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The Effect of Metatalk on L2 Spanish Vocabulary Development

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The Effect of Metatalk on L2 Spanish Vocabulary Development

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Dedicated to Mathias Hatch-Tocaimaza

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The Effect of Metatalk on L2 Spanish Vocabulary Development

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Prior research has supported the development of language through interaction (e.g. Swain, Brooks & Tocalli Beller, 2002; Swain, 2005). Following Sociocultural theory (SCT) notions (Vygotsky, 1978), metatalk (MT) is claimed to be a specific aspect of interaction that leads to language development (e.g. Swain & Lapkin, 2002; Swain, 2005). This study takes a step further to explore the relationship between MT and language development by inquiring specifically about vocabulary development. Learners of Spanish as a second language completed a dictogloss activity and their interactions were recorded, transcribed, and analyzed. The analysis of lexical language-related episodes (LLREs) was carried out by adopting Sociocultural theory as a theoretical framework in order to trace lexical development in interaction through MT. Conclusions indicate that (1) because MT is a cognitive and semiotic tool that enables lexical development by means of participation in socially-mediated activities it is comparable to other forms of speech in their mediation functions and potential; (2) learners' MT included the analysis of meaning, spelling, pronunciation, and word function, and reflected SCT concepts such as agency, situatedness, and task versus activity that explain their reliance on the word depth knowledge construct; and (3) SCT principles (e.g. roles, regulation) provide a window into learners' transformation and imminent development during MT. Inferencing strategies and

interaction features contribute further details to the analysis of how MT unfolds. New categories describing MT in interaction emerged from the data and illustrate how learners object-regulate and position themselves in the task. These results provide a detailed account of how MT occurs in collaborative settings to mediate vocabulary knowledge. This research contributes to the study of L2 vocabulary learning through the application of SCT.

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Chapter 1: Vocabulary development and metatalk

The *nature* versus *nurture* debate presents two opposing views on how languages are learned. According to the first position, learners learn language via the innate knowledge about language they possess, whereas the latter assumes that language development is inspired and conditioned by the environment; that is, through the interactions in which learners engage (Ziglari, 2008).

Interaction is defined as communication in which interlocutors exchange ideas, overcome communicative obstacles, modify their utterances, and help each other understand the message (R. Ellis & Heimbach, 1997). Followers of the interactionist position emphasize that such interaction is crucial to language learning because it provides second language (L2) learners with opportunities to experiment with the target language and its functions (García & Asención, 2001; Storch, 1999; Swain, 1985). Indeed, researchers have asserted that language learning does not emerge as a result of interaction, but rather that it happens *during* interaction (R. Ellis, 1999; Mackey, 1999; Suzuki & Itagaki, 2009; Swain, Brooks & Tocalli-Beller, 2002). This idea is assumed in the present study on lexical development and is supported by prior research findings on the role of interaction in facilitating vocabulary learning (Mackey & Goo, 2007, as cited in Gor & Long, 2009).

Brooks and Donato (1994) and Brooks, Donato and McGlone (1997) discuss specific features of learners' language during interaction. One of these features is *talking about the talk* or '*metatalk'* (MT). MT is commonly defined as learners' talk about their language or that of others; i.e. learners' looking at language as an object of inquiry. For example, MT occurs when learners, working on a collaborative task, pause to address a lexical aspect of a word that emerges in the interaction, such as its spelling or meaning. As

learners discuss the spelling or meaning of a given lexical item, language ceases to be a means of communication and becomes an object of inspection as well as a means of learning. Excerpt 1.1 from Storch (2008) shows how two learners of English employ MT as a means of learning.

Excerpt 1.1. Metatalk and word meaning (Intermediate learners).

76 N: Pensions…

77 R: Dictionary.

78 N: Pensions is the money no?

79 R: Pension money?

80 N: Yeah … when the people retire.

81 R: Uh-uh

82 N: The government also private company.

83 R: Uh-uh

84 N: Give the money back they…

85 R: OK… I must misunderstand that… so over half.

(Storch, 2008, p. 102)

Excerpt 1.1 illustrates how R and N focus on the word 'pension'. During the interaction, learners are able to define the target word as referring to 'money people receive when they retire'. Through MT, learners gained new insights about the meaning of the word 'pension'.

In the second language (L2) acquisition field, the study of MT is relevant because its occurrence has been linked to L2 development and acquisition (Swain, 2005; Swain & Lapkin, 2002; Vanderheijden, 2010). Indeed, it has been found that MT enables learning during interaction because it serves as a vehicle for students to deepen their awareness of form, rules, and their relationships; as such, MT is language used for cognitive purposes that enable the development of knowledge resulting from the linguistic exchange (Swain,

1998). Metatalk is the specific interaction feature at the core of this study on L2 vocabulary. The scope of this study is the role of MT in facilitating the learning of lexical target items during interaction (Mackey & Goo, 2007 as cited in Gor & Long, 2009). My goal is to examine what happens in vocabulary development when MT is present in interaction. This is accomplished by analyzing both *how* MT occurs in interaction and *what* learners accomplish through it.

The concept of language as a tool that promotes language development is a key notion within Sociocultural Theory (Vygotsky, 1978), the theoretical framework adopted in this study on vocabulary learning through MT. Sociocultural Theory (SCT) is a psychological theory that can be applied to second language acquisition (SLA) to shed light on the inseparable connection between social interaction and cognition. In addressing both the social and cognitive aspects of an interaction, SCT contemplates how interlocutors work together to solve problems and gain linguistic knowledge. Hence, knowledge is constructed by interaction, and learning is the internalization of that knowledge via the social interaction.

Storch's (2002) findings illustrate learning resulting from interaction. The author analyzed dyadic interaction in an English as a Second Language (ESL) setting over one semester. The target of the activities was the development of skills, such as academic writing. Following the analysis of the dyadic interactions, Storch examined the learners' performance on individual items originally discussed during pair talk and found evidence of knowledge transfer. For instance, the author comments on the erroneous use of the word 'Vietnamese' as a noun by one of the learners during pair talk. This misconception was corrected by one of the interlocutors during the interaction and later, in subsequent individual compositions, the term 'Vietnamese' was used correctly by the learner who had been corrected during interaction, thus indicating that there was knowledge transfer.

SCT's foundational principle is that mental processes are enabled by social tools, such as language, signs, and symbols (Lantolf, 2000). In SCT terms, it is said that mental processes are *mediated* or enabled by such tools that allow individuals to take control and master their environment according to their motives (mediation is further discussed in section 1.1.3.1). Therefore, the application of SCT to the study of language development does not limit language as a means of communication, but views it as a cognitive and symbolic tool that enables development (Donato, 2000; Kowal & Swain, 1997; Norris & Ortega, 2000; Swain, 1998; Swain & Lapkin, 1995; Swain & Lapkin, 1998). Additionally, this theoretical framework provides insight into the L2 learning process; in this study, the process of learning vocabulary is revealed through categories of analysis such as roles (to be discussed in section 1.1.3.1) which show how learners behave and create knowledge during their interactions (Aljaafreh & Lantolf, 1994; Kowal & Swain, 1997; Lantolf & Pavlenko, 1995; Nassaji & Swain, 2000).

MT research in language development has concentrated on several methodological issues, such as the type of task to be implemented (Fortune & Thorp, 2001; Fortune, 2005; Storch, 1999; Suzuki & Itagaki, 2007; Vanderheijden, 2010), the analysis of language-related episodes (LRE) from linguistic and extralinguistic perspectives (Antón & DiCamilla, 1998; Brooks et al., 1997; DiCamilla & Antón, 1997; Ohta, 1995; Platt & Brooks, 2002; Storch, 2002; Swain & Lapkin, 1995), and the development of particular linguistic targets, such as spelling or collocations (e.g. García & Asención, 2001; Kim, 2008; Lapkin, Swain, & Smith, 2002; Swain, Lapkin, Knouzi, & Brooks, 2009; Tocalli-Beller & Swain, 2007); nevertheless, many unanswered questions remain in MT research. A major lapse in the literature relates to the fact that there is no clear consensus on the definition of MT in the research. Most authors agree on a core definition that refers to learners' speech about their own language. However, there are other practicalities in terms

of boundaries for MT that diverge from one publication to the other that make the examination of the effects of MT in language development particularly challenging. For example, Brooks et al. (1997) consider a student's comment in which he mentions his preference for a word to be an instance of MT. This example presents a facet of MT apart from the learning function generally agreed upon by researchers (e.g. Suzuki & Itagaki, 2007; Vanderheijden, 2010).

Additionally, many studies have focused on the development of grammatical concepts through MT (e.g. pronominal verbs in Lapkin et al., 2002; voice in Swain et al., 2009), while others have analyzed collected data and described the emergence of both grammatical form and lexis (e.g. Swain & Lapkin, 1998). However, no in-depth study has been carried out solely on the effects of MT on lexical development following SCT notions. Consequently, since the study of the lexicon and MT has been thus far neglected, no concrete categorizations exist in the SCT literature describing how the lexicon emerges within the social realm to become knowledge as mediated through language.

Considering prior research and their limitations, I propose to study the relationship between lexical development and MT by operationalizing a definition of MT rooted in SCT notions. In this study, MT is defined as the verbalization of lexical aspects of the target language, and, with the adoption of an SCT framework, MT is also defined as a cognitive and semiotic tool that enables or mediates lexical development. Following this theoretical framework, learners adapt their interactions based on their own needs, desires and knowledge, and, in so doing, they adapt the task and shape their own learning. Verbalization under these conditions creates a fertile context for the occurrence of Zones of Proximal Development (ZPDs), which are defined as the mechanisms through which internalization and development operate (J. Lantolf, personal communication, November

22, 2011). It is in a ZPD (further discussed in section 1.1.3.2) that development occurs as social verbalization, and that verbalization creates thought and inner lexical knowledge. Hence, under this definition, MT is assumed to occur naturally in collaborative tasks as learners encounter a lexical problem that they work on together (Brooks et al., 1997; Swain 2001b). Additionally, the inquiry into lexical development based on the SCT tradition of peer-peer dialogue analysis allows me to identify systematic and descriptive categorizations of how lexical development is enabled through MT. This is one area that is lacking in the literature on SCT and SLA, to which this study contributes.

Lastly, due to the nature of vocabulary, wherein each vocabulary item comprises several layers of knowledge (e.g. meanings, synonyms, collocations), I propose that studying the development of vocabulary through MT will shed light on MT's effectiveness in mediating and organizing layers of knowledge about a single word, a concept otherwise known as *word depth knowledge* (Grabe, 2009; I. S. P. Nation, 2001). The word depth knowledge construct presents an overview of the various components of a word, which are divided into three main areas of knowledge: form, meaning, and use. 'Form' consists of spoken, written, and word parts knowledge; 'meaning' refers to associations, concepts and referents, and meaning; and 'use' includes grammatical function, collocations, and constraints for a word. Therefore, SCT enables the analysis of the lexical development process as it occurs in interaction, and the word depth knowledge construct serves as a measurement of vocabulary achievement.

