous research on lexical availability in EFL (e.g., Agustín Llach & Fernández Fontecha, 2014; Canga Alonso, 2017; Gallardo del Puerto & Martínez Adrián, 2014; Jiménez Catalán et al., 2014; Jiménez Catalán & Fernández Fontecha, 2019; Jiménez Catalán & Fitzpatrick, 2014). They were selected because they allowed the comparison of results of the present study to the ones reported with traditional prompts. Similarly, those two prompts could elicit words related to activities that could be associated with learning styles (e.g., travelling, shopping, watching TV, listening to music). For the objectives of the present study, we included six novel prompts (‘Look’, ‘Move’, ‘Say’, ‘Soft’, ‘Loud’, and ‘Bright’) which were not used in previous lexical availability studies. As one of the major objectives of this dissertation was to investigate perceptual learning styles, we resolved to choose two prompts related to each modality: visual (‘Look’ and ‘Bright’), auditory (‘Say’ and ‘Loud’), and tactile/kinesthetic (‘Soft’ and ‘Move’). Even though we grouped the tactile and kinesthetic learning styles under the category tactile/kinesthetic (see Chapter 3 for an explanation, p. 49), we selected one prompt for the tactile style (‘Soft’) and another one for the kinesthetic style (‘Move’). The selection of these six prompts was based on the following criteria:

- (i) cognate words were excluded to avoid the similarity in meaning, spelling, and pronunciation in Spanish and English;
- (ii) words (e.g., feel) that could be related to a modality (e.g., tactile/kinesthetic), but could also convey completely different meanings (e.g., feelings instead of something that can be touched) were excluded;
- (iii) words were monosyllabic to avoid the production of words with the same affix as the cue-word;
- (iv) since the majority of prompts used in previous studies were nouns, different word classes were included to ascertain whether nouns continue or not to predominate in learners' responses. In accordance with Cambridge, Collins and Merriam-Webster dictionaries, 'Look', 'Move', and 'Say' were considered both a noun and a verb; 'Soft' was mainly an adjective, but some entries also regarded it as an adverb and noun; 'Loud' was an adjective and an adverb; and 'Bright' was tagged as an adjective and a noun in the dictionaries used as reference. 'Look', 'Move' and 'Say' were finally considered as verbs, and 'Soft', 'Loud' and 'Bright' were regarded as adjectives because, although they pertain to more than one word class in the dictionaries, they were tagged as such in the imageability ratings databases;
- (v) in terms of frequency, following the database of Bird et al. (2001), the words in each category (verbs and adjectives) had a similar frequency: 'Say' (3,631), 'Look' (3,1303), 'Move' (2,631), 'Bright' (1,9296), 'Soft' (1,9127), and 'Loud' (1,4722);
- (vi) in terms of familiarity, following the Bristol norms (Stadthagen-Gonzalez & Davis, 2006) and the MRC psycholinguistic database (Coltheart, 1981), all the prompts were high-familiarity words ('Look': 607, 'Move': 572, 'Soft': 590, 'Loud': 577, 'Bright': 589), except 'Say' which was not reported in any database;
- (vii) in terms of imageability, following the Bristol norms (Stadthagen-Gonzalez & Davis, 2006) and the MRC psycholinguistic database (Coltheart, 1981), all the prompts had an average imageability ('Look': 395, 'Move': 413, 'Soft': 476, 'Loud': 448, 'Bright': 489). 'Say' was not included in any of these databases either.

### 6.3.5. Textbooks

The two textbooks examined in this study were *Out & About 2* (Hancock & McDonald, 2015) and *English File* (Latham-Koenig & Oxenden, 2014). The information about the textbooks used in the aforementioned high school was obtained from an interview with the teachers the day of the data collection.

*Out & About 2* (see Appendix 40) is published by Cambridge University Press; it is used in the 12th grade. It is intended for speakers of Spanish who are learning EFL; it was used as the medium of instruction in the English as a curricular subject program. Therefore, it was devised considering the age of these students (17.1 years old in our sample) and the topics they might be interested in. According to the Common European Framework of Reference for Languages (CEFR), this textbook is between the B1 and B2 level of English. *Out & About 2* includes the Student's Book with common mistakes at 12th grade and a Workbook. It also contains digital options, such as the Digital Student's Book and Workbook, and the option of downloading an Augmented Reality app to have access to all the video and audio. For this dissertation, only the Student's Book was analyzed because the Workbook usually includes a review of the main content learnt in the textbook; we intended to avoid the repetition of words. The *Out & About 2* Student's Book has 136 pages divided into six units. Each unit comprises different sections according to the different language skills (see Table 10, p. 127): reading, phrasal verbs, vocabulary 1, listening, grammar, vocabulary 2, pronunciation, speaking, writing, and two videos. After every two units, a review of those two units is included. The vocabulary topics covered in this textbook are the following: travel, environmental problems, health, stories, business, and entertainment. At the end of the textbook, the last 53 pages contain a section called Life skills which focuses on tips for each language skill learnt in each unit, a language reference which includes a review of the grammatical structures learnt throughout the units, a writing guide which reviews the different types of essays learnt, and a list with several irregular verbs. Afterwards, there are exam tips and exam practice for reading, listening, and speaking per unit.

*English File* (see Appendix 38) is published by Oxford University Press; it is used during the 12th grade. As *Out & About 2*, it was designed to the age and interests of students. According to the CEFR, this textbook is focused on a B2 level of English, and it was the medium of English instruction for those learners who studied this language with a Collaboration Program of the Official School of Languages. The *English File* series includes the Student's Book with iTutor, a Workbook, online Skills Practice,

Student's Book and Workbook e-books, a student's website, and an English File Pronunciation App. Similar to *Out & About 2*, only the Student's book was analyzed in this dissertation. The Workbook mainly comprises exercises to review and practice what has been learnt in the Student's Book; we wanted to avoid the repetition of words. The *English File* Student's Book has 167 pages divided into ten units. Instead of giving a title to each unit, as in *Out & About 2*, color-coding is used in this case. Each unit is divided into A and B parts, and each of them includes different language skill sections (see Table 10, p. 127): reading, grammar, pronunciation, vocabulary, listening, speaking, and writing. At the end of every odd unit, there is a section entitled "Colloquial English," where listening and speaking skills are emphasized. Likewise, after every even unit, there is a Revise and Check section in which the content learnt throughout the last two units is revised, as well as a video and an activity about that video. The vocabulary topics that are dealt with in this textbook are: illnesses and injuries, clothes and fashion, air travel, the environment and the weather, feelings, music, sleep, the body, crime and punishment, the media, advertising and business, and science. The last 62 pages of *English File* are comprised of a section of communication which is mainly composed of role-play activities, a writing section which reviews the different types of essays learnt, the listening transcripts of every unit, a Grammar and Vocabulary Bank in which the grammatical structures and vocabulary learnt are revised, an appendix which focuses on verb patterns, a list of several irregular verbs, and a Sound Bank in which there is a review of pronunciation.

Table 10

*A review of the content and vocabulary found in Out & About 2 and English File textbooks*

Contents per unit		Contents at the end of the book		Vocabulary topics	
<i>Out &amp; About 2</i>	<i>English File</i>	<i>Out &amp; About 2</i>	<i>English File</i>	<i>Out &amp; About 2</i>	<i>English File</i>
Reading	Reading	Life skills	Communication	Travel	Illnesses and injuries
Phrasal verbs	Grammar	Language reference	Writing	Environmental problems	Clothes and fashion
Vocabulary 1	Pronunciation	Writing guide	Listening transcripts	Health	Air travel
Listening	Vocabulary	Irregular verbs	Grammar Bank	Stories	The environment and the weather
Grammar	Listening	Exam tips	Vocabulary Bank	Business	Feelings
Vocabulary 2	Speaking	Exam Practice Reading	Appendix	Entertainment	Music
Pronunciation	Writing	Exam Practice Listening	Irregular verbs		Sleep
Speaking	Colloquial English	Exam Practice Speaking	Sound Bank		The body
Writing	Revise and check				Crime and punishment
Review					The media
Video					Advertising and business
					Science

#### 6.4. Procedure

Before data collection, the headmaster of the participating school signed a written consent for the administration of the tests and tasks to the group of informants. Students, their parents, tutors, and teachers were informed of the research purpose of these tasks and its voluntary basis. Data were collected in one session during school time in pen-and-paper format at the end of the first quarter. To preserve the anonymity of the participants, a code was written in each task before being distributed. All the tests were handed out face down at the same time. The researcher asked the participants to turn each test over

whenever it was time to do so. At the beginning of each task, instructions were presented orally in Spanish and in written form in either Spanish or English, depending on the test, to ensure that test-takers were able to understand the tasks they were being requested to perform. As time was passing by, they were informed orally of the time left. The researcher was present to address possible issues or clarify doubts, in the presence of the students' teachers.

First of all, students were asked to turn over the background questionnaire without looking at the rest of the pages, which contained the lexical availability task. The background questionnaire was in Spanish to ensure their thorough understanding; it took them around five minutes to complete it. After this questionnaire, they were asked to turn the page where there were written instructions in Spanish for the lexical availability task. These instructions were also given orally in Spanish. This task consisted of eight pages, one for each prompt. The prompts were randomly organized using the website RANDOM.ORG (2022); the order was the same for all students. Each prompt was written in capital letters on top of the page and 60 numbered lines were provided (see Appendix 1). They were asked not to move on to the following prompt until instructed to do so by the researcher. They were given two minutes to write down as many English words as they could associate to each prompt. Time was controlled by means of a stopwatch; the participants repeated the same procedures for all the prompts. Therefore, it took them 16 minutes to complete the lexical availability task.

Afterwards, part one of the Learning Style Survey (Cohen et al., 2009) was distributed in Spanish after being granted the permission to use the questionnaire and translate it into Spanish by the Center for Advanced Research on Language Acquisition (CARLA), University of Minnesota. It was translated into Spanish by the researcher and supervised by other Spanish-English bilingual researchers (see Appendix 2). We decided to distribute it in Spanish because it was the L1 of the majority of the test-takers (78.33 per cent) and the L2 of the rest (21.67 per cent) who both spoke and used Spanish in their daily life with a native-like fluency. It was thought that as they did not have the same command in English than in Spanish, their better understanding of this test would imply more accurate responses. Some adaptations were made to the original format of the LSS (Cohen et al., 2009). Apart from being translated and administered in Spanish, the description of what the instrument measured was removed. Only the instructions were kept, but they were translated into Spanish. The section title of Part 1 "How I use my physical senses" as well as the result interpretation section at the end of the questionnaire

were removed. However, we kept the number of statements and the scoring system (from 0 to 4) as in the original format. Participants had 10 minutes to complete the LSS.

Finally, test-takers were instructed to complete the 2,000 word version of the Productive Vocabulary Levels Test (PVLТ) (Laufer & Nation, 1995, 1999) (see Appendix 3). Oral instructions were given in Spanish and they were also written in English in the task itself. This instrument was distributed in English, since our aim was to determine the participants' controlled productive vocabulary knowledge in EFL. The time allotted to complete this task was 10 minutes as well.

After giving an explanation of the procedure followed before and after the data collection, the following section will be devoted to the analysis of the data, specifically the methodological decisions taken and the descriptive and statistical analyses performed.

## **6.5. Analyses**

This study is both quantitative and qualitative as it analyses numerical and non-numerical data. It is descriptive because it gives information about the characteristics of the sample. It also follows a cross-sectional design, since data were collected at a specific point in time from a sample of 12th grade EFL learners. Moreover, it is correlational because it examines the relationship among all the variables investigated in the present doctoral dissertation.

### **6.5.1. Methodological decisions**

**6.5.1.1. Learning Style Survey.** The responses of the Learning Style Survey (LSS) (Cohen et al., 2009) were coded and entered into a Microsoft Excel spreadsheet. Scores for each perceptual learning style (visual, auditory, and tactile/kinesthetic) were obtained by summing the points of each item: zero was the lowest point per item and four was the highest. As there were 10 items per modality, 40 were the maximum points to be acquired in each. The modality which had the highest overall score was established as informants' perceptual learning style preference. Following Tight (2010), if there was not a difference of at least three points between the highest and the following highest modality, participants were considered to have a mixed-modality preference, which will also be referred to as multimodal in this dissertation.

**6.5.1.2. Productive Vocabulary Levels Test.** The PVLТ test was corrected and marked; the responses were coded and entered a Microsoft Excel spreadsheet. Scores for

these tests were obtained by summing the points of the target words in each sentence: zero was the lowest point and 30 was the highest. In order to calculate the controlled productive vocabulary size of the test-takers in terms of word estimates, Nation's formula was applied: the number of correct answers, multiplied by the total number of words of the test (2,000), and divided by the number of items (30) (Nation, 1990). Unlike Laufer (1998), Laufer and Paribakht (1998), and Waring (1997) (see Chapter 4 Section 4.4.2.1., p. 81, for an explanation), we decided that a word was correct if it was well written both grammatically and orthographically. The first letters of the target word and context are given as a clue, so it is easier to determine to which word it refers. Therefore, if there was a mistake related to orthography or grammar (e.g., verbal tense), the score of that target word was zero.

**6.5.1.3. Lexical availability.** Informants' lemmatized word responses were typed into a Microsoft Excel spreadsheet. For the lemmatization, the criteria used in previous L2 English lexical availability studies (e.g., Jiménez Catalán & Agustín Llach, 2017; Jiménez Catalán & Canga Alonso, 2019; Jiménez Catalán & Fernández Fontecha, 2019; Jiménez Catalán & Montero-SaizAja, 2020) were adopted, although we included additional criteria which were specific to our objectives. These criteria were:

- (i) correction of spelling mistakes;
- (ii) elimination of repeated words in the same prompt;
- (iii) deletion of Spanish words and proper nouns, with the exception of those which refer to cities and countries in English (e.g., London, Sweden);
- (iv) lemmatization of plural words into singular unless they were plural in English (e.g., trousers);
- (v) irregular verb forms and irregular plural nouns were counted as different word types;
- (vi) hyphenation of lexical units with lexicalized meaning (e.g., fish-and-chips);
- (vii) deletion of titles of films or books and names of videogames (e.g. PS4);
- (viii) deletion of brand names (e.g., Coca Cola);
- (ix) lemmatization of verbs to bare infinitive unless they appeared as a lexical entry;
- (x) deletion of possessive adjectives and articles;
- (xi) deletion of prepositions which were not part of a phrasal verb;
- (xii) the negative particle NOT was kept;



- (xiii) contracted forms (e.g., don't) were counted as two different words (e.g., do not) unless they constituted a fixed expression (e.g. can't stand);
- (xiv) abbreviations corresponding to school subjects were kept (e.g., PE).

In addition to the criteria listed above, additional criteria were adopted specific for our objectives. These were as follows:

- (i) the expressions and phrases learners produced were kept as a lexical unit, although they did not appear in the dictionaries (e.g., I like watching TV), they were lemmatized in the main content word of the lexical unit;
- (ii) if a verb plus a preposition did not appear as an independent entry in the dictionaries (Cambridge, Collins), it was lemmatized into the main verb;
- (iii) if the response to a prompt (e.g., 'Look') was a preposition (e.g., up), we decided to join the prompt plus the preposition (e.g., lookup) for its lemmatization, as it might be possible that the informants associated the preposition (e.g., up) to the phrasal verb, for example, "look up" and this phrasal verb might appear in their ELT textbooks;
- (iv) we eliminated empty words, such as "thing," "that," "there," "someone," "something," "everything," "everywhere," "nothing," "this," "everybody," "too much," "too," "all," "whatever," or "anything."

Once all words were edited and lemmatized, they were processed with WordSmith Tools (2022) program in order to obtain the total number of words (tokens), the number of different words (types), and the frequency of these words. The Lexical Tutor program, specifically the VocabProfile Compleat (Cobb, 2022) in its classic version (GSL/AWL), was also employed to obtain the English frequency level of the words and classify them into different bands. With this program, word families were also obtained. We used WordSmith Tools program instead of VocabProfile since, although the latter also gives information on the tokens, types, and the frequency level of words, the former provides more statistical information (e.g., density, mean word length) and it also arranges words into alphabetical order.

It is worth noting that we only focused on content words because most of them tend to be concrete and easier to imagine (e.g., de Groot, 2006; Ellis & Beaton, 1993), which might be related to their visualization. Other words can contain sounds or be linked to movement which might be associated with auditory and tactile/kinesthetic associations respectively. For example, Akbarian et al. (2019) explored the relationship among

perceptual learning styles and depth of vocabulary using a vocabulary test which consisted of content words. These are the reasons why we only considered nouns, verbs, adjectives, and some adverbs which could be associated with the styles. Regarding adverbs, we kept those which were only classified as adverbs in the dictionaries (Cambridge, 2022; Collins, 2022; WordReference, 2022) and that could be associated with styles (e.g., softly). We also kept those words which were classified in the dictionaries (Cambridge, Collins, WordReference) not only as adverbs but also as other word classes (e.g., noun, verb, adjective). To classify the words retrieved by informants in the lexical availability task into the different types of content words, we looked up for the word class of all the words in three different dictionaries (Cambridge, Collins, WordReference) that we used as reference in the present dissertation.

Afterwards, we classified those content words into perceptual or non-perceptual words (see Appendices 26 to 31). A content word was considered perceptual if it met at least one of the following criteria. If not, we regarded it as a non-perceptual word:

- (i) We looked for the word in some lists of Neuro Linguistic Programming (NLP) predicates available in the literature (e.g., Transform Destiny, 2015; Rayner Institute, 2015; Brefi Group Limited, 2004; Juiced Concepts Limited, 2012; NLP Dynamics Ltd, 2013). If the word was found in any of those lists, we wrote “perceptual lists” in the column which was named “sources” of our documents (see Appendices 26 to 31).
- (ii) We searched for the word in the imageability column of the database of Bird et al. (2001), Bristol norms (Stadthagen-Gonzalez & Davis, 2006), and the MRC psycholinguistic database (Coltheart, 1981), the imageability value for the latter two was provided in one document. In the sources column of our documents (see Appendices 26 to 31), we provided the name of the database (e.g., Bird or MRC) followed by their imageability value in parentheses.
- (iii) We sought the word in the Cambridge Online Dictionary (2022) and Collins Online Dictionary (2022). If the definition provided by any of the dictionaries was related to any perceptual learning style, we considered that word to be perceptual and wrote the name of the dictionary or dictionaries in the column termed sources of our documents (see Appendices 26 to 31). For example, the word “calm” is defined as “without hurried movement or noise” (Cambridge Online Dictionary, 2022). This definition is related to the tactile/kinesthetic and auditory learning styles.

- (iv) We looked for the word in the *Dictionary of Emotions: Words for Feelings, Moods, and Emotions* (Ryan, 2014). A dictionary of emotions was employed as an objective source of reference, since, as explained below, we believe that emotions can be related to the perceptual learning styles which are object of study in this dissertation. An emotion can be seen (visual learning style), heard (auditory learning style), and expressed through movement and touch (tactile/kinesthetic learning style). If the word was found in that dictionary, we wrote Emotions in the column termed sources of our documents (see Appendices 26 to 31).

We did not consider the prompts ‘Town’ and ‘Hobbies’ for this classification into perceptual words because these are not words related to any perceptual style. After classifying words into perceptual and non-perceptual, we specified the styles in which perceptual words could be grouped. The Neuro Linguistic Programming (NLP) predicates lists gave the style in which the word is classified. If the word appeared in the imageability column of the databases of Bird et al. (Bird et al., 2001), and Bristol norms (Stadthagen-Gonzalez & Davis, 2006) and the MRC psycholinguistic database (Coltheart, 1981), the word was regarded as visual. We considered the word to be visual because concrete words tend to have a high imageability rating (Paivio et al., 1968). Imageability ratings ranged from 100 (low-imageability) to 700 (high imageability). We decided to consider those words which had an imageability rating beyond 300, since only high imageability words could be viewed as visual. Regarding the dictionaries (Cambridge, Collins), we examined the definitions provided in every entry to determine whether they included a trait which implied one of the styles or a combination of them. Words related to the visual style which appeared in the dictionary entries were, for example, “appearance,” “see,” “color,” “dark,” “show,” “light,” “shine,” “seem,” “picture,” or “photograph.” Words related to the auditory style which appeared in the dictionary entries were, for example, “sound,” “voice,” “pitch,” “music,” “suggest,” “discussion,” “talk,” “persuade,” “listen,” or “request.” Words related to the tactile/kinesthetic style include, for example, “move,” “turn,” “touch,” “do,” “speed,” “run,” “hit,” “heat,” or “walk.” Some words could be classified into two or three of those styles if the definitions implied more than one style. The words that appeared in the dictionary of emotions were grouped into the three styles (visual, auditory, and tactile/kinesthetic). In our opinion, a feeling or emotion can be seen by facial gestures (e.g., angry face), it can also be heard by the way you talk (e.g., loud

voice), and it can also be expressed through movement (e.g., body position) or touch (e.g., hugging someone when you are happy).

**6.5.1.4. Textbooks.** The activities in *Out & About 2* (see Appendices 40 and 41) and *English File* (see Appendices 38 and 39) textbooks were first examined, identified, and classified according to their suitability for each type of learner (visual, auditory, and tactile/kinesthetic). The decision of the type of activities which were suitable for each perceptual learning style was adopted following the review of the literature in Chapter 3 (see Section 3.3.2., p. 38), specifically we focused on the characteristics related to each perceptual learning style. The activities appropriate for visual learners (highlighted in blue in Appendices 38 and 40) include reading, writing, videos, taking notes, wordlists, those which require highlighting, underlining, matching, or filling in the gaps. Auditory learning style activities (highlighted in orange in Appendices 38 and 40) comprise listening, repetition, and speaking exercises. Activities suitable for tactile/kinesthetic learners (highlighted in green in Appendices 38 and 40) consisted of role-play, group work, or acting. All the activities were counted and classified according to each perceptual learning style. However, when an activity was found to be appropriate for more than one learning style, it was counted as a multimodal activity (highlighted in purple in Appendices 38 and 40). Both textbooks include as a heading the main skills that are going to be addressed in the activities, which implies that one style might predominate over others. Nevertheless, we did not base only on the predominant skill but also on the wording of the activity itself. Although one style might prevail, other styles might be necessary for completing an exercise. For example, a wording of an exercise in the *English File* textbook is the following: “Read the first paragraph of the article once and check your answer. Look at the highlighted phrases related to the body. With a partner, say what you think they mean” (Latham-Koenig & Oxenden, 2014, p. 18). Although the heading of this section is “Reading” and the main learning style targeted in this exercise is visual (read, check, and look), the auditory (say) and tactile/kinesthetic (work with a partner) styles are also needed to be able to do the exercise. There were some activities which referred to the end of the textbook where there were more exercises. In this case, we only counted the exercises at the end of the textbook, not the one which referred to them throughout it. Moreover, the grammar explanations, as well as the listening transcripts, both found at the end of the textbooks were not considered for analysis.

To analyze the vocabulary, both textbooks were scanned. Afterwards, an OCR program was used to recognize the words contained in the textbooks; they were transferred into a text format. The next step was to clear the text, distinguish between function and content words, and lemmatize the latter following similar criteria to the one adopted in the lexical availability (see section 6.5.1.3., p. 130). These criteria were:

- (i) correction of orthographic mistakes;
- (ii) deletion of numbers, letters of the alphabet to enumerate sections, phonetic symbols, and punctuation marks;
- (iii) deletion of Spanish words (or other languages) and proper nouns, with the exception of those which refer to cities and countries in English (e.g., London, Sweden);
- (iv) deletion of titles of films or books and names of videogames (e.g., PS4);
- (v) deletion of brand names (e.g., *Coca Cola*);
- (vi) irregular verb forms (e.g., broke) and irregular plural nouns (e.g., feet) were counted as different word types;
- (vii) plural nouns whose meaning changed in the singular form were kept in the plural form (e.g., trousers, glasses);
- (viii) lemmatization of verbs to bare infinitive unless they appeared as a lexical entry (e.g., ‘swimming is healthy,’ the gerund works as a noun);
- (ix) the negative particle NOT was kept;
- (x) contracted forms (e.g., don’t) were counted as two different words (e.g., do, not) unless they constituted a fixed expression (e.g., can’t stand);
- (xi) abbreviations which were found as a lexical entry in dictionaries were kept (e.g., PE, TV);
- (xii) the comparative and superlative forms of adjectives were lemmatized as the adjective in its bare form (e.g., ‘better’ and ‘best’ lemmatized as ‘good’);
- (xiii) lexical units that appeared in dictionaries were counted as one word (e.g., put up with);
- (xiv) the word “did” was kept when it referred to the past simple of the verb “to do.” The auxiliary “did” was eliminated;
- (xv) “do not” was kept when it referred to the negative form of the verb “to do,” it was deleted when it referred to the auxiliary;
- (xvi) the word “had” was kept when it referred to the past simple or past participle of the verb “to have,” it was deleted when it referred to the auxiliary;

- (xvii) idioms were kept;
- (xviii) exclamations and interjections (e.g., oh, um, oh well, erm, oh no, oh yes, haha) were kept because they are related to the auditory learning style.

Afterwards, these data were processed by means of WordSmith in order to obtain the total number of words (tokens), the number of different words (types), the type/token ratio, and the frequency of these words. The Lexical Tutor program, specifically the VocabProfile Compleat (Cobb, 2022) in its classic version (GSL/AWL), was also employed to obtain the English frequency level of the words and classify them into different bands. With this program, word families were also obtained.

Similar to the procedures explained in the lexical availability task, only content words, as well as interjections, were considered. All the content words were searched for in three dictionaries (Cambridge, Collins, and WordReference). We only included nouns, verbs, adjectives, and some adverbs. The adverbs considered were either related to the styles, they were part of an expression (e.g., all the time), or they were also classified as belonging to other types of words according to the entries of the dictionaries. If adverbs were only tagged as such in the dictionary, they were deleted (e.g., already, also). As in the lexical availability task, empty words (e.g., thing, somebody, everything, everybody, whatever, too much) were deleted. To classify the words of both textbooks into the different word classes of content words, we used the TagAnt software (Anthony, 2022), which is a part of speech tagger. We submitted each textbook in a text file and it provided the researchers with each word and the part of speech of each one based on context. We used this tool instead of the classification of the dictionaries, as in the lexical availability task, because in this case context is provided and this tool is able to differentiate the word class of each word. However, as a lexical availability task consists of a list of words without context, we cannot know for sure the word class the EFL learner elicited for those words which can be tagged as different word classes (see Appendices 34 and 35).

For the classification of words into perceptual and non-perceptual and the type of perceptual words (visual, auditory, tactile/kinesthetic, or a combination) (see Appendices 36 and 37), we used the same procedures explained for lexical availability in the previous section (see Section 6.5.1.3., p. 130).

### 6.5.2. Statistical analyses

The data were analyzed using SPSS version 21 to perform descriptive and inferential statistical analyses.

**6.5.2.1. RQ1. What are the perceptual learning style preferences of 12th grade EFL learners?** This research question was answered on the basis of a descriptive analysis of the data. The mean average, standard deviation, standard error, 95 per cent confidence interval for mean, minimum, and maximum were calculated for each perceptual learning style. We also calculated the frequency distribution for each perceptual learning style and its combinations. Regarding statistical analyses, a Kolmogorov-Smirnov test was used to determine the normality assumption of the variables. A Paired Samples Test was applied to ascertain whether there were statistically significant differences among perceptual learning styles. Finally, a Wilcoxon Signed Ranked Test was performed to determine the range of difference throughout the variables.

**6.5.2.2. RQ2. Is there a relationship among perceptual learning styles and productive vocabulary dimensions?** This research question was divided into two sub-questions, one for each vocabulary dimension: controlled productive vocabulary (see Section 6.5.2.3., p. 137) and lexical production (see Section 6.5.2.4., p. 138). The descriptive and statistical analyses will be explained in the following sections.

**6.5.2.3. RQ2.1. Is there a relationship among perceptual learning styles and controlled productive vocabulary size?** This research question was answered based on descriptive and inferential statistical analyses. For the descriptive analysis, we calculated the mean average of words, the standard deviation, minimum, and maximum. Concerning statistical analyses, a Kolmogorov-Smirnov test was performed to determine the normality assumption of controlled productive vocabulary. Afterwards, a linear regression, univariate and multivariate tests of skew and kurtosis, and bootstrap were used to ensure that all the requirements were met to perform the Pearson's correlation coefficient. Then, a Pearson's chi-square test was applied to ascertain the relationship among perceptual learning styles and controlled productive vocabulary. Finally, an ANOVA test was used to ascertain whether controlled productive vocabulary was significant for each perceptual learning style.

**6.5.2.4. RQ2.2. Is there a relationship among perceptual learning styles and lexical production in a lexical availability task?** This research question was based on descriptive and inferential statistical analyses. Regarding descriptive analysis, we calculated the mean, standard deviation, minimum, maximum, tokens and types for the whole lexical availability task, each prompt, and each group of prompts (visual, auditory, tactile/kinesthetic, and traditional). Then, we displayed the 50 most frequent words retrieved in the lexical availability task and in each prompt by using the classification provided by the WordSmith program. We also classified word types and word families according to their frequency levels by using the VocabProfile option of the Lexical Tutor program. Afterwards, we analyzed the word class of the content words produced in the lexical availability tasks and in each prompt, following the classification of the dictionaries. We also divided content words into perceptual and non-perceptual words. Perceptual words were classified according to the type of perceptual learning style to which they referred, following the criteria explained in Section 6.5.1.3., p. 130. For the inferential statistical analyses, a Kolmogorov-Smirnov test was performed to determine the normality assumption of lexical production. Bivariate and multivariate distributions, linear regression, and bootstrap were used to ensure that all the requirements were met to perform the Pearson's correlation coefficient. Afterwards, a Pearson's chi-square test was applied to ascertain the relationship among perceptual learning styles and lexical production. Finally, an ANOVA test was used to ascertain whether lexical production was significant for each perceptual learning style and each perceptual prompt.

**6.5.2.5. RQ3. To what extent are the perceptual learning styles represented in ELT textbooks?** This research question was divided into two sub-questions: perceptual words (see Section 6.5.2.6., p. 138) and perceptual activities (see Section 6.5.2.7., p. 139) in ELT textbooks. The descriptive analyses will be explained in the following sections.

**6.5.2.6. RQ3.1. How many content words related to each perceptual learning style are included in ELT textbooks?** This research question focused on descriptive analyses. We calculated the number of tokens, types, and type/token ratio of both ELT textbooks. Second, we presented the 50 most frequent words in the two textbooks provided by the WordSmith program. Afterwards, we classified word types and word families according to their frequency levels using the VocabProfile option of the Lexical



Tutor program. We also analyzed the word class of the content words included in the two ELT textbooks, following the classification provided by TagAnt program. Then, we divided content words into perceptual and non-perceptual words. Perceptual words were classified according to the type of perceptual learning style to which they referred, following the criteria explained in Section 6.5.1.3., p. 130. Finally, we determined the perceptual learning style preferences of informants enrolled in the two English instructional programs and calculated the difference among those styles and the perceptual words included in the textbooks.

**6.5.2.7. RQ3.2. How many activities related to each perceptual learning style are included in ELT textbooks?** This research question concentrated on descriptive analyses. We calculated the total number of perceptual activities in both ELT textbooks. Second, we classified the perceptual activities according to the perceptual learning style to which they referred, following the criteria explained in Section 6.5.1.4. (p. 134). Afterwards, we counted the number of visual aids contained in both textbooks. Finally, we compared the perceptual learning style preferences of the informants enrolled in the two English instructional programs and the perceptual activities contained in both textbooks.

**6.5.2.8. RQ4. Is there a relationship between perceptual content words included in ELT textbooks and the perceptual words retrieved by EFL learners at 12th grade in a lexical availability task?** For this research question, descriptive and inferential statistical analyses were applied. Regarding descriptive analyses, we calculated the number of tokens and types for the six perceptual prompts and the number of types related to perceptual words for each instructional program. Then, we obtained the average of words elicited in the six perceptual prompts for each instructional program. Second, we classified the perceptual words according to the perceptual learning style to which they referred, following the criteria explained in Section 6.5.1.3., p. 130. We also identified the number and percentage of the perceptual words retrieved in the six perceptual prompts per instructional program, which were included in the respective ELT textbook. For the inferential statistical analyses, a Paired Samples Test was applied to the data to analyze the relationship among the perceptual words retrieved in a lexical availability task and the perceptual words included in ELT textbooks. Finally, an

ANOVA test was run to determine whether there was any influence of ELT textbooks on the lexical production in a lexical availability task.

### **6.6. Summary of chapter**

In this chapter, a thorough description of the sample of informants of this study has been provided. We have given information on the number of informants, their gender, mean age, mother tongue, foreign languages spoken, and some specific characteristics for each group, such as the type of English instructional programs in which the informants were enrolled. In the second section, we have justified the selection of the instruments to collect our data. In the following section, we have accounted for the procedure followed to implement the aforementioned instruments the day of the data collection. We have explained anonymity of the questionnaires, the instructions that the informants had to follow, the language in which those instructions were given both orally and in written form, and the time limits to complete each questionnaire. In the last section, the methodological decisions taken in order to codify and process the data have been outlined. We have described how the data were codified, how the tests were corrected, how the scores were obtained in each test, the formula applied to estimate the productive vocabulary size, the criteria we adopted to lemmatize the words in the lexical availability task and the textbooks, and the programs used to process those words. Finally, the descriptive and inferential statistical analyses conducted in each research question have been provided.

## CHAPTER 7. RESULTS

### 7.1. Introduction

This chapter will report the results of the four research questions analyzed in the present doctoral dissertation. For the sake of clarity, it will be divided into four sections: one for each research question. The first section will focus on the perceptual learning style preferences of 12th grade EFL learners. The second section, which is divided into two sub-sections, will be devoted to the analysis of the relationship among perceptual learning styles and two productive vocabulary dimensions: controlled productive vocabulary and lexical production/association through a lexical availability task. The third section, which is also divided into two sub-sections, will focus on the representation of perceptual words in two ELT textbooks (*English File* and *Out & About 2*). Specifically, we will deal with the distribution of perceptual words and perceptual activities in the two ELT textbooks. Finally, the fourth section will concentrate on the relationship among the perceptual words included in the two ELT textbooks and the perceptual words elicited in a lexical availability task.

### 7.2. Perceptual learning style preferences

The first research question aimed at identifying the perceptual learning style preferences of 12th grade EFL learners. In the first place, we will present the main scales of the three research variables (visual learning style, auditory learning style, and tactile/kinesthetic learning style) which are object of study in the first research question. Each of them measures the degree of preference regarding these perceptual learning styles. Afterwards, we will provide the statistic tests which allow to answer this question.

Table 11 (p. 142) shows the descriptive statistics of each perceptual learning style. As can be observed, the visual learning style obtained a major mean preference, one point above the tactile/kinesthetic learning style and four points more than the sum of the items in the auditory learning style. The findings indicated that the maximum scores were achieved in the tactile/kinesthetic style, followed by visual and auditory styles. On the other hand, minimum scores were also obtained in the tactile/kinesthetic style. It was followed by auditory and visual learning styles.