In review, previous studies found evidence for the development of language through interaction (e.g. Swain, 2005; Swain & Lapkin, 2002). Within those studies that are carried out within the SCT framework (e.g. Swain, 2005; Swain & Lapkin, 2002), MT has been posited as a specific aspect of interaction that leads to language development. The current study builds on those assertions and takes a step further by inquiring about the reach

and effect of MT on development; particularly, of the lexicon. This analysis of lexical development will be done by operationalizing a definition of MT rooted in SCT that sees interaction in collaborative tasks as a tool that mediates lexical knowledge. Through this analysis of lexical development, we can better understand the lexical development process as it unfolds in interaction by utilizing the word depth knowledge construct as a measurement of vocabulary development.

In the remainder of this chapter, I address SCT, the theoretical framework of this study, in detail. Next, I discuss MT in terms of its functionality in language acquisition and in lexical development. Lastly, I refer to the concept of word depth knowledge as it applies to this study. This introductory section on SCT, MT, and word depth knowledge leads to the goals of my study, which are followed by a discussion of the significance and contributions of this research to the SLA field, and the outline of this dissertation. Appendix A includes a list of abbreviations and key terms.

1.1. THEORETICAL FRAMEWORK: SOCIOCULTURAL THEORY

This section introduces SCT, the theoretical framework adopted in this study, by referring to the different components of this theory of the mind, and its significance and contributions to the study of L2 language development. I begin with a comparison between Cognitivism, the theory used most prevalently in the field of SLA to date, and SCT. I reflect on the two approaches in regards to the study of language development and how the nature of this study favors SCT as a theoretical framework. Second, I introduce the origins of SCT in the Russian psychologist Lev Vygotsky's (1978) ideas. Third, I describe pivotal concepts in SCT; namely, *mediation*, *regulation*, *the zone of proximal development* (ZPD), *scaffolding*, *internalization*, *roles*, speech as mediation in its various forms, the concepts

of *continuous access*, *agency*, *affordances*, *the genetic method*, *the unit of analysis in SCT*, and metaphors and lexical knowledge in SCT.

1.1.1. SCT vs. Cognitivism and the study of language development

Cognitivism is a theoretical framework that aims to understand the mind and its cognitive capacities. The application of the cognitive framework to language learning consists of understanding mental abilities in relation to language learning. A basic distinction between Cognitivism and SCT arises from their opposite views on *learning* and *acquisition*. Sfard (1998) addressed two basic metaphors that underlie knowledge: the *acquisition* and the *participation* metaphor. While the *acquisition metaphor* observes knowledge as a commodity that a learner accumulates over time and focuses on the process of knowledge internalization, the *participation metaphor* is concerned with the individual's becoming a member of a community and stresses contextualization and engagement with others (Pavlenko & Lantolf, 2000). Depending on the metaphor a researcher embraces, learning is viewed differently. For some researchers, participating and communicating is sufficient evidence of learning; for others, participation is not sufficient evidence. Cognitive approaches to the study of language acquisition are based on the acquisition metaphor of learning, whereas Sociocultural Theory (SCT), while not denying cognitive processes, connects such cognitive processes with social processes of participation and interaction (Van Lier, 2000).

In this section, cognitive approaches to language learning are discussed and compared to SCT within the socio-constructivist theory. A rationale is then presented for the adoption of SCT as the theoretical approach embraced in this dissertation on vocabulary development through MT.

Historically speaking, tension emerged in the 1960s between cognitive and socio-anthropological aspects of language, with the former concentrating on mental functions while the latter focused on social features, such as culture. Since then, the SLA field has mainly followed a cognitive orientation. For example, followers of Chomsky's Universal Grammar (UG) see the matter of L1 acquisition as rooted in the individual's mind and brain (Firth & Wagner, 1997). As a result, cognitive processes such as competence and interlanguage development are prioritized over descriptions of communicative processes and information transfer among individuals in L2 settings. The individual's knowledge gain is the main concern. Cognitivism marginalizes and at times ignores the social and contextual aspects of language, perceiving them as superficial (Donato, 2000). In interactions, the native speaker's language represents the standard. In short, Cognitivism emphasizes 'etic' (scientist-oriented) concerns over 'emic' (participant-oriented) ones. In terms of research design, Cognitivism favors repeatable experiments that may require controlled environments and variables, thus requiring the researcher's manipulation of experimental settings over naturalistic ones. In all, Cognitivism presents a concern with language in general over communicative success. Linguistic errors are not explained as stemming from a sociolinguistic or discursive factor but rather from a lack of competence (Donato, 2000; Firth & Wagner, 1997; Thorne, 2000).

Other researchers (e.g. Swain) argue in favor of a constructivist approach to language learning, in which learners take an active role and are placed at the center of the learning process. These researchers propose that in order to understand cognition, learning must be studied as it arises in performance. SCT offers this shift in which not all cognition is explained in terms of internal or mental processes; instead, SCT sustains that verbal and non-verbal interactions lead to learning and the negotiation of meaning, as it occurs in interaction, allowing for the observation of learning processes at work (Van Lier, 2000).

SCT views language learning as essentially social, a process in which internal mental processes derive from constructions and representations originating among individuals during interaction. These interactions serve a central role in learning that goes beyond a source of input. Hence, learning is a semiotic process attributed to participation in socially-mediated activities. Mediation is a key concept in the process of learning (discussed in detail in section 1.1.3.1) and it refers to the use of tools to accomplish goals. Regarding language learning, language itself becomes a tool that mediates learning. As such, language learning constitutes a semiotic process linked to participation in socially-mediated activities; it is through mediation that the social and mental domains intertwine (Donato, 2000; Swain & Deters, 2007).

Contrary to cognitive notions, the individuals and their agency are central in SCT. In research designs, SCT takes into consideration how learners transform their environment instead of only the way they conform to it. Thus, no amount of experimental management can deflect learners' agency and control over their activities. In other words, SCT does not manipulate tasks, but rather considers how a learner's values, assumptions, or beliefs change the task (Donato, 2000). As discussed earlier, SCT followers pursue a more ecological approach to language learning, in which the social component of communication is highlighted and the mere consideration of language as a simple conduit to transfer messages is rejected. SCT insists on the role of language as an enabler of knowledge (Brooks & Donato, 1994; Yilmaz, 2005).

The study of language development under SCT is the observation of how mediational means are appropriated by the individual as a result of dialogic interactions with other individuals (Aljaafreh & Lantolf, 1994). Upon considering the role that language carries in mediating language development, it can be argued that SCT provides the SLA researcher with a view of cognitive processes unfolding in an individual's mind as language

emerges in its different dialogic forms, whether in conversing with a peer or with oneself (Lantolf, 2000). SCT allows for capturing development 'in flight' through two indicators of observable development: changes in *quantity* and in *quality* of mediation, as provided through language itself during meaningful interaction (Poehner, 2007).

In summary, Cognitivism follows the *acquisition metaphor* in which the individual and cognitive processes are highlighted. Knowledge gain is measured, while social and environmental factors are ignored. SCT views learning as *participation,* and it makes language more than a means of transferring messages but rather the means to further linguistic knowledge. Individuals and their social settings are considered as they are involved in dialogic interactions. As a result, SCT allows the researcher two advantages in the study of language development though interaction: first, it offers a window to the development process; and second, it is suited for the analysis of collaborative language (DiCamilla & Antón, 1997).

Vygotskian Sociocultural Theory adds clarity to studies on interaction and negotiation of meaning as it contemplates how interlocutors work together in constructing language, solve problems, and assist each other (Lantolf, 2000; Vygotsky, 1978). Furthermore, SCT does not limit language to its role of a means of communication; but it views language itself as a cognitive and symbolic tool that promotes language acquisition (Donato, 2000; Kowal & Swain, 1997; Norris & Ortega, 2000; Swain, 1998, Swain & Lapkin, 1995, 1998). In other words, and according to this line of reasoning, we utilize language not only to communicate a message, but also to serve as a thinking tool (Brooks et al., 1997). When referring to language as a tool, it is no longer an object that enables us to transmit a message to another interlocutor; it as a symbolic tool that enables a process (Norris & Ortega, 2000). Based on these notions, SCT provides an ideal frame for the analysis of lexical development as it affords the researcher a window between social

interaction and language development and the observation of language in its capacity to mediate the lexicon through collaborative talk (Donato & McCormick, 1994; Ohta, 1995). Additionally, SCT underscores the importance of conceptualizing language learning as a socially-driven developmental process occurring in a social setting; in this study, the L2 classroom (Wertsch, 1991, 1998, as cited in Donato, 2000).

To conclude this section, a partial excerpt from Fortune (2005) exemplifies how lexical knowledge emerges during a collaborative task as learners participate in a shared task. The excerpt illustrates how learners work through the words 'blindly' and 'conform'.

Excerpt 1.2. Deciphering meaning (Advanced learners).

1 B: … Her son, warned her son never conform blindly.

2 A: Never conform.

3 B: Blindly to the crowd.

4 A: Blindly to the crowd.

5 B: The meaning.

6 A: [INT][1]

7 B: Blindly is like somebody is blind, he doesn't see.

8 A: Yes.

9 B: He cannot see…

10 A: [INT] mean, not, don't, like a normal person.

11 B: Yeah, I guess so, oh my God…to conform, I need the right [INT] … yeah, this is to conform is actually to do what someone else does [INT] the society.

12 A: [INT]

13 B: Has that behavior, me too…so the mother warned him to, to yeah.

[1] Unintelligible. Additional transcription conventions are located in Appendix C.

14 A: What [INT] other people.

15 B: Actually not try to.

16 A: Try to do the thinking.

17 B: Not [INT] never conform, she does never, yeah, she advises him to do so, like like somebody else but never.

18 A: Don't do.

19 B: Yeah, okay, don't do like someone else does, blindly, actually this adverb, we have it in our language it say so I think if you are studying maybe I am looking what what you are doing and it's a good thing yeah I can conform, yeah, if you are maybe taking drugs, I have to use my brain to decide this is not good so I don't.

(Fortune, 2005, p. 30)

In Excerpt 1.2, one of the learners inquires as to the meaning of the term 'blindly', to which his interlocutor responds by supplying an explanation of a related term, 'blind'. At a later turn, an explanation of the term 'conform' is provided and mutual understanding of the definitions of the terms are scaffolded. Besides meaning, word function is discussed as well. Thus, new lexical knowledge emerges from this interaction that includes the meaning of the words 'blindly' and 'conform' as well as an understanding of the function of the term 'blindly'. This knowledge emerges through participation in a collaborative task. SCT highlights the participation and collaboration that result in lexical development.

1.1.2. Origins of Sociocultural Theory

SCT has its origins in the writings of the Russian psychologist Lev Semenovitch Vygotsky (1896-1934) and his colleagues. In his research, his goal was to unify semiotics, neurolinguistics, psychology, and psycholinguistics into one theoretical framework that had at its core the exploration and explanation of function and development in the human

mind. Between 1925 and his death in 1934, together with his colleagues A. R. Luria and A. N. Leont'ev, Vygotsky redefined his ideas into a sociocultural theory of human mental processing.

At the foundation of Vygotsky's ideas is the study of consciousness. Vygotsky argued that because psychology had refused to study consciousness, it had deprived itself from access to complex problems of human behavior. He saw consciousness not only as awareness of one's cognitive skills, but as a self-regulatory mechanism that enables humans to solve problems on their own. In his view, consciousness emerges and develops as people interact with reality. As such, Vygotsky argued that socially meaningful activity must be considered as the explanatory principle for consciousness development. Vygotsky viewed concrete and symbolic activity in interaction linking humans to each other and to their artifacts; therein lies the importance Vygotsky gave to the social setting, an aspect that differentiates this theory from most other theories of mental development.

Vygotsky insisted that the sociocultural setting is the primary and determining factor in development. Biological factors are necessary for elementary processes to emerge, but sociocultural factors constitute the basic condition for natural processes to develop. In this manner, lower order mental functions, or input systems such as vision, hearing, and natural memory develop into higher order mental functions (logical memory, voluntary attention, planning, perception, problem solving). This transformation is enabled through the mediating function of culturally constructed artifacts, which include tools, symbols, and other more elaborate sign systems, such as language itself. Lastly, Vygotsky also called for the redefinition of 'development' from a quantitative to a qualitative problem (Lantolf & Appel, 1994), thus highlighting the transformation process over its outcome.

1.1.3. Pivotal concepts of Sociocultural Theory

1.1.3.1. Symbolic mediation

As humans assimilate to the world in which they live, they also attempt to control and master their environment. This need for control has led to the creation of tools that allow individuals in collaboration with other individuals to shape the world according to their motives. Tools function as mediators, or instruments between the subject and the object or goal, towards which the action is performed; they exert a change. They are created by people under specific cultural and historical conditions, and reflect the characteristics of their culture. They are directed outwardly toward the physical world (Lantolf & Appel, 1994). Psychological tools (also known as 'artifacts') include various kinds of human cultural constructions, such as numbers and, the most powerful of all, language (Lantolf & Thorne, 2006).

Tools allow us to gain control, organize mental activity (e.g. rational thinking and learning), and develop higher mental functions. Higher mental functions are different from elementary mental functions because elementary functions are heavily influenced by environmental circumstances, while higher functions are under voluntary control of the person (self-regulation); higher functions are subject to conscious realization; elementary functions are biological in origin, but higher functions are historical in origin and in nature. This means that they develop from participation in sociocultural or cultural activities. Higher mental functions entail the use of psychological tools or signs to regulate the self as well as other individuals (Lantolf & Thorne, 2006).

The following example illustrates how higher mental functions are enabled, or mediated, though tools. In addressing quantitative operations, Vygotsky argued that the ability to see 'two' as a combination of 'one plus one' results from humans' initial use of concrete objects in the counting activity. At this initial stage, counting was dependent on

external stimuli from the physical environment. Eventually, a decontextualization took place, thus separating the counting activity from the physical environment. This shift from an activity that relies on the environment to an activity of the mind occurred with the help of tools (like counting) that aided in the development of higher mental functions (Lantolf & Appel, 1994).

Psychological tools may be outwardly directed towards others, as in the case of language for social communication, while at the same time they are inwardly directed to regulate and control the speaker's mental processes. This function of psychological tools is called *reversibility of the linguistic sign.* This reversibility explains that in interaction, a linguistic artifact is capable of changing us inwardly as it simultaneously changes our interlocutors. Hence, while physical tools are directed outwardly towards the physical world, psychological tools entail a dual directionality: what originates as social speech aimed at mediating or regulating others also regulates our own mental processes (Lantolf & Thorne, 2006).

Mediation in which symbolic and socioculturally-constructed artifacts enable mental activity is a fundamental tenet of SCT (Aljaafreh & Lantolf, 1994). Therefore, processes such as attending, predicting, planning, or monitoring—that is, higher cognitive processes—are mediated activities fueled by the interaction happening among individuals, where speaking and writing are indispensable (Swain, 2001a). In this manner, mental and sociocultural activity come together in a dependent, symbolically mediated, relationship that develops during ontogenesis (Lantolf & Appel, 1994).

The studies by Ableeva and Lantolf (2011) and Negueruela (2003) illustrate the study of mediation with L2 learners. Ableeva and Lantolf (2011) consider mediation in the development of listening skills. In their study, seven intermediate university L2 learners of French were assessed before and after an enrichment program. In the assessments, learners

were asked to recall information from video excerpts. During early assessment sessions, the researchers took note of learners' linguistic challenges, which were later addressed in the enrichment program. As part of their participation in the enrichment program, subjects worked with a peer or researcher who served as mediators during their collaborative tasks. In order to trace development of L2 listening comprehension skills, a 'pausal unit analysis' (PUA) was applied. They PUA identified the number of idea units contained in a speech stretch bounded by pauses produced during assessments. Results showed that idea units recalled in post-enrichment sessions were superior in number to those recalled in pre-enrichment assessment sessions. The authors concluded that listening comprehension skills improved as a result of working collaboratively with a mediator.

Negueruela (2003) discussed how knowledge of scientific concepts helps students develop grammatical knowledge because scientific concepts mediate understanding and the ability to apply newly learned grammatical features in new contexts. Negueruela implemented a systemic-theoretical instruction (STI) in an L2 advanced grammar class. STI consists of three pillars: the 'concept' as the pedagogical unit of instruction, 'materialization' of the object of study through didactic models and physical objects, and 'verbalization' aimed at internalization. The learners were taught the concept of aspect/tense by following procedures that aimed at materializing, verbalizing, and internalizing meanings (e.g. through the use of diagrams) instead of simply learning rules of thumb commonly introduced in language textbooks (e.g. use of the imperfect aspect to describe weather). According to Negueruela, learners needed to be introduced to these scientific concepts since gaining a conceptual understanding of a feature of language serves to shape or mediate cognitive development. Results showed that the knowledge of scientific concepts served as the tool that mediated learners' understanding and ability to reproduce the relevant grammatical features in new contexts.

In the current study, by adopting the Vygotskian concept of symbolic mediation, MT is viewed as a tool that allows the development of lexical concepts and enables knowledge development as it emerges between individuals during their interactions.

1.1.3.2. Metacognition: the Zone of Proximal Development and regulation

Zone of Proximal Development

Vygotsky originally theorized the Zone of Proximal Development (ZPD) in terms of child development. ZPD was first conceptualized as the difference between the child's developmental level in problem solving and the potential development gained under guidance and in collaboration with a more capable peer; often an adult or caregiver who plays the role of expert in the interaction where the child is the novice (Ohta, 1995).

Vygotsky observed how children learn activities such as work and play from society. The sociocultural setting provides the child with a variety of tasks and engages the child's attention in them mainly through the use of language. Parents, as representatives of the culture and the experts, guide their children, who are the novices, mostly by talking to them. ZPD considers the distinction between what children are capable of doing by themselves and what they are potentially capable of accomplishing with the help of another person. Lantolf and Appel (1994, p. 10) defined the ZPD, saying that "it is the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers". Lantolf (2000) clarified that the ZPD is not a physical place situated in time and space; it is rather a metaphor for understanding how mediation is appropriated and internalized. The ZPD is a collaborative construction of opportunities, also known as *affordances*, or occasions for individuals to develop their mental abilities (Van Lier, 2000).

Vygotsky concluded that learning can have the greatest impact when it occurs in the ZPD. In practical terms, targeting the ZPD in the learning process refers to offering appropriate mediation to help the individual exceed current abilities. Help that is found to be effective in the ZPD is 'graduated' (i.e. the expert or peer provides help according to the novice's skills), 'contingent' (offered only when needed), and both assessed and provided through dialogic activity, an essential notion in SCT (Aljaafreh & Lantolf, 1994).

The study by Aljaafreh and Lantolf (1994) exemplifies learning in the ZPD by means of error correction and negative feedback provided by a tutor during interaction. The notions of mediation and ZPD were employed in their study to analyze the interaction constructed between the learners and their tutor. The study included advanced ESL learners who, as part of a class assignment, wrote essays and had weekly meetings with a tutor who provided them feedback on their writing. The analysis of students' writing focused on four grammatical areas: articles, tense marking, prepositions, and modal verbs. Prior to each meeting, the tutor or mediator read the essay and made a plan of corrective procedures to be negotiated in the ZPD with the student. In order to assess improvement, developmental criteria were used that consisted of 5 levels. Lower levels indicated that the learners needed much guidance from the mediator while higher levels pointed an increased ability to control their own behavior and transfer of new knowledge into new contexts. The researchers concluded that whenever implicit feedback was sufficient to lead learners to correct answers, learners were high in the ZPD because of their independent performance and self-regulation. Conversely, those who required explicit feedback were low in the ZPD and required much guidance from a mediator in order to correct their errors. The study shows evidence of knowledge that arises from interaction and transitions from intermental (dialogic, joint, and between people) to intramental (within the individual) functioning as learners work with a mediator within their ZPDs.

The idea of assessing a learner's ZPD in order to provide the appropriate level of assistance has been explored under *dynamic assessment* (DA) within the SCT framework. DA constitutes an integration of teaching and assessment as a unified activity in order to provide learners exactly what they need in order to reach development (Lantolf & Thorne, 2007; Poehner & Lantolf, 2013). The main prerequisite of implementing dynamic assessment is being able to determine a learner's ZPD, which is accomplished through dialogic interaction (Ohta, 2000).

Poehner (2007) observed how individuals composing oral narratives in French developed writing skills with the aid of a tutor or mediator and the application of DA. As part of DA, mediators combined instruction and assessment into one pedagogical approach; through a method known as 'transcendence', individuals were supported by mediators in tasks that increased in difficulty over time. As part of the DA program, students met with a mediator outside of class to help them develop their oral skills. The task consisted of composing an oral past-tense narrative by recounting events from a video clip they had seen. During initial meetings, the mediator identified problematic aspects of the individuals' performance, mainly matters of verbal tense and aspect, which were addressed in later meetings. As observed in the analysis of interactions between the learners and their mediator, learners eventually were able to mediate themselves. TR was also observed as learners succeeded in extending their performance to new tasks, indicating that true development goes beyond improvement in one particular assessment task and emerges in subsequent tasks of increasing difficulty.