Table 11

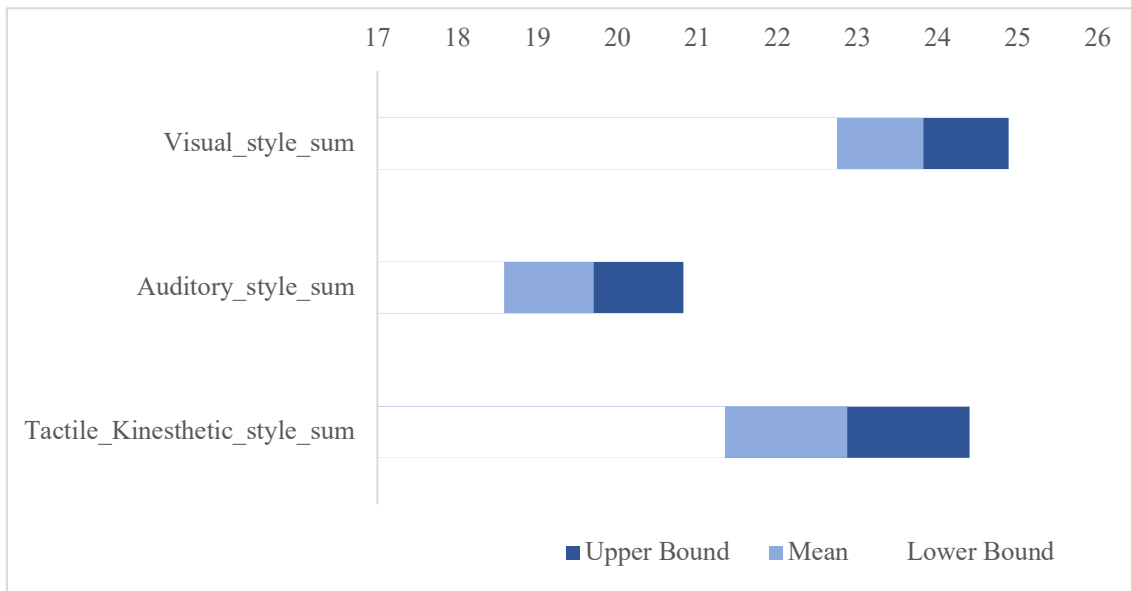
Descriptive statistics of perceptual learning styles

Perceptual learning styles	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for mean		Min.	Max.
					Lower Bound	Upper Bound		
Visual	60	23.82	4.172	.539	22.74	24.89	13	35
Auditory	60	19.70	4.335	.560	18.58	20.82	11	31
Tactile/kinesthetic	60	22.87	5.925	.765	21.34	24.4	9	36

Figure 6 displays the 95 per cent of confidence interval for mean for each perceptual learning style. As can be observed, the auditory learning style does not intersect with the other two learning styles. This suggests that the minor preference for the auditory learning style can be generalized, always taking this result with caution. It can also be concluded that it is not a result of chance.

Figure 6

Confidence interval for mean sum

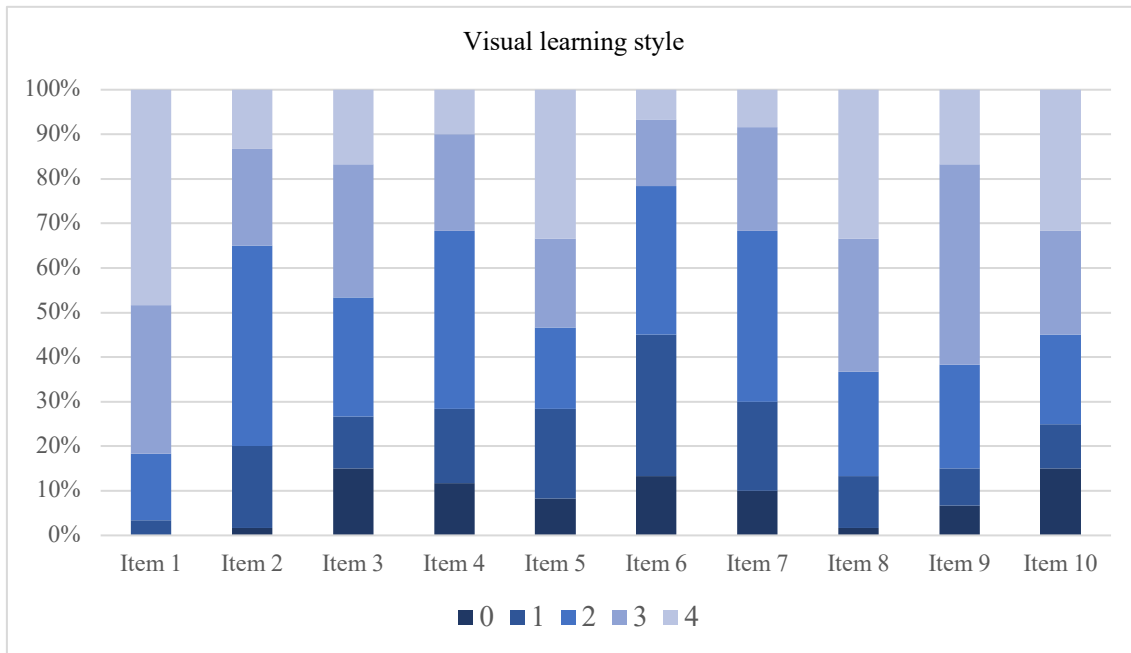


Figures 7 (p. 143), 8 (p. 144), and 9 (p. 145) illustrate the percentage of responses (0, 1, 2, 3, 4) to the *Learning Style Survey* (Cohen et al., 2009) for each item per perceptual learning style. As stated in Chapter 6 (p. 121), this questionnaire is based on a five-point Likert scale (0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always). Figure 7 presents the 10 items pertaining to the visual learning style. As can be appreciated, item one (“I

remember something better if I write it down”) appears to be their major preference. However, items three (“When I listen, I visualize pictures, numbers, or words in my head”) and ten (“I remember peoples’ faces but not their names”) seem to be the least favored.

Figure 7

Percentage of informants who selected the different scales per item in the visual learning style



Concerning the auditory learning style shown in Figure 8, item 19 (“I can identify people by their voices (e.g., on the phone)”) is reported to be the favorite by the learners, whereas item 14 (“Background sound helps me think”) appears to be the least preferable because it scored the highest number of the never option.

Figure 8

Percentage of informants who selected the different scales per item in the auditory learning style

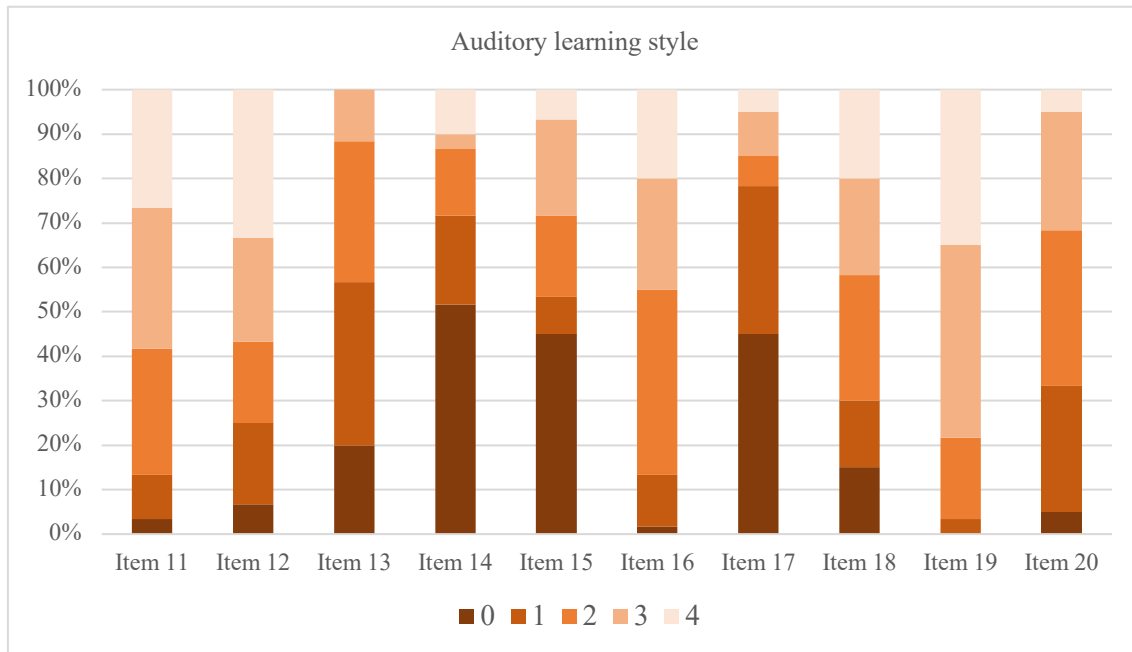
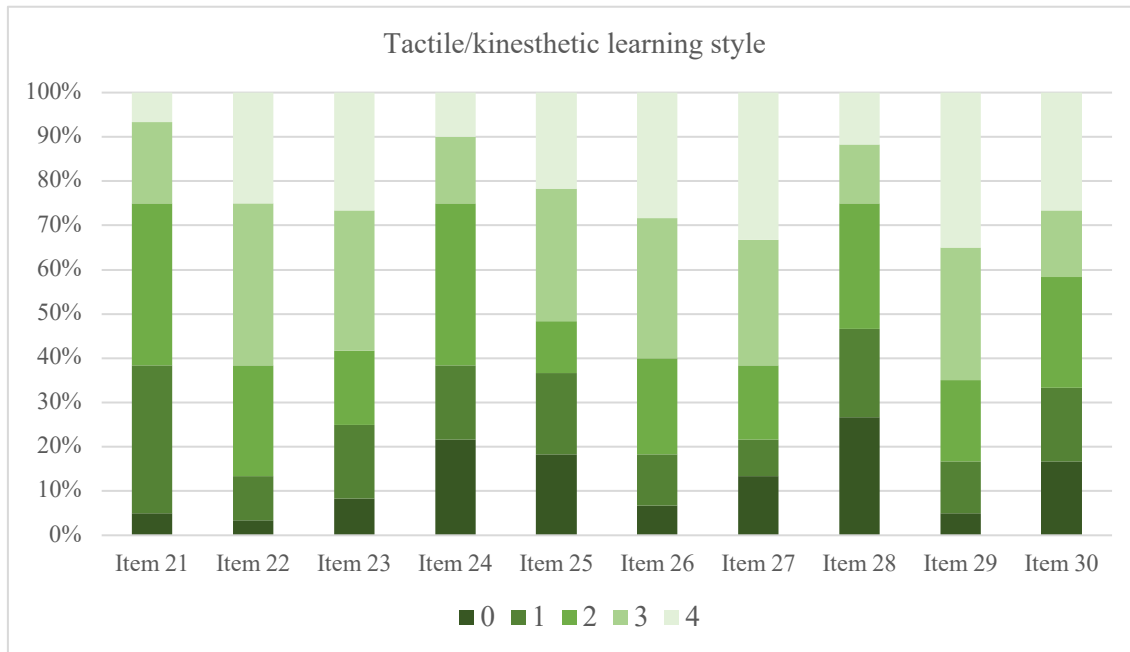


Figure 9 displays the responses for each item regarding the tactile/kinesthetic learning style. Item 29 (“I move my hands when I speak”) seems to be their major preference, whereas item 28 (“Manipulating objects helps me to remember what someone says”) appears to be the least favorite.

Figure 9

Percentage of informants who selected the different scales per item in the tactile/kinesthetic learning style



A Kolmogorov-Smirnov test was applied to the data to ascertain whether the three variables met the normality assumption. The results revealed that the three variables followed a normal distribution ( $p$ -value = .200). In order to answer the research question with more certainty, the parametric Paired Samples Test was performed. It is calculated for each pair of variables (visual-tactile/kinesthetic, visual-auditory, tactile/kinesthetic-auditory) by means of subtracting one value with respect to the other one for each informant. Table 12 provides a summary of the findings for the three new pairs of variables which measure the difference of preference between each perceptual learning style regarding its pair. Figure 10 displays the 95 per cent of confidence interval for paired differences means.

As shown in both Table 12 and Figure 10 (p. 146), the only confidence interval whose lower and upper limits have a different sign, including the zero value, is the one which compares the two perceptual learning styles with a higher preference (visual vs. tactile/kinesthetic). The illustration of Figure 10 corresponds to the result of the Paired Samples Test (see Table 12) which indicates that the difference between their means (visual vs. tactile/kinesthetic) is not statistically significant for a level of significance  $\alpha$  .05. Conversely, the comparisons with the auditory learning style seem to be statistically significant, according to the T-test (two-tailed) displayed in Table 12.

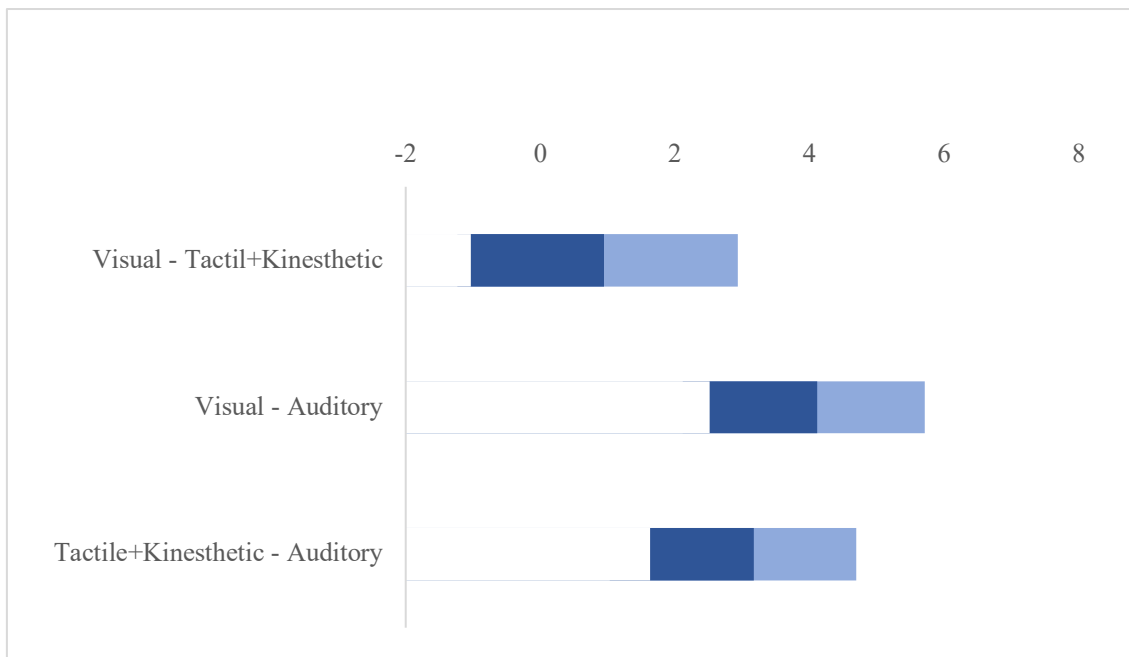
Table 12

## Paired Samples Test

Pairs	Paired Differences						t	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1	Visual- Tactile/kinesthetic	.950	7.677	.991	-1.033	2.9	.959	.342
Pair 2	Visual-Auditory	4.117	6.189	.799	2.518	5.716	5.15	.000
Pair 3	Tactile/kinesthetic- Auditory	3.167	5.929	.765	1.635	4.698	4.14	.000

Figure 10

## Confidence interval for paired differences means sum



To be able to confirm that the mean preference for the visual or tactile/kinesthetic perceptual learning styles is higher than the preference observed in the auditory learning style, the T-test has to be contrasted with a one-tailed test. Following Gómez-Biedma et al. (2001), if we want to assess which sample has the highest statistic (positive bias), a one-tailed test is required. The critical values and the rejection area of the one-tailed test double the ones in the two-tailed test, which entails the comparison of the significance



value with .10 instead of .05. Therefore, it can be concluded that the preference for visual and tactile/kinesthetic learning styles over the auditory style observed in the sample is not a result of chance. Likewise, it cannot be stated that there is a different preference between visual and tactile/kinesthetic learning styles, beyond the one observed before in the present sample of informants.

The same results can be deduced from the analysis of the variables that classify informants into a specific modality (see Table 13), unless there is a three-point difference between the highest and the following highest modality, which is considered as a mixed-modality preference or multimodal (Tight, 2010). Table 13 includes the distribution of frequencies regarding unimodal and multimodal learning style preferences. As can be observed, the visual perceptual learning style obtained the highest scores. Some of those cases were on its own, that is, there were not any combinations of visual with other perceptual learning styles, and other occasions with the tactile/kinesthetic style, the auditory style, and also with both styles (auditory and tactile/kinesthetic).

Table 13

*Perceptual learning styles with a major score*

Perceptual learning styles		Frequency	Percent	Cum. Percent
Valid	V	21	35%	35%
	T/K	13	22%	57%
	A	3	5%	62%
	V+T/K	11	18%	80%
	V+A+T/K	6	10%	90%
	A+T/K	4	7%	97%
	V+A	2	3%	100%
Unimodal		37	62%	
Multimodal		23	38%	
Total		60	100%	

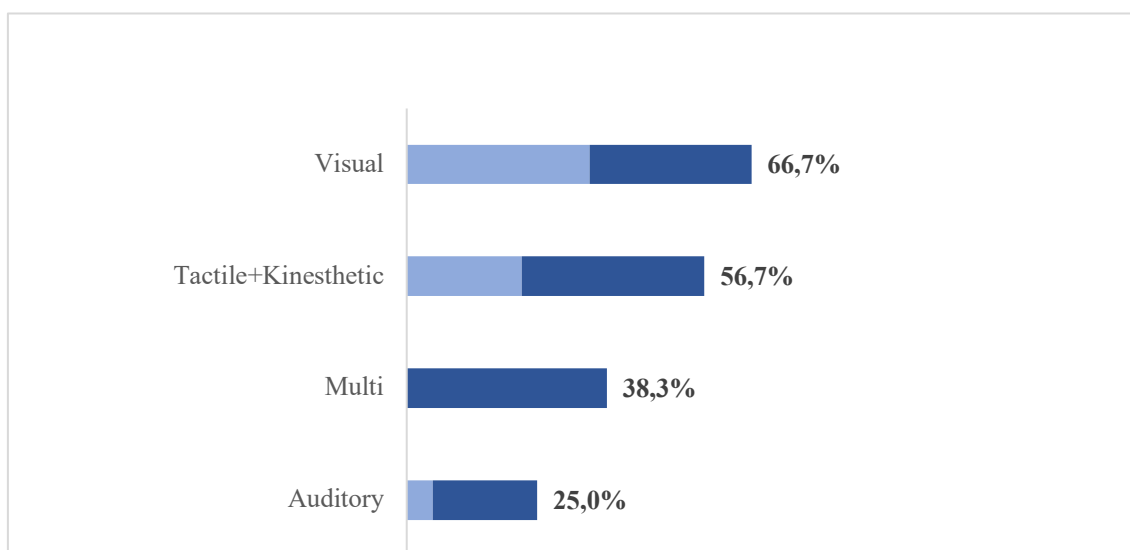
*Note.* V stands for Visual, T/K stands for Tactile/kinesthetic, A stands for Auditory.

As shown in Figure 11 (p. 146), in 38 of the observations, the visual learning style was the highest ranked, although 17 of those cases can be classified as multimodal or mixed-modality preferences. The tactile/kinesthetic learning style follows with some observations on its own, and others with the visual style, the auditory style, and with both styles (visual and auditory). In total, more than half of the sample preferred the

tactile/kinesthetic learning style. This style was followed by mixed-modality preferences, since some of the informants were considered to be multimodal (see Figure 11). The major mixed-modality preference was the visual and tactile/kinesthetic styles, followed by the three styles in balance, auditory and tactile/kinesthetic, and finally visual and auditory learning styles. As can be seen in Figure 11, the auditory learning style was the last ranked. It only had a couple of observations on its own, but also with both visual and tactile/kinesthetic styles, the tactile/kinesthetic style, and with the visual learning style.

*Figure 11*

*Percentage of informants who preferred each perceptual learning style*



A Wilcoxon Signed Ranked Test was performed to the data in order to determine the range of difference throughout these variables. Table 14 (p. 149) reveals that the Wilcoxon test (one-tailed) confirmed the aforementioned results, adding the intermediate position of the multimodal preference. As stated before, the multimodal preference follows the visual and tactile/kinesthetic styles, but it precedes the auditory learning style.

Table 14

*Wilcoxon Signed Ranks Test statistics*

	Auditory2- Visual2	T/K2- Visual2	Auditory2- T/K2	Multimodal2- Visual2	Multimodal2- T/K2	Auditory2- Multimodal2
Negative Ranks	640	471	360	273	104	82
Positive Ranks	140	.349	75	52	16	23
Z	-4.003(a)	-.949(a)	-3.528(a)	-3.400(a)	-2.840(a)	-2.138(a)
Asymp. Sig. (2-tailed)	.000	.343	.000	.001	.005	.033
Exact Sig. (2-tailed)	.000	.430	.001	.001	.007	.057
Exact Sig. (1-tailed)	.000	.215	.000	.000	.004	.029

Note. a Based on positive ranks.

In sum, the findings for the first research question indicated that visual was the major perceptual learning style preference of the 12th grade EFL learners analyzed in the present investigation. It was followed by tactile/kinesthetic, mixed-modality preferences (multimodal), and auditory learning styles. However, there appeared to be more learners who preferred one modality (62 per cent of unimodal learners) over mixed-modality preferences (38 per cent of multimodal learners).

### **7.3. Relationship among perceptual learning style preferences and productive vocabulary dimensions**

The second research question is divided into two specific sub-questions which address the relationship among perceptual learning styles in relation to two dimensions of productive vocabulary: controlled productive vocabulary and lexical production in a lexical availability task.

These two dimensions of productive vocabulary (controlled and lexical production) are dependent variables, whereas perceptual learning styles are independent variables. The purpose of this research question is to determine whether perceptual learning styles (visual, auditory, and/or tactile/kinesthetic) influence the production of vocabulary. In each sub-question, the characteristics of each pair of variables are analyzed and the results of the statistic tests related to those characteristics are presented.

As the characteristics of the variables which represent the three perceptual learning styles were already explained in the previous research question, this section will

only focus on the characteristics of the dependent variables and the ones that the statistic tests require.

### **7.3.1. Relationship among perceptual learning styles and controlled productive vocabulary**

The first sub-question explored the relationship among perceptual learning styles and controlled productive vocabulary. First, we will identify the controlled productive vocabulary of the informants. Afterwards, we will examine the relationship among each independent variable (visual, auditory, and tactile/kinesthetic) and the dependent variable (controlled productive vocabulary). Finally, we will ascertain whether the informants classified into different perceptual learning styles have the same productive vocabulary knowledge or whether the informants classified into one of the styles outperform the others concerning their controlled productive vocabulary knowledge.

Regarding controlled productive vocabulary knowledge, the informants obtained a mean of 1,043.33 words (standard deviation: 453.13) out of the 2,000 most frequent words that the PVLТ measured. They reached a maximum of 1,733.33 words, whilst the minimum of word estimates was of 200 words. Therefore, it can be concluded that the overall controlled productive vocabulary of this sample was a little bit higher than 1,000 words.

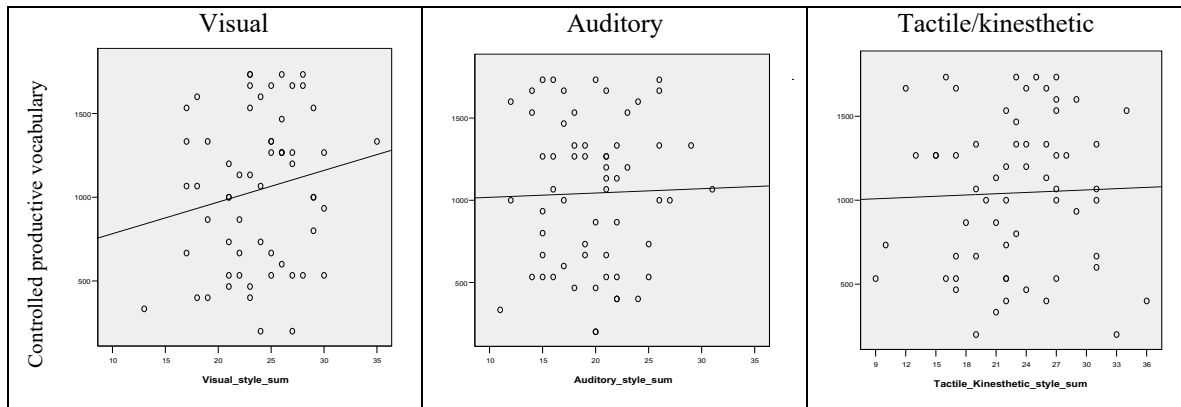
A Kolmogorov-Smirnov test was applied to the data to examine whether the dependent variable (controlled productive vocabulary) met the normality assumption. Similar to the three independent variables (visual, auditory, and tactile/kinesthetic) analyzed in the first research question, the dependent variable of controlled productive vocabulary followed a normal distribution ( $p\text{-value}=0.093$ ).

Although all the variables (perceptual learning styles and controlled productive vocabulary) followed a normal distribution, before applying the Pearson's chi-square test to examine the relationship among them, it is necessary to study whether all the requirements for this parametric test are met. First, we have to visualize the observations in a XY scatter plot, as can be observed in Figure 12 (p. 151). This illustration acknowledges the existence of a linear relationship between each pair of variables. This linearity is one of the requirements needed to apply the Person's correlation coefficient, among them, bivariate normal distribution; in other words, a normal distribution in the joint probability of X and Y (Asuero et al., 2006). However, the SPSS program does not provide the statistics related to multivariate or bivariate normal distribution. Therefore, a

program or macro file for SPSS “normtest.sps” univariate and multivariate tests of skew and kurtosis was used. This procedure identified the outliers by means of calculating the Mahalanobis distance (DeCarlo, 1997).

Figure 12

Scatter plots relationship among perceptual learning styles and controlled productive vocabulary



Regarding the linearity of the relationship among the variables, Table 15 reveals that data did not adjust to a linear model in any of the three pair of variables: perceptual learning styles (visual, auditory, and tactile/kinesthetic) vs. controlled productive vocabulary. Concerning the bivariate normal distribution, while the asymmetry tests (Small’s and Srivastava’s test) and some of the kurtosis tests (Mardia’s test) were favorable, the Omnibus test, which is based on Small’s test, rejected the bivariate normality hypothesis. In fact, for each perceptual learning style in relation to controlled productive vocabulary, the probability of this multivariate analysis was less than .05 (p-value=.0076; .0061; .0078, respectively).

Table 15

Linear regression: perceptual learning styles vs. controlled productive vocabulary

Dependent variable: controlled productive vocabulary	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Visual	.030	1.811	1	58	.184	593.198	18.900
Auditory	.001	.037	1	58	.849	991.563	2.628
Tactile/kinesthetic	.001	.063	1	58	.803	985.769	2.517

The bootstrap procedure (Efron, 1979), which is incorporated in the SPSS program, was used to approximate empirically, through bootstrapping techniques, the distribution of the Pearson's correlation coefficient. It estimates the errors of the test independent of its distribution. Table 16 shows the bootstrap results for the controlled productive vocabulary per each perceptual learning style, being c) the bootstrap results based on 1,000 bootstrap samples. It can be appreciated that Pearson's correlation coefficient for each perceptual learning style regarding controlled productive vocabulary is weak or non-existent, as well as non-statistically significant ( $p\text{-value} > .05$  one-tailed). Therefore, the fact that the higher preference for one of the three perceptual learning styles entailed a higher controlled productive vocabulary could not be confirmed.

Table 16

*Bootstrap for controlled productive vocabulary and each perceptual learning style*

Perceptual learning styles	Pearson Correlation	Sig. (1-tailed)	N	Bootstrap <sup>c</sup>			
				Bias	Std. Error	BCa 95% Confidence Interval	
						Lower	Upper
Visual	.174	.092	60	.005	.120	-.065	.421
Auditory	.025	.424	60	-.005	.123	-.207	.241
Tactile/kinesthetic	.033	.401	60	.005	.138	-.228	.323

Finally, we determined whether the controlled productive vocabulary knowledge of informants was higher in a specific modality. For that, a dichotomic variable was created to divide the informants of this study into two groups. As can be observed in Table 17, the mean average of words is lower in the four groups of informants which were classified as "Other;" in other words, non-visual in the case of that style, non-auditory, non-tactile/kinesthetic, and non-multimodal. This difference appears to be higher in the visual learning style vs. non-visual. Moreover, results suggested that those informants classified as multimodal obtained a higher controlled productive vocabulary knowledge (out of 2,000 words). Nevertheless, these differences were not enough to be able to extrapolate them. The probability of the F in the ANOVA test (see Table 17) was not less than .05, which suggested that the controlled productive vocabulary knowledge was not statistically significant in any perceptual learning style. Consequently, the limits of the confidence interval obtained through a bootstrap of 1,000 samples (Bias corrected) for each dichotomy intersected. For example, the lower limit for those informants who

scored better in the visual learning style was lower than the upper limit of the rest of the informants, being the visual learning style the closest to be statistically significant.

Table 17

*ANOVA test with dichotomic variables: perceptual learning styles and controlled productive vocabulary*

Perceptual learning style	Mean	Bootstrap <sup>a</sup>				ANOVA F Sig.
		Bias	Std. Error	BCa 95% Confidence Interval		
				Lower	Upper	
Visual	1,123.33	-.603	67.000	1,000.374	1,253.610	.052
Others	883.33	-5.216	101.909	706.721	1,058.629	
Auditory	1,057.78	-1.958	101.85	871.233	1,254.33	.888
Others	1,038.52	-1.242	69.237	915.969	1,164.861	
Tactile/kinesthetic	1,090.20	-1.002	79.184	945.598	1,240.746	.364
Others	982.05	-2.699	83.243	825.293	1,138.158	
Multimodal	1,168.12	-.148	81.755	1,017.806	1,326.403	.093
Others	965.77	-2.722	76.355	825.728	1,103.09	

*Note.* a. bootstrap results are based on 1000 bootstrap samples.

In the same vein, following the classification of informants into single (visual, auditory, or tactile/kinesthetic) or mixed-modality preferences (multimodal), statistically significant differences were not achieved either. Table 18 presents the findings to the ANOVA test among controlled productive vocabulary and perceptual learning styles, being a) the bootstrap results based on 1,000 bootstrap samples and b) based on 956 samples. As shown in this table, multimodal learners seemed to have a higher controlled productive vocabulary knowledge, followed by visual, tactile/kinesthetic, and auditory learners.

Table 18

*ANOVA test for the controlled productive vocabulary for each perceptual learning style*

Perceptual learning styles	Mean	Bootstrap <sup>a</sup>				ANOVA F Sig.
		Bias	Std. Error	BCa 95% Confidence Interval		
				Lower	Upper	
Visual	1,009.52	-3.039	101.709	808.908	1205.395	.338
Auditory	822.22	-3.99 <sup>b</sup>	115.28 <sup>b</sup>	666.67 <sup>b.c.</sup>	1066.67 <sup>b</sup>	
Tactile/kinesthetic	928.21	-3.761	144.291	653.333	1206.667	
Multimodal	1,168.12	-.148	81.755	1017.806	1326.403	

In sum, results revealed that the controlled productive vocabulary knowledge of 12th grade EFL learners was of 1,043 words. However, a statistically significant relationship among perceptual learning styles and controlled productive vocabulary was not found. In fact, it was not statistically significant when controlled productive vocabulary was compared to each perceptual learning style either. These findings suggested that the major preference for a specific perceptual learning style (or a combination in the case of mixed-modality preferences) did not ensure a higher controlled productive vocabulary size.

### **7.3.2. Relationship among perceptual learning styles and lexical production in a lexical availability task**

The second sub-question examined the relationship among perceptual learning styles and lexical production as measured by a lexical availability task. First, we will determine the total average of words informants retrieved in the eight prompts analyzed, as well as the average of words per prompt. We will also analyze the words produced by group of prompts (visual, auditory, tactile/kinesthetic, and traditional). Second, we will report the 50 most frequent words retrieved in the task and in each prompt, identify the type of content words retrieved in the lexical availability task, and group them into perceptual or non-perceptual. Finally, we will ascertain whether there is a statistically significant relationship among perceptual learning styles and lexical production in a lexical availability task.

**7.3.2.1. Average of words retrieved in the lexical availability task.** Table 19 (p. 155) presents the mean average of words that informants retrieved in each prompt and in the whole task, the standard deviation, the minimum and maximum values, as well as the tokens and types for the whole sample. Considering the total number of informants which participated in the present study and the eight prompts analyzed in the lexical availability task, 12th grade EFL learners produced a total average of 11 words. As indicated in Table 19, ‘Hobbies’ appears to be the most productive prompt, followed by ‘Town,’ ‘Move,’ and ‘Say.’ The least productive prompt is ‘Soft,’ followed by ‘Bright,’ ‘Look,’ and ‘Loud.’ Nonetheless, ‘Town’ was the prompt which had the highest number of retrieved words, a difference of one point with the most productive prompt ‘Hobbies.’ As can be observed in Table 19, the maximum number of words produced per prompt was around 22. The minimum value (zero) was achieved in three (‘Bright,’ ‘Loud,’ and



‘Soft’) out of the four least productive prompts, being three the minimum value obtained in ‘Look.’ The prompts differed in the number of tokens and types. For example, although ‘Town’ was more productive than ‘Move,’ the latter had a slightly higher number of types. ‘Say’ comprised of more tokens than ‘Loud,’ but there was a one-point difference in the number of types. Likewise, the number of types in ‘Look’ was higher than in ‘Loud,’ even though the latter surpassed it concerning tokens.

Table 19

*Descriptive statistics per prompt*

Prompt	Mean	Std. Deviation	Min.-Max.	Tokens and types
‘Bright’	9.35	4.905	0-21	Tokens: 561 Types: 227
‘Hobbies’	15.58	4.525	4-28	Tokens: 933 Types: 275
‘Look’	9.93	3.999	3-20	Tokens: 595 Types: 261
‘Loud’	10.1	4.887	0-22	Tokens: 606 Types: 246
‘Move’	11.68	4.065	4-22	Tokens: 703 Types: 268
‘Say’	10.5	3.788	2-20	Tokens: 629 Types: 247
‘Soft’	7.47	4.37	0-15	Tokens: 448 Types: 175
‘Town’	13.37	4.55	5-29	Tokens: 805 Types: 235
Total	10.99	4.386125	2.25-22.12	Tokens: 5,277 Types: 1,311

In Table 20 (p. 156), we display the mean average, standard deviation, minimum and maximum values for each group of prompts (visual, auditory, tactile/kinesthetic, and traditional). As commented in Chapter 6 (p. 123), we selected two prompts for each perceptual learning style (visual, auditory, and tactile/kinesthetic) and two traditional

prompts to be able to compare our results with previous studies. In line with the previous Table (Table 19, p. 155), results indicated that the group of traditional prompts were the most productive. However, the auditory prompts were ranked the second, followed by visual and tactile/kinesthetic prompts, which were the least productive. The maximum number of words retrieved for each group of prompts did not coincide with their productivity, as more words were produced in the visual prompts than in the auditory ones. Similarly, the auditory group had the minimum value, followed by visual, tactile/kinesthetic, and traditional prompts.