Upon describing the ZPD, Vygotsky considered a 'temporal' element to the construct by describing cognitive functions as 'buds' or 'flowers' of development that emerge in interaction (Vygotsky, 1978). The temporality of the concept implies that in order to identify the ZPD, there has to be evidence of long-lasting effects in the learners'

cognitive functions where the 'buds' or 'flowers' observed during interaction turn into something more concrete that shows that learners have indeed adopted or internalized the new knowledge. Devoid of the internalization that follows the interaction, ZPD is more closely aligned with scaffolding processes where a more knowledgeable participant creates supportive conditions for a novice with the intent to participate and extend current skills.

This temporality feature of ZPD has been adapted (Lantolf & Thorne, 2006) to the SLA field. While conservative stakeholders of the ZPD construct view it both as a situation in which problems are solved under the guidance of a peer (a tool to achieve results) as well as the concrete identification of knowledge resulting from the exchange (the actual result), a more progressive view of the ZPD takes the learners' participation rather than the result into consideration (Kinginger, 2002; McCafferty, 2000). Wells (1999) has adopted this later view of the ZPD and argues that it is during learners' participation that transformation takes place. Thus, instead of viewing development as progress towards some ideal, this new tendency focuses on the transformative nature of learning in the ZPD with an emphasis on the various changes occurring, such as the transformation of the activity setting caused by the problem-solving action, rather than the observation of an activity result (McCafferty, 2000). In the current study on lexical development through MT, I maintain a more progressive view of the ZPD in which transformations that support learning are observed.

Another adaptation to the ZPD in the SLA field refers to role taking in which assistance is provided by a more experienced individual or 'expert' (e.g. tutor, teacher, researcher, more proficient classmate). The ZPD scope has been broadened to include peer-peer interaction in which both participants collaborate and co-construct knowledge in the situated social context. In this collaborative context, participants can alternate the roles of expert and novice, and at times take no role at all (Lantolf, 2000). The ZPD concept is

essential in the current study as it allows the identification of transformations during interactions that contribute to vocabulary development.

Regulation

As people produce language and take and exchange roles during interaction, *regulation* in its various forms can occur. *Regulation* is defined as the response or behavior an individual presents when confronted with interactive stimuli. Upon returning to research with children, Vygotsky found that a child can eventually take over a larger portion of responsibility for strategic functions and become *self-regulated* without relying exclusively on *other-regulation* through dialogic speech from an adult. Therefore, *self-regulation*, or the subjects' control over their own behavior, emerges through repeated use of language as a mediating tool. The tool takes on heightened relevance for those individuals, like L2 learners, who begin to develop agency over their behavior (Lantolf & Appel, 1994; Lantolf & Thorne, 2006).

Self-regulation is inherently connected with one taking the role of expert in an interactive setting and regulating one's own actions. When an individual participates in a task where another fulfills the role of expert, the individual is being *other-regulated*. The roles of *expert* and *novice* can alternate; thus an individual can switch between being self-regulated or other-regulated (Alanen, 2003). Similarly, being self-regulated is not an absolute; once it has been achieved it is possible to encounter a task in which other-regulation is necessary. The transition from other-regulation, or intermental activity to self-regulation, or intramental activity, can take place in the ZPD.

A key aspect in regulation is the type of assistance provided between 'expert-novice' and 'peer-peer' interactions. Assistance from an expert to a novice is graduated and moves from explicit to more implicit levels. It is offered only when needed and

withdrawn once the novice shows signs of *self-regulation*. In peer interaction, there is no clear expert, and learners help each other to work jointly on a task (Ohta, 2000).

Self-regulation has been linked to *internalization*. Lantolf (2000) defined *internalization* as the mechanism through which transformation of functions occurs from the interpsychological to the intrapsychological plane. Interpsychological processes are the basis for higher mental processes occurring when one individual is mediated by another, more experienced, person. When learning from social interaction is internalized within a person, it is said that the learning has moved from an interpsychological place (social interaction between subjects) to an intrapsychological plane (the individual's cognition). In other words, internalization is the process through which a person moves by carrying out concrete actions with the assistance of material artifacts or other individuals, to carrying out actions mentally without assistance (Lantolf, 2000; Manning, 1991; Ohta, 2000). Through the process of internalization, members of communities of practice appropriate the symbolic artifacts used in communicative activity and convert them into psychological artifacts that mediate their mental activity. Thus, symbolic artifacts lose their exclusive unidirectionality and take on bidirectional functions (intended for social others but also having an effect on the self) (Lantolf, 2006). Hence, internalization is the process by which, in the current study, higher mental forms come to be vocabulary knowledge.

1.1.3.3. Scaffolding

A concept associated with ZPD, roles, and regulation is that of *scaffolding*. As previously mentioned, crucial to the Vygotskian framework is the concept of roles where a more knowledgeable participant can create supportive conditions for a novice to participate and extend current skills and reach higher levels of development (Nassaji & Swain, 2000). This support, provided by one individual to the other, is the essence of the

scaffolding metaphor. The concept of scaffolding was first introduced by Bruner (1978, as cited in Aljaafreh & Lantolf, 1994) in describing a mother's behavior toward her child regarding performing a task. The mother's scaffolded behavior includes (a) reducing the complexity of the task, (b) getting and keeping the child's attention, (c) offering models, (d) extending the scope of the present situation, and (e) providing support so the child can move forward.

Successful scaffolding can also occur in educational settings. Scaffolded behavior in this context includes (a) recruiting the tutee's attention, (b) making a task more manageable, (c) keeping directions in terms of the task goals, (d) marking critical features, (e) controlling frustration, and (f) modeling solutions to problems encountered in doing the task. In regards to the ZPD, when learning occurs during interaction with another individual, it is the mediator (expert) who adjusts the complexity of the interaction to facilitate the novice's mastery of the task, provides support, and encourages the novice to move forward. This mode of learning has been termed *mediated learning experience* (De Guerrero & Villamil, 2000).

In the L2 classroom, 'scaffolding' differs from the traditional scaffolding concept between caregiver-child or tutor-tutee situations. The most prevalent form of scaffolding in the L2 classroom is mutual scaffolding, which occurs between peers. Scaffolding in L2 development is mainly advanced by the more expert partner's behavior, which facilitates language development. Effective scaffolding in the L2 context has been described as being graduated or made appropriate to the learner's needs; learning assistance is accomplished through talking (Aljaafreh & Lantolf, 1994).

Studies on L2 peer scaffolding (e.g. Antón & DiCamilla, 1998; Brooks & Donato, 1994; Ohta, 1995) have shown that by working collaboratively, learners can influence each other positively in terms of development. Such positive effects can occur even when peers

have unequal capacities in the L2; hence, less advanced learners can profit from the other learners' expertise and assistance, while the more advanced learners can also benefit by refining, experimenting, and adjusting their own language. Additionally, the role of the L1 has been noted as a powerful mediation tool in the students' discourse in scaffolding situations (Antón & DiCamilla, 1998; DiCamilla & Antón, 1997).

The study by De Guerrero & Villamil (2000) describes how scaffolding is manifested in the L2 classroom. The authors noted consistent patterns of behavior and attitudes in a study that centered on interaction in the L2 classroom between a reader and a tutor or writer. Their main findings are also applicable to other scaffolding contexts among L2 learners. Behaviors by the tutor include (a) recruiting and maintaining interest, (b) marking critical aspects or discrepancies in the writer's text, (c) explicitly instructing on issues of grammar and mechanics, and (d) modeling. The reader's behavior and attitude consist of (a) intentionality (meaning that the reader is willing to influence his partner's actions, keep the interaction going, and accomplish goals), (b) efforts at making the task manageable for both and inducing solutions to problems, (c) the promotion of meaning and understanding by focusing on what is not clear and eliciting clarification or correction, and (d) appropriate responsitivity to the partner's cues.

In this way, the scaffolding concept is applicable to the analysis of interactions in the L2 classroom context where learners take roles, support, and regulate each other in order to overcome obstacles and create meaning.

1.1.3.4. Egocentric speech, inner speech, private speech; continuous access

In SCT, language is the primary means of communication in social interaction, but it also serves an intrapersonal (i.e. speech is converted into thought) and cognitive function (Appel & Lantolf, 1994). Language in its latter function can take different shapes:

egocentric speech, *inner speech*, and *private speech*. Speech performed by the individuals, regardless of its form, becomes a tool that mediates or facilitates the development of higher mental functions and knowledge. Thus, speech, in its different forms, fulfills a cognitive function (Lantolf & Appel, 1994; Lantolf & Thorne, 2006).

Vygotsky explained that as children develop adult forms of mental processes, their speaking activity goes beyond its social and communicative function to include the intrapersonal function of communicating with the self in order to mediate mental behavior. This process is known as *egocentric speech*, or the speech that children direct to themselves. Egocentric speech is identical in structure to social speech, but its purpose is psychological. It is the emergence of egocentric speech that allows children to transition from intermental to intramental functioning. As children mature, they adopt the cognitive patterns of their culture as presented to them by their parents or caregivers. When egocentric speech goes 'underground' in the form of verbal thought or *inner speech*, children gain greater control over their own mental activity. In the case of *inner speech*, words take on nuances and merge with other words. In its most condensed form, inner speech can be reduced to a single word packed with meaning. In the inner speech modality, form becomes less complete and coherent.

The emergence of inner speech is well documented by Pavlenko and Lantolf (2000) in the linguistic experience of Eva Hoffman, a Polish immigrant who moved to Canada with her family as a child. Over time, and in her new linguistic surroundings, Hoffman noticed that her childhood L1 inner speech was no longer useful in making sense of her L2 experiences. As such, she developed an inner speech in her L2. De Guerrero (2004) also researched inner speech in the L2 context. In her study, students were required to write entries in their journals about any type of language in the L2 that they thought of but did

not verbalize during class time. An analysis of their journal entries led the author to conclude that their L2 inner speech represents the beginning stages of L2 learning.

Inner speech does not necessarily remain 'underground', meaning that is not verbalized, forever. Adults achieve self-regulation over their mental activity, but they can still utilize earlier knowing strategies (such as talking to oneself in egocentric speech) in situations in which self-regulation alone is not sufficient. Thus, when facing challenging situations, adults can use strategies based on prior knowledge that allow them to keep control of their mental activity. In these situations, inner speech reemerges as *private speech*. The function of private speech is the externalization of individuals' attempts to regain control of their cognitive functioning (Stafford, 2013). In fact, the more challenging the task, the more private speech resembles social speech (Appel & Lantolf, 1994). For example, when doing a complex mathematical operation, individuals can use private speech, talking to themselves, in order to control the challenging task.

The capacity adults have to return to previously acquired strategies (namely, private speech) is known as *continuous access* (Centeno-Cortés & Jiménez Jiménez, 2004; Lantolf & Appel, 1994). The concept of continuous access has two important implications: first, self-regulated activity is not the end of developmental processes (quite the opposite—development is dynamic, fluid, and ongoing); second, the fluidity and continuity of development is observed while inner-speech resurfaces as private speech in self-regulated adults whenever they are engaged in a difficult task.

In terms of function, private speech in the L2 context serves foremost as a semiotic tool for the internalization of the L2 (Ramirez, 1992). Additional functions have been identified as well. Donato (2000) observed that private speech can emerge along with various functions, such as asking for assistance, externalizing one's thinking and problem solving as a cognitive tool, and navigating and mediating between a learner and a teacher,

which can lead to shared understanding and problem solution as a consequence of externalizing one's thinking. Ohta (2001) found that L2 learners use private speech to help themselves internalize the target language and, as they do so, they do not necessarily focus on aspects of the target language emphasized in the lesson but rather on those aspects that are of interest to them.

McCafferty (1994) referred to three major functions of L2 private speech: metacognitive or cognitive, social, and affective. The metacognitive or cognitive function relates to the use of private speech as a problem-solving tool (e.g. when individuals encounter a difficult mathematical task and make use of private speech to regulate themselves). The social function signifies how the external verbalization of private speech can aid in a social setting in which learners can benefit collectively from it and understand the problem (for example, when individuals work together in completing a task and one individual's private speech produced with the sole purpose of regulating himself or herself is overheard by others who also benefit from it). The affective function indexes private speech, which provides learners with a conduit for expressing feelings and attitudes towards the task (such as nervousness or frustration).

Moreover, McCafferty (1994) cited the work of Lantolf and Frawley (1985) regarding the classification of forms of private speech. This three-category system was formulated for the analysis of the specific task of picture narration, and included object-, other-, and self-regulation. Object-regulation refers to the strategic use learners make of elements in the task itself to gain control over the task. Object-regulation may include these elements of perspectival markers (markers that allow learners to relate to events from their temporal perspective), affective markers (e.g. sighs or laughter), the pronominalization of a thematized subject (i.e. a lack of distinction that implies that learners are the only target of their speech); the use of tense and aspect forms (those used, for instance, to reach a sense

of immediacy by using the present progressive tense or to create distance necessary to self-regulate with the use of past tense). Other-regulation includes questions addressed to the researcher of the type where learners are expected to work on their own, and self-directed questions that take a dialogically-based structure. The last categorization of self-regulation includes metacomments where learners can respond to their own comments by accepting them or rejecting them without a third party's intervention.

In addition, Ramirez (1992) found that L2 private speech is shaped by several factors; namely, the type of task, task difficulty, the goal of the task, the degree of concern a participant feels about the outcome of the task, and the cultural background of the participants. The more challenging a task is, or the higher the degree of concern the participants present, the more involved private speech will be. In terms of the language employed for the production of private speech, it has been reported that both the L1 and L2 are employed but with different results. Ramirez (1992) found that children use private speech in both the L1 and L2, according to their purpose; for example, practicing sounds or attending to the meaning of new words. Other studies (e.g. Centeno Cortés & Jiménes Jiménes, 2004; Swain & Lapkin, 1998) concluded that the language of the task influences the language that speakers access to control their thinking in the task and that L2 speakers find it difficult to sustain L2 usage in private speech in complex-problem solving contexts.

To conclude this section on private speech, it is worth mentioning that private speech is not comparable to think-aloud protocols, a common practice in L2 studies. Private speech is spontaneous language with a cognitive function, while language in think-aloud exercises is produced as per the researcher's request in order to discover learners' thoughts and reactions. Think-aloud protocols differ from private speech in the motivations behind their production. Therefore, egocentric speech, inner speech, and private speech serve as semiotic tools that mediate knowledge by means of language. In this study, it is proposed

that MT is comparable to these forms of speech in its function as a cognitive and mediating tool.

1.1.3.5. Activity theory; task vs. activity

After Vygotsky's death, a group of his colleagues and students, including A. N. Leont'ev, Peter Galperin, and Peter Zinchenzo rejected the concept of mediation as symbolic. Instead, they adopted the concept that mediation arises from practical activity in the world of objects. Their proposal was designed to provide a more Marxian approach to higher mental functioning. The question they raised, and from which *Activity Theory* (AT) arises, is "what is the individual or group doing in a particular setting?" The answer to this question was formulated at three levels of analysis: *activity*, *action*, and *operation* (Lantolf & Appel, 1994).

AT does not imply merely doing something; it is doing something motivated either by a biological need like hunger, or a culturally-constructed one like the need to be literate. Needs become motives once they are directed towards a particular object; for example, hunger does not become a motive until people decide to go looking for food. Motives are realized as specific actions that are goal-oriented and carried out under particular temporal conditions and through appropriate mediational means. Without an object towards which it is directed, an activity is devoid of meaning. The final dimension of an activity are its operational levels. Operations determine the means through which an action is carried out as they are bound to the conditions under which a goal is realized, and the same goal can be achieved through a different set of operations. Therefore, the motive and goal constitute a vector that determines the direction and amount of effort invested in an activity. Motives energize the activity and goals give it direction, while the realization of the activity is accomplished through material circumstances at the operational level. In an attempt to

exemplify motives, goals, and activity, Vygotsky compared human and insect behavior. While humans see and anticipate the construction of a structure in their minds' eye long before even designing an executable plan on paper or laying a foundation, a bee or spider initiates action right away without considering motives or goals that move towards action (Lantolf & Appel, 1994). The link between socioculturally defined motives and concrete operations is created by semiotic systems (i.e. signs and symbols), of which language is the most powerful (Lantolf & Appel, 1994).

In L2 learning and SCT, AT is a unified account of Vygotsky's original proposal on the nature and development of human behavior. AT addresses the implications of the concept that human behavior results from the integration of artifacts, whether that activity be psychological or social, as a functional system (Lantolf, 2000). Two distinct concepts related to human activity are *task* and *activity*, as they are understood in SCT terms and in connection to AT. *Tasks* are defined as a behavior blueprint often imposed by the researcher or teacher in order to elicit data. *Activities* are what individuals actually do as they perform a task and engage in the communicative process. The term *orientation* is tightly connected to tasks and activities. Orientation is defined as the way individuals view a task and how they plan to carry it out to keep it under control; re-orientation refers to the strategies learners employ to remain in control of the task (Appel & Lantolf, 1994).

Roebuck's (2000) study exemplifies the distinction between task, activity and orientation when different learners perform the same task. Learners were asked to reproduce a text; some did so literally and reproduced the text without giving any thought to its content or form, while others tried to comprehend the text during the process of writing it. Some learners paused during the reproduction task to do lexical searches, while others did not. These variations in behavior were evident in the finished reconstructed text, in the way the activity was built among learners, and in the learners' orientation towards

the task. How learners positioned themselves in regards to the task varied as well. This task was difficult, and some learners distanced themselves from their finished product as if to signify that something was defective with the task itself. As learners distance themselves, they protect themselves from teachers' judgments or criticisms. Some learners inserted their voices into the recall text to reveal uncertainty regarding words or propositions. Others complained about time constraints, chosen texts, or the researcher as a way to deflect responsibility for shortcomings in their performance. In this manner, learners positioned themselves in the task and, by so doing, they avoided becoming an object of criticism.

AT supports the notion that people are uniquely constructed individuals, which reflects one of the central claims of SCT that individuals co-construct the activity they engage in based on their own socio-history and goals. In experimental settings, subjects cannot be controlled by the researcher or the task, which implies that the same task can result in different types of activities when performed by different learners, or by the same learners at different times. Different results are the outcome of individuals' interpretations, effort, and goals established in performing a task, and how learners position themselves as performing agents (Lantolf & Thorne, 2006). Furthermore, an individual's orientation can change during the performance of the task itself (R. Ellis, 2000; Roebuck, 2000).

The study by Coughlan and Duff (1994) illustrates how the same task performed by the same participant at different times can change. The researchers' intention was to analyze the subject's learning of existential constructions (e.g. there is/are). During an interview, JDB, the subject, was asked to describe a picture. The same task was repeated after one year. During the re-test, it was expected that the learner would remember the picture from previous exposure to it and that JDB's description would present evidence of language learning. Instead, the learner seemed to have forgotten the picture and the

description of the picture during the pre-test. His performance was poor in comparison to that produced a year earlier. Interestingly, having learners repeat a task is a standard practice in linguistic research (pre-test, post-test, and occasionally delayed post-tests); however, as seen in this example, learners can drastically change their performance at different times, even when there is no treatment involved. Therefore, upon having subjects repeat a task in order to test for changes due solely to a particular treatment, results must be taken with caution as learners can change their performance based on their own individual interpretations or expectations about a task or other personal reasons.

The SCT approach to task varies considerably from that of researchers in the psycholinguistic tradition. Whereas in the psycholinguistic tradition the inherent features of the task are essential to accomplishing acquisition, within SCT, learners, their interaction, and the interaction setting are as important as the task itself (Sullivan, 2000). In the cognitive framework, tasks are controlled, a homogeneous group of learners is sought, and it is intended for every participant to adhere to the task as designed by the teacher or researcher; otherwise the learner is removed from the study in order to preserve validity (Roebuck, 2000). SCT rejects the notion that the resulting activity can be predicted or controlled from a researcher or task standpoint. As human agents take part in the communicative process, the object of activity is implicitly or explicitly negotiated; it shifts and can be challenged or ignored over the period of interaction. These aspects of an interaction are noted during an activity. At times, boundaries between activity and task can be ambiguous and dynamic and yet, the resulting performance still serves as an indicator of the subjects' personal history, goals, current abilities, and motivation.

In the SCT framework, the focus is on how learners achieve intersubjectivity in regards to the activity that results from a task, their goals, procedures, and collaboration (e.g. scaffolding). Learners who deviate from task expectations provide as much insight

into the activity as those who strictly follow task instructions; they provide information on their own development and abilities, or lack thereof, in comparison to other participants (Roebuck, 2000). SCT has been favored by researchers who argue that a constructionist approach facilitates the observation of learning from performance (Swain, 2000). Still, this position is criticized with arguments that include equating 'use' with 'acquisition' or failing to acknowledge that task features and variables can have an impact on task performance. In terms of this last criticism, SCT argues that variables on the task are considered as variables inherent to artifacts deployed (R. Ellis, 2000). As it will be seen in the next chapters, in the current study learners adapt the task according to their own needs, intentions, and socio-cultural histories thus creating their own activities as they develop vocabulary knowledge.

1.1.3.6. The learner: situatedness and agency

In describing how learners position themselves in an interaction and how the interaction shapes their performance, two concepts are relevant: *agency* and *situatedness*. *Agency* is the sociocultural capacity to act, and it is linked to the concepts of AT, tasks, and activities. As participants assess a proposed task, their own capacity to accomplish it, and their position within the task, they shape their participation and activity performance. As such, agency is mediated socioculturally and dialectically enacted. It is constrained by social, material, and symbolic resources, situational contingencies and individuals' and groups' capacities. In other words, we are biological beings endowed with mental capacities and we have inherited a cultural endowment from our ancestors. This ability allows us to mediate and organize our functioning and makes us into sociocultural beings. The two areas of our humanity, natural and cultural, do not operate independently; rather, they are intertwined. This happens mainly through language, which allows humans to

control, organize, and resignify behavior; as they act and change the world, they change themselves (Lantolf, 2012). Hence, agency in SCT is far from popular conceptions of free and independent thinking; rather, it is shaped by an individual's present environment and history. Agency is construed by the subject and is a relationship co-constructed and renegotiated with those around the individual: agency is the human ability to act through mediation (Lantolf & Thorne, 2006; Lantolf, 2012).