*Table 20*

*Descriptive statistics per group of prompts*

Prompt	Mean	Std. Deviation	Min.	Max.
Visual (‘Look’+‘Bright’)	9.64	3.729	1.5	20
Auditory (‘Loud’+‘Say’)	10.3	3.789	1	19.5
Tactile/kinesthetic (‘Move’+‘Soft’)	9.575	3.258	3	16
Traditional (‘Hobbies’+‘Town’)	14.475	3.695	6.5	23.5

**7.3.2.2. 50 most frequent words retrieved in response to the prompts.** Before delving into the classification of word families into frequency levels, we will focus on the 50 most frequent words retrieved in the eight prompts and then on the 50 most frequent words retrieved in each prompt. Comparing Table 21 (p. 157) which presents the 50 most frequent word responses in the eight prompts with Table 22 (p. 158), it can be concluded that some of the responses (light, sun, star, eye, clothes, hair, and TV) to the prompt ‘Bright’ were among the 50 most frequent words of the whole task.

Table 21

*50 most frequent words in response to the eight prompts*

Rank	Word	Frequency (%)	Rank	Word	Frequency (%)
1	MUSIC	83 (1.57)	26	SEE	28 (0.53)
2	CAR	62 (1.17)	27	READ	28 (0.53)
3	PEOPLE	56 (1.06)	28	SHOP	26 (0.49)
4	TALK	49 (0.93)	29	STAR	25 (0.47)
5	LIGHT	49 (0.93)	30	BUS	25 (0.47)
6	EYE	49 (0.93)	31	TELL	24 (0.45)
7	HOUSE	48 (0.91)	32	SOUND	24 (0.45)
8	SCHOOL	47 (0.89)	33	TRAVEL	23 (0.44)
9	RUN	46 (0.87)	34	ROAD	23 (0.44)
10	WALK	43 (0.81)	35	WATCH	22 (0.42)
11	SPEAK	42 (0.80)	36	SING	22 (0.42)
12	FOOTBALL	42 (0.80)	37	MOUTH	22 (0.42)
13	SUN	41 (0.78)	38	PLAY	21 (0.40)
14	CITY	40 (0.76)	39	GLASSES	21 (0.40)
15	SPORT	38 (0.72)	40	FILM	21 (0.40)
16	DANCE	35 (0.66)	41	BIKE	21 (0.40)
17	BASKETBALL	34 (0.64)	42	ANIMAL	21 (0.40)
18	CLOTHES	32 (0.61)	43	WRITE	20 (0.38)
19	FRIEND	31 (0.59)	44	TRAIN	20 (0.38)
20	PARTY	30 (0.57)	45	MOVIE	20 (0.38)
21	NOISE	30 (0.57)	46	CHURCH	20 (0.38)
22	WORD	29 (0.55)	47	STREET	19 (0.36)
23	VILLAGE	29 (0.55)	48	SHOUT	19 (0.36)
24	TV	29 (0.55)	49	TOWNHALL	18 (0.34)
25	HAIR	29 (0.55)	50	SWIM	18 (0.34)

Table 22

*50 most frequent first word responses to 'Bright'*

Rank	Word	Frequency (%)	Rank	Word	Frequency (%)
1	LIGHT	45 (8.02)	26	TV	4 (0.71)
2	SUN	38 (6.77)	27	SHOE	4 (0.71)
3	STAR	24 (4.28)	28	NECKLACE	4 (0.71)
4	GOLD	14 (2.50)	29	FIRE	4 (0.71)
5	DIAMOND	14 (2.50)	30	WINDOW	3 (0.53)
6	COLOUR	15 (2.50)	31	WATER	3 (0.53)
7	EYE	12 (2.14)	32	TORCH	3 (0.53)
8	LAMP	11 (1.96)	33	SILVER	3 (0.53)
9	SHINE	10 (1.78)	34	SHINY	3 (0.53)
10	MOON	9 (1.60)	35	SEA	3 (0.53)
11	SKY	8 (1.43)	36	ROOM	3 (0.53)
12	DAY	8 (1.43)	37	PLANET	3 (0.53)
13	CLOTHES	8 (1.43)	38	PENCIL	3 (0.53)
14	JEWELLERY	7 (1.25)	39	LIGHTER	3 (0.53)
15	FUTURE	7 (1.25)	40	LED	3 (0.53)
16	DARK	7 (1.25)	41	HIGHLIGHTER	3 (0.53)
17	HAIR	6 (1.07)	42	HAPPINESS	3 (0.53)
18	GLITTER	6 (1.07)	43	GLOW	3 (0.53)
19	DRESS	6 (1.07)	44	GLASS	3 (0.53)
20	YELLOW	5 (0.89)	45	ELECTRICITY	3 (0.53)
21	WHITE	5 (0.89)	46	CRYSTAL	3 (0.53)
22	TREE	5 (0.89)	47	CHRISTMAS	3 (0.53)
23	MIND	5 (0.89)	48	BLIND	3 (0.53)
24	IDEA	5 (0.89)	49	WEATHER	2 (0.36)
25	BRACELET	15 (0.89)	50	TURNON	2 (0.36)

Concerning the prompt 'Hobbies', Table 23 (p. 159) reveals that football, music, sport, basketball, read, run, walk, write, swim, friend, dance, TV, movie, film, bike, travel, sing, play, and party were among the most frequent 50-word responses in the lexical availability task. Only the word TV was reported to be one of the most frequent ones in both 'Bright' and 'Hobbies.' None of the other 49 words were repeated in these two prompts.

Table 23

*50 most frequent first word responses to 'Hobbies'*

Rank	Word	Frequency (%)	Rank	Word	Frequency (%)
1	FOOTBALL	36 (3.86)	26	SWIMMING	10 (1.07)
2	MUSIC	32 (3.43)	27	HANGOUT	10 (1.07)
3	SPORT	31 (3.32)	28	GUITAR	10 (1.07)
4	BASKETBALL	30 (3.22)	29	TRAVEL	9 (0.96)
5	READ	21 (2.25)	30	SING	9 (0.96)
6	RUN	17 (1.82)	31	RUNNING	9 (0.96)
7	WALK	16 (1.71)	32	PLAY	9 (0.96)
8	WRITE	14 (1.50)	33	CINEMA	9 (0.96)
9	SWIM	14 (1.50)	34	PARTY	8 (0.86)
10	TIME	13 (1.39)	35	HORSE	8 (0.86)
11	TENNIS	13 (1.39)	36	HANDBALL	7 (0.75)
12	READING	13 (1.39)	37	GAME	7 (0.75)
13	INSTRUMENT	12 (1.29)	38	FUN	7 (0.75)
14	FRIEND	12 (1.29)	39	CHESS	7 (0.75)
15	DANCE	12 (1.29)	40	BASEBALL	7 (0.75)
16	BOOK	12 (1.29)	41	THEATRE	6 (0.64)
17	TV	11 (1.18)	42	STUDY	6 (0.64)
18	SHOPPING	11 (1.18)	43	SLEEP	6 (0.64)
19	SERIES	11 (1.18)	44	PIANO	6 (0.64)
20	PAINTING	11 (1.18)	45	PAINT	6 (0.64)
21	MOVIE	11 (1.18)	46	EAT	6 (0.64)
22	GOOUT	11 (1.18)	47	DANCING	6 (0.64)
23	FILM	11 (1.18)	48	COOKING	6 (0.64)
24	BIKE	11 (1.18)	49	SINGING	5 (0.54)
25	VIDEOGAME	10 (1.07)	50	RUGBY	5 (0.54)

As shown in Table 24 (p. 160), eleven words (eye, see, watch, glasses, TV, clothes, film, read, people, sun, and shop) were also the most frequent words in the total corpus. The words eye, window, TV, clothes, shoe, dress, colour, blind, tree, and sun were among the 50 most frequent words in the prompt 'Bright' as well. Regarding 'Hobbies,' the only shared words were the following: TV, film, read, book, and series.

Table 24

*50 most frequent first word responses to 'Look'*

Rank	Word	Frequency (%)	Rank	Word	Frequency (%)
1	EYE	35 (5.88)	26	DRESS	4 (0.67)
2	SEE	24 (4.03)	27	COLOUR	4 (0.67)
3	WATCH	20 (3.36)	28	BOOT	4 (0.67)
4	GLASSES	20 (3.36)	29	BOOK	4 (0.67)
5	SIGHT	11 (1.85)	30	BLIND	4 (0.67)
6	LOOKFOR	11 (1.85)	31	BEAUTIFUL	4 (0.67)
7	LOOKAT	10 (1.68)	32	APPEARANCE	4 (0.67)
8	WINDOW	8 (1.34)	33	VICTIM	3 (0.50)
9	MIRROR	8 (1.34)	34	UGLY	3 (0.50)
10	TV	7 (1.18)	35	TSHIRT	3 (0.50)
11	LOOKAFTER	7 (1.18)	36	TREE	3 (0.50)
12	LANDSCAPE	7 (1.18)	37	TELEVISION	3 (0.50)
13	FACE	7 (1.18)	38	SUNGLASSES	3 (0.50)
14	CLOTHES	7 (1.18)	39	SUN	3 (0.50)
15	FILM	6 (1.01)	40	STYLE	3 (0.50)
16	TABLE	5 (0.84)	41	SOCK	3 (0.50)
17	READ	5 (0.84)	42	SKIRT	3 (0.50)
18	PEOPLE	5 (0.84)	43	SHOP	3 (0.50)
19	FASHION	5 (0.84)	44	SERIES	3 (0.50)
20	EYEBROW	5 (0.84)	45	SENSE	3 (0.50)
21	VIEW	4 (0.67)	46	PICTURE	3 (0.50)
22	SHOE	4 (0.67)	47	PHONE	3 (0.50)
23	OUTFIT	4 (0.67)	48	PERSON	3 (0.50)
24	LOOKAROUND	4 (0.67)	49	OLDFASHIONED	3 (0.50)
25	JEANS	4 (0.67)	50	NATURE	3 (0.50)

Table 25 (p. 161) reveals that there were two of the most frequent words in response to the prompt 'Loud' that were also the most frequent ones in the whole corpus: TV and people. There were also some shared responses with the prompts 'Bright' (TV), 'Hobbies' (music, party, TV, instrument, and sing), and 'Look' (people and TV).

Table 25

*50 most frequent first word responses to 'Loud'*

Rank	Word	Frequency (%)	Rank	Word	Frequency (%)
1	MUSIC	44 (7.26)	26	HIGH	5 (0.83)
2	NOISE	24 (3.96)	27	FESTIVAL	5 (0.83)
3	SOUND	21 (3.47)	28	CHILDREN	5 (0.83)
4	VOICE	14 (2.31)	29	YELL	4 (0.66)
5	CONCERT	13 (2.15)	30	TRAFFIC	4 (0.66)
6	PARTY	12 (1.98)	31	SING	4 (0.66)
7	VOLUME	11 (1.82)	32	NEIGHBOUR	4 (0.66)
8	SPEAK	11 (1.82)	33	LOW	4 (0.66)
9	TALK	9 (1.49)	34	FIGHT	4 (0.66)
10	SONG	9 (1.49)	35	ANNOYING	4 (0.66)
11	SHOUT	9 (1.49)	36	ANIMAL	4 (0.66)
12	SCREAM	9 (1.49)	37	VIDEO	3 (0.50)
13	PEOPLE	9 (1.49)	38	TRAIN	3 (0.50)
14	CAR	9 (1.49)	39	SINGER	3 (0.50)
15	TV	7 (1.16)	40	SCHOOL	3 (0.50)
16	SPEAKER	7 (1.16)	41	NIGHT	3 (0.50)
17	EAR	6 (0.99)	42	LISTENING	3 (0.50)
18	CRY	6 (0.99)	43	LISTEN	3 (0.50)
19	CITY	6 (0.99)	44	LAUGH	3 (0.50)
20	ROCK	5 (0.83)	45	HURT	3 (0.50)
21	RADIO	5 (0.83)	46	HEAVYMETAL	3 (0.50)
22	PLANE	5 (0.83)	47	EARPHONES	3 (0.50)
23	NOISY	5 (0.83)	48	DJ	3 (0.50)
24	MICROPHONE	5 (0.83)	49	DISCO	3 (0.50)
25	INSTRUMENT	5 (0.83)	50	BIG	3 (0.50)

Concerning the prompt 'Move' and as shown in Table 26 (p. 162), 19 words which were retrieved in response to this prompt were also encountered in the most 50 frequent words of the corpus. These words were the following: run, car, walk, dance, travel, train, bus, play, bike, house, sport, swim, people, music, movie, football, city, basketball, and village. None of the words in that Table coincided with the most 50 words in response to the prompt 'Bright.' Nevertheless, some of the word responses corresponded with the ones pertaining to the prompts 'Hobbies' (run, walk, dance, travel, play, bike, sport, swim, music, movie, horse, football, and basketball), 'Look' (people), and 'Loud' (car, train, plane, people, music, and city).

Table 26

*50 most frequent first word responses to 'Move'*

Rank	Word	Frequency (%)	Rank	Word	Frequency (%)
1	RUN	28 (3.98)	26	BOAT	7 (1.00)
2	CAR	27 (3.84)	27	MOTORBIKE	6 (0.85)
3	WALK	26 (3.70)	28	FLY	6 (0.85)
4	DANCE	21 (2.99)	29	TOWN	5 (0.71)
5	LEG	16 (2.28)	30	COUNTRY	5 (0.71)
6	TRAVEL	14 (1.99)	31	ARM	5 (0.71)
7	TRAIN	12 (1.71)	32	VOYAGE	4 (0.57)
8	PLANE	12 (1.71)	33	TAXI	4 (0.57)
9	MOVEMENT	12 (1.71)	34	SWIM	4 (0.57)
10	BUS	12 (1.71)	35	SLOWLY	4 (0.57)
11	BODY	11 (1.56)	36	PEOPLE	4 (0.57)
12	TRIP	10 (1.42)	37	MUSIC	4 (0.57)
13	PLAY	10 (1.42)	38	MOVIE	4 (0.57)
14	MOVE	10 (1.42)	39	JOURNEY	4 (0.57)
15	JUMP	10 (1.42)	40	HORSE	4 (0.57)
16	BIKE	10 (1.42)	41	HEAD	4 (0.57)
17	TRANSPORT	9 (1.28)	42	FOOTBALL	4 (0.57)
18	PLACE	9 (1.28)	43	FINGER	4 (0.57)
19	HAND	9 (1.28)	44	FALL	4 (0.57)
20	MOVEAROUND	8 (1.14)	45	CITY	4 (0.57)
21	HOUSE	8 (1.14)	46	CHAIR	4 (0.57)
22	GO	8 (1.14)	47	BASKETBALL	4 (0.57)
23	CHANGE	8 (1.14)	48	VILLAGE	3 (0.43)
24	SPORT	7 (1.00)	49	SLOW	3 (0.43)
25	FAST	7 (1.00)	50	SKELETON	3 (0.43)

Table 27 (p. 163) displays the words retrieved in response to the prompt 'Say' which were among the most frequent 50-word responses in the whole lexical availability corpus. These words were the following: talk, speak, word, tell, mouth, shout, sing, people, friend, write, and noise. Some of the most frequent words in the table were also shared with other prompts, such as 'Hobbies' (sing, friend, and write), 'Look' (people), 'Loud' (talk, speak, shout, sing, listen, people, song, scream, and noise), or 'Move' (people). None of the responses were in line with the ones related to the prompt 'Bright.'



Table 27

*50 most frequent first word responses to 'Say'*

Rank	Word	Frequency (%)	Rank	Word	Frequency (%)
1	TALK	39 (6.20)	26	ARGUMENT	5 (0.79)
2	SPEAK	31 (4.93)	27	WRITE	4 (0.64)
3	WORD	26 (4.13)	28	VERB	4 (0.64)
4	TELL	23 (3.66)	29	TEACHER	4 (0.64)
5	MOUTH	20 (3.18)	30	TALKATIVE	4 (0.64)
6	CONVERSATION	13 (2.07)	31	SAID	4 (0.64)
7	SHOUT	10 (1.59)	32	PHRASE	4 (0.64)
8	LIE	10 (1.59)	33	OPINION	4 (0.64)
9	SING	9 (1.43)	34	JOKE	4 (0.64)
10	SENTENCE	9 (1.43)	35	INSULT	4 (0.64)
11	LANGUAGE	9 (1.43)	36	IDIOM	4 (0.64)
12	SPEECH	8 (1.27)	37	HELLO	4 (0.64)
13	TRUTH	7 (1.11)	38	HEAR	4 (0.64)
14	TONGUE	7 (1.11)	39	GOSSIP	4 (0.64)
15	STORY	7 (1.11)	40	EXPLAIN	4 (0.64)
16	LISTEN	7 (1.11)	41	ARGUE	4 (0.64)
17	QUESTION	6 (0.95)	42	UNDERSTAND	3 (0.48)
18	PEOPLE	6 (0.95)	43	SECRET	3 (0.48)
19	FRIEND	6 (0.95)	44	SCREAM	3 (0.48)
20	COMMUNICATION	6 (0.95)	45	NOISE	3 (0.48)
21	TEXT	5 (0.79)	46	LOUDLY	3 (0.48)
22	SONG	5 (0.79)	47	INFORMATION	3 (0.48)
23	MESSAGE	5 (0.79)	48	HISTORY	3 (0.48)
24	COMMENT	5 (0.79)	49	GOODBYE	3 (0.48)
25	CALL	5 (0.79)	50	EXPRESS	3 (0.48)

Four words (hair, clothes, animal, and people) from the responses to the prompt 'Soft' were also included in the most 50 frequent words of the whole corpus, as can be observed in Table 28 (p. 164). Some of the word responses corresponded with the ones pertaining to the prompts 'Bright' (hair, clothes, shoe, and dress), 'Hobbies' (sleep), 'Look' (clothes, T-shirt, face, sock, shoe, people, and dress), 'Loud' (animal and people), 'Move' (hand, people, and slow), and 'Say' (people).

Table 28

*50 most frequent first word responses to 'Soft'*

Rank	Word	Frequency (%)	Rank	Word	Frequency (%)
1	HAIR	21 (4.69)	26	TEXTURE	4 (0.89)
2	SKIN	16 (3.57)	27	SWEET	4 (0.89)
3	BED	16 (3.57)	28	FACE	4 (0.89)
4	CLOTHES	15 (3.35)	29	VELVET	3 (0.67)
5	DOG	13 (2.90)	30	SWEATER	3 (0.67)
6	CAT	13 (2.90)	31	SOFTWARE	3 (0.67)
7	HARD	12 (2.68)	32	SOCK	3 (0.67)
8	WOOL	11 (2.46)	33	SMOOTH	3 (0.67)
9	PILLOW	10 (2.23)	34	SHOE	3 (0.67)
10	COTTON	10 (2.23)	35	SAND	3 (0.67)
11	ANIMAL	10 (2.23)	36	PEOPLE	3 (0.67)
12	SOFA	8 (1.79)	37	PAPER	3 (0.67)
13	TOUCH	7 (1.56)	38	MATERIAL	3 (0.67)
14	SHEEP	7 (1.56)	39	DRESS	3 (0.67)
15	SCARF	7 (1.56)	40	COMFORTABLE	3 (0.67)
16	JACKET	7 (1.56)	41	BIRD	3 (0.67)
17	HAND	7 (1.56)	42	WOOD	2 (0.45)
18	FUR	7 (1.56)	43	TROUSERS	2 (0.45)
19	TSHIRT	6 (1.34)	44	TOY	2 (0.45)
20	BEAR	6 (1.34)	45	TOUGH	2 (0.45)
21	NICE	5 (1.12)	46	SOFTNESS	2 (0.45)
22	DOLL	5 (1.12)	47	SLOW	2 (0.45)
23	COAT	5 (1.12)	48	SLEEP	2 (0.45)
24	BLANKET	5 (1.12)	49	SILK	2 (0.45)
25	BABY	5 (1.12)	50	RELAX	2 (0.45)

Finally, as shown in Table 29 (p. 165), there were 15 words out of the most frequent ones in response to the prompt 'Town' that also predominated in the whole corpus. These words were the following: school, house, city, people, village, shop, car, church, townhall, road, street, bus, friend, party, and train. There were some shared responses with the prompts 'Bright' (tree), 'Hobbies' (friend, party, and cinema), 'Look' (people, shop, and tree), 'Loud' (school, city, people, car, neighbour, party, train, and children), 'Move' (house, city, people, village, car, bus, country, transport, and train), 'Say' (people and friend), and 'Soft' (people).

Table 29

*50 most frequent first word responses to 'Town'*

Rank	Word	Frequency (%)	Rank	Word	Frequency (%)
1	SCHOOL	38 (4.72)	26	BAR	7 (0.87)
2	HOUSE	35 (4.35)	27	STATION	6 (0.75)
3	CITY	30 (3.73)	28	SHOPPINGCENTRE	6 (0.75)
4	PEOPLE	27 (3.35)	29	POLLUTION	6 (0.75)
5	VILLAGE	26 (3.23)	30	MAYOR	6 (0.75)
6	SHOP	22 (2.73)	31	HOME	6 (0.75)
7	CAR	20 (2.48)	32	FLAT	6 (0.75)
8	CHURCH	19 (2.36)	33	FAMILY	6 (0.75)
9	TOWNHALL	18 (2.24)	34	TRANSPORT	5 (0.62)
10	SQUARE	18 (2.24)	35	SWIMMINGPOOL	5 (0.62)
11	ROAD	17 (2.11)	36	SPORTSCENTRE	5 (0.62)
12	STREET	15 (1.86)	37	PARTY	5 (0.62)
13	BUILDING	15 (1.86)	38	MOUNTAIN	5 (0.62)
14	PARK	14 (1.74)	39	MONUMENT	5 (0.62)
15	LIBRARY	14 (1.74)	40	FESTIVITY	5 (0.62)
16	BUS	11 (1.37)	41	CITIZEN	5 (0.62)
17	NEIGHBOUR	9 (1.12)	42	CINEMA	5 (0.62)
18	COUNTRY	9 (1.12)	43	UNIVERSITY	4 (0.50)
19	SUPERMARKET	8 (0.99)	44	TRAIN	4 (0.50)
20	SMALL	8 (0.99)	45	SUMMER	4 (0.50)
21	RESTAURANT	7 (0.87)	46	CHILDREN	4 (0.50)
22	NEIGHBOURHOOD	7 (0.87)	47	CAFE	4 (0.50)
23	INHABITANT	7 (0.87)	48	BRIDGE	4 (0.50)
24	FRIEND	7 (0.87)	49	BANK	4 (0.50)
25	FACILITY	7 (0.87)	50	TREE	3 (0.37)

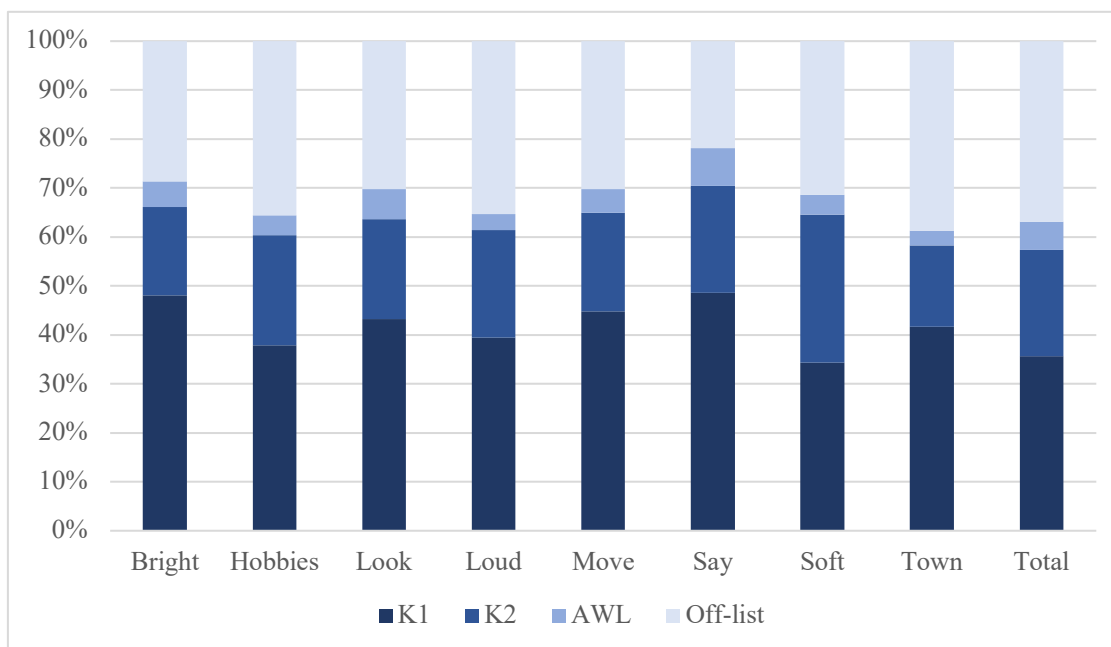
### 7.3.2.3. Frequency level of the words included in the lexical availability task.

Considering the whole corpus (eight prompts) and as can be observed in Figure 13 (p. 166), 35.70 per cent of the words belonged to the 1K band, 21.66 per cent to the 2K band, 5.80 per cent to the AWL list, and 36.84 per cent were off-list words. Let us describe each prompt in isolation. With reference to the prompt 'Bright,' 48.02 per cent of the words retrieved in response to this prompt pertained to the 1K band, 18.06 per cent to the 2K band, 5.29 to the AWL list, and 28.63 per cent were off-list words. Regarding 'Hobbies,' 37.82 per cent of words belonged to the 1K band, 22.55 per cent to the 2K band, 4 per cent to the AWL list, and 35.64 per cent were off-list words. As shown in Figure 13, 43.30 per cent of words produced in the prompt 'Look' were included in the 1K band, 20.31 per

cent in the 2K band, 6.13 per cent in the AWL list, and 30.27 per cent were off-list words. In the prompt ‘Loud,’ 39.43 per cent pertained to the 1K band, 21.95 per cent to the 2K band, 3.25 to the AWL list, and 35.37 were off-list words. Concerning the prompt ‘Move,’ 44.78 per cent of the words belonged to the 1K band, 20.15 per cent to the 2K band, 4.85 per cent to the AWL list, and 30.22 per cent were off-list words. In the prompt ‘Say,’ 48.58 per cent of the words retrieved were included in the 1K band, 21.86 in the 2K band, 7.69 in the AWL list, and 21.86 were off-list words. Figure 13 indicates that a higher percentage of words (34.29) in the prompt ‘Soft’ belonged to the 1K band, 30.29 per cent to the 2K band, 4 per cent to the AWL list, and 31.43 per cent were off-list words. Finally, in the prompt ‘Town,’ 41.70 per cent of words pertained to the 1K band, 16.60 per cent to the 2K band, 2.98 per cent to the AWL list, and 38.72 per cent were off-list words. All in all, the majority of the words retrieved in most prompts belonged to the 1K band, then a higher percentage was given for off-list words, followed by the 2K band, and AWL list words.

Figure 13

Percentage of total words per frequency level in each prompt and in total

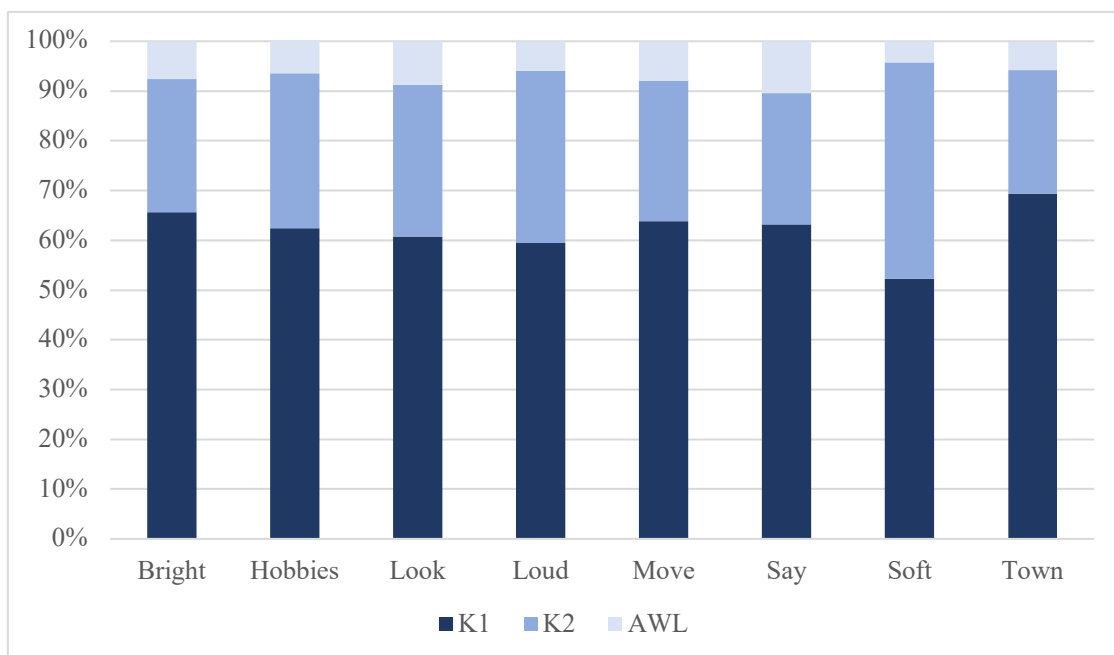


As to word families, Figure 14 (p. 167) shows their percentage per frequency level for each prompt. The Off-list level was not included in the figure because it was not reported in any prompt. As can be observed, informants retrieved a higher number of word families within the 1,000 word-frequency band in response to the prompt ‘Town’,

followed by ‘Bright,’ ‘Move,’ and ‘Say.’ ‘Soft’ was the prompt with the lowest number of word families within the 1K band, followed by ‘Loud,’ ‘Look,’ and ‘Hobbies.’ On the other hand, test-takers produced by far a higher number of words within the 2,000 word-frequency in response to the prompt ‘Soft.’ Figure 14 illustrates that ‘Loud’ was ranked the second, followed by ‘Hobbies’ and ‘Look.’ ‘Town’ was the prompt with the lowest number of word families within the 2K band, followed by ‘Say,’ ‘Bright,’ and ‘Move.’ Considering the AWL band, ‘Say’ concentrated the highest number of word families, followed by ‘Look,’ ‘Move,’ and ‘Bright.’ In this case, the prompt ‘Soft’ obtained the lowest number of word families within the AWL, followed by ‘Town,’ ‘Loud,’ and ‘Hobbies.’

Figure 14

Percentage of word families per frequency level in each prompt



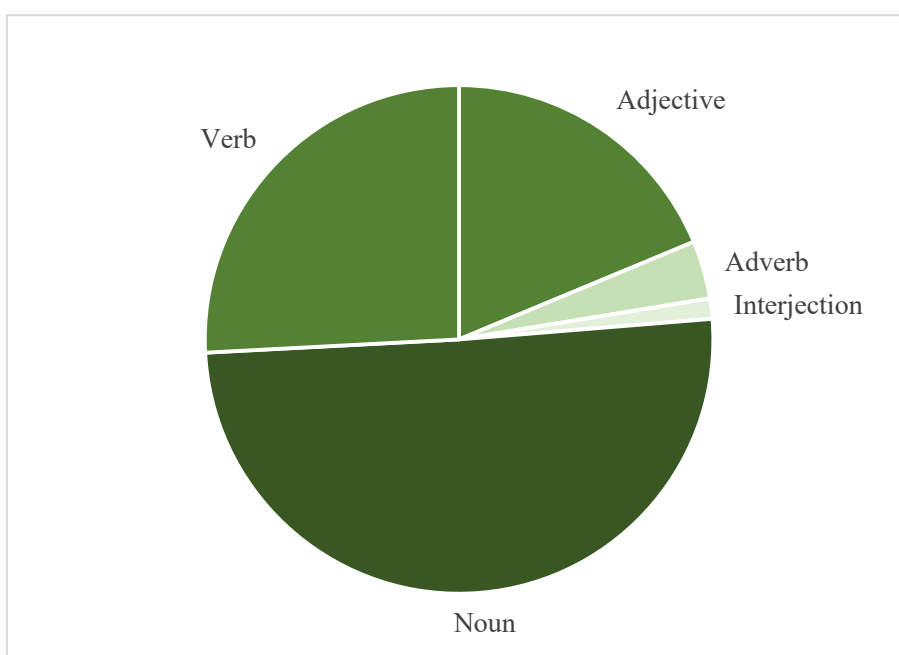
**7.3.2.4. Type of content words.** Concerning the type of content words, we analyzed the word class of each type retrieved in the whole corpus and in each prompt. First, we considered the frequency of occurrence of adjectives, adverbs, conjunctions, interjections, nouns, prepositions, pronouns, and verbs in isolation (see the following Figures). In other words, we included the total number of occurrences of a given word class without considering combination of word classes (e.g., noun and verb). Then, we

focused on the realizations of combinations with other word classes and on the word classes in isolation if they only functioned as such.

As illustrated in Figure 15, when considering the word class in isolation, the whole corpus of the lexical availability task (eight prompts) was constituted mainly by nouns (1,094), followed by verbs (560), adjectives (406), adverbs (80), and interjections (28). However, as we will see in the following paragraph, most of the content words retrieved in the lexical availability task could be classified into different word classes.

*Figure 15*

*Frequency of word classes in isolation of the whole lexical availability task*



As can be observed in Table 30 (p. 169), if we examine the combinations of word classes, the words produced in the lexical availability task corresponded to the pattern of noun plus verb, followed by the patterns adjective and noun, or adjective, noun, and verb, as the higher occurrences.