Lantolf (2012) cited an example of agency introduced by Vygotsky. A researcher invites a participant into a room to participate in an experiment. The researcher leaves the room without giving any explanations to the subject. After ten minutes, amidst much solitude, the participant looks for some external point of support. He looks at the clock and decides that he will leave the room when the clock strikes 2:30. According to Vygotsky, the subject converted the clock from a situationally neutral object into one with relevance, which enabled him to deal with the uncertainty arising from the situation. The subject gave relevance to the clock and, in so doing, created his own agency. In applying agency to more than performance, and especially to learning, learners can actively construct the terms and conditions of their own learning. Agency is linked to motivation, which is in turn linked to a variety of activities that learners can adopt as part of their learning experience. This notion of learners' agency in learning is intrinsically related to the concept of *situatedness.*

Situatedness is defined as the act of learners constructing their own learning; that is, each learner or dyad builds their own learning experience. For instance, learners can be presented with a task conducive to a particular linguistic target in which they might divert their linguistic attention to features other than those that were target aspects and ignore certain aspects altogether. Circumstances that affect the way in which activities unfold include the individuals' characteristics, their histories, the signs they use, and the assistance they provide and are provided (Donato, 2000). Donato (2000) illustrated situatedness in a

classroom setting in which learning adopts different shapes and shades for each one of the participants. The author presented findings from a graduate seminar in which students researched aspects of SCT in connection with L2 learning. In his concluding remarks, Donato spoke about his students' and his own participation in the seminar and about lessons learned by each individual based on each person's characteristics and circumstances. He concluded that, thanks to this experience, they were all able to see firsthand that learning and development are situated.

Situatedness, specifically connected to second language teaching, can be exemplified by experiences often encountered by language teachers in which, despite the teacher's intentions and efforts, students deviate their attention from the main lesson objective to focus on other aspects of the lesson. A simple example from an L2 Spanish lesson can illustrate this concept. The lesson was focused on question formation through subject–verb inversion. The teacher first presented the statement '*Un hombre alto juega básquetbol*' 'a tall man plays basketball'; which was followed by the question *¿Juega el hombre alto básquetbol?* 'Does the tall man play basketball?' The point of the lesson was to exemplify question formation; however, upon comparing the two statements, a learner raised her hand to inquire about the use of the definite and indefinite articles (*un hombre* vs. *el hombre*) in the sample sentences. The teacher's intention had been to present the students with two identical statements, except for the subject-verb inversion in the question, so that learners' attention could be focused on that feature. Yet, this learner focused on article use and not on the question formation patterns being introduced. This exemplifies situatedness for the learner who decided to focus on article usage. The learner shaped her learning according to her own individual characteristics and needs.

In the current study, as learners participate in the lexical activity, their individual features play a role how the activity is carried out as well as in the learning that results from it.

1.1.3.7. The genetic method, unit of analysis in SCT

While most research theories allow for the implementation of diverse research approaches—either quantitative, qualitative or both—SCT presents a close link between the theory and its approach to research with the introduction of the *genetic method*. In fact, the introduction of this method by Vygotsky is one of his most relevant contributions to theories of psychology (Lantolf & Thorne, 2006).

The genetic method studies the development of higher mental processes (e.g. memory and planning) from their initial state and focuses on processes instead of products. It seeks to uncover the dynamic relations at work in the development of higher mental functions. The genetic method emerged from the assumption that higher forms of human mental functioning are mediated by culturally-constructed semiotic artifacts and sociocultural practices that, when inwardly directed, serve psychological functions and thus enable us to control our biologically-endowed mental processes voluntarily (Lantolf & Thorne, 2006).

The genetic method originates in Vygotsky's belief that the developmental history of a present entity, the genesis of a process, is important. This belief explains why Vygotsky studied children; he wanted to understand how something comes into being (Swain & Deters, 2007). For Vygotsky, psychological processes are best studied as they emerge, a process that requires the person confronting a challenge or disruption to be observed during the flow of the task in order to note changes or development occurring as a result of interference. Such is the essence of the genetic method (Roebuck, 2000).

Four distinct domains of research categorize Vygotsky's genetic method: (a) the *phylogenetic domain*, which observes how human mental activity came to be distinguished from mental processes in other life forms through the integration of meditational means over time; (b) the *sociocultural domain*, which explains how human cultures affected the kinds of mediation they favored and the kinds of thinking valued by cultures; (c) the *ontogenic domain*, which observes how children appropriate mediation, mainly through language, and apply it in thinking activities (i.e. it observes the development of an individual); and (d) the *microgenetic domain*, where interest is placed on the organization and development of mediation over a short period of time (e.g. learning a word or grammatical feature). Most research has been pursued in the ontogenetic domain; e.g. observing how voluntary memory is formed in children as they integrate meditational means into their thinking processes (Lantolf, 2000).

Changes studied through the genetic method can be viewed from a macro or micro perspective. The macrogenetic method documents the development of human and culturally-specific modes of thought. The microgenetic method studies mental development over an individual's life span (i.e. ontogenesis) or the emergence of mental processes, such as a particular linguistic ability, over short periods of time (Ableeva & Lantolf, 2011).

As I analyze lexical development, I observe how knowledge develops from participation in a sociocultural activity. Because of the nature of the intervention used in my study (described in Chapter 3), lexical development is observed over a limited period of time from a microgenetic perspective.

1.1.3.8. Metaphors and lexis

Metaphors can be defined as *conceptual metaphors* or *linguistic metaphors*, which correspond to two different but related concepts. *Conceptual metaphors* are culturally constructed models that organize experiences that underlie and at the same time make manifest the linguistic expression. For example, the concept of 'argument is war' can be materialized through expressions such as 'he shot down all of my arguments'. Conceptual metaphors arise from experiences, which, in many cases, can be shared across cultures (for instance, 'down' is bad and 'up' is more). A *linguistic metaphor* is manifested as the use of underlying concepts through which people attempt to understand a domain (defined as a coherent organization of experience) in terms of another (Lantolf & Thorne, 2006). Thus, an expression such as 'our marriage is on the rocks' likens a troubled marriage to a ship that has shipwrecked and depicts marital trouble through a concept pertaining to the maritime domain.

For Vygotsky, cognitive development, including L2 learning, is shaped by the appropriation early in life of cultural models; i.e. culturally-organized concepts such as narratives, behaviors, values, and conceptual metaphors (Lantolf, 2006). Conceptual metaphors are at the core of everyday mental and linguistic activity and can function as artifacts that mediate cognitive development.

As conceptual metaphors take the role of artifacts that mediate L2 cognitive development, new questions arise: To what extent are L2 learners able to appropriate conceptual metaphors? Can metaphorical knowledge be taught in the L2 classroom? What is the relationship, if there is one, between linguistic proficiency and metaphorical competence? In considering these questions, Lantolf (2006) argued that, if learners can control linguistic metaphors, they will also control conceptual ones. Conversely, if they do not control linguistic metaphors, they will not have appropriated conceptual metaphors

either. The author cited studies (e.g. Irujo, 1986 & 1993) in which learners' knowledge of conceptual metaphors was assessed. Their findings suggest that learners are able to apply conceptual metaphors in the L2 when such metaphors have close equivalents in the L1, and that L2 learners, despite being highly proficient, do not use conceptual metaphors in performance spontaneously. Therefore, it was concluded that even though L2 linguistic proficiency and the appropriation of conceptual metaphors go hand in hand, metaphorical competence is to some extent independent from linguistic proficiency and must be developed within its own terms as pragmatic competence. This conclusion leads to the question of learnability.

Pavlenko (1997, as cited in Lantolf, 2006) researched how lexically-organized concepts are observed in relation to their learnability and performance. The focus of the study is on the different concepts learners have of the term 'privacy', based on their exposure to cultural metaphors. Subjects were monolingual English speakers, monolingual and monocultural Russian immigrants recently arrived in the U.S., and proficient L1 Russian speakers of L2 English (this group subdivided into two groups: those who had studied English as a foreign language and were recently arrived in the US, and those who studied English as a second language and had resided in the U.S. for several years). The author noted that, although Russian has words that translate literally into English, they are not semantically equivalent. For example, for Americans, the term 'privacy' can be seen in opposition to 'public'. In Russian, the term 'privacy' can also be seen as opposite to 'public'; however, unlike English, the Russian concept of 'privacy' also includes such connotations as 'secret', 'strictly confidential information', 'secluded', and 'away from the public'. Another difference lies in the fact that for the Anglo-Saxon culture, 'privacy' can apply to 'having one's private space or time' while the Russian culture lacks that connotation. Participants in Pavlenko's study were asked to react to a short film in which

a woman, sitting in an empty area of a crowded plaza, begins to write. A young man approaches and sits a few feet away from her. After a moment, the woman, who did not notice the man, walks away. Upon analyzing her subjects' reactions, Pavlenko found that none of the L1 Russian monolinguals or recent immigrants to the U.S. perceived the woman's reaction in the film as a matter of invasion of her privacy by the man, a reaction that was common among Americans and Russian immigrants who had been in the U.S. for an extended period of time.

These findings by Pavlenko led to conclusions on the matter of metaphor learnability by L2 learners. The author concluded that under conditions of cultural immersion, L2 speakers are capable of appropriating concepts that mediate their thinking processes, which responds positively to the question of metaphor learnability. However, despite these encouraging findings, Lantolf (2006) acknowledged that the learnability of conceptual metaphors is a complex matter and it is not yet known how such competence is built in L2 learners or how it can be taught in the L2 classroom. Additionally, studies such as the one cited by Pavlenko consider cultural models built within a culture and society but do not consider additional metaphors and cultural models pertaining to each unique L2 learner. As learners approach the learning of an L2, they also bring to the table their own metaphors and models, not necessarily shared by their society that shape their cognition.

In regards to vocabulary, the lexicon of a language is clearly influenced by culture and metaphor but there is still an element in each lexical item that is literal and concrete (Lantolf & Thorne, 2006). For example, in the Chinese culture, the term 'white' is metaphorically linked to 'virtue' or 'chastity', and culturally associated with 'mourning' and 'death'. However, the term 'white' can also have a more literal and concrete meaning where it refers to the color white, in opposition to other colors such as red or green. This study on vocabulary development aims to examine cognitive development of literal and

concrete elements (pronunciation, collocation, etc.) of lexical units, as far as it is realistically possible to isolate literal and concrete meanings from metaphor and individual cultural models.

1.2. METATALK

This section defines metatalk (MT) as a tool that mediates language development, focusing on vocabulary. I discuss how MT mediates knowledge, thus leading to language development, and I introduce language related episodes (LREs). In particular, lexical language-related episodes (LLREs) are studied in the analysis of MT in dialogue.

1.2.1. Defining metatalk

Swain (1985) first introduced the term MT in connection with the Comprehensible Output Hypothesis. She commented on Krashen's (1982) Input Hypothesis and concluded that, in practical terms and based on her observations, input is not sufficient for the attainment of native-like proficiency in the L2. The author then turned her attention to language production, or *output*. Swain proposed three functions of output in L2 learning: noticing, hypothesis-testing, and metalinguistic reflection (or metatalk). She concluded that in producing output, L2 learners may notice the gaps between what they want to say and what they can actually say, may experiment with the language and test their own hypotheses, and may engage in metalinguistic reflections on their use and knowledge of the target language (Swain, 1998). The author also encouraged the study of these areas of output production, saying that they may be carriers of important cognitive processes in L2 learning (Swain, 2005).

While the terminology might vary, *metalinguistic reflection*, *metacognition,* and *metatalk* carry the same fundamental description and function in L2 development. Kuiken and Vedder (2005) discussed metacognition, saying that it has a facilitative effect

on L2 acquisition as it helps learners understand relations between meaning, form, and function. The authors highlighted the potential of metacognition as it is facilitated by interaction. They described language production as enabling learners to deepen their awareness of grammatical and lexical matters, test hypotheses with others, receive feedback and reprocess their output. In this manner, learners engage in co-constructing their L2.

R. Ellis (2000) discussed the nature of tasks and interaction in connection with metacognition. The author addressed production tasks in which learners are prompted to solve problems. It is in these settings that MT, or metacognitive verbalization, arises as learners are engaged in meaningful interactions. Such verbalizations may lead learners to understand the relationship between meaning, form, and function. At the same time, these verbalizations allow researchers to observe learners working with hypotheses as they experience the language learning process.

More recently, another relevant term with a slight variation in meaning has been introduced: *languaging*. Swain (2006) proposed this term to be a form of verbalization used to mediate cognitively-demanding activity. Languaging is defined as the process of making meaning and shaping knowledge and experience through language (Swain, 2006). The author introduced this term from a sociocultural psychology standpoint and claimed that, as L2 learners engage in languaging while producing and comprehending language, they benefit from an important source of L2 learning (Suzuki & Itagaki, 2009; Swain, 2006). Languaging differs in form from previously introduced terms in that it is applicable to verbalization that is either written or oral.

Although the terms *metacognition*, *metalinguistic reflection*, *languaging*, and *MT* might vary slightly in form, they share the same functions at their core: the observation of language as an object of inquiry; the verbalization of such observations in a meaningful

context; and the development of L2 knowledge that emerges from the process. In this study, the focus is that of MT in its oral form.

In the SLA field, MT has been variously defined as: a metalinguistic function (Swain & Lapkin, 1995; Swain, 2000); a means to develop cognitive skills (Swain & Deters, 2007); a function of output (Swain, 1985), a window into the process of language learning (Storch, 2008); a surfacing of language used in problem solving (Swain, 1985, 1998); and a cognitive or semiotic tool that mediates language development (Donato & McCormick, 1994; Swain & Lapkin, 1995; Swain, 1998). Others have found MT to occur on occasions wherein students talk about their own language and discuss it as an object of inquiry, or when language stops being a content vehicle and becomes a tool for analysis and thought that promotes development (Brooks et al., 1997; Gass & Selinker, 2001; Swain, 2001b; Vanderheijden, 2010). It must be noted that MT is one type of collaborative talk; dialogue in which participants are engaged in problem solving and knowledge building, and which can occur in many domains (e.g. mathematics). For our purposes, MT is only conceived of as a problem solving and knowledge building tool in the linguistic domain (Swain & Lapkin, 2002; Swain, 2000).

Most researchers agree on a core definition of MT that includes learners' speech about their own language production. However, they often indiscriminately include other elements in their analysis, or shift their focus to areas derived from MT. For example, Brooks et al. (1997) considered a student's expression of frustration with L2 learning as an example of MT, while Storch's (2008) definition included notions of increased levels of attention and awareness that result from joint collaboration. In these examples, MT and its boundaries are not clearly delineated.

As stated in the introduction to this chapter, MT is defined as the verbalization of aspects of the target language; that is, learners' awareness of something about the L2 that

comes to surface through verbalization. Also, MT is a cognitive and semiotic tool that enables the mediation of lexical development and as such allows learners to work through knowledge layers of each vocabulary item (as described in the concept of word depth) through joint verbalization. MT occurs naturally in linguistic tasks that require collaboration as learners encounter a lexical problem that they work on together (Brooks et al., 1997; Swain 2001).

Thus, MT mediates lexical development by playing a role in how knowledge is enabled and how learners respond to the task, which is known as regulation. MT is seen as comparable to other forms of mediation within SCT, including egocentric speech, inner speech, and private speech. Like other forms of speech, MT can serve individuals first and foremost by mediating knowledge as they negotiate with an interlocutor. Even if language is used for mediation in a social context, individuals benefit from it differently and will organize their own thoughts in a unique manner, as compared to their peers in the same social task.

1.2.2. Language-related episodes

A language-related episode (LRE) is the unit of analysis used to examine the role of MT in L2 learning. It is an episode where learners talk about the language they are producing, question their language use, and correct themselves and others. In an LRE, learners verbally pay explicit attention to language itself (Storch, 2008; Swain & Lapkin, 1995, 2002; Swain, 1998). The following excerpt from Storch (2008) illustrates an LRE focused on word form.

Excerpt 1.3. LRE focused on word form (Intermediate learners).

1 M: The immigrants particular.

2 C: South.

3 M: …is particularly.

4 C: Why is 'ly'?

5 M: Or in particular…because is, is adjective and in this context. This not adjective here.

6 C: Mm [SOME AGREEMENT].

7 M: Yeah…particularly…in south…maybe in…in.

8 C: The immigrants particularly.

(Storch, 2008, p. 101)

Excerpt 1.3 provides a form-focused LRE showing how learners deliberate over the use of the adverb 'particularly' by comparing the word form to that of the adjective 'particular'. Also, learners examine the use of the phrase 'in particular' as a possible synonym for the term 'particular'. The LRE is solved correctly and concludes when C repeats the target phrase with the addition of the adverb 'particularly'; thus showing that he now understands how to use the term appropriately.

In the SLA literature, the analysis of LREs varies depending on the focus of the study. Categorizations for analysis include 'resolution' and 'engagement' (Kuiken & Vedder, 2002; Storch, 2008). Resolution refers to the outcome of the LRE, which can be correct and acceptable or incorrect and inacceptable. 'Engagement' describes the quality of the learner's MT as it enables cognition, which can be elaborate or limited. When there is elaborate engagement, the learner deliberates over language items, and seeks and provides confirmations, explanations, and alternatives. When there is limited engagement, the learner does not contribute further deliberation. Excerpt 1.4 illustrates the concepts of limited engagement and no resolution.

Excerpt 1.4. Limited engagement and no LRE resolution (Intermediate learners).

1 K: In 1974 and then full stop.

2 A: You want full stop and here capital.

3 K: One, one in five Australian.

(Storch, 2008, p. 102)

Here, K suggests that a full stop should be inserted. A repeats the suggestion and adds that a capital letter is necessary to start the subsequent sentence. When Storch examined the learners' reconstructed text, she found that they had indeed written a full period and a capital letter for 'one'; however, their punctuation choice was incorrect. Excerpt 1.4 also shows limited engagement on K's part as the learner did not follow up on A's comments about inserting a full stop and a capital letter. Thus, learners can work together, produce MT, and arrive at incorrect conclusions. But at times they show little interest in the discussion and limit their engagement and participation, which can affect the outcome and effectiveness of MT.

Additionally, LREs can be analyzed in terms of 'form' and 'content'. Storch (2008) discussed a series of moves that can shape an LRE: suggestion, counter-suggestion, clarification request, explanation, and repetition. Excerpt 1.3 (seen earlier) illustrates a variety of moves: suggestion (line 3), clarification request (line 4), counter-suggestion (line 5), explanation (line 5), and repetition (line 8). Moreover, the analysis of LREs may include a variety of conversation strategies drawn from the Interaction Hypothesis (Long, 1985); namely, listeners' clarification requests when they have not understood; listeners' confirmation requests when they believe they have understood but need confirmation; comprehension checks made by the speaker to be certain that the listener has understood, repetitions, which consist largely of restatements of another subject's utterance as a type of confirmation check; and listeners' requests for repetition of the speaker's previous utterance (Gass & Varonis, 1985, as cited in R. Ellis, 1999). Excerpts 1.5 to 1.9 (from Gass

& Selinker, 2001, p. 275) demonstrate these conversation strategies. Learners' proficiency levels are not indicated by the original authors.

Excerpt 1.5. Clarification request.

1 NNS1: …research.

2 NNS2: Research, I don't know the meaning.

Excerpt 1.6. Confirmation request.

1 NNS1: When can you go visit me?

2 NNS2: Visit?

Excerpt 1.7. Comprehension check.

1 NNS1: I was born in Nagasaki. Do you know Nagasaki?

Excerpt 1.8. Comprehension check.

1 NNS1: And your family have some ingress.

2 NNS2: Yes ah, OK OK.

3 NNS1: More or less OK?

Excerpt 1.9. Repetition / Request for repetition.

1 NS: Do you like California?

2 NNS: Huh?

3 NS: Do you like Los Angeles?

4 NNS: Uhm…

5 NS: Do you like California?

6 NNS: Yeah, I like it.

(Gass & Selinker, 2001, p. 275)

Ohta (2000) analyzed LREs and their linguistic forms in terms of development as speakers interact. Her analysis included mechanisms of assistance and internalization processes. Her investigation of assistance also considered explicit requests for help (e.g. questions) as well as other subtler cues, such as intonation or pauses. The analysis of internalization the author proposed is microgenetic in nature and observes how discourse develops and language structure is appropriated by learners.

Fortune and Thorp (2001) listed three main categories in terms of the content of LREs: lexical (reconstructing the meaning of an original sentence in learners' own words, finding synonyms, checking the existence of a word, checking word meaning, etc.); grammatical (discussing verb forms, pluralization of nouns, etc.); orthographic (discussing spelling); and discourse (e.g. checking for cohesion). Grammatical LREs also include subcategorizations such as verb form, gerund/infinitive, subject-verb-agreement, determiners, prepositions, word order, and inflectional and derivational morphology. With respect to discourse LREs, three subcategorizations are introduced: reference, linking text elements with an appropriate connector, and lexical cohesion. In terms of lexical LREs, the authors proposed to identify items according to these subcategorizations: lexical items, homophones, collocations, pronouns, semantic markers, and modal auxiliaries in terms of meaning. Excerpts 1.10 and 1.11 exemplify lexical subcategorizations introduced by the authors.