Table 30

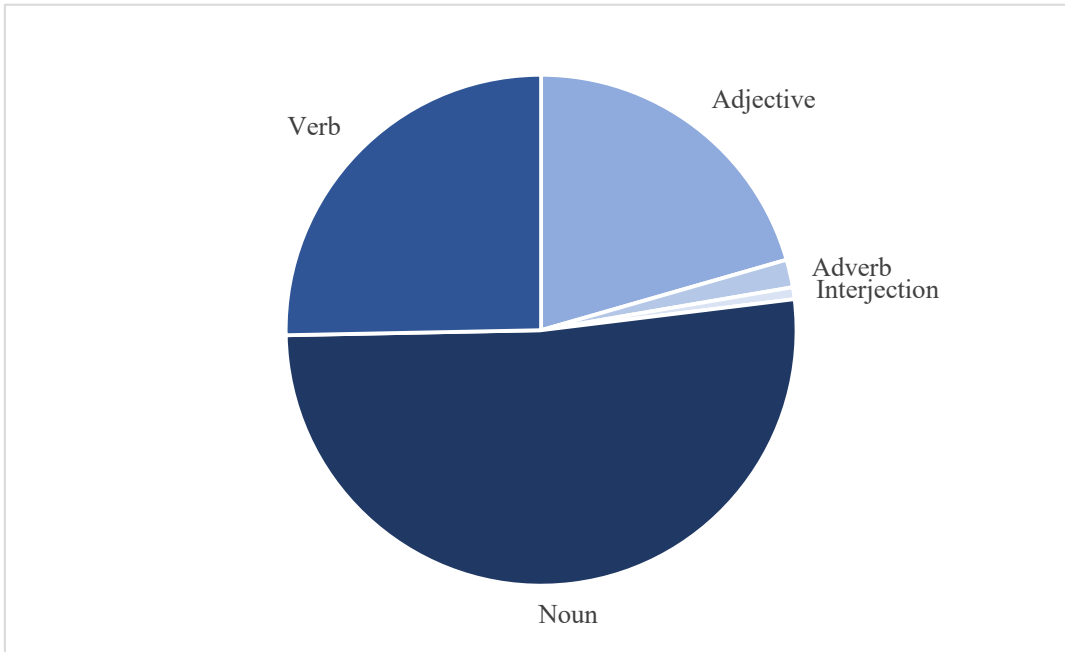
*Frequency of word classes in the lexical availability task (eight prompts)*

Word class	Frequency	Word class	Frequency
Adjective	92	Adverb	11
Adjective, adverb	13	Adverb, adjective, interjection, noun, verb	1
Adjective, adverb, conjunction, noun	1	Adverb, conjunction	1
Adjective, adverb, interjection, noun	1	Adverb, interjection, noun, verb	1
Adjective, adverb, interjection, noun, verb	2	Adverb, interjection, verb	1
Adjective, adverb, noun	15	Adverb, noun	2
Adjective, adverb, noun, preposition	1	Adverb, noun, verb	1
Adjective, adverb, noun, preposition, verb	2	Adverb, verb	1
Adjective, adverb, noun, verb	17	Interjection	3
Adjective, adverb, verb	7	Interjection, adverb	1
Adjective, interjection, noun	3	Interjection, noun	5
Adjective, interjection, noun, verb	2	Interjection, noun, verb	8
Adjective, noun	147	Noun	452
Adjective, noun, preposition	1	Noun, adverb	1
Adjective, noun, verb	96	Noun, verb	334
Adjective, pronoun, noun	1	Verb	83
Adjective, verb	4		

We now turn on the description of the content words retrieved in each prompt. For the prompt ‘Bright’ (see Figure 16, p. 170), the noun (206) was the most retrieved word class by far, followed by verbs (101), adjectives (82), adverbs (7), and interjections (3).

Figure 16

Frequency of word classes in isolation in the prompt 'Bright'



Considering the combinations of word classes in the prompt 'Bright,' findings indicated that the combination of noun and verb had the highest frequency, followed by adjective, noun, and verb; and adjective and noun, among the highest (see Table 31).

Table 31

Frequency of word classes in the prompt 'Bright'

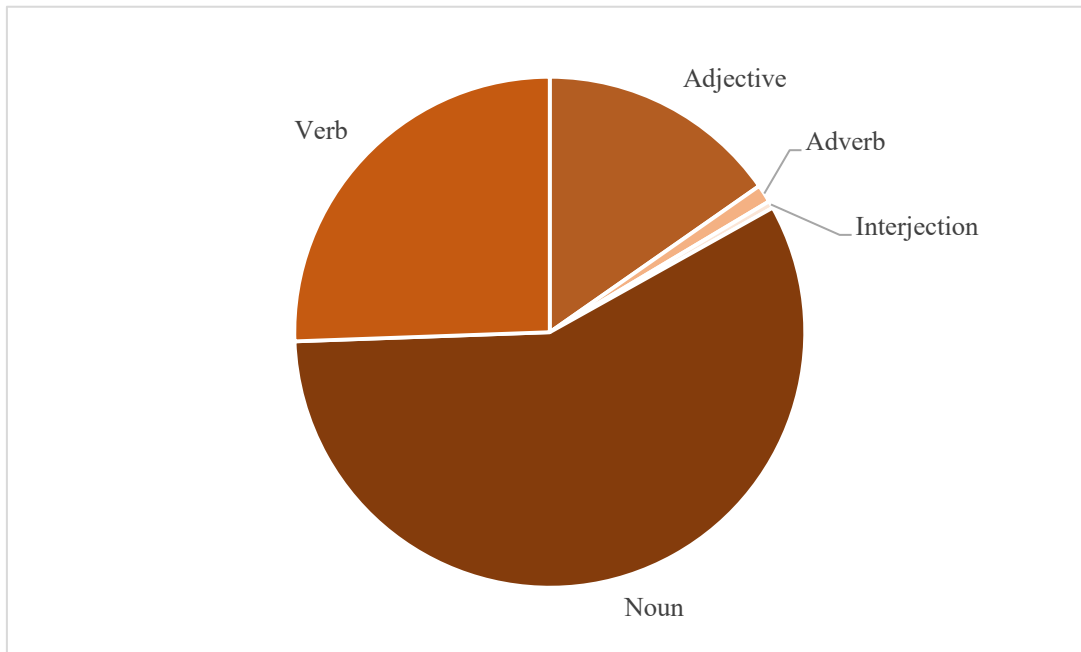
Word class	Frequency	Word class	Frequency
Adjective	13	Adjective, verb	1
Adjective, adverb, noun	1	Adverb	2
Adjective, adverb, noun, verb	3	Interjection, noun	1
Adjective, adverb, verb	1	Interjection, noun, verb	1
Adjective, interjection, noun	1	Noun	77
Adjective, noun	30	Noun, verb	60
Adjective, noun, verb	32	Verb	3

Concerning the prompt 'Hobbies' and as shown in Figure 17 (p. 171), the noun (252) was also the major word class. The second ranked word class was the verb (112), followed by the adjective (67), the adverb (5), and the interjection (2).



Figure 17

Frequency of word classes in isolation in the prompt 'Hobbies'



Likewise, the combination of noun and verb had the greater number of occurrences in the prompt 'Hobbies,' followed by adjective and noun, and adjective, noun, and verb, among others (see Table 32). This finding concords with the prompt 'Bright,' although the combination adjective, noun, and verb occurred at a slightly higher frequency than adjective and noun.

Table 32

Frequency of word classes in the prompt 'Hobbies'

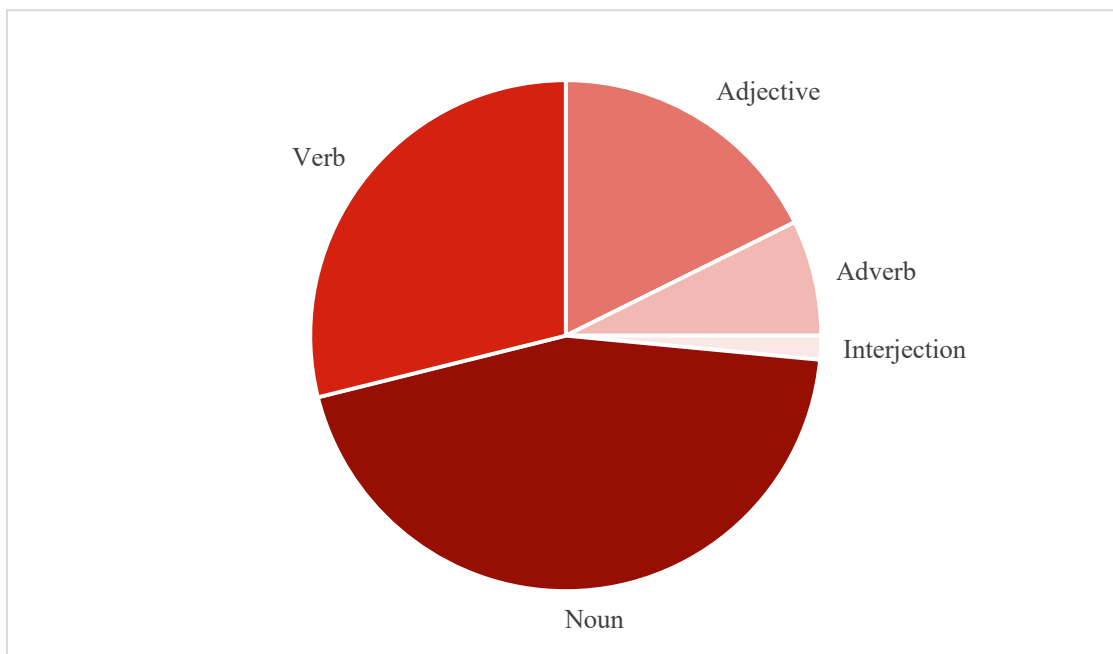
Word class	Frequency	Word class	Frequency
Adjective	8	Adjective, noun, verb	14
Adjective, adverb, noun	2	Adverb, noun, verb	1
Adjective, adverb, noun, preposition, verb	1	Interjection, noun, verb	2
Adjective, adverb, noun, verb	1	Noun	112
Adjective, adverb, verb	1	Noun, verb	79
Adjective, noun	40	Verb	13

Figure 18 (p. 172) illustrates the frequency of occurrence of the word classes in isolation in which the words produced for the prompt 'Look' were classified. As it

happened with 'Bright' and 'Hobbies,' more nouns (207) were retrieved, followed by verbs (134), adjectives (82), adverbs (34), and interjections (7).

Figure 18

Frequency of word classes in isolation in the prompt 'Look'



The same pattern appears in the prompt 'Look,' since the combination of noun and verb seemed to be the largest (see Table 33, p. 173), followed by adjective and noun, and adjective, noun, and verb, among others, as it happened in 'Hobbies.'

Table 33

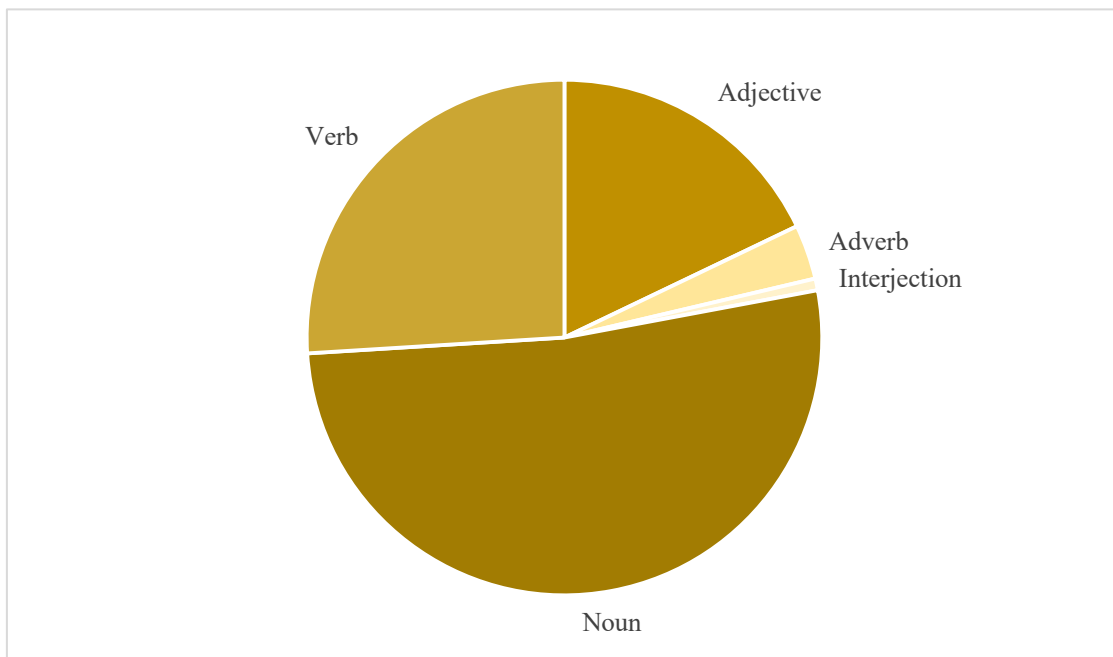
*Frequency of word classes in the prompt 'Look'*

Word class	Frequency	Word class	Frequency
Adjective	24	Adjective, noun	23
Adjective, adverb	3	Adjective, noun, verb	19
Adjective, adverb, conjunction, noun	1	Adjective, pronoun, noun	1
Adjective, adverb, interjection, noun	1	Adverb	1
Adjective, adverb, interjection, noun, verb	1	Adverb, adjective, interjection, noun, verb	1
Adjective, adverb, noun	1	Interjection, noun	1
Adjective, adverb, noun, preposition, verb	1	Interjection, noun, verb	2
Adjective, adverb, noun, verb	4	Noun	69
Adjective, adverb, verb	1	Noun, verb	81
Adjective, interjection, noun	1	Verb	24

Referring to the prompt 'Loud,' Figure 19 indicates that the noun (212) was the predominant word class, followed by verbs (106), adjectives (73), adverbs (14), and interjections (3).

Figure 19

*Frequency of word classes in isolation in the prompt 'Loud'*



As shown in Table 34, noun and verb was also the first ranked combination of word classes in the prompt ‘Loud.’ It was followed by the combination adjective, noun, and verb, and adjective and noun, among the ones with the highest frequency of occurrence, similar to the prompt ‘Bright.’

Table 34

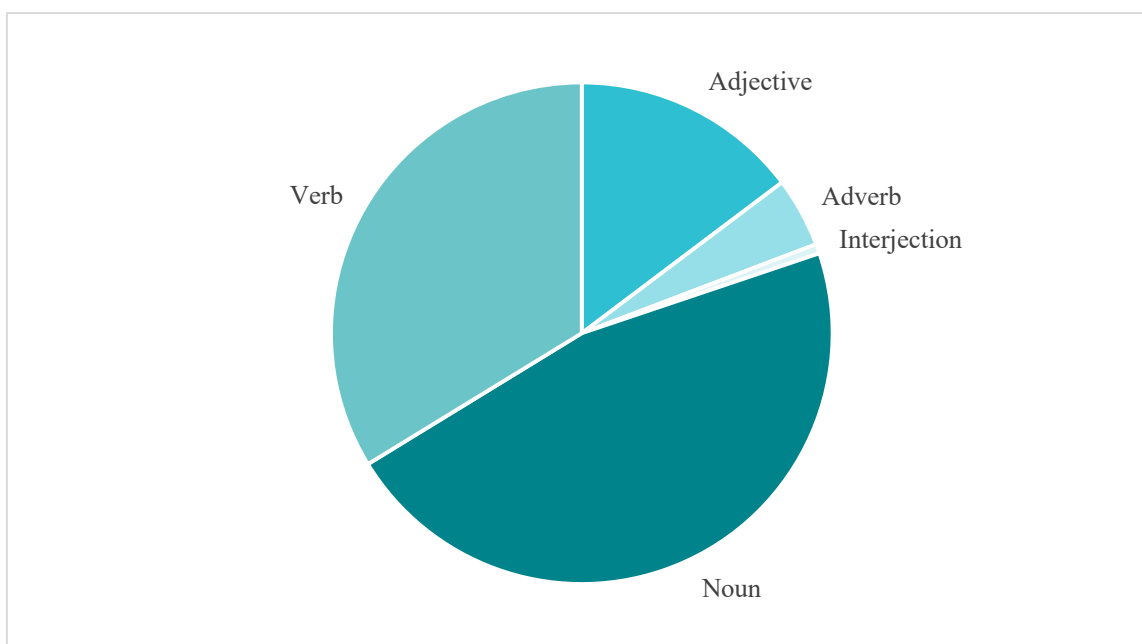
*Frequency of word classes in the prompt ‘Loud’*

Word class	Frequency	Word class	Frequency
Adjective	17	Adverb	3
Adjective, adverb	3	Adverb, interjection, noun, verb	1
Adjective, adverb, noun	4	Interjection, noun	1
Adjective, adverb, noun, verb	3	Interjection, noun, verb	1
Adjective, noun	22	Noun	89
Adjective, noun, verb	23	Noun, verb	68
Adjective, verb	1	Verb	9

Following the same pattern, the noun (227) was the most frequent word class in response to the prompt ‘Move’ (see Figure 20), followed by verbs (165), adjectives (72), adverbs (22), and interjections (3).

Figure 20

*Frequency of word classes in isolation in the prompt ‘Move’*



In the same vein, the results shown in Table 35 reveal that the noun and the verb were also the first ranked combination of word classes in the prompt ‘Move.’ It was followed by the combination adjective, noun, and verb, and adjective and noun, among the ones with the highest frequency of occurrence. A similar pattern was observed in the prompts ‘Bright’ and ‘Loud.’

Table 35

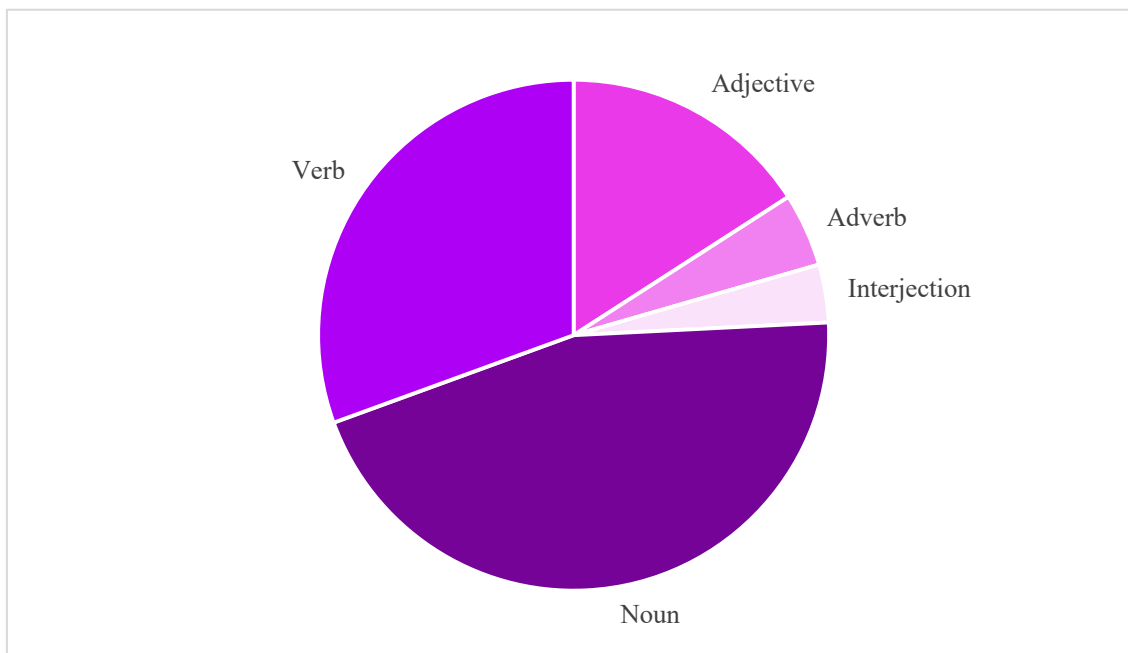
*Frequency of word classes in the prompt ‘Move’*

Word class	Frequency	Word class	Frequency
Adjective	7	Adjective, verb	1
Adjective, adverb	3	Adverb	2
Adjective, adverb, conjunction, noun	1	Adverb, interjection, verb	1
Adjective, adverb, interjection, noun, verb	1	Adverb, noun	2
Adjective, adverb, noun	3	Adverb, noun, verb	1
Adjective, adverb, noun, preposition, verb	1	Interjection, noun, verb	1
Adjective, adverb, noun, verb	5	Noun	62
Adjective, adverb, verb	2	Noun, verb	102
Adjective, noun	22	Verb	24
Adjective, noun, verb	26		

Regarding the prompt ‘Say,’ most of the words produced in response to this prompt were nouns (185), followed by verbs (125), adjectives (65), adverbs (19), and interjections (15) (see Figure 21, p. 176).

Figure 21

Frequency of word classes in isolation in the prompt 'Say'



The prompt 'Say' presents the same pattern observed in previous prompts. Table 36 shows that the noun and the verb were the predominant word class, which was followed by adjective and noun, and adjective, noun, verb, among the most frequent word classes. This also occurred in the prompts 'Hobbies' and 'Look.'

Table 36

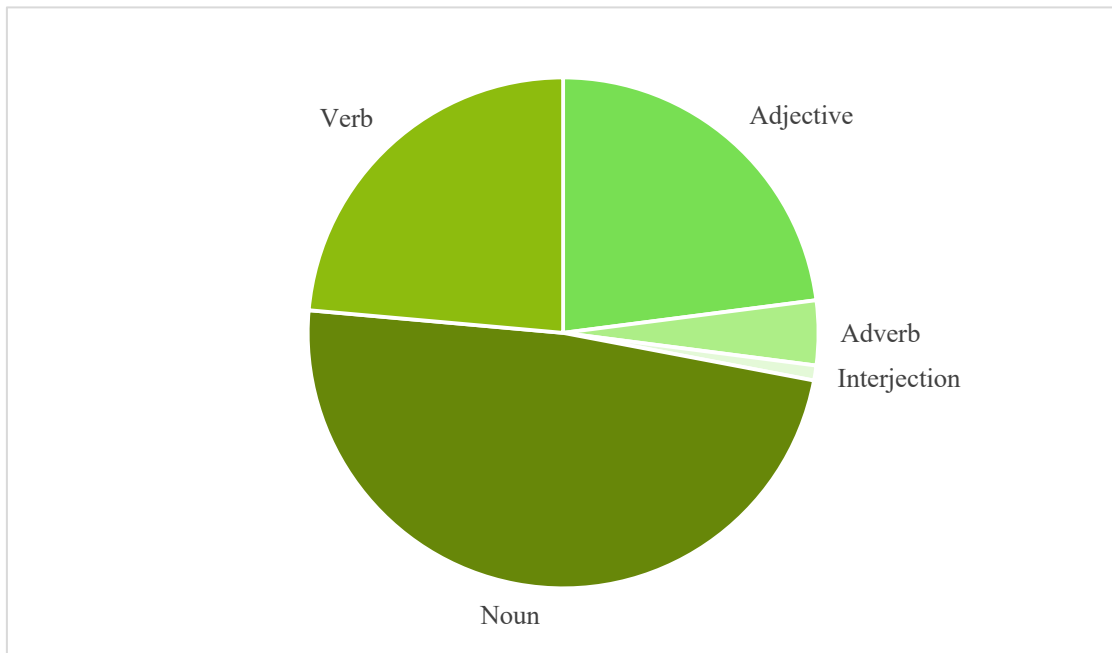
Frequency of word classes in the prompt 'Say'

Word class	Frequency	Word class	Frequency
Adjective	15	Adverb, conjunction	1
Adjective, adverb	2	Adverb, interjection, verb	1
Adjective, adverb, noun	2	Adverb, noun	1
Adjective, adverb, noun, verb	4	Adverb, verb	1
Adjective, adverb, verb	2	Interjection	3
Adjective, interjection, noun, verb	2	Interjection, adverb	1
Adjective, noun	19	Interjection, noun	4
Adjective, noun, preposition	1	Interjection, noun, verb	4
Adjective, noun, verb	15	Noun	68
Adjective, verb	3	Noun, verb	65
Adverb	4	Verb	28

As to the prompt ‘Soft’ and as shown in Figure 22, the noun (154) was the most frequent word class in the classification of word responses to this prompt, followed by verbs (75), adjectives (73), adverbs (13), and interjections (3).

Figure 22

Frequency of word classes in isolation in the prompt ‘Soft’



As can be observed in Table 37, the same pattern is observed concerning the prompt ‘Soft,’ since the combination of noun and verb seemed to be the largest, followed by adjective and noun, and adjective, noun, and verb, among others, as it happened in ‘Hobbies,’ ‘Look,’ and ‘Say.’

Table 37

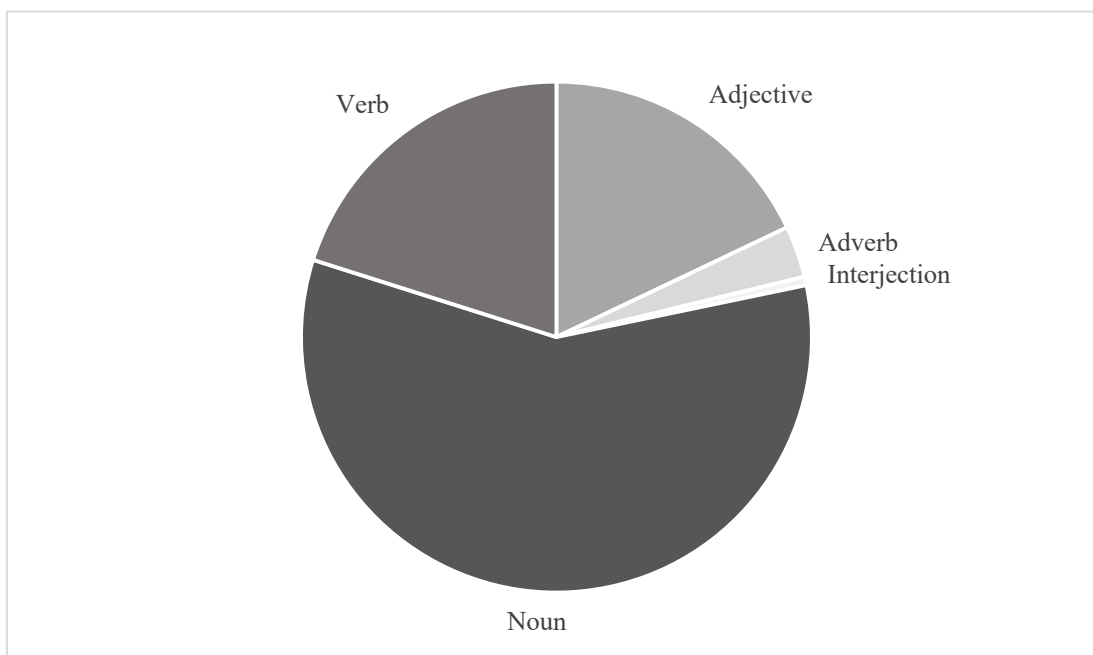
Frequency of word classes in the prompt ‘Soft’

Word class	Frequency	Word class	Frequency
Adjective	12	Adjective, noun	28
Adjective, adverb	2	Adjective, noun, verb	19
Adjective, adverb, interjection, noun, verb	1	Adverb	1
Adjective, adverb, noun	3	Noun	51
Adjective, adverb, noun, verb	4	Noun, verb	46
Adjective, adverb, verb	2	Verb	3
Adjective, interjection, noun	2		

Finally, referring to the prompt ‘Town,’ Figure 23 reveals that the noun (214) was the most frequent word class in which most words could be classified, followed by verbs (74), adjectives (66), adverbs (12), and two occurrences for interjections.

Figure 23

Frequency of word classes in isolation in the prompt ‘Town’



Similarly, the results of Table 38 reveal that the noun and the verb were also the first ranked combination of word classes in the prompt ‘Move.’ It was followed by the combination adjective and noun, and adjective, noun, and verb, among the ones with the highest frequency of occurrence, like the prompts ‘Hobbies,’ ‘Look,’ ‘Say,’ and ‘Soft.’

Table 38

Frequency of word classes in the prompt ‘Town’

Word class	Frequency	Word class	Frequency
Adjective	14	Adjective, noun	24
Adjective, adverb	3	Adjective, noun, verb	16
Adjective, adverb, noun	2	Interjection, noun, verb	2
Adjective, adverb, noun, preposition	1	Noun	116
Adjective, adverb, noun, preposition, verb	1	Noun, verb	48
Adjective, adverb, noun, verb	4	Verb	2
Adjective, adverb, verb	1		



In sum, the same pattern when considering word classes in isolation and their combinations was observed. Nouns were the most retrieved word class, followed by verbs, adjectives, adverbs, and interjections. The combination of the noun and the verb was also the first ranked. Nonetheless, there were differences in the ranking of the combinations adjective and noun, and adjective, noun, and verb, since in some prompts one was ranked before the other or the other way round.

**7.3.2.5. Type of perceptual words.** Let us now turn to the classification of content words into perceptual or non-perceptual. As stated in the Methodology (see Chapter 6, p. 130), for this division we only focused on the perceptual prompts, leaving behind the two traditional prompts ('Hobbies' and 'Town'). It is important to note that for this part related to perceptual words only the number of types retrieved in each perceptual prompt was considered in the analysis. As can be observed in Table 39, the whole perceptual corpus consisted of 1,377 perceptual words and 46 non-perceptual words. In fact, the majority of words retrieved in each prompt were perceptual.

*Table 39*

*Number of perceptual and non-perceptual words per prompt*

Prompt	Perceptual	Non-perceptual
Bright	218	9
Look	253	8
Loud	236	9
Move	259	9
Say	241	6
Soft	170	5

Table 40 (p. 180) displays the number of words related to each style produced in each prompt. Considering all the perceptual prompts, the results revealed that visual words (1,187) were the most frequent ones followed by tactile/kinesthetic (1,066) and auditory (584). This result coincides with the perceptual learning style preferences of the informants commented in the first research question (p. 141). Table 40 indicates that visual words were retrieved more often in response to the visual prompts ('Bright' and 'Look'). The same occurs regarding the prompt 'Move' (tactile/kinesthetic prompt) in which there was a higher number of tactile/kinesthetic words. Nevertheless, this does not occur concerning the prompts 'Loud,' 'Say,' and 'Soft' because the higher number of

words retrieved were not the ones related to the perceptual learning style they represent (see Table 40).

*Table 40*

*Number of perceptual words for each prompt*

Prompt	Visual (sum)*	Auditory (sum)	Tactile/kinesthetic (sum)
Bright	209	65	151
Look	245	83	196
Loud	181	149	161
Move	193	62	233
Say	202	182	171
Soft	157	43	154

*Note.* \*Visual (sum)=Visual+Visual and tactile/kinesthetic+Visual and auditory+Visual, auditory, and tactile/kinesthetic.

As shown in Figure 2 (p. 181), the words produced in response to the six perceptual prompts were multimodal to a great extent. In this case, we classified the words into each learning style in isolation; if the words were a combination of two or three learning styles, they were considered multimodal. Specifically, there were 1,026 multimodal words in the whole corpus of perceptual prompts, followed by visual (188), tactile/kinesthetic (108), and auditory (55) words. In fact, auditory words were only retrieved in the two auditory prompts ('Loud' and 'Say').

Figure 24

Percentages of perceptual words related to each perceptual learning style

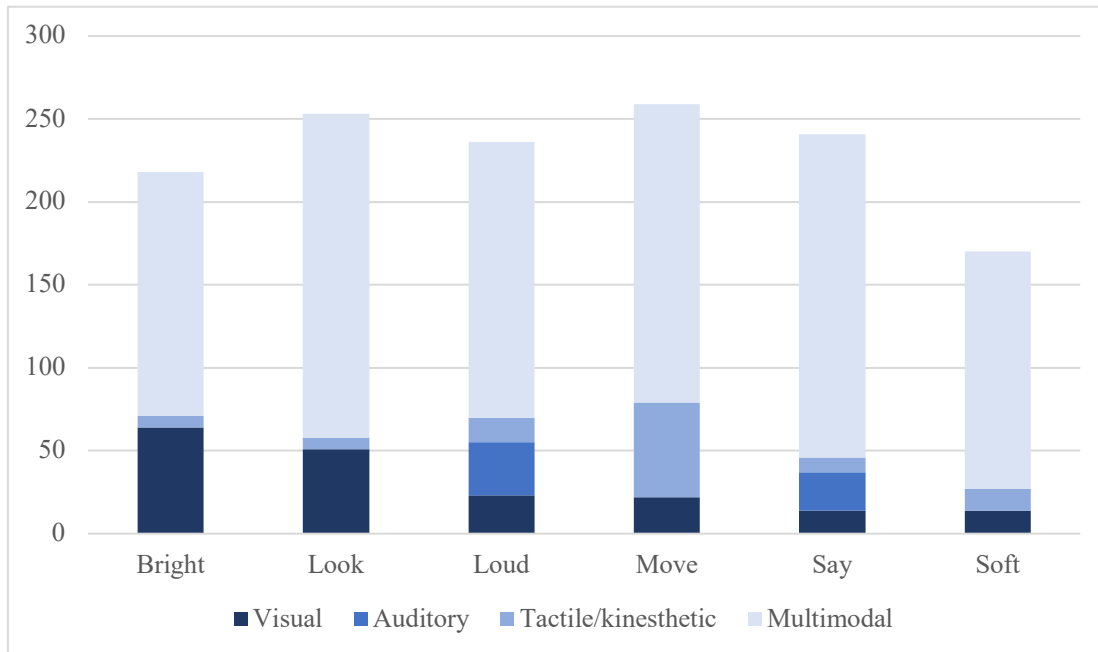


Table 41 displays the different combinations of the multimodal words observed across the six perceptual prompts. As can be observed, visual and tactile/kinesthetic words were retrieved more often in response to perceptual prompts (537), followed by visual, auditory, and tactile/kinesthetic (394), visual and auditory (68), and auditory and tactile/kinesthetic (27) words.

Table 41

Multimodal words per perceptual prompt

Prompt	A, T/K	V, A	V, T/K	V, A, T/K
Bright	2	3	82	60
Look	1	6	112	76
Loud	8	20	89	49
Move	9	4	118	49
Say	7	33	36	119
Soft	0	2	100	41

Note. V stands for visual, A stands for auditory, T/K stands for tactile/kinesthetic.

**7.3.2.6. Relationship among perceptual learning styles and lexical production.** To determine the relationship among perceptual learning styles and lexical production, a Kolmogorov-Smirnov test was applied to the means of the eight prompts to determine whether the dependent variable (lexical production) met the normality assumption. Like the three independent variables (visual, auditory, and tactile/kinesthetic) and the dependent variable (controlled productive vocabulary) analyzed in the first and second research questions, the dependent variable of lexical production also followed a normal distribution ( $p\text{-value}=.200$ ). Although the univariate distribution was normal, this result did not ensure compliance with the requirement of having a normal bivariate distribution. In this case, for the three variables analyzed in this sub-question, the findings for the multivariate normal distribution were favorable ( $p\text{-value}=.8803$ ;  $.7931$ ;  $.8896$ , respectively).

Like controlled productive vocabulary, the data did not adjust to a linear model in any of the three perceptual learning styles and their relation to lexical production (see Table 42). As can be observed in Table 42, the findings suggested the almost non-existent R Square and its high probability of non-linearity ( $>.05$ ).

Table 42

*Linear regression: perceptual learning styles vs. lexical production*

Dependent variable: lexical production	Model Summary				Parameter Estimates		
	R Square	F	df1	df2	Sig.	Constant	b1
Visual	0.016	0.962	1	58	0.331	8.868	0.089
Auditory	0.001	0.044	1	58	0.834	11.365	-0.019
Tactile/kinesthetic	0	0.001	1	58	0.976	10.953	0.002

Figure 25 (p. 183) displays a scatter plot of the relationship among the three perceptual learning styles (visual, auditory, and tactile/kinesthetic) and the average of lexical production of the eight prompts under study. The XY scatter plots allow us to visualize the geometric interpretation of Pearson's correlation coefficient. When the dots or observations occupy all the quadrants, the correlation is considered to be weak or non-existent, as is shown here. The trend line that is drawn in the scatter plots is almost flat and its slope is nearly non-existent. Consequently, as it has been mentioned, the results of the linearity tests could not confirm the existence of a linear relationship either. However, a slightly positive slope, a higher correlation coefficient, and the less negative

or higher lower confidence interval can be observed in the scatter plot of the visual learning style.

Figure 25

Scatter plots relationship among perceptual learning styles and lexical production

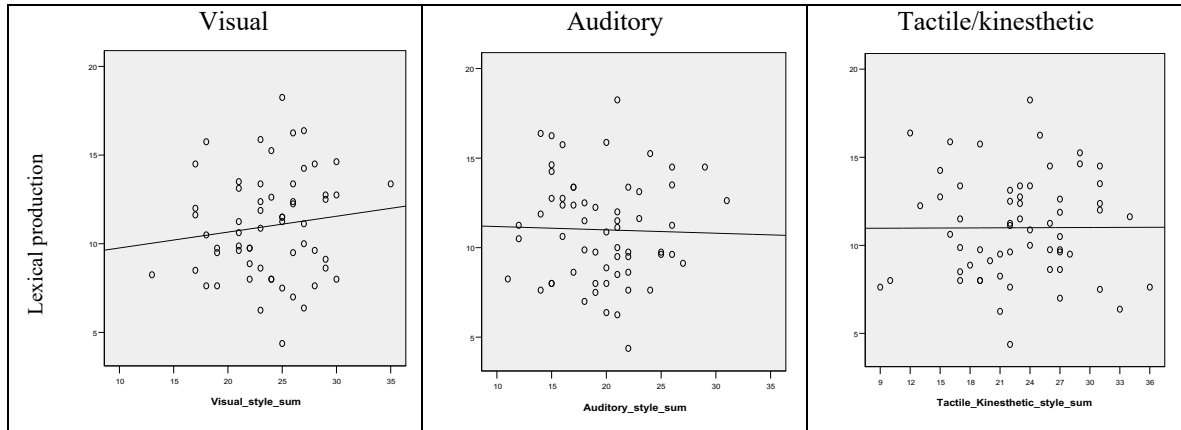


Table 43 shows the correlations regarding the relationship among perceptual learning styles and lexical production (average of the eight prompts). Our results revealed that the Pearson's correlation coefficient was non-statistically significant. In addition, the two limits of the confidence interval had a different sign, that is, they contained the zero value. Therefore, the null hypothesis of the inexistence of a positive non-existent relationship among variables could not be rejected.

Table 43

Correlations relationship among perceptual learning styles and lexical production

Perceptual learning styles	Pearson Correlation	Sig. (1-tailed)	N	Bootstrap <sup>c</sup>			
				Bias	Std. Error	BCa 95% Confidence Interval	
						Lower	Upper
Visual	.128	.165	60	.003	.116	-.097	.360
Auditory	-.028	.417	60	-.012	.121	-.263	.171
Tactile/kinesthetic	.004	.488	60	.000	.139	-.276	.286

Note. c bootstrap results are based on 1000 bootstrap simples.

Following the procedure adopted in the first sub-question, we compared the lexical production among groups of informants classified according to their maximum

score in each perceptual learning style. As can be seen in Table 44, the differences were not statistically significant either.

Table 44

*ANOVA test dichotomic variables: perceptual learning styles and lexical production*

Perceptual learning styles	Mean	Bootstrap <sup>a</sup>				ANOVA F Sig.
		Bias	Std. Error	BCa 95% Confidence Interval		
				Lower	Upper	
Visual	11.31	-.013	.482	10.354	12.228	.241
Others	10.37	-.036	.550	9.420	11.352	
Auditory	10.31	-.031	.609	9.206	11.479	.295
Others	11.23	-.015	.454	10.383	12.128	
Tactile/kinesthetic	11.09	-.021	.502	10.169	12.030	.778
Others	10.88	-.015	.538	9.838	11.830	
Multimodal	11.3	-.025	.642	10.176	12.411	.534
Others	10.81	-.014	.453	9.935	11.691	

*Note.* a bootstrap results are based on 1000 bootstrap samples.

Similar findings were obtained using one classification in which each informant was classified into their highest single modality or mixed-modalities (see Table 45). In this table, a) bootstrap results are based on 1,000 bootstrap samples and b) on 956 samples. The differences observed were small and the results of the ANOVA test appeared to be non-significant. This means that the null hypothesis in which the lexical production is equal in the four modalities (visual, auditory, tactile/kinesthetic, and multimodal) could not be rejected.

Table 45

*ANOVA test relationship perceptual learning styles and lexical production*

Perceptual learning styles	Mean	Bootstrap <sup>a</sup>				ANOVA F Sig.
		Bias	Std. Error	BCa 95% Confidence Interval		
				Lower	Upper	
Visual	11.14	-.016	.643	9.915	12.306	.802
Auditory	10.25	-.04126 <sup>b</sup>	1.15 <sup>b</sup>	8.5 <sup>b,c</sup>	12.63 <sup>b</sup>	
Tactile/kinesthetic	10.40	-.023	.722	9.072	11.750	
Multimodal	11.30	-.025	.642	10.176	12.411	

Finally, a higher production of words related to one of the perceptual learning styles could be expected to be higher if there was a preference for that style. Nevertheless, Table 46 shows that this was not the case in any of the prompts related to the perceptual learning styles. It is important to precise here that we did not consider the prompts ‘Hobbies’ and ‘Town’ for this relationship because they are not related to a specific perceptual learning style (see Chapter 6, p. 130, for an explanation).

Table 46

*Bivariate correlations perceptual learning styles vs. perceptual prompts*

Prompts	Pearson Correlation	Sig. (1-tailed)	N	Bootstrap <sup>c</sup>			
				Bias	Std. Error	BCa 95% Confidence Interval	
						Lower	Upper
LOOK	.002	.493	60	.007	.115	-.251	.251
BRIGHT	.130	.161	60	-.001	.115	-.078	.345
LOOK+BRIGHT	.087	.255	60	.006	.107	-.132	.300
SAY	.030	.410	60	-.015	.126	-.187	.226
LOUD	.061	.320	60	-.016	.134	-.189	.263
SAY+LOUD	.055	.339	60	-.018	.131	-.167	.240
MOVE	.043	.373	60	-.004	.147	-.247	.312
SOFT	.108	.205	60	.007	.138	-.163	.392
MOVE+SOFT	.099	.225	60	.002	.149	-.201	.385

All in all, ‘Hobbies’ appeared to be the most productive prompt, followed by ‘Town,’ ‘Move,’ ‘Say,’ ‘Loud,’ ‘Look,’ ‘Bright,’ and ‘Soft.’ Concerning the type of prompts, traditional prompts were the most productive. They were followed by auditory, visual, and tactile/kinesthetic group of prompts. Regarding the frequency levels of word types and word families, many of the elicited words pertained to the 1K band, whilst words that belonged to the AWL list were the least ranked. Nouns were considered the most retrieved word class in the lexical availability task as well as in the rest of the prompts, followed by verbs, adjectives, and adverbs. In fact, the combination of noun and verb was the most common. Most of the words elicited were perceptual, specifically visual words, followed by tactile/kinesthetic and auditory. Nevertheless, when considering multimodal words, they predominated over the three other styles. The combination of visual and tactile/kinesthetic was the first ranked, followed by the three styles in balance, visual and auditory, auditory and tactile/kinesthetic. Finally, a statistically significant relationship among perceptual learning styles and lexical

production was not found. A higher production of words related to a specific learning style was not found either.

In sum, findings for the second research question revealed that there was not a statistically significant relationship among perceptual learning styles and the two dimensions of vocabulary under study in the present dissertation: controlled productive vocabulary knowledge and lexical production through a lexical availability task composed of eight prompts ('Look,' 'Town,' 'Move,' 'Say,' 'Hobbies,' 'Soft,' 'Loud,' and 'Bright'). Finally, it is worth noting that throughout these analyses we found a linear, direct, and positive relationship between the two dimensions of productive vocabulary: controlled productive vocabulary and lexical production/association.

#### **7.4. Representation of perceptual learning styles in ELT textbooks**

The third research question is divided into two specific sub-questions which discuss the representation of perceptual learning styles in ELT textbooks in terms of perceptual words and perceptual activities. We will report the number and type of content words related to each perceptual learning style. We will also provide the number and type of activities associated with each perceptual learning style included in ELT textbooks.

##### **7.4.1. Content words related to each perceptual learning style in ELT textbooks**

The first sub-question explored the number and type of content words related to each perceptual learning style included in the two ELT textbooks (*English File* and *Out & About 2*). First, we will calculate the number of tokens, types, and type/token ratio of both textbooks. Second, we will present the 50 most frequent words of the two ELT textbooks. Then, we will classify word types and word families according to their frequency levels. We will also focus on the word classes of the content words contained in the textbooks. Afterwards, we will divide words into perceptual and non-perceptual and we will identify the type of perceptual words (visual, auditory, tactile/kinesthetic, or multimodal). We will also analyze the perceptual learning style preferences of the informants according to the program of English in which they were enrolled (OSL and ECS). Finally, we will determine whether the most preferred modality of the informants (considering their English instructional program) concords with the most representative style in terms of perceptual words in both ELT textbooks.

As explained in Chapter 6 (p. 125), there were two ELT textbooks analyzed in the present dissertation. *English File* was used for students who were enrolled in a



Collaboration Program with the Official School of Languages (OSL); *Out & About 2* was used by students who were enrolled in English as a curricular subject (ECS). The *English File* textbook consisted of 34,223 tokens and 4,251 types. Its type/token ratio was of 12.42. On the other hand, *Out & About 2* comprised 27,788 tokens and 3,501 types. Its type/token ratio was of 12.60. The difference in the number of tokens and types between both ELT textbooks is not surprising because *English File* had more pages than *Out & About 2* (167 vs. 136).

Before focusing on word frequency levels, let us first look at the 50 most frequent words included in each ELT textbook (see Table 47 in p. 188 and Table 48 in p.189). As can be observed in Tables 47 and 48, both textbooks coincided with the first and the tenth most frequent words (be and verb, respectively) out of the 50 analyzed. In fact, 33 out of the 50 most frequent words were shared in both textbooks. The words in *English File* that did not correspond with the 50 most frequent ones contained in *Out & About 2* were the following: try, now, were, listen to, look at, noun, said, happen, wish, phrase, adjective, article, person, need, feel, part, and film. The words included in *Out & About 2* that were not among the 50 most frequent ones in *English File* were the following: unit, write, text, language, form, exercise, exam, box, business, new, tip, choose, problem, writing, idea, eat, and give.

Table 47

*50 most frequent words included in English File*

Rank	Word	Frequency (%)	Rank	Word	Frequency (%)
1	BE	1336 (3.90)	26	LISTENTO	117 (0.34)
2	PEOPLE	356 (1.04)	27	LOOKAT	114 (0.33)
3	USE	352 (1.03)	28	PARTNER	113 (0.33)
4	WAS	331 (0.97)	29	NOUN	107 (0.31)
5	THINK	308 (0.90)	30	WORK	106 (0.31)
6	HAVE	275 (0.80)	31	STORY	105 (0.31)
7	SAY	254 (0.74)	32	SAID	105 (0.31)
8	WORD	237 (0.69)	33	HAPPEN	102 (0.30)
9	READ	215 (0.63)	34	WISH	101 (0.30)
10	VERB	208 (0.61)	35	GOOD	101 (0.30)
11	DO	202 (0.59)	36	PHRASE	100 (0.29)
12	ONE	179 (0.52)	37	ASK	97 (0.28)
13	THEREBE	176 (0.51)	38	ADJECTIVE	95 (0.28)
14	QUESTION	170 (0.50)	39	WANT	94 (0.27)
15	SENTENCE	169 (0.49)	40	ARTICLE	94 (0.27)
16	LISTEN	158 (0.46)	41	SEE	91 (0.27)
17	MAKE	143 (0.42)	42	PERSON	88 (0.26)
18	TWO	138 (0.40)	43	NEED	88 (0.26)
19	TRY	133 (0.39)	44	FEEL	88 (0.26)
20	ANSWER	132 (0.39)	45	PART	85 (0.25)
21	TIME	130 (0.38)	46	GET	84 (0.25)
22	LIKE	126 (0.37)	47	FIRST	84 (0.25)
23	COMPLETE	122 (0.36)	48	FILM	83 (0.24)
24	NOW	120 (0.35)	49	TALKABOUT	81 (0.24)
25	WERE	119 (0.35)	50	START	80 (0.23)

Table 48

50 most frequent words included in *Out & About 2*

Rank	Word	Frequency (%)	Rank	Word	Frequency (%)
1	BE	1103 (3.97)	26	THEREBE	117 (0.42)
2	USE	465 (1.67)	27	LANGUAGE	109 (0.39)
3	WORD	281 (1.01)	28	FORM	107 (0.39)
4	PEOPLE	213 (0.77)	29	EXERCISE	107 (0.39)
5	SENTENCE	205 (0.74)	30	EXAM	104 (0.37)
6	DO	199 (0.72)	31	BOX	104 (0.37)
7	QUESTION	196 (0.71)	32	LIKE	103 (0.37)
8	WAS	179 (0.64)	33	GET	99 (0.36)
9	HAVE	174 (0.63)	34	BUSINESS	96 (0.35)
10	VERB	165 (0.59)	35	NEW	90 (0.32)
11	ANSWER	157 (0.56)	36	WORK	89 (0.32)
12	READ	155 (0.56)	37	WANT	88 (0.32)
13	MAKE	152 (0.55)	38	TIP	86 (0.31)
14	TIME	149 (0.54)	39	ASK	83 (0.30)
15	ONE	149 (0.54)	40	CHOOSE	81 (0.29)
16	UNIT	148 (0.53)	41	TALKABOUT	80 (0.29)
17	PARTNER	147 (0.53)	42	PROBLEM	80 (0.29)
18	WRITE	143 (0.51)	43	FIRST	80 (0.29)
19	THINK	135 (0.49)	44	WRITING	78 (0.28)
20	SAY	134 (0.48)	45	START	78 (0.28)
21	STORY	131 (0.47)	46	IDEA	78 (0.28)
22	TEXT	125 (0.45)	47	EAT	75 (0.27)
23	GOOD	121 (0.44)	48	TWO	74 (0.27)
24	SEE	120 (0.43)	49	LISTEN	74 (0.27)
25	COMPLETE	119 (0.43)	50	GIVE	74 (0.27)

Let us now move onto the frequency level of the words included in the two ELT textbooks. As can be observed in Figure 26 (p. 190), 25.85 per cent of the words contained in *English File* belonged to the 1K band, 18.14 per cent to the 2K band, 8.66 per cent to the AWL list, and 45.35 per cent were off-list words. Regarding *Out & About 2*, 61.85 per cent of the total number of content words pertained to the 1K band, 13.75 per cent to the 2K band, 7.56 per cent to the AWL list, and 16.84 per cent were off-list words. Therefore, *English File* included more words related to the 2K band, AWL list, and off-list words (almost half of the total number of words) than *Out & About 2*. More than half of the words contained in *Out & About 2* belonged to the 1K band, surpassing the number of words in *English File* related to this frequency level.

Figure 26

Percentage of total words per frequency level in each textbook

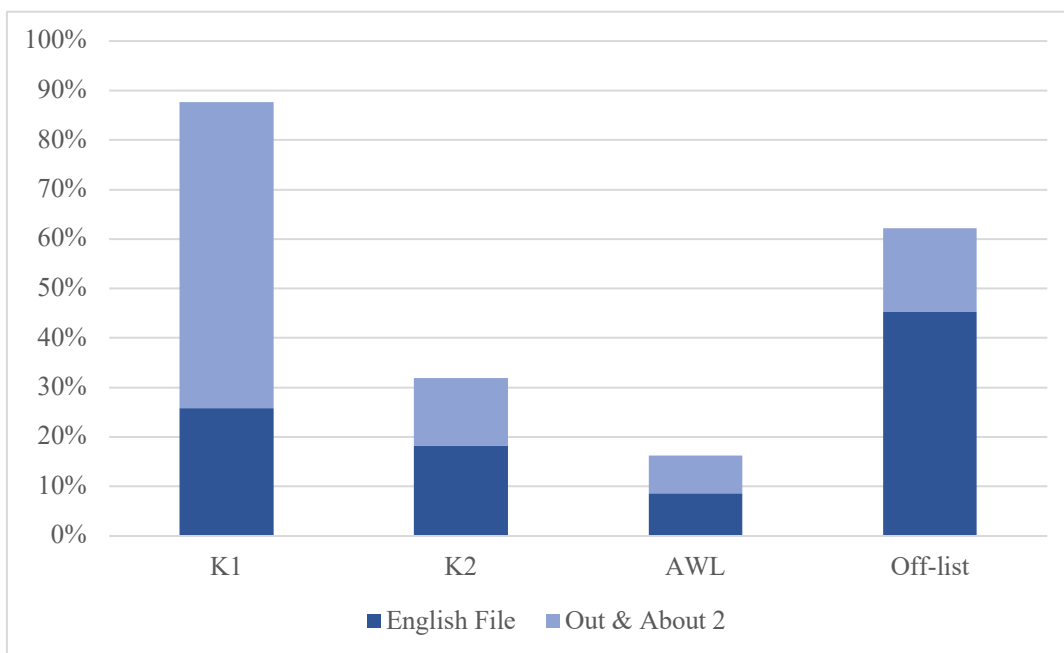
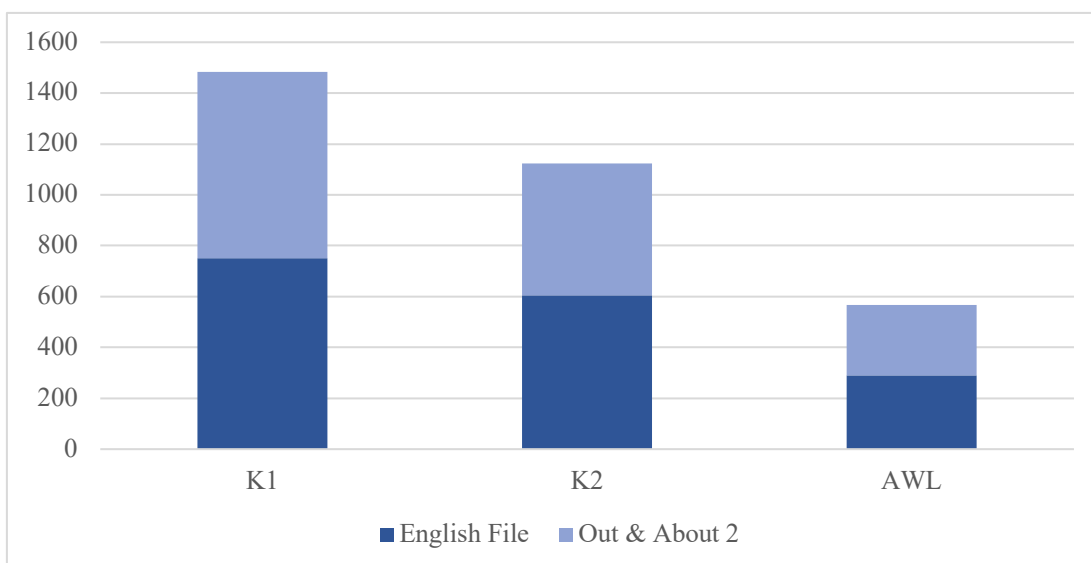


Figure 27 shows the number of word families per frequency level for each textbook. The Off-list level was not included in the figure because it was not reported in any textbook. As can be observed, there were more word families related to each frequency level in *English File*: 1K band (752 vs. 731), 2K band (606 vs. 517), and AWL list (289 vs. 277).

Figure 27

Number of word families per frequency level in each textbook

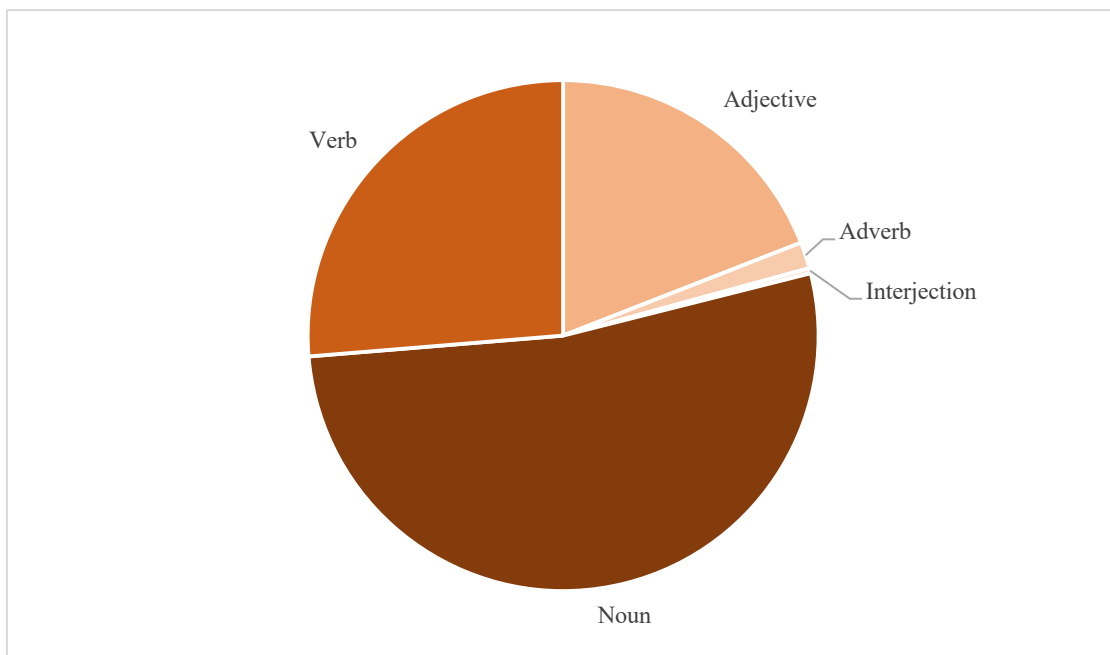


Moving onto the type of content words included in both ELT textbooks, we analyzed the word class of each word type included in both textbooks. First, we considered the frequency of occurrence of adjectives, adverbs, interjections, nouns, and verbs (see Figure 28 and Figure 29 in p. 192). In other words, we only included the total number of occurrences of a given word class. Afterwards, we focused on the combinations of word classes and on the word classes in their own if they only functioned as such (see Table 49 in p. 192 and Table 50 in p. 193).

Concerning the textbook *English File* (see Figure 28), noun (2,547) was the largest word class included by far, followed by verbs (1,272), adjectives (923), adverbs (81), and interjections (16).

Figure 28

*Frequency of word classes in isolation in English File*



Considering the combinations of word classes in *English File*, the results indicated that the combination of noun and verb had the highest frequency, followed by adjective and noun, adjective and adverb, adjective and verb, among the highest (see Table 49, p. 191).

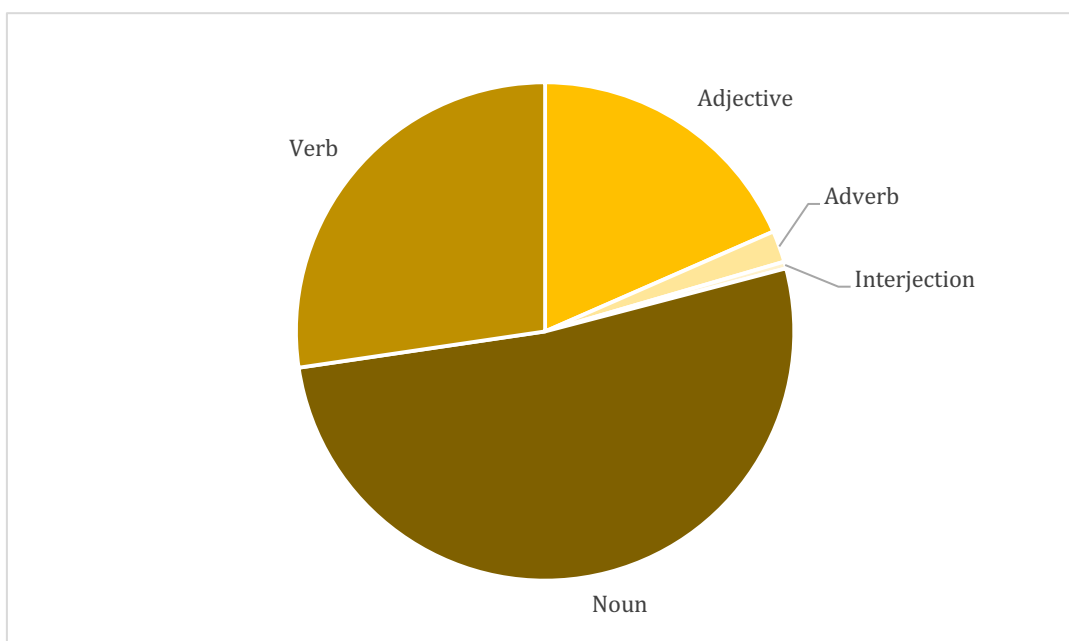
Table 49

## Frequency of word classes in English File

Word class	Frequency	Word class	Frequency
Adjective	720	Adverb, determiner, interjection, noun	1
Adjective, adverb	31	Adverb, interjection	1
Adjective, adverb, interjection, noun	2	Adverb, noun	1
Adjective, adverb, noun	9	Adverb, noun, preposition	1
Adjective, adverb, noun, preposition	1	Adverb, noun, verb	1
Adjective, adverb, noun, verb	2	Adverb, preposition	2
Adjective, adverb, preposition	2	Interjection	9
Adjective, adverb, verb	2	Interjection, noun	1
Adjective, interjection	2	Noun	2,057
Adjective, noun	113	Noun, verb	346
Adjective, noun, verb	12	Preposition	1
Adjective, verb	27	Preposition, verb	1
Adverb	25	Verb	881

As far as *Out & About 2* is concerned, Figure 29 reveals that noun (1,997) was the word class in which most words could be classified, followed by verbs (1,054), adjectives (711), adverbs (79), and interjections (17). Both ELT textbooks showed the same pattern regarding word classes in isolation. Notwithstanding, *English File* exceeded *Out & About 2* in the number of every word class, except for interjection.

Figure 29

Frequency of word classes in isolation in *Out & About 2*

Similarly, the results of Table 50 reveal that noun and verb was also the first ranked combination of word classes in *Out & About 2*. It was succeeded by the combination adjective and noun, adjective and adverb, adjective and verb, among the ones with the highest frequency of occurrence. The results mirror the ones obtained in *English File*.

Table 50

*Frequency of word classes in Out & About 2*

Word class	Frequency	Word class	Frequency
Adjective	563	Adverb, interjection, noun	1
Adjective, adverb	21	Adverb, noun	4
Adjective, adverb, interjection	1	Adverb, noun, verb	1
Adjective, adverb, noun	1	Adverb, preposition	2
Adjective, adverb, noun, preposition	2	Interjection	10
Adjective, adverb, preposition	1	Interjection, noun	1
Adjective, adverb, verb	2	Interjection, verb	1
Adjective, interjection	2	Noun	1,680
Adjective, noun	93	Noun, preposition, verb	1
Adjective, noun, verb	6	Noun, verb	207
Adjective, verb	19	Preposition	3
Adverb	42	Verb	836
Adverb, determiner, interjection	1		

We now move on to the classification of content words into perceptual or non-perceptual. It is important to note that for this part related to perceptual words only the number of types included in each textbook was considered in the analysis. As already mentioned, *English File* consisted of 3,845 perceptual words and 406 non-perceptual words. *Out & About 2* comprised 3,240 perceptual words and 261 non-perceptual words. Therefore, the former textbook surpassed the latter one in the number of both perceptual and non-perceptual words.

Table 51 (p. 193) displays all the word types included in both textbooks considering each perceptual learning style in isolation. As can be observed in Table 51, both textbooks present a similar distribution of perceptual and non-perceptual words. There appeared to be a higher representation of tactile/kinesthetic words in the two textbooks. It was followed by visual, multimodal, and auditory words, being non-perceptual the least represented. It is worth noting that if we consider the words classified

into two or three perceptual learning styles under the category of multimodal, the percentage of words was 60 per cent in *English File* and 63 per cent in *Out & About 2*.

Table 51

Number and percentage of perceptual words in isolation per textbook

Perceptual learning style (sum)*	<i>English File</i>		<i>Out &amp; About 2</i>	
Tactile/kinesthetic	3,380	80%	2,853	81%
Visual*	2,712	64%	2,318	66%
Auditory	1,390	33%	1,148	33%
Non perceptual	406	10%	261	7%
Multimodal**	2,552	60%	2,196	63%
Total words	4,251	100%	3,501	100%

Note.\*Visual (sum)=Visual+Visual, tactile/kinesthetic+Visual, auditory+Visual, auditory, tactile/kinesthetic.

\*\*Multimodal=Visual,tactile/kinesthetic+Auditory, tactile/kinesthetic+Visual, auditory+Visual, auditory, tactile/kinesthetic.

Table 52 (p. 195) shows the number and percentage of words classified into perceptual learning styles, considering their combinations, included in *English File* and *Out & About 2*. Both textbooks coincided in their representation of perceptual and non-perceptual words. As indicated in Table 52, the most frequent perceptual word was the combination of visual and tactile/kinesthetic. This occurs in both textbooks with very similar percentages. The combination of visual, auditory, and tactile/kinesthetic was the following most represented perceptual word category in the two textbooks, followed by tactile/kinesthetic, visual, auditory and tactile/kinesthetic, visual and auditory, auditory, and non-perceptual words (see Figure 30 for a visual representation of perceptual and non-perceptual words in both textbooks, p. 195).



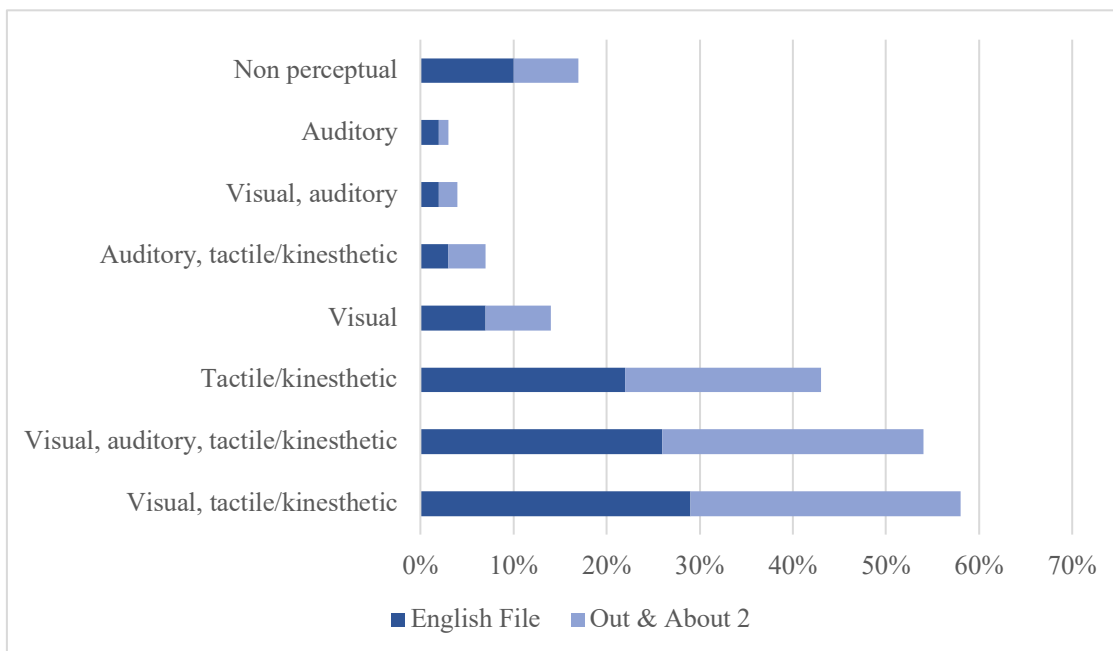
Table 52

Total number of perceptual and non-perceptual words per textbook

Perceptual learning style	<i>English File</i>		<i>Out &amp; About 2</i>	
Visual, tactile/kinesthetic	1,226	29%	1,008	29%
Visual, auditory, tactile/kinesthetic	1,085	26%	969	28%
Tactile/kinesthetic	930	22%	743	21%
Visual	299	7%	255	7%
Auditory, tactile/kinesthetic	139	3%	133	4%
Visual, auditory	102	2%	86	2%
Auditory	64	2%	46	1%
Non perceptual	406	10%	261	7%
Total words	4,251	100%	3,501	100%

Figure 30

Percentage of perceptual and non-perceptual words included in both textbooks



As commented in Chapter 6 (p. 119) and at the beginning of this first sub-question within the third research question, informants were enrolled in two different English instructional programs: a Collaboration Program with the Official School of Languages (OSL) and English as a curricular subject (ECS). In the first research question (see Section 7.2., p. 141), we accounted for the perceptual learning style preferences of the whole sample of informants without considering the English instructional program in which they were enrolled. Figure 31 (p. 196) illustrates the perceptual learning style

preferences of the informants, considering combinations, according to their English instructional program (OSL and ECS).

As shown in this figure, visual was the major perceptual learning style preference in both English instructional programs. Regarding OSL, it was followed by visual and tactile/kinesthetic, visual, auditory, and tactile/kinesthetic, a tie between tactile/kinesthetic and auditory and tactile/kinesthetic, and another tie between auditory and visual and auditory. In the ECS program, the second most favored perceptual learning style was tactile/kinesthetic, followed by a tie between visual and tactile/kinesthetic, and auditory and tactile/kinesthetic, auditory, and another tie between visual, auditory, and tactile/kinesthetic, and visual and auditory.

Figure 31

Perceptual learning style preferences per English instructional program

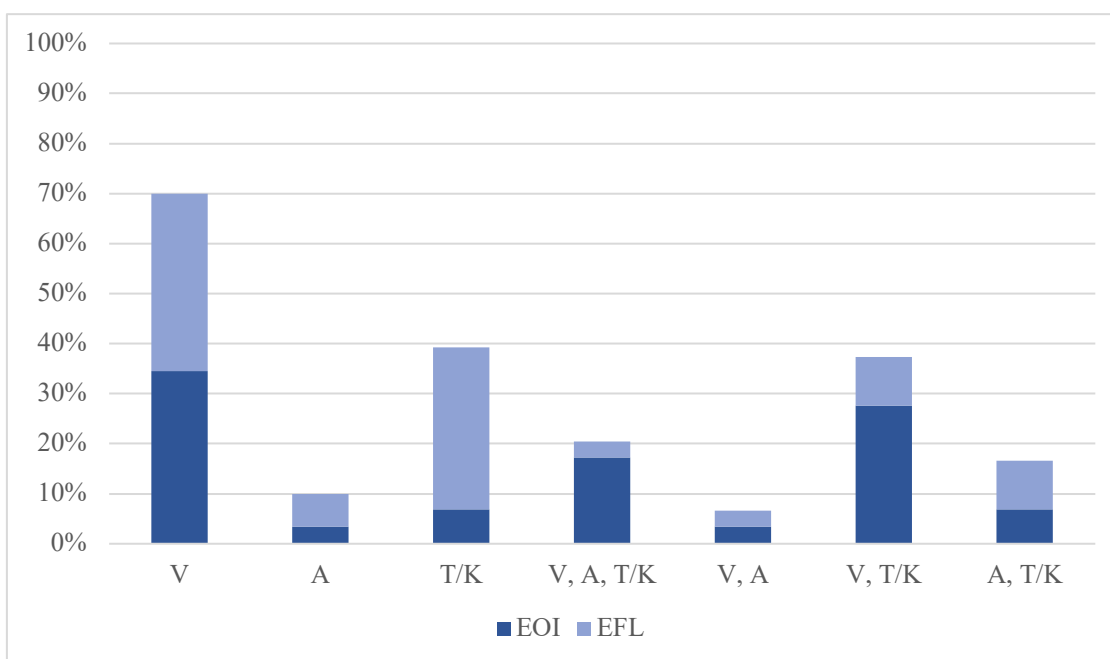


Table 53 (p. 197) displays the distribution of perceptual words in the two textbooks, the perceptual learning style preferences in isolation according to each English instructional program (OSL and ECS), and the difference between perceptual learning style preferences of the informants and the distribution of perceptual words in both textbooks. Note that for the percentage of perceptual words in the textbooks we considered the number of perceptual words as the total amount of words (3,845 for *English File*; 3,240 for *Out & About 2*). Moreover, we only considered the perceptual

learning styles in isolation; in other words, the frequency of occurrence of a given style whether it was part of a combination of other styles or as its own. As can be observed in Table 53, the percentage of perceptual words included in *English File* and *Out & About 2* is practically the same. Tactile/kinesthetic words prevailed in both textbooks, followed by visual, multimodal, and auditory words. Nevertheless, the perceptual learning style preferences of the informants enrolled in OSL and ECS did not coincide. In the OSL program, visual seemed to be the most favored learning style, followed by tactile/kinesthetic, multimodal, and auditory. On the other hand, tactile/kinesthetic appeared to be their major preference, followed by visual, multimodal, and auditory. All in all, the informants of the OSL program appeared to have more perceptual learning style preferences than the students in the ECS program.

Table 53

Percentage of perceptual words, perceptual learning styles, and their difference

Perceptual learning style	Perceptual words		Informants' perceptual learning styles		DIF Style - Word	
	<i>English File</i> (EF)	<i>Out &amp; About 2</i> (OA)	OSL	ECS	DIF	DIF
					OSL-EF	ECS-OA
Visual (sum)*	71%	72%	82.80%	51.61%	11.80%	20.39%
Tactile/kinesthetic (sum)	88%	88%	58.62%	54.84%	33.16%	33.16%
Auditory (sum)	36%	35%	31.03%	22.58%	4.97%	12.42%
Multimodal**	66%	68%	55.17%	25.81%	10.83%	42.19%

Note.\*Visual (sum)=Visual+Visual, tactile/kinesthetic+Visual, auditory+Visual, auditory, tactile/kinesthetic.

\*\*Multimodal=Visual, tactile/kinesthetic+Auditory, tactile/kinesthetic+Visual, auditory, tactile/kinesthetic+Visual, auditory.

The degree of adaptation of the textbooks to the perceptual learning style preferences (or vice versa) depends on the distribution of the learning style preferences of informants (OSL and ECS). Through the difference between the percentage of perceptual learning style preferences and the percentage of perceptual words included in the textbooks (see Table 53), it can be implied that the textbook *English File* adapted better to the informants enrolled in the OSL program than *Out & About 2* to our informants of the ECS program. On another note, findings suggested that the students of the OSL program had a larger productive vocabulary knowledge in the both dimensions

under study in the present dissertation (controlled productive vocabulary and lexical production/association) than the informants of the ECS program.

In sum, *English File* had more types and tokens than *Out & About 2*. However, 33 out of the 50 most frequent words presented were shared between textbooks, coinciding in the first and tenth position. Regarding the frequency level, *English File* contained more off-list word types, followed by 1K, 2K and AWL list words. *Out & About 2* included more 1K word types, followed by off-list, 2K and AWL list words. Both textbooks coincided with the word families ranked according to their frequency levels: 1K succeeded by 2K and AWL list. Moreover, they agreed with the most representative word class which was the noun, followed by adjectives, adverbs, and interjections. Noun and verb were the predominant word class when considering combinations of word classes. There were more perceptual than non-perceptual words in both textbooks, although *English File* surpassed *Out & About 2* in the number of them. They agreed with the higher number of tactile/kinesthetic words, followed by visual, multimodal, and auditory words. Visual and tactile/kinesthetic words were the most ranked when considering multimodality. Visual was reported to be the major preference of OSL informants, followed by tactile/kinesthetic, multimodal, and auditory. For the ECS group, tactile/kinesthetic was their most favored modality, followed by visual, multimodal, and auditory. *English File* was proved to be the textbook which adapted better to the perceptual learning styles of OSL informants. However, the percentage of perceptual words in both textbooks was practically the same.

#### **7.4.2. Activities related to each perceptual learning style in ELT textbooks**

The second sub-question aimed at identifying the number and type of perceptual activities included in the two ELT textbooks (*English File* and *Out & About 2*). First, we will report the total number of perceptual activities contained in both textbooks. Second, we will classify those activities according to the perceptual learning style to which they refer. We will make a comparison between both textbooks concerning the total number of activities and their types. We will also count the number of visual aids included in each textbook. Finally, we will consider whether the preferred perceptual learning styles of the informants enrolled in the two English instructional programs (OSL and ECS) coincide with the most representative perceptual activities in ELT textbooks.

The textbook *English File* included more perceptual activities than *Out & About 2*. Table 54 (p. 199) shows the number and percentage of activities classified into the

different perceptual learning styles in both ELT textbooks. For this classification, we considered the perceptual learning styles in isolation; in other words, regarding visual, we summed all the activities which were classified under this category even if they were multimodal.

Table 54 reveals that visual activities predominated in both textbooks. In *English File*, auditory activities were the second most frequent, followed by multimodal. However, there appeared to be no activities classified under the modality tactile/kinesthetic. Concerning *Out & About 2*, multimodal activities were ranked the second, followed by auditory and tactile/kinesthetic activities. Therefore, the distribution of perceptual activities in both ELT textbooks differed in their second and third most frequent activities, being visual and tactile/kinesthetic the most and least representative respectively in both textbooks.

Table 54

Number and percentage of perceptual activities per textbook (sum of perceptual learning style)

Perceptual learning style (sum)	<i>English File</i>		<i>Out &amp; About 2</i>	
Visual*	786	98.74%	634	98.60%
Auditory	418	52.51%	243	37.79%
Tactile/kinesthetic	203	0%	159	24.73%
Multimodal**	415	52.14%	248	38.57%
Total	796	100%	643	100%

Note.\*Visual (sum)=Visual+Visual, tactile/kinesthetic+Visual, auditory+Visual, auditory, tactile/kinesthetic.

\*\*Multimodal=Visual, tactile/kinesthetic+Auditory, tactile/kinesthetic+Visual, auditory, tactile/kinesthetic+Visual, auditory.

Table 55 (p. 200) shows the number and percentage of activities classified into their corresponding perceptual learning styles that were found in *English File* and *Out & About 2*. The most frequent perceptual activity is visual in both ELT textbooks. Nonetheless, they differed in the percentage of distribution of this specific perceptual activity (see Table 55). Regarding the *English File* textbook, visual and auditory activities were the second most predominant, followed by visual, auditory, and tactile/kinesthetic, auditory, and visual and tactile/kinesthetic. There did not seem to be any activities classified under the modalities tactile/kinesthetic, and auditory and tactile/kinesthetic. The second most frequent perceptual activity in the *Out & About 2* textbook was visual,

auditory, and tactile/kinesthetic. It was followed by visual and auditory, tactile/kinesthetic, and visual and tactile/kinesthetic activities. In this case, there did not appear to be any activities classified into the modality of auditory, and auditory and tactile/kinesthetic (see Figure 32 for a visual representation of the representation of perceptual activities in both textbooks).

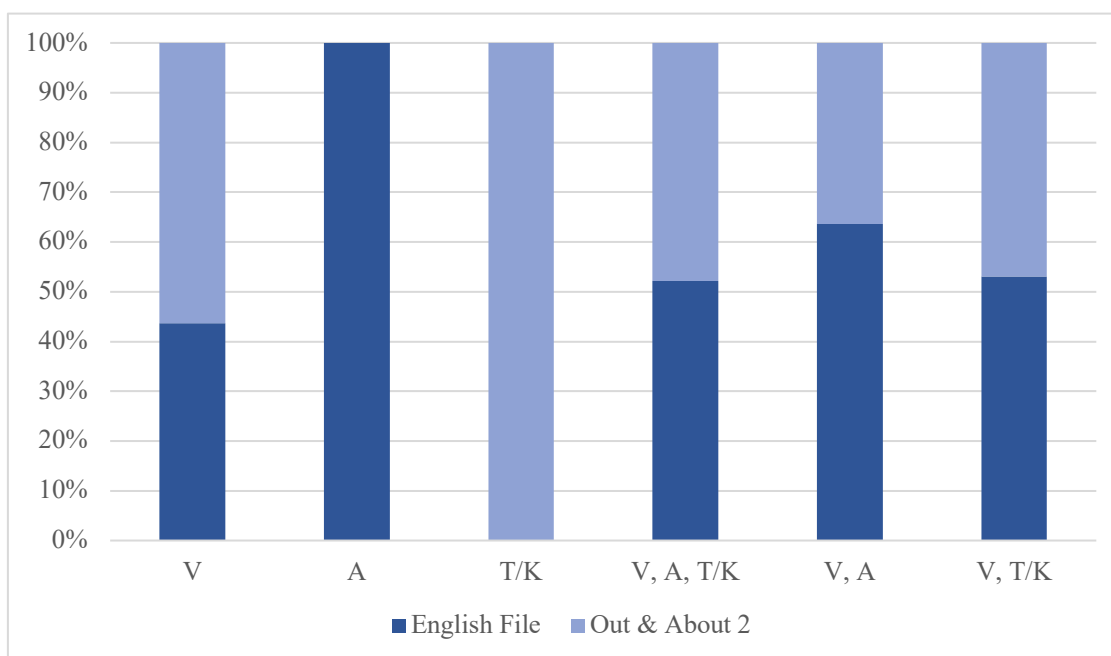
Table 55

Number and percentage of perceptual activities per textbook

Perceptual learning style	<i>English File</i>		<i>Out &amp; About 2</i>	
Visual	371	46.60%	386	60.03%
Auditory	10	1.26%	0	0%
Tactile/kinesthetic	0	0%	9	1.40%
Visual, auditory, tactile/kinesthetic	196	24.63%	145	22.55%
Visual, auditory	212	26.63%	98	15.24%
Visual, tactile/kinesthetic	7	0.88%	5	0.78%
Auditory, tactile/kinesthetic	0	0%	0	0%

Figure 32

Percentage of perceptual activities included in both textbooks



A common tendency in the two ELT textbooks is the inclusion of a high number of visual aids, such as the following: images, pictures, drawings, tables, highlighted sections, charts, different fonts, shapes, and many different colors. Figures 33 (p. 201)

and 34 (p. 202) illustrate the distribution of the main visual aids used in both textbooks. As can be observed, the number of images nearly covers 60 per cent of each book. Tables also occupy a great proportion of the textbooks, above all in *Out & About 2* (nearly 40 per cent). Drawings are also among the most employed visual aids in *English File*, being its portrayal very limited in *Out & About 2*. The use of glossaries is non-existent in the ELT book, while we can find some of them in the OSL textbook. Charts are hardly present, being their representation of less than one per cent in both textbooks. It is worth noting that visual aids are nearly equally represented across units in both textbooks.

Figure 33

Representation of visual aids in *English File*

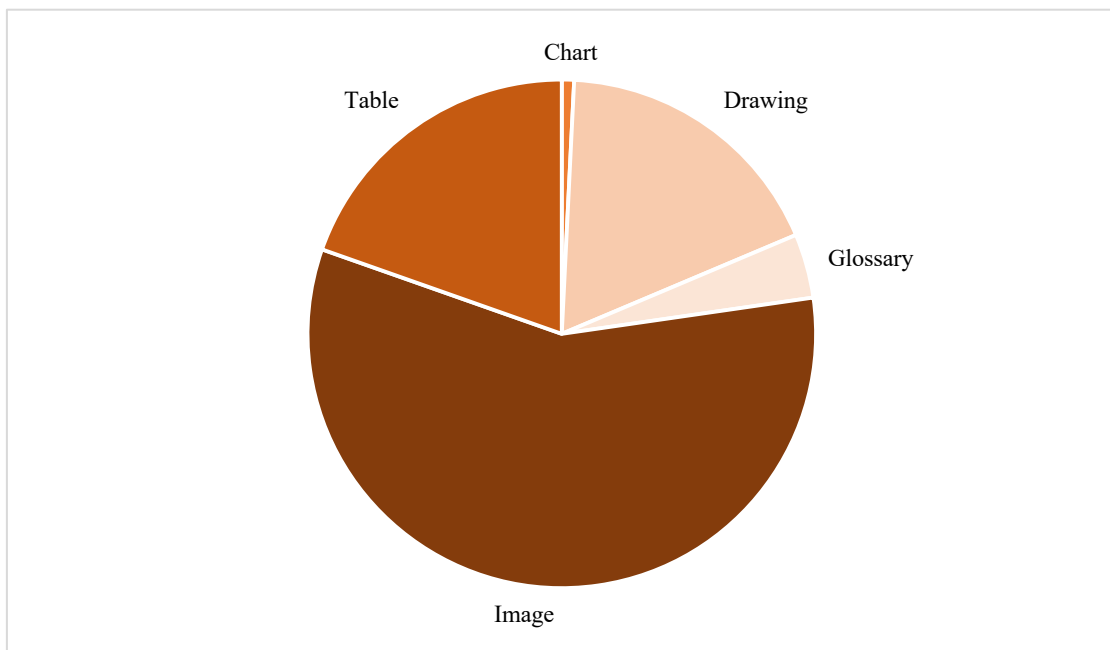
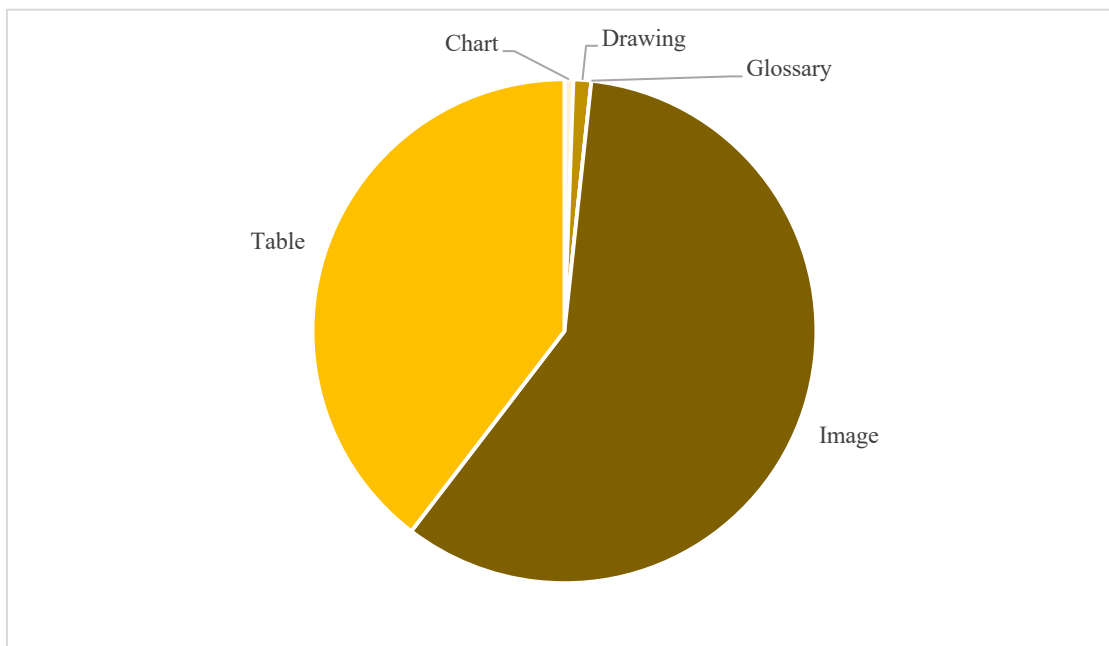


Figure 34

Representation of visual aids in *Out & About 2*



If we compared the perceptual learning style preferences of the informants enrolled in the OSL and ECS programs (see Section 7.4.1., p. 186) and the representation of perceptual activities in the two ELT textbooks, we see that they only coincided with visual as the major preference for both informants and activities in the textbooks. The other perceptual learning styles did not match. Therefore, it can be concluded that the preferred perceptual learning styles of informants were not equally distributed in the two ELT textbooks.

In sum, *English File* seemed to have more perceptual activities than *Out & About 2*. Nevertheless, visual activities were the predominant and tactile/kinesthetic were the least represented in both textbooks. The two ELT textbooks had numerous visual aids throughout all the units. Nevertheless, the perceptual learning style preferences of OSL and ECS informants were not equally distributed in their respective textbooks.

### **7.5. Relationship among perceptual content words in ELT textbooks and EFL learners' retrieval of perceptual words**

The fourth research question aimed at examining whether the perceptual words retrieved in response to perceptual prompts in the lexical availability task by the EFL informants of the two English instructional programs coincided with the perceptual words included in their respective ELT textbooks. First, we will reveal the number of tokens and



types for the six perceptual prompts and the number of types related to perceptual words. Then, we will reveal the average of words elicited in the six perceptual prompts for each instructional program. Second, we will classify the perceptual words retrieved in the six perceptual prompts according to the learning style or styles they refer to. Afterwards, we will analyze the number and percentage of the retrieved words for each instructional program that can be found in their respective textbook. Finally, we will determine whether the two ELT textbooks have an impact on the lexical production of the informants of each instructional program.

The number of tokens and types elicited by the lexical availability task for the six perceptual prompts all together were 3,542 and 1,490 respectively. As shown in Table 56 (p. 204), most of those types were perceptual words. We observe that the informants of the ECS program produced considerably lower words than the OSL informants in the six perceptual prompts of the lexical availability task. The average production of words was 3.9 per informant and prompt; it was of 4.7 and 3.1 words for OSL and ECS informants respectively if we consider the instructional program. Table 56 also shows the number of perceptual words, including the multimodal realizations, that were elicited in the six perceptual prompts of the lexical availability task classified by English instructional program (ECS and OSL). As it can be observed, both instructional programs coincided with the type of perceptual words produced. Visual and tactile/kinesthetic words were the most retrieved type of perceptual word by EFL learners in both instructional programs. The second most frequent perceptual word was the combination of the three styles (visual, auditory, and tactile/kinesthetic). The first and second most produced perceptual words summed 934 types altogether, which were one type in three perceptual words. They were followed by visual, tactile/kinesthetic, visual and auditory, auditory, and auditory and tactile/kinesthetic perceptual words.

Table 56

*Number of perceptual words retrieved in the six perceptual prompts by instructional program*

Type of perceptual words	ECS	OSL	Total
Visual, tactile/kinesthetic	222	294	516
Visual, auditory, tactile/kinesthetic	167	251	418
Visual	87	107	194
Tactile/kinesthetic	39	75	114
Visual, auditory	28	37	65
Auditory	20	37	57
Auditory, tactile/kinesthetic	15	18	33
General total	578	819	1397

Table 57 (p. 205) presents the number and percentage of perceptual words which were retrieved in each instructional program and which were included in their respective textbooks (ECS in *Out & About 2*; OSL in *English File*). Similarly, visual and tactile/kinesthetic words were the most produced and encountered in the textbooks. They were followed by the three styles (visual, auditory, and tactile/kinesthetic), visual, tactile/kinesthetic, visual and auditory, auditory and tactile/kinesthetic, and auditory. In relative terms, the number of multimodal words obtained the higher percentage in their inclusion in textbooks. As shown in Table 57, the global percentage did not vary between the two English instructional programs. However, essential differences can be observed among types of perceptual words. Concerning the average of words produced per instructional program which were included in their textbooks, it was of 2.1 and 3.2 per informant and item for ECS and OSL programs respectively. On the one hand, the data provided evidence of the importance of multimodal words, especially the type that combines the three styles (visual, auditory, and tactile/kinesthetic), since they were the most retrieved by the learners.

Table 57

Number and percentage of retrieved perceptual words included in ELT textbooks

Type of perceptual words	ECS	%	OSL	%	Total	%
Visual, tactile/kinesthetic	148	67%	230	78%	378	73%
Visual, auditory, tactile/kinesthetic	134	80%	202	80%	336	80%
Visual	41	47%	38	36%	79	41%
Tactile/kinesthetic	26	67%	43	57%	69	61%
Visual, auditory	25	89%	25	68%	50	77%
Auditory, tactile/kinesthetic	12	60%	13	35%	25	44%
Auditory	5	33%	10	56%	15	45%
General total	391	68%	561	68%	952	68%

After grouping together the perceptual words related to each perceptual learning style, it can be noticed that auditory was the least retrieved type of perceptual word which was included in the textbooks. In this regard, this result also coincides with the least representative perceptual words of both textbooks, and even less in *Out & About 2* textbook, discussed in Section 7.4.1. (p. 186). Table 58 (p. 206) reveals that the words which were associated with a single perceptual learning style were the least retrieved by the informants of the present study. Three in four multimodal words appeared to be more retrieved than the average. The percentage of words which were not multimodal in the two instructional programs was of 50 per cent; it was of 44 per cent for the whole sample of informants. Considering each informant to compare differences between instructional programs, globally the average number of words retrieved by each informant that could be encountered in the textbooks was of 79.6 per cent. Regarding perceptual words, this percentage rose up to 82 per cent, being this difference statistically significant.

Table 58

Sum of number and percentage of retrieved perceptual words included in ELT textbooks

Type of perceptual words (sum)	ECS			OSL			Total		
	Total	<i>Out &amp; About 2</i>	%	Total	<i>English File</i>	%	Total	Books	%
Visual*	504	348	69%	689	495	72%	1,193	843	71%
Tactile/kinesthetic	443	320	72%	638	488	76%	1,081	808	75%
Auditory	230	176	77%	343	250	73%	573	426	74%
Multimodal**	432	319	74%	600	470	78%	1,032	789	76%
Total	578	391	68%	819	561	68%	1,397	952	68%

Note.\*Visual=Visual+Visual, tactile/kinesthetic+Visual, auditory, tactile/kinesthetic+Visual, auditory.

\*\*Multimodal=Visual, tactile/kinesthetic+Auditory, tactile/kinesthetic+Visual, auditory+Visual, auditory, tactile/kinesthetic.

Table 59 (p. 207) displays a Paired Samples Test to determine the significance of the relationship among the perceptual words retrieved and the ones that were found in the ELT textbooks. Pair 1 referred to the tokens and pair 2 referred to the types. Concerning Pair 1, the confidence interval for the mean varied between 80 and 85 per cent. These were very high values which allow us to confirm that, at least, 80 per cent of the perceptual words that an informant elicited in a lexical availability task were words that could be encountered in their textbook. Therefore, a large proportion of the words produced in the lexical availability task were also included in the respective ELT textbooks. In the case of Pair 2, the findings obtained were the same, as shown in Table 59.

Table 59

*Paired Samples Test*

		Paired Differences					t	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference			
					Lower	Upper		
	% words in textbooks –							
Pair 1	% perceptual words in textbooks (tokens)	-3.019	34.376	.4438	-39.075	-21.314	-6.804	59
	% words in textbooks –							
Pair 2	% perceptual words in textbooks (types)	-2.711	25.331	.3270	-33.654	-20.567	-8.290	59

This high percentage is spread throughout the six perceptual prompts, being homogenous in both instructional programs (OSL and ECS) except the prompt ‘Soft,’ in which OSL informants elicited a higher number of perceptual words than ECS informants (82 per cent vs. 68 per cent). The test statistic “F” in the ANOVA test indicated a probability of .008 (<.05), which confirms that the textbook could have an influence on the lexical production of informants. ‘Soft’ was reported to be the less productive prompt in both instructional programs: 5.45 in ECS vs. 9.62 in OSL. In relative terms, this was the greatest difference that could be observed. As stated before, the production of words across the six perceptual prompts was higher in OSL informants than in ECS ones.

In sum, OSL informants retrieved more perceptual words across the six perceptual prompts than ECS ones. The informants of both instructional programs coincided with the types of perceptual words produced across the six perceptual prompts, being visual and tactile/kinesthetic words the most retrieved and auditory and tactile/kinesthetic the least. Likewise, visual and tactile/kinesthetic words were the most produced in both instructional programs and the most encountered in the two ELT textbooks, being auditory the least found. In addition, findings indicated that at least 80 per cent of the words that informants retrieved could be encountered in their textbooks. Therefore, it can be concluded that the textbooks had an influence on the lexical production of informants.

## 7.6. Summary of chapter

This chapter has provided the answers for the research questions posed in this dissertation, specifically in Chapter 5 (p. 114.). As a general conclusion, the results to the first research question indicated that visual was the major perceptual learning style preference of 12th grade EFL learners, whilst auditory seemed to be the least favored. In fact, more informants were reported to be unimodal than multimodal. In the second research question, a statistically significant relationship could not be found among perceptual learning styles and the two dimensions of productive vocabulary analyzed in the present dissertation: controlled productive vocabulary and lexical production/association through a lexical availability task. In this respect, the controlled productive vocabulary of the informants was around 1,000 words. Nevertheless, results suggested that the major preference for a specific perceptual learning style did not ensure a higher productive vocabulary size. Concerning lexical production/association, ‘Hobbies’ was the most productive prompt, being ‘Soft’ the least productive one. Many of the words retrieved in the lexical availability task belonged to the first 1,000 most frequent words, whilst the words which belonged to the AWL list were the least frequent. Nouns were the most elicited word class by the lexical availability task, and the noun and verb combination appeared to be the most frequent. In addition, most of the words retrieved were perceptual words, which were mainly visual if each style was considered in isolation; if their combinations were considered altogether, multimodal words were the most elicited. As in controlled productive vocabulary, the preference for a specific perceptual learning style did not ensure a higher production of words. Moving onto the third research question, there were more tokens and types in *English File* than in *Out & About 2*. Nonetheless, 33 out of the 50 most frequent words were shared by both textbooks. They differed in the frequency level to which their words belonged, being off-list and 1K band the first ranked in *English File* and *Out & About 2* respectively. Similar to lexical production, nouns were the most frequent word class, as well as its combination with verb. The same occurred with perceptual words, although *English File* had more perceptual words than *Out & About 2*. In this regard, tactile/kinesthetic perceptual words were the most representative if the styles were considered in isolation or visual and tactile/kinesthetic words when considering multimodal words. Visual and tactile/kinesthetic seemed to be the preferable learning style for OSL and ECS informants respectively. Moreover, *English File* appeared to be the textbook which adapted better to the perceptual learning styles of the OSL informants who followed it. A higher number

of perceptual activities were encountered in *English File* than in *Out & About 2*, being visual and tactile/kinesthetic the most and least represented in both textbooks. Nevertheless, the perceptual learning style preferences of OSL and ECS informants were not equally distributed in their respective textbooks. Finally, the fourth research question showed that visual and tactile/kinesthetic words, apart from being the most retrieved type of perceptual words, were also the most encountered in both textbooks, being auditory the least found. The results revealed that at least 80 per cent of the words produced in the six perceptual prompts of the lexical availability task were also included in the two ELT textbooks which were analyzed in the present dissertation. Therefore, it could be confirmed that the textbook had an impact on the lexical production of the informants of this study.





## CHAPTER 8. DISCUSSION

### 8.1. Introduction

This chapter will be devoted to the discussion of the findings explained in Chapter 7 (p. 141). As in the previous chapter, the results for each research question will be discussed separately. The first section will address the discussion of the perceptual learning style preferences of 12th grade EFL learners. The second section, which is divided into two sub-sections, will discuss the relationship among perceptual learning styles and two productive vocabulary dimensions: controlled productive vocabulary and lexical production/association through a lexical availability task. The third section, which is also divided into two sub-sections, will discuss the findings regarding the representation of perceptual words in two ELT textbooks (*English File* and *Out & About 2*). Specifically, we will focus on the distribution of perceptual words and perceptual activities in the two ELT textbooks. Finally, the fourth section will discuss the results concerning the relationship among the perceptual words included in the two ELT textbooks and the perceptual words elicited in a lexical availability task.

### 8.2. Perceptual learning style preferences

In the first research question, we aimed at ascertaining the perceptual learning style preferences of 12th grade EFL learners. Results showed that visual was their major preference, followed by tactile/kinesthetic and auditory. Our findings were not consistent with previous studies (e.g., Payaprom & Payaprom, 2020; Peacock, 2001; Reid, 1987; Shen, 2010) because they pointed at the superiority of the tactile/kinesthetic style, followed by auditory and visual modalities (see Chapter 3, Section 3.3.3.4., p. 57). However, we should take this result with due caution as, to the best of our knowledge, no investigation has been conducted with a sample of 12th graders in the Spanish educational system to be able to compare our results. Although most studies did not consider visual to be the preferred modality, Oxford (1995a) argued that 50 to 80 percent of learners in a classroom are visual. This figure coincides with the one obtained in our study, in which nearly 67 percent of the informants were reported to be visual learners. Now, let us discuss each perceptual learning style finding.

Visual learning style might be their favored modality for several reasons. First, textbooks appear to be the main medium of instruction in EFL learning (Gibbons, 2015; Hutchinson & Torres, 1994; Jiménez Catalán & Mancebo Francisco, 2008; Salbego et

al., 2015). It has also been proved that they play a crucial role in the EFL classroom (e.g., Bueno-Alastuey & Luque Agulló, 2015; Mirhosseini & Emadi, 2022; Nordlund & Norberg, 2020; Zhang, 2020). In addition, as it was shown in the third research question (see Chapter 7, Section 7.4.2., p. 198), visual activities predominated over other activities in the two ELT textbooks under study in this dissertation. These visual activities consisted of readings, writings, grammatical exercises, or activities that involved highlighting, circling, or underlining. Therefore, EFL learners might be more used to these types of activities, which might also promote their preference for the visual learning style. In the same vein, the two ELT textbooks analyzed included a wide range of visual aids, such as images, tables, glossaries, drawings, charts, pictures, graphs, as well as different colors and fonts. These are visual features with which visual learners prefer to learn (e.g., Arnold & Fonseca, 2004; Dörnyei, 2005; Dörnyei & Ryan, 2015). Likewise, Dual Coding Theory, which was explained in Chapter 2 (see Section 2.4.3., p. 26), supported the use of visuals and imagery to improve language learning and comprehension (e.g., Heredia & Altarriba, 2014; Sadoski & Paivio, 2001). Some scholars have highlighted the importance of reading, textbooks, and taking detailed notes in EFL classrooms (e.g., Hatami, 2018; Reid, 1987). Moreover, EFL teachers might also use visual aids and materials (e.g., PowerPoint, Prezi), the blackboard, and technology to support their lectures and explanations. On another note, the 12th grade in the Spanish educational system is an examination-oriented year in order to prepare students for their state exam to be able to access university. This might be another reason for the predominance of textbooks and visual materials because it is a written examination. In sum, learning seems to be primarily based on visual materials, which concurs with visual as the preferred learning style in our study: “images are part of our everyday lives and visual literacy has become very important in educational contexts” (Salbego et al., 2015, p. 6).

Tactile/kinesthetic was the second most favored perceptual learning style. An explanation for this finding might be that with the advent of communicative approaches to language teaching, communicative activities (e.g., discussion, role-play, group work) constitute a fundamental element in EFL classrooms (e.g., Ochoa et al., 2016; Phoeun & Sengsri, 2021; Weda et al., 2021). Another reason could be the increasing use of technology in EFL education (e.g., Fakih, 2022; Lee, 2019; Lin & Wang, 2021). The teachers informed the researcher about their students through informal talks that they used technology in their classrooms on a daily basis. Some of them played YouTube videos and TED Talks to expose their students to authentic language; they also sent their students

other links that could be interesting for them so that they could play them at home. Other teachers reported to use Kahoot with their students; some asked them to prepare oral presentations using digital resources. As it was explained in Chapter 6 (see Section 6.3.5., p. 125), the textbooks followed in both English instructional programs also included digital options which catered to the tactile/kinesthetic style. In the textbook *Out & About 2*, the students' book and workbook were also available in digital form; students could download an Augmented Reality app to access more videos and audios. There were activities which asked students to look for information on the Internet or to search the meaning of words in online dictionaries, as well as activities which asked students to watch a video and answer some questions. In the *English File* textbook, students had access to the textbook and workbook as e-books, and the textbook had an iTutor. A students' website was also provided, along with a pronunciation app to practice the sounds learnt throughout the units. Similar to *Out & About 2*, it included videos and activities which promoted the use of digital resources. This finding can also be related to the Total Physical Response (TPR) method explained in Chapter 2 (see Section 2.4.1., p. 15). Although it may seem more appropriate for children, TPR activities also include discussions, doing projects, group work, which are suitable for adolescent EFL learners, as were the informants of the present study. This means that EFL learners might prefer to take an active role and participate in the EFL classroom in order to learn English.

Mixed-modality preferences were ranked right after the visual and tactile/kinesthetic learning styles. Visual and tactile/kinesthetic learning styles appeared to be the favorite modalities among multimodal learners. This result is in accordance with the predominance of visuals in EFL classrooms which are used to foster interaction and participation (e.g., Ampera et al., 2021; Wiyati & Marlina, 2021). It is also in line with student-centered approaches to language teaching in present day EFL classrooms which emphasize active learning to achieve communicative competence (e.g., Huda & Lubis, 2019; Simon, 2020; Weda et al., 2021).

The fact that visual and auditory learning styles were the least preferred mixed-modality preferences might be associated with the finding that Mansourzadeh (2014) achieved. This scholar revealed that learning English vocabulary by means of audio-visual aids was not effective. Our informants might have preferred materials and exercises which encouraged the use of visual and tactile/kinesthetic styles, instead of those which were related to visual and auditory, that is, audio-visual materials.

Despite this, more learners were reported to be unimodal (62 per cent) than multimodal (38 per cent). This finding corroborates the study conducted by Hatami (2018) with Iranian EFL university students, since she found that 67 per cent of them were unimodal learners and 33 per cent were multimodal learners. A possible explanation is that EFL learners might feel more secure using one modality over a combination of them. This result might also be a consequence of the materials that teachers distribute in the EFL classroom which might foster the preference for one specific learning style (e.g., Gargallo-Camarillas, 2021).

Finally, auditory seemed to be the least favored perceptual learning style. Two main reasons can account for this outcome. Although audio activities and materials (e.g., lectures, listening, pronunciation, recordings, videos) can be encountered in EFL classrooms, its amount is limited in comparison with, for example, visual activities (e.g., Hatami, 2018; Kim & Kim, 2018). This finding was also corroborated in our third research question (see Chapter 7, Section 7.4.2., p. 198), which indicated a lesser number of auditory activities, compared to visual activities, in the two ELT textbooks analyzed. Another explanation could be that listening is believed to be the most complicated language skill in EFL learning (e.g., Goh, 2002; Nushi & Orouji, 2020; Vandergrift, 2007). Many EFL learners feel that they cannot control the pace at which the speaker speaks (Underwood, 1989), so they usually have problems following the conversation, for example, in listening activities. Dunn and Burke (2005) gave another reason to justify why most students are not auditory which had to do with memory: “it is rare for [them] to remember 75 percent of what is said to them in a typical class period – lectures, discussions and questioning are the least-effective method of teaching” (p. 6).

### **8.3. Relationship among perceptual learning style preferences and productive vocabulary dimensions**

In this section, we will discuss the results obtained regarding the relationship among perceptual learning styles and two specific dimensions of productive vocabulary: controlled productive vocabulary (see Section 8.3.1., p. 215) and lexical production (see Section 8.3.2., p. 217).

### 8.3.1. Relationship among perceptual learning styles and controlled productive vocabulary

This first sub-question within the second research question pursued to identify the controlled productive vocabulary knowledge of 12th grade EFL learners. Our findings revealed that their controlled productive vocabulary was of 1,043 words, out of the 2,000 most frequent words that the *Productive Vocabulary Levels Test* measured. It is consistent with the results achieved in the study undertaken by Montero-SaizAja (2021). She conducted her investigation with 51 12th grade EFL learners, in the Spanish educational system, specifically in the autonomous community of La Rioja, which coincides with the background of the informants in the present dissertation. She distributed the same test: the 2,000 word parallel version (A+C) of the *Productive Vocabulary Levels Test*. This researcher reported that her sample of informants had a controlled productive vocabulary knowledge of 1,014 words. Therefore, there was a difference of 29 words between the investigation of Montero-SaizAja (2021) and the findings obtained in the present doctoral dissertation. These results might point to a similar instruction on EFL vocabulary up to the 12th grade. Nevertheless, it cannot be generalized to the autonomous community of La Rioja because the sample of informants is limited in both investigations and they were conducted in one particular high school. All in all, the controlled productive vocabulary size of the informants of the present investigation was around 1,000 words. Nation (2006) declared that the knowledge of the first 1,000 words represents an average coverage of 80 per cent of the running words in both written and spoken texts. Indeed, the knowledge of 2,000 to 3,000 words is recommended to achieve a 98 per cent coverage of written texts and 95 per cent of spoken texts (e.g., Schmitt & Schmitt, 2014; van Zeeland & Schmitt, 2012; Webb & Nation, 2017; Webb & Rodgers, 2009). Accordingly, the sample of informants of the present study might have issues communicating in English orally and in written form.

The results of this sub-question also showed that there was not a statistically significant relationship among perceptual learning styles and controlled productive vocabulary knowledge. This outcome confirmed our expectations, since it suggested that having a preference for a specific modality or modalities did not affect the amount of controlled productive vocabulary size. In other words, regardless of their preferred perceptual learning style, EFL learners were able to acquire a similar knowledge of controlled productive vocabulary. As far as we know, other scholars have not investigated this relationship, therefore, it is not possible to support our results with previous research.

With caution we could relate them to the findings obtained in the studies conducted by Yeh and Wang (2003), Kassaian (2007), Hatami (2018), and Akbarian et al. (2019), as they confirmed that perceptual learning style preferences did not influence L2 vocabulary learning. Nevertheless, the type of vocabulary analyzed differed from our study. Yeh and Wang (2003) examined the impact of perceptual learning styles on vocabulary annotations in a sample of Taiwanese college students. Kassaian (2007) explored whether matching the instructional method with the perceptual learning styles of Iranian university students improved their intentional vocabulary learning and retention. Hatami (2018) looked at the relationship among perceptual learning styles and incidental vocabulary acquisition in a sample of Iranian university students. Akbarian et al. (2019) analyzed the relationship among perceptual learning style preferences and vocabulary depth in Iranian EFL university students. They concluded that there was not a statistically significant relationship among those variables, except for the tactile learning style. A reason for this lack of relationship might be, as Willingham (2005) argued, that most of the information that is learnt is based on meaning. He claimed that we might first learn information from our visual, auditory, or physical interaction with it, but that information in the mind is not usually stored as visual, auditory, or tactile/kinesthetic, it is mainly meaning-based.

Even though differences were not statistically significant, multimodal learners were reported to have a higher controlled productive vocabulary knowledge (1,168 words) than unimodal learners (around 920 words). This result appears to be consistent with the study undertaken by Pouwels (1992). He investigated the influence of perceptual learning styles on a vocabulary test using pictorial, verbal, and pictorial-verbal aids in L2 university students in the United States. In that investigation, parity learners (visual and auditory) appeared to achieve better scores in the vocabulary test than unimodal learners. An interpretation of this finding could be that if in a particular case these learners find it difficult to learn vocabulary with a specific style (e.g., visual), as they can use the three of them equally well, they can resort to the other two styles (e.g., auditory and tactile/kinesthetic). In this regard, they seem to have better opportunities of success in vocabulary learning than unimodal learners, who depend on a single modality. Evidence for this interpretation is found in how the brain works: “A word network consisting of many components, i.e., visual, aural, kinetic, olfactory, etc. [...] stores and retrieves information more efficiently than a small network” (Macedonia, 2015, p. 2).

### 8.3.2. Relationship among perceptual learning styles and lexical production in a lexical availability task

The second sub-question within the second research question aimed at examining the relationship among perceptual learning styles and lexical production. Results indicated that ‘Hobbies’ was the most productive prompt, followed by ‘Town,’ ‘Move,’ ‘Say,’ ‘Loud,’ ‘Look,’ ‘Bright,’ and ‘Soft.’ Contrary to our expectations, ‘Hobbies’ appeared to be more productive than ‘Town,’ which contradicts the findings obtained in the literature with Spanish EFL learners in the 12th grade (Canga Alonso, 2017; Jiménez Catalán & Canga Alonso, 2019; Jiménez Catalán & Fernández Fontecha, 2019). A reason why ‘Hobbies’ was more productive than ‘Town’ might be because our study was conducted in a different high school. It could also be related to the two English instructional programs in which our informants were enrolled, the amount of input they received in their EFL classes, or because hobbies were more represented in the ELT textbooks of our sample of informants.

Regarding the perceptual prompts, our assumptions were partly met. We were right in expecting that ‘Soft’ was going to be the least productive prompt but not ‘Loud.’ Nevertheless, although ‘Say’ was the second most productive perceptual prompt, ‘Move’ and ‘Loud’ surpassed ‘Look.’ It was surprising that ‘Move’ was the most productive prompt among the six perceptual ones, before ‘Say’ and ‘Look,’ since it had a lower frequency than ‘Say’ and ‘Look,’ as well as the second highest value of familiarity and imageability. On the contrary, ‘Say’ had the highest frequency of the six perceptual prompts, but it was not included in any of the familiarity and imageability lists used to choose these prompts. ‘Move’ is a prompt which activates associations with other words which might be very familiar to EFL learners since they started learning English. Another plausible explanation could be the effect of this prompt because it is similar in form and meaning to the word in Spanish (*Mover*). Indeed, previous investigations (e.g., Nation, 1990; Rogers et al., 2015) have found that cognates facilitate the learning of those L2 forms. Owing to this, it could be explained why they might have retrieved more words in that prompt in the lexical availability task. On the other hand, we expected the least productivity of ‘Bright’ and ‘Soft’ because they were less frequent and less familiar words, and they had a lower imageability value than the other words (except ‘Loud’). This could also be related to the effect that the prompt seems to produce in the mind to activate words. The prompt ‘Move’ might generate more words associated with people, objects, activities, or means of transport than the prompts ‘Bright’ and ‘Soft.’ Another

reason might be the familiarity of EFL learners to the prompt and the frequency level of that word: it seems to be more difficult to generate words related to those which might not be as frequently used and encountered (e.g., bright, soft) than words which learners are more used to seeing or hearing on a daily basis in their EFL classes (e.g., move, say, loud).

Considering the productivity of the four groups of prompts (traditional, visual, auditory, and tactile/kinesthetic), as it was expected, traditional prompts ('Hobbies' and 'Town') were the most productive group of prompts. This is also in line with the productivity of each prompt in isolation. It corroborates the findings obtained in the investigations conducted by Fernández Orío and Jiménez Catalán (2015) and Jiménez Catalán and Dewaele (2017) with traditional and non-traditional prompts (emotion words in the latter study). As these scholars argued, the productivity of traditional prompts might be interpreted as having a greater exposure towards words related to traditional prompts than to non-traditional ones (perceptual prompts in our study). We also predicted that the group of tactile/kinesthetic prompts ('Move' and 'Soft') were going to be the least productive; our hypothesis was confirmed. 'Soft' was actually the least productive prompt in the whole lexical availability task. In contrast, the auditory ('Loud' and 'Say') group of prompts outperformed the visual ('Look' and 'Bright') ones, which contradicted our expectations. After knowing the productivity of each prompt, this finding was not surprising because 'Loud' and 'Say' were among the most productive perceptual prompts when they were considered in isolation.

Findings also revealed that many of the 50 most frequent words of the whole lexical availability task were also among the 50 most frequent ones in each prompt. This result was not a surprise, since it seems logical that some of the most frequent words in each prompt were also among the 50 most frequent ones of the corpus. There were also shared words across prompts (e.g., TV, friend, movie, people, clothes, window, country, children). Most of them were general words that could fit in any of the prompts, which could explain their repetition across the categories.

Regarding the frequency level of the words, there were a few more words that were off-list in the whole corpus of lexical availability, followed closely by words that belonged to the 1K band, 2K band, and AWL list. In general, most of the words retrieved in each prompt pertained to the first 1,000 most frequent words, they were followed by off-list words, the 2K band, and AWL list. In the case of word families, most of them belonged to the 1K band, followed by the 2K band and AWL list. The fact of producing



more off-list words is consistent with the studies conducted by Agustín-Llach (2017, 2022). In her first study, her informants consisted of monolingual and bilingual EFL learners in the 12th grade. However, she found that, after off-list words, the words retrieved by monolingual and bilingual students in a lexical availability task belonged to the first 2,000 most frequent ones, followed by the 1K band. The distribution of words into frequency levels after the off-list words changed in her second study. She investigated 10th and 12th grade EFL learners. Her findings indicated that, after off-list words, most of them pertained to the first 1,000 most frequent words, followed by the 2K band.

In the present study, if we consider each prompt in isolation, a great number of words pertained to the 1K band. This result is consistent with other lexical availability studies with EFL learners (e.g., Akbarian et al., 2020; Jiménez Catalán & Fernández Fontecha, 2019). Our informants might have produced more words that belonged to the first 1,000 most frequent ones than to the second 1,000 for several reasons. First, high frequency words are acquired before less frequent ones (Nation & Waring, 1997). Second, high frequency words and words that belong to a low level of difficulty tend to be the most accessible (Agustín Llach, 2022). Students are used to seeing, hearing, and using them. In addition, their controlled productive vocabulary knowledge was around 1,000 words, so it was not surprising that they elicited a lesser number of words that belonged to the second 1,000 most frequent words.

Nouns were reported to be the predominant word class found in the words retrieved in the lexical availability task. As the eight prompts were not only nouns but also adjectives, verbs, and adverbs, we predicted that, for example, more adjectives were going to be elicited in ‘Soft,’ ‘Loud,’ and ‘Bright’. Nonetheless, nouns predominated over the other word classes in the whole lexical availability task and in each prompt. This result is in line with previous research undertaken in lexical availability tasks with EFL learners from different grades (e.g., Agustín Llach & Fernández Fontecha, 2014; Fernández Fontecha, 2021; Fernández Fontecha et al., 2021; Germany & Cartes, 2000; Jiménez Catalán & Dewaele, 2017; Jiménez Catalán & Fitzpatrick, 2014; Jiménez Catalán & Montero-SaizAja, 2020; Jiménez Catalán & Ojeda Alba, 2009). According to the literature (Fernández Orío & Jiménez Catalán, 2015; Jiménez Catalán & Dewaele, 2017; Jiménez Catalán & Fitzpatrick, 2014; Jiménez Catalán & Montero-SaizAja, 2020), one interpretation of this finding might be that nouns are usually the first acquired in the mother tongue. As nouns are acquired earlier than other word classes, they are more easily

accessed, and so, they are more likely to be elicited in a lexical availability task. Indeed, adjectives, adverbs, verbs, among other word classes, are learnt later than nouns (Jiménez Catalán & Dewaele, 2017). In the study conducted by Fernández Orío and Jiménez Catalán (2015), nouns prevailed over other word classes both in the traditional ('Animals,' 'Clothes,' and 'Food and drink') and non-traditional prompts ('Friendship,' 'Happy,' and 'Give up'). They concluded that more word classes, apart from nouns, were retrieved in the non-traditional prompts. The same occurred with the investigation of Jiménez Catalán and Dewaele (2017), in which more word classes were elicited in emotion prompts (especially 'Happy' and 'Sad'). These results do not corroborate our findings, since verbs, adjectives, adverbs, and interjections, but in a small number, were also elicited in our traditional and perceptual prompts. The combination of noun and verb was the most frequent, which coincides with the findings obtained in Jiménez Catalán and Montero-SaizAja (2020). This result was not unexpected because verbs appeared to be the second most predominant word class in the corpus, and in each prompt specifically, of the present dissertation.

Many words elicited in the six perceptual prompts ('Bright,' 'Look,' 'Loud,' 'Move,' 'Say,' and 'Soft') were reported to be perceptual. Considering the three styles in isolation, visual words prevailed, followed by tactile/kinesthetic and auditory words. This result is consistent with the research conducted by Amirhosseini and Kazemian (2019). In their study, they used Neuro Linguistic Programming (NLP) to determine the favorite representational system of a group of university students in London. Their findings indicated that most of the informants were visual learners, followed by tactile/kinesthetic and auditory, as it happened in our study (see Chapter 7, Section 7.2., p. 141). After analyzing the words written in the questionnaire, they found that visual predicates or visual words were the predominant, followed by tactile/kinesthetic and auditory predicates/words. Notwithstanding, we should be cautious with these results, since their informants were university level students and, although it is not explicitly stated, we ventured that they were L1 speakers not EFL learners as in our investigation.

In another vein, multimodal words surpassed visual ones, and within multimodality visual and tactile/kinesthetic words were the predominant in the present dissertation. In fact, this finding coincides with the favored multimodal learning style preferences of the informants of our investigation. Our multimodal learners reported to prefer visual and tactile/kinesthetic learning styles; the most frequent multimodal words retrieved in the six perceptual prompts were also visual and tactile/kinesthetic. In this

respect, having a preferable modality might make us elicit words which are related to our favored perceptual learning styles.

Our prediction that more words related to the style of the prompt were going to be retrieved was only confirmed in three ('Bright,' 'Look,' and 'Move') of the six perceptual prompts. Similar to the word class of the prompts, these findings suggested that a perceptual prompt which is related to a specific perceptual learning style did not always guarantee a higher number of retrieved words associated with that style. Therefore, the type of perceptual words elicited by each prompt might depend more on the learning preferences of the test-taker than on the type of prompt itself.

Finally, a statistically significant relationship among perceptual learning styles and lexical production was not found. These findings are consistent with the ones reported by Domínguez Pelegrín (2019), in which he concluded that learning styles did not influence lexical availability. Notwithstanding, we should take it with caution because his informants were Spanish as a Foreign Language learners, while ours were EFL learners. An interpretation of this outcome could be that the favored way of learning in general, and learning vocabulary in particular, does not ensure a higher production of words in a lexical availability task. In other words, having a particular preference for a perceptual learning style might not be decisive for having a larger productive vocabulary. The size of productive vocabulary might be influenced by other factors, such as the hours of instruction in EFL or the textbook followed in EFL classes, among other factors which were not object of analysis in the present dissertation.

#### **8.4. Representation of perceptual learning styles in ELT textbooks**

In this section, we will discuss the results obtained regarding the representation of perceptual words (see Section 8.4.1., p. 221) and perceptual activities (see Section 8.4.2., p. 226) in *English File* and *Out & About 2*.

##### **8.4.1. Content words related to each perceptual learning style in ELT textbooks**

As for the first sub-question within the third research question, we sought to analyze the perceptual words included in the two ELT textbooks. Results revealed that *English File* had more tokens (34,223 vs. 27,788) and types (4,251 vs. 3,501) than *Out & About 2*. This finding is not surprising because the first textbook consisted of 31 more pages than the second one. Indeed, as commented in Chapter 6 (see Section 6.3.5., p. 125), the English level of *English File* was a bit higher than the one in *Out & About 2* (B2

vs. B1-B2). Consequently, the OSL informants who followed the *English File* textbook had a higher input to the English language than ECS informants who followed *Out & About 2*. The number of tokens and types of each textbook in our study outdid those investigations of the literature on 12th grade ELT textbooks (Aziez & Aziez, 2018; Criado, 2009; Criado & Sánchez Pérez, 2009; Larsson, 2017; Rahmat & Coxhead, 2021), except for the study of Rahmat and Coxhead (2021), which slightly surpassed the number of tokens of *Out & About 2*. The type/token ratio indicated that both textbooks had a similar lexical variation: 12.42 for *English File*, and 12.60 for *Out & About 2*. It implies that many content words were continually repeated in both textbooks, so the learning of those words will be practically guaranteed as they were encountered many times.

Furthermore, results showed that the two textbooks under study in the present dissertation shared 33 out of the 50 most frequent words. In fact, they coincided with the words that were in the first (“be”) and tenth (“verb”) positions in each textbook. They were general words to which EFL learners are very familiar (e.g., be, people, use, have, do, complete, answer, question, good, work, ask); they probably knew them since they started learning English in primary education. Therefore, textbook designers of different publishing houses do not appear to agree with the selection of vocabulary input (e.g., Jiménez Catalán & Mancebo Francisco, 2008). This might be problematic because at the end of the day no matter in which English instructional program informants are enrolled, they are all going to sit the same exam to be able to apply for university.

Regarding the frequency level of word types, in the *English File* textbook, more words belonged to the off-list, followed by 1K band, 2K band, and AWL list. For *Out & About 2*, more words pertained to the 1K band, followed by off-list, 2K band, and AWL list. These findings are not entirely consistent with the literature. For example, Larsson (2017) reported that most of the words included in 12th grade Swedish ELT textbooks belonged to the 1K band, followed by the 2K band, 3K band, off-list, 6K-25K bands, 4K band, and 5K band. Rahmat and Coxhead (2021) revealed that most of their words analyzed belonged to the first two 1,000 words, followed by the 3K to 9K bands and 10K to 25K bands. Therefore, a great number of words in these two studies pertained to the first frequency level. It can be partly associated with the results in *Out & About 2*, although there were more off-list words than those which belonged to the 2K band. In *English File*, off-list words surpassed the first 1,000 words, which were followed by the 2K band and AWL list. The fact that off-list words prevailed in *English File* might be because textbook designers based their selection of words on the communicative needs

of the students who would follow that textbook (Alcaraz Mármol, 2009). However, the predominance of off-list words might inhibit EFL learners' learning as those words do not pertain to the 1K band.

Concerning the frequency level of word families, both of our textbooks coincided, since most of the words pertained to the 1K band, followed by 2K band and AWL list. These results are not in line with the ones obtained by Criado (2009) and Criado and Sánchez (2009) with a sample of 12th grade ELT textbooks, which suggested that most of the word families belonged to the 2K band, followed by the 3K and 1K bands. It seems logical that a larger proportion of words in both textbooks corresponded to the first 1,000 most frequent words because, as revealed in the second research question, the controlled productive vocabulary of the informants of this study was around 1,000 words. If a great number of the words included in textbooks belonged to the second 1,000 most frequent words or to lower frequency bands, the students would not be able to follow them because it would be beyond their language level.

The results also indicated that the noun was the most frequent word class included in both textbooks. It was followed by verbs, adjectives, adverbs, and interjections. These results were also obtained in previous studies with primary (e.g., Alcaraz Mármol, 2009, 2011b; Nordlund, 2015a, 2015b; Nordlund & Norberg, 2020) and secondary ELT textbooks (e.g., Jiménez Catalán & Mancebo Francisco, 2008). An interpretation for the predominance of nouns over other word classes in ELT textbooks might be because this word class is learnt earlier (Ellis & Beaton, 1993). Both textbooks coincided with the combination of noun and verb as the most repeated, which is not surprising as noun was the most frequent word class and verb was the second.

There were more perceptual words included in *English File* and *Out & About 2* (3,845 vs. 3,240) than non-perceptual (406 vs. 261). This might be, as explained before, because the former textbook had more units and pages than the latter. There are therefore more chances for perceptual words to occur. Both textbooks coincided with the distribution of the type of perceptual words. The majority of them were tactile/kinesthetic words, followed by visual, multimodal, and auditory words. Unfortunately, to the best of our knowledge, scholars have not analyzed the type of perceptual words included in ELT textbooks. Hence, our results cannot be compared with other studies. Nevertheless, the following paragraphs will suggest some plausible explanations for these results.

Tactile/kinesthetic words might be the most represented in the textbooks because the headings of the activities tend to ask students to do something, which implies

movement. For example, they might ask you to work with a partner, search the meaning of words on the Internet, or take a pen and write about something. Likewise, when a story is narrated in the readings contained in ELT textbooks, there might be many verbs which involve movement (e.g., go, run, follow, move).

Visual words were the second most frequent in both ELT textbooks. One possible explanation is that as textbooks are full of visual aids (e.g., pictures, graphs, tables), and the headings of the exercises might refer to them (e.g., look at picture X). In fact, visual activities were the predominant in the two ELT textbooks analyzed, so this could also be a reason for the high number of visual words. Furthermore, in the narration of a story or event, a lot of visual details are usually provided so that you can picture it. This might make textbook designers employ more visual words. Although, as far as we know, visual words have not been investigated, our study corroborates the results of previous research on vocabulary acquisition and teaching (e.g., Tahir et al., 2020; Vedyanto, 2016) which found that the use of visuals facilitated the vocabulary acquisition of EFL learners.

Auditory words were the least represented, which is consistent with the lesser number of auditory activities contained in the two ELT textbooks. This result coincides with the investigation conducted by Bal-Gezegin (2014) in which the use of audio led to a lesser amount of EFL vocabulary learning than the use of video.

Considering the types of multimodal words, visual and tactile/kinesthetic words were the most frequent in both textbooks. They were followed by visual, auditory, and tactile/kinesthetic words, tactile/kinesthetic, visual, auditory and tactile/kinesthetic, visual and auditory, and auditory words. Indeed, the fact that visual and tactile/kinesthetic words prevailed over other multimodal words was not unexpected, as it coincides with the most frequent perceptual words in isolation: tactile/kinesthetic first and then visual. This result could be related to the study conducted by Er and Azap (2013) in which the use of visual (e.g., reading) and tactile/kinesthetic (e.g., cooperative activities) aids improved EFL vocabulary acquisition.

Moving onto the learning preferences of OSL and ECS students and following the discussion of the first research question, the visual learning style might be their favorite preference because textbooks appear to be the main medium of instruction in EFL in the Spanish educational system (e.g., Bueno-Alastuey & Luque Agulló, 2015; Jiménez Catalán & Mancebo Francisco, 2008). Regarding the content provided by ELT textbooks, they included a large number of visual aids and visual activities prevailed over other types, so EFL learners might be used to them. This result corroborates the findings of

studies in which the use of visual input enhanced EFL learners' different language skills, such as listening comprehension (e.g., Sehati & Khodabandehlou, 2017), speaking (e.g., Okar & Shahidy, 2019), vocabulary (e.g., Tahir et al., 2020), or writing (e.g., Fani & Hashamdar, 2017).

If the realizations of each style in isolation and in mixed-modality preferences were considered, for the OSL informants, visual was their favored learning style, followed by tactile/kinesthetic, multimodal, and auditory. For the ECS informants, tactile/kinesthetic was their major preference, followed by visual, multimodal, and auditory. The difference in these findings could be because the preferences for learning might be influenced by the textbook they followed, a higher number of hours of study, a higher English language level and vocabulary level, or due to other aspects, such as motivation, which have not been considered in the present dissertation.

For both groups of informants visual and tactile/kinesthetic were their major perceptual learning style preferences. As explained in the discussion to the first research question, this finding could be related to the student-centered approaches to English language learning in which students are much more involved in classroom activities with the aim of achieving communicative competence (Huda & Lubis, 2019; Simon, 2020; Weda et al., 2021). Likewise, auditory might have been their least favored perceptual learning style owing to being one of the most difficult language skills in EFL learning (Goh, 2002; Nushi & Orouji, 2020; Vandergrift, 2007) and because it is very complicated to remember most of what is said in the EFL classroom (Dunn & Burke, 2005).

It was also concluded that *English File* accommodated better the OSL informants who followed it than *Out & About 2* to our ECS informants. This means that the representation of perceptual words in the former textbook adapted better to the perceptual learning style preferences of our OSL informants than the latter did. A possible explanation might be that *English File* was exclusively designed for working the different language skills that were going to be object of examination to get the B2 language certificate in the Official School of Languages.

Finally, OSL informants appeared to have a larger productive vocabulary knowledge than ECS informants, both in controlled productive vocabulary and lexical production/association. An interpretation of this finding could be that some of the OSL informants had already been enrolled in CLIL, having thus a greater exposure to the English language, which may have led them to acquire a higher language level than the informants of the ECS program. Another reason could be that they had been exposed to

a wider vocabulary input owing to the higher number of tokens and types of the textbook they followed. They were students who were preparing themselves to be able to get a B2 language certificate at the end of the course. In fact, the language level of the textbook followed was slightly higher than the one in the ECS program. This probably prompted the appearance of vocabulary pertaining to a higher language level.

#### **8.4.2. Activities related to each perceptual learning style in ELT textbooks**

The second sub-question within the third research question aimed at identifying the type of perceptual activities included in the two ELT textbooks analyzed. Findings indicated that *English File* contained more perceptual activities than *Out & About 2*. This was expected because the first textbook had four more units and more pages than the second one, as abovementioned.

Visual activities were the predominant in the two ELT textbooks, followed by multimodal, auditory, and tactile/kinesthetic. These results regarding the most and least representative perceptual activities are in line with the studies undertaken by Šímová (2011), Pänkäläinen (2012), and Mattheoudakis and Alexiou (2015), although they did not consider multimodal activities. The difference among these investigations and ours lies in the educational level and country where the textbooks were employed. These three scholars investigated primary school ELT textbooks, whereas our study focused on 12th grade ELT textbooks. They were conducted in the Czech Republic (Šímová, 2011), Finland (Pänkäläinen, 2012), and Greece (Mattheoudakis & Alexiou, 2015), while ours was performed in Spain. For example, Šímová (2011) found that there were more activities related to the visual and auditory learning styles than to the tactile/kinesthetic, which appeared to be scarce. Pänkäläinen (2012) argued that visual and auditory activities were the most represented ones, although the number of visual activities was higher than auditory ones. Tactile/kinesthetic activities seemed to be the more infrequent in the analysis of the 3rd grade Finish textbook series. Likewise, the investigation on 3rd grade ELT textbooks of Mattheoudakis and Alexiou (2015) concluded that visual activities were the predominant in both textbooks, whilst the number of auditory and, especially, tactile/kinesthetic activities was considerably lower.

The fact the visual activities were the most representative in the two ELT textbooks we analyzed was according to expectations owing to the amount of visual aids included in them. There were a high number of images and tables, different colors, fonts, and shapes which might attract the students' attention and interest. In fact, visual aids and



visual stimuli have been proved to be essential components of language learning textbooks and to improve foreign language learning (e.g., Elmiana, 2019; Jahangard, 2007; Roohani & Sharifi, 2015). One interpretation for the predominance of visual activities in textbooks is that most language learners tend to prefer to learn visually (Oxford, 1995).

Multimodal activities were one of the most predominant in ELT textbooks after visual activities. This may be associated with the increasing presence of multimodality in EFL teaching and learning (e.g., Fang, 2015; Fedorenko et al., 2021; Ganapathy & Seetharam, 2016; Sakulprasertsri, 2020), which promotes the use of a variety of modes to convey information. In line with this interpretation, multimodal learning that caters to a broad range of learning styles is said to improve the language learning of students as they feel more confident and autonomous (e.g., Paxton et al., 2017; Sankey, 2006). Another possible interpretation for our results may be related to the frequent use of multimodal resources in ELT textbooks (e.g., Chen, 2010; Liu & Qu, 2014; Yu & Chang, 2019). For textbook designers, it might be easier to design activities which accommodate two or three styles than a single one because, although one style might predominate in a given activity, other styles might help in its completion.

Visual and auditory were the most frequent multimodal activities included in *English File*. This finding was not surprising owing to the advent of technology in EFL teaching, which prompted the use of audiovisual materials and aids (e.g., Mansourzadeh, 2014; Rashtchi et al., 2021; Wood-Borque, 2022).

The combination of the three styles (visual, auditory, and tactile/kinesthetic) was the most representative multimodal activity in *Out & About 2*. The inclusion of activities which cater to the three styles might benefit not only those students who perform equally well in the three styles, but also those which favor one or two of those styles. This result coincided with the conclusion Fadel (2008) reached: multimodal learning appears to be more efficient than unimodal learning.

On the other hand, auditory and tactile/kinesthetic activities had no representation in any of the two textbooks analyzed. An explanation for this finding could be that these two styles might be more appropriate for the teaching and learning of English for children. In fact, the Total Physical Response method, which was described in Chapter 2 (see Section 2.4.1., p. 15), was initially designed for beginner learners. Therefore, auditory and tactile/kinesthetic learning styles might not be suitable for adolescents who are about to start university.

Auditory activities were nearly as infrequent as tactile/kinesthetic ones, up to the point of being excluded in the textbook *Out & About 2*. Only 1.26 per cent of the activities were classified under auditory as a single modality in *English File*, rising that percentage up to almost 53 per cent when its occurrences in mixed-modality activities were considered. It corroborates the results of previous studies on oral activities in ELT textbooks (e.g., Abu Ellif & Maarof, 2011; Bueno-Alastuey & Luque Agulló, 2015; Donzelli, 2007). For example, Abu Ellif and Maarof (2011) pointed to the scarcity of oral communicative activities in secondary school ELT textbooks in Saudi Arabia. In a similar vein, Bueno-Alastuey and Luque Agulló (2015) stated that there were more activities associated with the written than the oral skills in the 12th grade ELT textbooks they analyzed in the Spanish educational system. The limited, or non-existent, number of auditory activities in ELT textbooks might be explained by the difficulty of finding authentic materials appropriate for the level and content of each textbook. Furthermore, it might be complicated to design activities which only address the auditory learning style. For example, as shown in the two textbooks analyzed, listening and speaking activities usually involved a combination of styles, since they ask you to listen and answer some questions or to discuss with your partner the answers to an activity.

Tactile/kinesthetic activities were the most infrequent in the two ELT textbooks. Indeed, they were non-existent in the *English File* textbook. This finding is consistent with the investigations on activities that cater to the different types of multiple intelligences in ELT textbooks (e.g., Maharma, 2021; Razmjoo & Farmer, 2012; Talebpour, 2017). These researchers concluded that the activities which implied the body/kinesthetic intelligence, which is related to our notion of tactile/kinesthetic learning style, were the least representative in ELT textbooks. A plausible explanation for this result could be the age and course level, which might impose certain restrictions on the skills to be practised. As stated before, these types of activities are usually linked to the Total Physical Response method which is mainly used for the teaching of English to children. Moreover, the 12th grade in the Spanish educational system is an exam-oriented course which prepares students to pass the university entrance exam. Since tactile/kinesthetic activities are not an object of evaluation in that specific exam, this might have prompted textbook designers to lessen the amount of these activities or even exclude them, as it occurs in the textbook *English File*. In addition, textbook designers might have also thought about the limited time and space that ELT teachers have in their

50-minute classes to allow learners to move freely around the classroom to do those activities.

Finally, we explored whether the perceptual learning style preferences of the informants who followed each textbook (OSL informants used *English File*; ECS informants used *Out & About 2*) coincided with the most representative perceptual activities in each textbook. The preferred modality or modalities of the informants were not equally distributed in their respective textbooks. Only visual was the major preference of both groups of informants and the most frequent activity in both textbooks. As explained before, these textbooks only favored visual learners. Although a major proportion of learners might be visual, ELT textbooks ought to include a balanced number of activities related to each learning style so that no learning style would be excluded. This lack of coincidence among students' perceptual learning styles and the perceptual activities included in ELT textbooks might be due to the absence of knowledge of textbook designers regarding the literature on perceptual learning styles. Another explanation, as Alcaraz Mármol (2011a) argued, could be the willingness of textbook designers to apply the results of research to their textbooks or not: "The question is whether designers really take research findings into account or just play lip-service to them" (p. 11).

### **8.5. Relationship among perceptual content words in ELT textbooks and EFL learners' retrieval of perceptual words**

The fourth research question examined whether the perceptual words that the informants of two English instructional programs (OSL and ECS) produced in the six perceptual prompts of a lexical availability task were also included in their respective ELT textbooks.

Results indicated that the informants enrolled in the Collaboration Program with the Official School of Languages (OSL) generated more perceptual words in response to the six perceptual prompts than the informants enrolled in the English as a curricular subject program (ECS). In fact, the former retrieved a higher number of words than the latter, which corroborates the findings of Fernández Orío and Jiménez Catalán (2015) and Akbarian et al. (2020). Fernández Orío and Jiménez Catalán (2015) investigated the lexical production of 10th grade informants enrolled in two English instructional programs (OSL and ECS) in the Spanish educational system, as in our study, in response to three traditional ('Animals,' 'Food and drink,' and 'Clothes') and three non-traditional

(‘Friendship,’ ‘Happy,’ and ‘Give up’) prompts. Their results revealed that OSL informants activated more words than ECS students. In the same line, Akbarian et al. (2020) compared the lexical production of two groups of EFL learners (incoming and outgoing) in Iran and its relationship with receptive vocabulary. The outgoing group had received more hours of instruction in English than the incoming group. Their findings indicated that the outgoing group produced more words than the incoming group. We agree with the interpretation of Fernández Orío and Jiménez Catalán (2015) when they claimed that the OSL group might have produced more words because they were more motivated to learn English. Another reason might be that, as stated before, many of the informants of the OSL program had already been enrolled in CLIL, which increased their exposure to the English language. As they were more exposed to this language, it could have been easier for them to produce more words in the lexical availability task, hence their vocabulary production might have increased.

Both instructional programs coincided with the type of perceptual words which were produced in the six perceptual prompts. Visual and tactile/kinesthetic words were the most frequent among the elicited words for both groups; it was also the most encountered type of perceptual words in both textbooks. A possible explanation for this finding might be that, as these students were used to encountering visual and tactile/kinesthetic words in their respective ELT textbooks, they had probably assimilated them and this is why they activated them in the lexical availability task. It could also be related to the use of visual and tactile/kinesthetic aids to promote vocabulary learning in EFL education (Er & Azap, 2013). Furthermore, visual and tactile/kinesthetic learning styles were the major multimodal preference for both OSL and ECS informants. Therefore, apart from finding these types of words in their textbooks, it was their preferred way of learning as well.

Auditory and tactile/kinesthetic words were the type of perceptual words which were the least produced in the six prompts in both groups; auditory was the type of perceptual word elicited which was the least found in the textbooks. This result was predictable because auditory was the least favored perceptual learning style of the informants. In addition, auditory words were the least elicited in response to the six perceptual prompts. As these words were the least predominant in ELT textbooks and auditory was also the least preferred learning style of informants, this might explain why they were the least retrieved in the lexical availability task. As explained above, the lesser

amount of auditory and tactile/kinesthetic words could be related to the Total Physical Response theory which is more suitable for children than for adolescents.

Multimodal words were by far the most elicited words in the six prompts that were most encountered in both textbooks, especially the combination of the three styles (visual, auditory, and tactile/kinesthetic). It seems that the association of a word to multiple senses facilitated its retrieval for the informants of this study. Following the reasons explained above, as the textbook was the major source of input for informants, if the multimodal words which catered to the three learning styles prevailed in the textbook, it is not surprising that the informants had learnt them and retrieved them in the lexical availability task. Another reason for the predominance of multimodal words could be that multimodality has been proved to be very common in EFL classrooms at the present time (e.g., Girón-García & Gargallo-Camarillas, 2021) due to the emergence of technology in language learning.

Similar to the predominance of the OSL over the ECS program in the retrieval of words, the words produced by the OSL informants in the six perceptual prompts were more encountered in their textbook than the ECS program. A possible explanation for this finding could be the willingness of the OSL informants to learn English. These students had deliberately chosen to enroll in the Collaboration Program with the Official School of Languages perhaps because they really liked English, they wanted to improve their level for personal issues, or because they wanted to achieve B2 to be able to get the official certificate, among many other reasons. It was not compulsory to enroll in this program, as in the case of the English as a curricular subject group. Therefore, OSL students might have been more motivated than ECS learners to learn the language (e.g., Fernández Orío & Jiménez Catalán, 2015), they had paid more attention to the vocabulary input of the textbook, and this is why many of the words produced in the lexical availability task were also found in their textbook.

Findings also suggested that at least 80 per cent of the perceptual words elicited across the six perceptual prompts were found in the two ELT textbooks. After this outcome, it was not surprising to find out that the two ELT textbooks had an influence on the lexical production of the informants who were enrolled in both instructional programs. This result was not in line with the studies conducted by Milton and Vassiliu (2000), Tsai (2015) and Canga Alonso and Cifone Ponte (2016) on the relationship between the input provided by ELT textbooks and EFL learners vocabulary production or vocabulary size. This lack of coincidence might be because these scholars only considered collocations

(Tsai, 2015) and cultural types (Canga Alonso & Cifone Ponte, 2016); they did not compare all the words produced by their informants with all the lexical input of the textbooks. Tsai (2015) concluded that a very low number of collocations retrieved in EFL learners' essays were also found in their ELT textbooks; Canga Alonso and Cifone Ponte (2016) revealed that around 50 per cent of the cultural types elicited in a lexical availability task were also encountered in the textbooks under analysis. Concerning the study conducted by Milton and Vassiliu (2000), the reason why our results did not coincide might be due to the educational level and context of their informants, as well as the English level and the vocabulary test used. They researched Greek EFL learners who were enrolled in the first year of primary education who probably had a lower level of English than our 12th grade informants. Instead of using a lexical availability task, they employed a yes/no test to identify whether their informants had learnt the vocabulary contained in their textbooks. An interpretation of our finding might be that, as the textbook seems to be the main medium of instruction in the Spanish EFL educational system (e.g., Jiménez Catalán & Mancebo Francisco, 2008), it is where their main source of vocabulary input comes from. Students mostly learn from the content and vocabulary provided in their textbook; they can also learn from some extra materials that some EFL teachers might give their students, but in a minor way. As the object of examination is what appears in the textbook, students have to learn it to be able to pass their exams. This might be why at least 80 per cent of the perceptual words they produced in the lexical availability task were also in their textbooks. Consequently, textbook designers ought to be very careful with the selection of vocabulary that has to be included in each textbook because it is what the students are going to learn when they follow it.

Having discussed the findings for the four research questions in the light of important investigations conducted in the literature, in the next chapter we will present the summary of the results, the pedagogical implications, the limitations found, and some lines for further research.

## CHAPTER 9. CONCLUSIONS

The present doctoral dissertation explored the relationship among perceptual learning styles, productive vocabulary knowledge, and perceptual activities and vocabulary included in two ELT textbooks with Spanish EFL learners who were enrolled in the second year of non-compulsory secondary education (equivalent to the 12th grade). For this purpose, a learning style questionnaire, a controlled productive vocabulary test, a lexical availability task, and two ELT textbooks (*English File* and *Out & About 2*) were analyzed.

The three first chapters of this dissertation provided the basis for the variables under study and allowed us to acknowledge the lack of studies concerning their relationship. Owing to this, the present thesis aimed at contributing to narrow the gaps in the literature regarding perceptual learning styles and vocabulary in 12th grade Spanish EFL learners. In this regard, the perceptual learning styles of the sample of informants were explored in order to determine the relationship among them and the two dimensions of productive vocabulary under study in the present dissertation: controlled productive vocabulary and lexical production. In addition, we examined the representation of perceptual words and perceptual activities in the two aforementioned ELT textbooks. Finally, we investigated the relationship among the perceptual words elicited in response to a lexical availability task and the perceptual words included in both textbooks. Therefore, the present chapter is devoted to providing an overview of the main findings obtained in this doctoral dissertation. It will also address the pedagogical implications of the results, acknowledge the limitations, and provide suggestions for further research.

With respect to the results achieved, the findings of the first research question, which examined perceptual learning style preferences, revealed that visual and auditory were the most and least favored perceptual learning styles respectively of 12th grade Spanish EFL learners. Results also indicated that there were more unimodal (single modality preference) than multimodal (mixed-modality preference) learners.

As for the second research question, which aimed at investigating the relationship among perceptual learning styles and two dimensions of productive vocabulary (controlled productive vocabulary and lexical production), findings showed that there was not a statistically significant relationship among these variables. Although the informants of this study were reported to have a knowledge of around 1,000 words, results indicated that the preference for a perceptual learning style did not ensure a higher controlled

productive vocabulary size. Regarding lexical production/association, ‘Hobbies’ and ‘Soft’ seemed to be the most and least productive prompts respectively in the lexical availability task. Most of the words elicited in this task pertained to the first 1,000 most frequent words, while the words which belonged to the AWL list were the least frequent. Furthermore, nouns were the most frequent word class produced, as well as the combination of noun and verb. The majority of the words retrieved were perceptual, specifically, visual if each style was considered in isolation; multimodal if their combinations were considered. Likewise, the preference for a specific perceptual learning style did not ensure a higher production/association of words.

The findings of the third research question, which analyzed the representation of perceptual learning styles in the two ELT textbooks, indicated that the textbook *English File* had more types and tokens than *Out & About 2*. Both textbooks shared 33 out of the 50 most frequent words. They differed in the frequency level of their words, since off-list and the first 1,000 most frequent words were the first ranked in *English File* and *Out & About 2*, respectively. As it occurred in lexical production, nouns were the most frequent word class elicited, together with the combination of noun and verb; perceptual words prevailed. However, *English File* had more perceptual words than *Out & About 2*, specifically, tactile/kinesthetic words if each style was considered in isolation; visual and tactile/kinesthetic if their combinations were considered. On another note, visual and tactile/kinesthetic were reported to be the preferred perceptual learning styles for the informants who were enrolled in the Collaboration Program with the Official School of Languages (OSL) and English as a curricular subject (ECS), respectively. In fact, *English File* was the textbook which adapted better to the perceptual learning styles of the OSL informants who followed it. Concerning perceptual activities, *English File* seemed to include a larger number of those activities than *Out & About 2*, specifically, visual and tactile/kinesthetic activities were the most and least predominant in both textbooks. Nonetheless, the perceptual learning style preferences of OSL and ECS informants were not equally distributed in their respective textbooks (*English File* and *Out & About 2*).

The results of the fourth research question, which investigated the relationship among the perceptual learning styles represented in the two ELT textbooks and the retrieved words in a lexical availability task, showed that visual and tactile/kinesthetic were both the most elicited words in response to the six perceptual prompts and the most encountered perceptual words in both textbooks. In addition, at least 80 per cent of the words retrieved in response to the six perceptual prompts of the lexical availability task



were included in the two ELT textbooks. It allowed us to conclude that the vocabulary input of textbooks influenced the lexical production/association of the informants of both instructional programs.

Several relevant pedagogical implications emerge from this study, which can be useful for researchers, EFL teachers, and textbook designers. The results of the second research question indicated that the controlled productive vocabulary knowledge of 12th grade Spanish EFL learners was around 1,000 words. Therefore, more instruction on EFL vocabulary would be necessary so that learners would be able to communicate effectively in the English language, as the knowledge of at least 2,000 to 3,000 words is required for that (e.g., Nation & Waring, 1997; Schmitt & Schmitt, 2014; van Zeeland & Schmitt, 2013). In addition, the instruction of EFL vocabulary could also include tasks based on authentic input to practice and strengthen the vocabulary learnt from the textbooks and curricular materials.

Even though the perceptual learning style preferences of the informants of our study did not have an impact on their productive vocabulary knowledge (both controlled productive vocabulary and lexical production), teachers could accommodate their teaching materials to their learners' perceptual learning styles to improve their learning, giving rise to balanced instruction. In this respect, students would become more positive and motivated, since the instruction would be more learner-centered and inclusive of all learning preferences, not favoring one particular learning style (e.g., Natividad & Batang, 2018; Payaprom & Payaprom, 2020). All in all, new teaching methodologies and a more learner-centered approach would be beneficial for Spanish EFL learners in their language learning in general and in vocabulary learning specifically.

As it is almost impossible to be cognizant of the preferred perceptual learning styles of the students who are going to follow the textbooks, textbook designers ought to include a balanced number of perceptual words and perceptual activities in order to cater for the different perceptual learning styles. In this regard, all the styles would be equally represented, as well as the different learning styles of EFL learners, who might favor one modality or a combination of them. Likewise, textbook designers should be very careful with the selection of vocabulary to be included in ELT textbooks because, as our study proved, the input of the two textbooks varied. This means that the EFL learners enrolled in the two instructional programs did not receive the same vocabulary input, which might be problematic since all of them have to sit the same exam to be able to access university. In the same vein, EFL teachers ought to be aware of the selection of textbooks since it

has been proved that they have a crucial influence on the vocabulary knowledge of their students. Moreover, in order to achieve the balanced instruction explained above, it would be better for their students if the textbooks addressed the different perceptual learning styles, as well as the same number of words because our study revealed there were differences in the types and occurrence of those types between both ELT textbooks.

The present doctoral dissertation presents some limitations that need to be acknowledged, as the results of this investigation cannot be broadly generalizable. One limitation is the size of the sample because only 60 students of a particular state school in the autonomous community of La Rioja (Spain) participated in this research. Other limitations can be encountered with respect to the data collection instruments. For example, we did not contrast the results obtained in the *Learning Style Survey* (Cohen et al., 2009) with other questionnaires that also identified perceptual learning styles to determine whether similar findings arise. We did not conduct oral interviews with the informants to compare whether the learning style preferences they believed to have coincide with the ones they actually resort to in the process of learning English. Additionally, we only implemented the first part of the learning style questionnaire related to perceptual learning styles, considering only one dimension of learning styles. Since we only investigated perceptual learning styles, other individual differences (e.g., language aptitude, culture, learning strategies, motivation, personality) were not taken into consideration, which might have also contributed to these outcomes.

Similarly, controlled productive vocabulary was only measured at the 2,000-word frequency level. We did not implement the rest of the levels, which could have altered our results. Furthermore, only one instrument (PVLТ) assessed this type of vocabulary knowledge. It was not contrasted with other productive vocabulary tests (controlled and free), so this might have affected the findings. Regarding lexical production, as it was the first time that those six perceptual prompts were used in a lexical availability task, we could not compare our results with other studies. Another limitation is that we only examined one textbook which was used in the Collaboration Program with the Official School of Languages and one textbook which was followed in the English as a curricular subject program. As we could not make a comparison with other textbooks adopted in each English instructional program, the findings achieved cannot be generalized unless more textbooks for each program as well as more schools providing the two programs are analyzed.

There are also limitations which arise from the classification of perceptual words and activities. Regarding the classification of content words into perceptual or non-perceptual, as explained in Chapter 6 (p. 130), there are some lists of Neuro Linguistic Programming (NLP) predicates in the literature (e.g., Transform Destiny, 2015; Rayner Institute, 2015; Brefi Group Limited, 2004; Juiced Concepts Limited, 2012; NLP Dynamics Ltd, 2013) which classify perceptual words. However, we found that these lists were limited because they did not include many words and most of those words were repeated in every list. There is not a perceptual predicates dictionary either, which could have made the classification of perceptual words more objective. For this classification, we had to rely on other sources to make an objective decision, such as the definition of the words in two dictionaries (Cambridge and Collins), imageability values, and a dictionary of emotions. Although we used reliable sources to make an objective classification, some of the classifications might be questionable.

In a similar vein, there is not well-established criteria to classify the perceptual activities of ELT textbooks. Following the few studies (Mattheoudakis & Alexiou, 2015; Pänkäläinen, 2012; Šimová, 2011) that have analyzed perceptual activities, the classification was made based on the characteristics determined in the literature of each perceptual learning style. Similar to perceptual words, this classification might arise some concerns.

Considering the limitations discussed above, there are some areas where future research should be conducted. First, the sample size could be increased by including more state schools, charter schools, private schools, or even extending it to other autonomous communities to be able to compare the findings. In this respect, as more schools will be included, the number of textbooks pertaining to each English instructional program could also be increased to determine any trends. Second, future studies could implement more perceptual learning style questionnaires to ascertain whether similar results arise. Subsequent investigations could also include observation and oral interviews with the participants to identify whether the preferences they believe they have according to the questionnaire match the preferences they actually have for learning, thereby overcoming the aforementioned limitation. In the same view, further research could also measure free productive vocabulary by means of speaking, writing, or both to be able to have more information on the productive vocabulary knowledge of informants. As it was suggested in the limitations, the inclusion of more individual differences (e.g., creativity, language

apptitude, motivation, earning strategies) in further investigations could give a more accurate picture of the foreign language process.

As an avenue for further research, a longitudinal study at the beginning and at the end of the academic year in the 12th grade could be conducted to notice whether similar results arise. At the beginning, the *Learning Style Survey*, *Productive Vocabulary Levels Test*, and a lexical availability task could be distributed to determine EFL learners' perceptual learning styles, controlled productive vocabulary knowledge, and lexical production. Then, teachers and learners could be instructed in perceptual teaching and learning styles respectively to become familiar with other ways of teaching and learning. Teachers could teach their students vocabulary not only from textbooks but also from authentic exposures. In this regard, after knowing their perceptual learning styles, teachers could design vocabulary exercises that cater to all the different learning styles (e.g., readings, videos, role-plays) to increase their EFL vocabulary. At the end of the academic course, learners' perceptual learning styles, controlled productive vocabulary knowledge, and lexical production could be investigated again to explore whether any changes have occurred after the instruction in these styles and notice whether their productive vocabulary knowledge and word production have improved.

For the classification of perceptual words, it could be useful to compile a complete list of perceptual words and their types (visual, auditory, tactile/kinesthetic) or even to design a dictionary with those words to be able to overcome the aforementioned limitation. Likewise, further studies could determine the criteria to classify the perceptual activities of textbooks. In this regard, the classification would be more objective. Future research could also focus on the analysis of each activity related to each perceptual learning style in isolation to acknowledge any limitations. For example, regarding auditory activities, it could be interesting to examine which ones promote comprehension, production, or both to see whether there is a predominance of one over the others.

Concerning lexical production, future studies could analyze the types of associations (semantic, formal, and encyclopedic) among prompts and the words retrieved in each prompt and also among the elicited words in a given prompt. It would also be interesting to determine the language level of the words produced and see whether the informants who had a higher controlled productive vocabulary knowledge retrieved words which belonged to a higher level. Moreover, the frequency level of the words retrieved by the informants enrolled in the two English instructional programs (OSL and ECS) could be compared to acknowledge whether OSL informants elicit more infrequent

words, which is expected as learners advance in language level. The words produced in response to the prompts ‘Town’ and ‘Hobbies’ could be classified into perceptual and non-perceptual words and the different types of perceptual words, to determine whether a specific perceptual learning style prevails.

In sum, despite the limitations explained above, we hope that this study provides insight into the process of learning English as a foreign language by means of analyzing individual differences, such as perceptual learning styles, EFL learners’ productive vocabulary knowledge, as well as the input from two ELT textbooks.



## CONCLUSIONES

La presente tesis doctoral tiene como objetivo analizar la relación existente entre los estilos de aprendizaje de percepción, el vocabulario productivo, y las actividades y vocabulario perceptuales que aparecen en los libros de texto que utiliza el estudiantado de 2º de Bachillerato de inglés como lengua extranjera. Para ello, se ha utilizado un cuestionario de estilos de aprendizaje, un test para medir el vocabulario productivo controlado, una prueba de disponibilidad léxica, y dos libros empleados por el estudiantado de este estudio (*English File* y *Out & About 2*).

Los tres primeros capítulos de esta tesis proporcionan el fundamento teórico para analizar esas variables y poner en evidencia la falta de estudios que hay sobre la relación entre ellas. Por consiguiente, mediante esta investigación se pretende cubrir la escasez de estudios sobre los estilos de aprendizaje de percepción y el vocabulario, en estudiantado español de 2º de Bachillerato que estudia inglés como lengua extranjera. En este sentido, se han explorado los estilos de aprendizaje de percepción de este estudiantado con el fin de examinar la relación existente entre los estilos de aprendizaje de percepción y las dos dimensiones de vocabulario productivo estudiadas en la presente tesis: vocabulario productivo controlado y producción léxica. Asimismo, se ha investigado la representación de las palabras perceptuales y de las actividades perceptuales proporcionadas en los dos libros de texto enunciados anteriormente. Finalmente, se ha analizado la relación que hay entre las palabras perceptuales producidas en respuesta a una prueba de disponibilidad léxica y las palabras perceptuales encontradas en ambos libros de texto. Por consiguiente, este capítulo pretende ofrecer una visión general de los principales resultados obtenidos en el presente estudio y centrarse en las implicaciones pedagógicas de los resultados, reconocer las limitaciones de esta tesis doctoral, y sugerir ideas para futuras investigaciones.

En lo que respecta a los resultados obtenidos, la respuesta a la primera pregunta de investigación, relativa a los estilos de aprendizaje de percepción, nos informa de que los estilos visual y auditivo son los más y menos preferidos, respectivamente, por el alumnado de 2º de Bachillerato que estudia inglés como lengua extranjera. También nos indica que hay un mayor número de estudiantado unimodal (con una única preferencia de aprendizaje) que multimodal (con dos o tres preferencias de aprendizaje).

Los resultados de la segunda pregunta de investigación, que tiene como finalidad examinar la relación entre los estilos de aprendizaje de percepción y las dos dimensiones

de vocabulario productivo (vocabulario productivo controlado y producción léxica), muestran que no existe una relación estadísticamente significativa entre estas variables. En cuanto al vocabulario productivo controlado, los resultados demuestran que, si bien el alumnado de este estudio tiene un conocimiento aproximado de 1.000 palabras, la preferencia por un estilo de aprendizaje de percepción específico no garantiza un mayor tamaño de vocabulario productivo controlado. Por otro lado, en lo que se refiere a la producción/asociación léxica, la categoría semántica ‘Hobbies’ resulta ser la más productiva en la prueba de disponibilidad léxica, mientras que ‘Soft’ es la categoría semántica que presenta una menor productividad. Es importante destacar que la mayoría de las palabras producidas en esta prueba pertenecen a las primeras 1.000 palabras más frecuentes, mientras que las palabras que pertenecen a la lista AWL fueron las menos predominantes. Además, tanto los sustantivos como la combinación de sustantivo y verbo son las clases gramaticales que prevalecen en la prueba realizada. Cabe destacar que la mayor parte de las palabras producidas en la prueba de disponibilidad léxica son perceptuales. Más concretamente, predominan las palabras visuales, si se considera cada estilo de aprendizaje de forma individual, o las palabras multimodales, si se tienen en cuenta las combinaciones entre estilos. Igualmente, se llega a la conclusión de que la preferencia por un estilo de aprendizaje de percepción específico no garantiza la mayor producción/asociación de palabras en la prueba de disponibilidad léxica.

Los resultados de la tercera pregunta de investigación, en la que se analizó la representación de los estilos de aprendizaje de percepción en los dos libros de texto de inglés antes citados, nos indican que el libro de texto *English File* contiene un mayor número de vocablos y palabras que *Out & About 2*. En este sentido, 33 de las 50 palabras más frecuentes coinciden en ambos libros de texto, pero difieren en el nivel de frecuencia de sus palabras, ya que las palabras fuera de la lista predominan en *English File*, en tanto que las primeras 1.000 palabras más frecuentes prevalecen en *Out & About 2*. Al igual que ocurre en la producción léxica, los sustantivos son la clase gramatical predominante, así como la combinación de sustantivo y verbo. Asimismo, las palabras perceptuales también prevalecen en ambos libros de texto. Sin embargo, se pueden encontrar más palabras perceptuales en *English File* que en *Out & About 2*. Concretamente, predominan las palabras táctiles/kinestésicas, si se considera a cada estilo de aprendizaje individualmente, o las palabras visuales y táctiles/kinestésicas, si se consideran las combinaciones entre estilos. Los estilos de aprendizaje de percepción visual resultan ser los preferidos para el alumnado que cursa el Programa de Colaboración con la Escuela



Oficial de Idiomas, mientras que aquellos que cursan inglés como asignatura curricular tienen preferencia por el estilo táctil/kinestésico. De hecho, *English File* es el que mejor se adapta a los estilos de aprendizaje de percepción del estudiantado del Programa de Colaboración con la Escuela Oficial de Idiomas que lo utilizan. Respecto a las actividades perceptuales, *English File* incluye un mayor número de estas actividades que *Out & About 2*. Más concretamente, las actividades visuales y táctil/kinestésicas son las más y menos frecuentes en ambos libros, respectivamente. Sin embargo, los estilos de aprendizaje de percepción del alumnado que cursa los dos programas de inglés no están distribuidos equitativamente en sus respectivos libros.

Los resultados de la cuarta pregunta de investigación, que tiene como fin determinar la relación entre las palabras perceptuales incluidas en los dos libros de texto y las producidas en una prueba de disponibilidad léxica, muestran que las palabras visuales y táctiles/kinestésicas son las más producidas en respuesta a las seis categorías semánticas relacionadas con los estilos de aprendizaje. A su vez, son el tipo de palabras que predominan en ambos libros. De hecho, al menos el 80 por ciento de las palabras producidas en las seis categorías semánticas de la prueba de disponibilidad léxica aparecen también en dichos libros. Así, estos resultados nos permiten concluir que el vocabulario proporcionado en los libros de texto influye en la producción/asociación léxica del estudiantado que cursa ambos programas.

De la presente investigación surgen varias implicaciones pedagógicas que pueden resultar de gran utilidad para investigadores, equipo docente de inglés como lengua extranjera, y editores de libros de texto. En este respecto, los resultados de la segunda pregunta, en la que se mide el vocabulario productivo controlado de los informantes de este estudio (1.000 palabras), reflejan la necesidad de incrementar la enseñanza de vocabulario para que el alumnado pueda comunicarse de forma más efectiva en esta lengua, ya que para lograrlo se necesita el conocimiento de, al menos, 2.000 o 3.000 palabras (ej., Nation & Waring, 1997; Schmitt & Schmitt, 2014; van Zeeland & Schmitt, 2013). Al mismo tiempo, sería conveniente que esta enseñanza de vocabulario incluyese actividades basadas en exposiciones auténticas a la lengua que permitan afianzar los conocimientos para poder practicar y reforzar el vocabulario aprendido en los libros de texto y materiales curriculares.

Ahora bien, a pesar de que los estilos de aprendizaje de percepción de los informantes no influyen en el conocimiento de vocabulario productivo, sería conveniente que el equipo docente tratase de adaptar los materiales de enseñanza a los estilos de

aprendizaje de su alumnado para que puedan mejorar su aprendizaje, dando lugar a una instrucción equilibrada. De esta manera, al incluir todas las preferencias de aprendizaje en la enseñanza del estudiantado, sin que se favorezca un estilo de aprendizaje de percepción específico, se fomentaría exponencialmente la motivación de los estudiantes (ej., Natividad & Batang, 2018; Payaprom & Payaprom, 2020). En resumidas cuentas, la aparición de nuevas metodologías de enseñanza que se basan en un enfoque más centrado en el alumnado sería beneficiosa para el estudiantado español aprendiz de inglés como lengua extranjera, tanto en su aprendizaje de la lengua en general, como en el aprendizaje de vocabulario en particular.

Sin embargo, dado que no es posible conocer los estilos de aprendizaje de percepción preferidos por el alumnado que va a utilizar cada libro de texto, sería aconsejable que los diseñadores editoriales incluyeran un número equilibrado de palabras y actividades perceptuales que atiendan a los diferentes estilos de aprendizaje. De este modo, todos los estilos estarían representados equitativamente, así como los diferentes estilos de aprendizaje de percepción de los aprendices de inglés como lengua extranjera, independientemente de que sean unimodales o multimodales. De igual forma, es importante que los diseñadores editoriales sean cuidadosos con el vocabulario a incluir en los libros de texto porque, tal y como se demuestra en esta investigación, varía el input de los dos libros de texto analizados. Esto implica que los aprendices de inglés como lengua extranjera que participan en ambos programas de inglés no recibieron el mismo input, pudiendo ser problemático cuando todo el estudiantado tiene que aprobar el mismo examen para entrar en la universidad. Por esta razón, el equipo docente de inglés debería ser igualmente cuidadosos en la elección de los libros de texto porque se ha demostrado que influyen en gran medida en el vocabulario productivo del alumnado. Además, si quisieran conseguir una enseñanza equilibrada, sería conveniente para el estudiantado que los libros incluyesen los diferentes estilos de aprendizaje de percepción, así como el mismo número de palabras debido a que nuestro estudio mostró la diferencia entre los tipos y la ocurrencia de dichos tipos en ambos libros.

No obstante lo anterior, esta tesis doctoral presenta una serie de limitaciones por las que los resultados obtenidos no podrían ser extrapolados a todo tipo de investigaciones. Por un lado, destacan las limitaciones relativas a la muestra utilizada, donde conviene resaltar el reducido tamaño de los informantes, ya que solamente se logró la participación de 60 estudiantes de 2º de Bachillerato de un único colegio público de educación secundaria de la comunidad autónoma de La Rioja (España). Existen

limitaciones respecto de los instrumentos de recolección de datos. Por ejemplo, los resultados obtenidos en el cuestionario *Learning Style Survey* (Cohen et al., 2009) no han podido ser comparados con otros cuestionarios de estilos de aprendizaje de percepción para poder comprobar si se obtiene alguna similitud entre ellos. Tampoco se realizaron entrevistas orales con los informantes para poder determinar si los estilos de aprendizaje de percepción que utilizan en el aprendizaje de inglés coinciden con los que ellos creen que tienen. De la misma forma, es importante señalar que solamente fue implementada la primera parte del cuestionario *Learning Style Survey* señalado anteriormente, considerando un único tipo de estilos de aprendizaje. Al investigar exclusivamente los estilos de aprendizaje de percepción, no se tuvieron en cuenta otras diferencias individuales como, por ejemplo, aptitud, cultura, estrategias de aprendizaje, motivación o personalidad, entre otras, que podrían haber influido en los resultados explicados anteriormente.

Resulta necesario destacar que solo se analizó el nivel de las 2.000 palabras más frecuentes de vocabulario productivo controlado. Los demás niveles no se distribuyeron, pudiendo haber alterado los resultados. Además, solo fue empleado un instrumento (PVLT) para medir este tipo de vocabulario productivo, sin ser contrastado con otras pruebas de vocabulario productivo (controlado y libre), lo que podría haber afectado también a los resultados. En lo que respecta a la producción léxica, al utilizarse por primera vez las seis categorías semánticas relacionadas con los estilos de aprendizaje en una prueba de disponibilidad léxica, no se pudieron comparar estos resultados con los de otros estudios.

Otra de las limitaciones encontradas hace referencia a que solo se analizó un único libro por cada uno de los programas de inglés en los que participan los informantes de este estudio: el Programa de Colaboración con la Escuela Oficial de Idiomas y el programa de inglés como asignatura curricular. En este sentido, los resultados obtenidos en esta investigación no pueden generalizarse a menos que se analicen más libros de texto por cada programa de inglés y más colegios en los que se estudien dichos programas.

También existen limitaciones en lo que respecta a la clasificación de palabras y actividades. En lo que se refiere a la clasificación de las palabras en perceptuales y no perceptuales, como se explica en el Capítulo 6 (p. 130), existen listas de predicados en la literatura de Programación Neurolingüística (e.g., Transform Destiny, 2015; Rayner Institute, 2015; Brefi Group Limited, 2004; Juiced Concepts Limited, 2012; NLP Dynamics Ltd, 2013) para clasificar las palabras perceptuales. Sin embargo, estas listas

son limitadas porque no recogen una gran cantidad de palabras, y aquellas que aparecen tienden a repetirse en las distintas listas. Por lo que se conoce hasta el momento, no existe un diccionario de predicados perceptuales, lo que podría haber facilitado considerablemente la clasificación de este tipo de palabras. Para esta clasificación, se han considerado otras fuentes para tomar una decisión objetiva, como la definición de las palabras en dos diccionarios (Cambridge y Collins), los valores de imagibilidad, y un diccionario de emociones. Por esta razón, aunque se han utilizado fuentes fiables para clasificar las palabras de forma objetiva, algunas de las clasificaciones realizadas podrían ser cuestionadas.

Del mismo modo, tampoco existe un criterio consolidado para clasificar las actividades perceptuales de los libros de texto para la enseñanza de inglés como lengua extranjera. Siguiendo los limitados estudios (Mattheoudakis & Alexiou, 2015; Pänkäläinen, 2012; Šimová, 2011) que han analizado actividades perceptuales, la clasificación se realiza siguiendo las características pertenecientes a cada estilo de aprendizaje de percepción explicadas en la literatura. Como ocurre con las palabras perceptuales, esta clasificación también podría ser cuestionada.

Por todo ello, y considerando las limitaciones explicadas anteriormente, existen diversas áreas en las que se podrían realizar futuras investigaciones. En primer lugar, sería conveniente incrementar el tamaño de la muestra de informantes, ampliando el número de institutos públicos, concertados, e incluso privados de la comunidad autónoma objeto de estudio, o incluso extendiendo la muestra a otras comunidades autónomas para poder comparar los resultados. En ese caso, al incluir un mayor número de institutos públicos, sería posible aumentar el número de libros de texto que utiliza el estudiantado en el aprendizaje de inglés, para así poder comprobar si existe algún tipo de tendencia. En segundo lugar, futuros estudios podrían implementar más cuestionarios que midan los estilos de aprendizaje de percepción para determinar si se obtienen resultados similares. Otras investigaciones podrían incluir observaciones y entrevistas orales con los informantes para identificar si las preferencias que creen tener según el cuestionario coinciden con las preferencias que en realidad tienen al aprender, solucionando así la limitación expuesta anteriormente. Asimismo, se podría medir el vocabulario productivo libre a través de actividades comunicativas, escritas, o ambas para obtener más información sobre el vocabulario productivo de los informantes. Como se ha sugerido en las limitaciones, otras investigaciones podrían añadir más diferencias individuales (ej.,

creatividad, aptitud, motivación, estrategias de aprendizaje) para tener una visión más concreta del proceso de aprendizaje de lenguas extranjeras.

Además, se podría llevar a cabo un estudio longitudinal tanto al principio como al final del curso académico de 2º de Bachillerato para comprobar si se obtienen los mismos resultados. Primero, se podrían distribuir los cuestionarios *Learning Style Survey*, *Productive Vocabulary Levels Test*, y una prueba de disponibilidad léxica para examinar los estilos de aprendizaje de percepción, el vocabulario productivo controlado, y la producción léxica de alumnos españoles aprendices de inglés como lengua extranjera. Después, sería conveniente implementar un programa de instrucción en estilos de enseñanza y estilos de aprendizaje para que tanto los profesores como los estudiantes se familiaricen con otras maneras de enseñanza y aprendizaje. La instrucción de vocabulario podría realizarse a través del libro de texto, pero también mediante exposiciones auténticas a la lengua. De esta manera, tras conocer los estilos de aprendizaje de su alumnado, el equipo docente podría diseñar ejercicios de vocabulario que se adapten a sus distintos estilos (ej., lecturas, vídeos, juegos de roles) con el fin de incrementar su vocabulario. Al final del curso académico, resultaría interesante rehacer el estudio para ver si ha ocurrido algún tipo de mejora tanto en el vocabulario productivo controlado como en la producción de palabras mediante la prueba de disponibilidad léxica.

Para la clasificación de las palabras perceptuales, sería útil compilar una lista completa de palabras perceptuales y sus tipos (visual, auditiva, táctil/kinestésica) o incluso crear un diccionario con esas palabras para poder solucionar dicho problema. Además, futuros estudios podrían decidir criterios específicos para la clasificación de las actividades perceptuales recogidas en los libros de texto con el fin de incrementar su objetividad. También se podría analizar cada actividad relacionada con cada estilo de aprendizaje perceptual para comprobar cualquier limitación. Por ejemplo, en el caso de las actividades auditivas, sería interesante explorar cuáles son aquellas que fomentan la comprensión, la producción, o ambas para determinar si un tipo concreto de esas actividades prevalece sobre otras.

En lo que se refiere a la producción léxica, futuras investigaciones podrían analizar los tipos de asociaciones (semántica, formal, y enciclopédica) entre las categorías semánticas y las palabras producidas en cada una de ellas o también entre las propias palabras producidas en cada categoría semántica. Sería interesante determinar el nivel de las palabras producidas y ver si los informantes que obtuvieron un mayor vocabulario productivo controlado producen palabras de mayor nivel. Asimismo, se podría comparar

el nivel de frecuencia de las palabras producidas por los informantes que cursan el Programa de Colaboración con la Escuela Oficial de Idiomas y los que cursan inglés como asignatura curricular para determinar si los del primer programa producen palabras menos frecuentes, lo esperado con estudiantado que tiene un nivel de inglés más avanzado. Se podría también clasificar las palabras producidas en respuesta a las categorías semánticas ‘Town’ y ‘Hobbies’ en perceptuales y no perceptuales, y los diferentes tipos de palabras perceptuales, para ver si predomina un estilo de aprendizaje de percepción específico.

En definitiva, a pesar de las limitaciones explicadas anteriormente, esperamos que se trate de un estudio que permita conocer con profundidad el proceso de aprendizaje de inglés como lengua extranjera a través de variables individuales, tales como los estilos de aprendizaje de percepción, el vocabulario productivo de aprendices de inglés como lengua extranjera, así como el input de los libros de texto.

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