Excerpt 1.10. Deciphering the meaning of a modal verb (Intermediate learners).

1 E: 'The animal might be sick.

2 H: Mhm.

3 E: But 'might' is in the present or in the past.

4 H: Mm maybe.

5 E: ‘Might’.

6 H: ‘Might’ is.

7 E: Is in the past.

8 H: Er past verb.

9 E: Yes.

10 H: Yes past verb.

11 E: And ‘may’.

12 H: ‘May’, ‘might’ yes.

13 E: Yes OK it’s correct.

14 H: Past and sometimes, use erm past, condition.

15 E: Yes.

16 H: Condition.

17 E: Yes, when a person is not sure about something.

18 H: Yes yes yes yes.

19 E: ‘Might’ be sick.

(Fortune & Thorp, 2001, p. 153)

In Excerpt 1.10, the learners discuss the difference between ‘may vs. might’. In so doing, they consider the use of different tenses as well as meaning as in line 17 when ‘might’ is discussed and learners explain that it would be used ‘when a person is not sure about something’.

In Excerpt 1.11, learners discuss the suitability of the verbs ‘to give’ or ‘to leave’ with the noun ‘tip’, a matter of collocation, seen especially in line 11.

Excerpt 1.11. Collocation (Intermediate learners).

1 S: Also they must leave … in the place in the place where they have to leave a tip.

2 P: Tip tipo.

3 SJ: Give a tip.

4 P: Yes.

5 SJ: Leave.

6 P: Leave.

7 SJ: Leave or give?

8 P: I don't leave.

9 S: OK, er leave a tip.

10 SJ: And then about about.

11: S: Yes, yes, yes, because it's about leaving a tip…they must know the places where they have to leave a tip…

(Fortune & Thorp, 2001, p. 153)

Researchers working under SCT have also proposed categorizations for the analysis of learner metalinguistic talk. Brooks and Donato (1994) proposed the following categorizations for a Vygotskian analysis of learner talk: (a) speaking as object regulation; that is, talking about the task and the discourse that constitutes the task. This talk can function to initiate or sustain discourse, to establish intersubjectivity, and to orient them to solve a problem. Speaking as object regulation is a metacognitive strategy often articulated in the L1 by novices; and (b) speaking as goal formation, such as when learners speak in order to externalize the goal or end-result of the activity. The first categorization of learner talk is what in this study is understood by MT; that is, making language an object of scrutiny through language. Excerpts 1.3, 1.10, and 1.11 exemplify this concept. Excerpt 1.12, from Brooks & Donato (1994), exemplifies the second categorization of speaking as goal formation. Translations are added by this author in brackets; additional details about

the interaction are indicated in brackets and capital letters. Learners' proficiency levels are not indicated in the study.

Excerpt 1.12. Speaking as goal formation.

1 S1: I like that word we have to use that one…

2 Argh!

3 ¿*Qué tienes*? [what do you have?]

4 S2: No.

5 S1: ¿*No tienes*? [you don't have?]

]6 S2: [NO RESPONSE]

7 S1: ¿*Nada*? [nothing?]

8 S2: Hold it, hold it.

9 S1: *Uno, dos, tres* [one, two, three].

10 S2: Sí en el [yes, in the].

11 U*no dos tres* [one two three].

(Brooks & Donato, 1994, p. 268)

Regarding Excerpt 1.12, the authors note that S1 changes the direction of the discussion when she learns of a way to establish reference points on diagrams, which facilitates the task completion. In this instance, language is used by learners to discuss how the task at hand is to be completed.

In the current study, lexis-based LREs (LLREs) are the focus of my analysis. LLREs involve an aspect of the lexicon such as searching for a word or choosing among vocabulary items (Swain, 2001a). In this study, the concept of the LLRE is broadened to include any aspect related to the target word in terms of the *word depth knowledge* construct, such as spelling, meaning, and synonym.

Fortune (2005) proposed a specific categorization for LLREs in terms of form that includes: an explanation of the meaning of a lexical item (M+exp); the provision of a synonym or antonym (M+SY); an example of the item used in another context, or reference to another context to illustrate its meaning (M+EXA); and reference to the relationship between lexical selection and level of formality (M+STY). Excerpt 1.13 exemplifies M + exp, or the explanation of the meaning of a lexical item by one of the participants.

Excerpt 1.13. Deciphering meaning through an example (Advanced learners).

1 B: ... her son, warned her son never conform blindly.

2 A: Never conform.

3 B: Blindly to the crowd.

4 A: Blindly to the crowd.

5 B: The meaning.

7 B: Blindly is like, somebody is blind, he doesn't see.

8 A: Yes.

9 B: He cannot see . . .

10 A: Mean, not, don't, like normal person.

11 B: Yeah, I guess so, oh my God ... to conform, I need the right . . . yeah, this is to conform is actually to do what someone else does the society.

12 B: Has that behavior, me too . . . so the mother warned him to, to, yeah.

13 A: What () other people.

14 B: Actually not try to.

15 A: Try to do the thinking.

16 B: Not () never conform, she does never, yeah, she advises him to do so, like somebody else but never.

17 A: Don't do.

18 B: Yeah, okay, don't do like someone else does, blindly, actually this adverb, we have it in our language it say like so I think if you are studying maybe I am looking what, what you are doing and it's a good thing. Yeah I can conform yeah, if you are maybe taking drugs, I have to use my brain to decide this is not good so I don't.

19 A: Yeah.

20 B: This is what, what they mean.

(Fortune, 2005, p. 29)

In Excerpt 1.13, learners discuss the components of the phrase 'conform blindly'. Learner A is unaware of the meaning of both words, learner B explains each item and sets them in a context in order to exemplify their use and meaning. The LLRE concludes when A is able to understand the phrase 'conform blindly' in the given context of the task.

In this study, in which I examine learner's MT, I draw relevant categories of analysis from the literature review presented thus far. I consider the outcome or resolution of LLREs (Storch, 2008; Swain, 1998); the moves and conversation strategies that learners utilize, such as clarification requests, suggestions, repetitions, etc. (Gass & Varonis, 1985; Storch, 2008); the LLRE focus, such as meaning or spelling (as seen under the *word depth knowledge* construct) and the LLRE form following Fortune's (2005) categorizations. The ultimate goal is to observe how language becomes an object of scrutiny in metatalk that mediates lexical development (Brooks & Donato, 1994).

1.2.3. Function of MT in language development

Brooks et al. (1997) have criticized the abundant attention that has been paid in the L2 context to promoting target language use in the classroom, while critical psycholinguistic and semiotic processes have been neglected. Instead, the focus has been placed on what learners are trying to achieve, especially when faced with trying to solve a

linguistic problem. Success is mistakenly equated with production that is fluent and relatively flawless. As a consequence, with much concern for final results, little consideration is given to the process of language development itself. Swain and Lapkin (2002) shared this concern and believe an understanding of how language learning takes place in interaction is fundamental, rather than focusing on how language development results from interaction (Swain & Lapkin, 2002, p. 286).

MT fulfills a central cognitive role in the analysis of language in interaction and linguistic development and serves as a window into developmental processes. Swain and Lapkin (2002) elucidated the function of MT in development by providing a broad picture of language use and functions. They explained that speaking, besides being a social activity, is also a cognitive activity that mediates language learning. Through speech, language is externalized and becomes an object. In the process, it can be reflected upon, questioned, changed, or disregarded. As learners engage in dialogue, they participate in the creation of meaning. At times, in order to make meaning clear, learners debate language as if it were an object. Their discussions may include matters of form, such as morpho-syntax, discourse, and lexical choice. This talk supports the process of internalization—the 'moving inwards' of dialogic and joint (intermental) activity to psychological (intramental) activity.

Similar assessments have been made by other authors in terms of the function MT plays in language learning. Storch (2008) explained that, as a cognitive tool that mediates language learning, MT is conducive to a deeper level of attention; to language development; and to knowledge of relationships between meaning, form, and function. A similar assertion by Swain (1998) describes MT as a tool beneficial to L2 acquisition processes; she encouraged the inclusion of MT in contexts where learners are engaged in making meaning. Otherwise, she warned, "critical links between meaning, forms, and

function may not be made" (Swain, 1998, p. 69). The study reported in Swain (2006) exemplifies the study of L2 development through MT. In her study, participants in a French immersion program were asked to write a story. Next, the students' stories were reformulated by a native speaker who improved and corrected ungrammatical elements. Students were then asked to look at their reformulated stories and to comment on the changes. During this noticing process, learners engaged in much discussion about the language of the story and the best way to express the meaning they had intended. In post-test activities, the author found that learners were able to incorporate elements they had noticed and discussed thus concluding that MT had mediated L2 knowledge.

Other studies illustrate how MT can be utilized to develop particular linguistic systems, thus enabling connections between meaning, forms, and functions in the L2 (Swain, 1998). Swain and Lapkin (1998) focused on the development of French reflexive verbs. In their study, learners were given a jigsaw task with pictures depicting a story that they were instructed to work out together and write it out. Students' interaction was recorded and analyzed. LREs were categorized as either lexis- or form-based. It was found that a large number of LREs positively influences post-test results, LREs provide a representation of mental processes in L2 learning, and, overall, it was concluded that MT enabled the learning of reflexive verbs. Swain et al., (2009) targeted the grammatical concept of voice in French. The authors examined the relationship between quality and quantity of languaging (or MT) and performance in post-tests. As part of the intervention, students were introduced to grammatical explanations followed by texts in which they were asked to identify the voice used (in their L1). LREs and post-test results suggest that all participants learned something about the concept of voice during the intervention. It was also concluded that greater depth of understanding of the concept of voice was gained among high languagers.

Broner and Tarone (2001) and Tocalli-Beller and Swain (2007) discussed language learning in play. Broner and Tarone (2001) analyzed classroom interactions among children and focused on two notions of language play: 'ludic language play', or language used for enjoyment or fun, and 'language play' as rehearsal in private speech (as in rehearsing target linguistic forms). In analyzing children's interactions, the researchers separated the distinct functions that the two types of language inherently possess and concluded that while ludic language play may stretch the interlanguage as learners play with words and sounds, language play as rehearsal has a clear impact on language development. Tocalli-Beller and Swain (2007) researched humorous language play through languaging in the ESL context. Participants in dyads were video- and audio-recorded as they worked together in language play sets. Through a microgenetic analysis, post-tests and the scrutiny of LREs shed light on the process of learning humorous language. It was found that learners were able to move from no comprehension to comprehension and production while constructing new knowledge about the words utilized in the activity. The authors utilized their findings to negate criticisms of studies based on sociocultural-theory made by other researchers, such as R. Ellis (2003), who claim that such work does not show evidence of learning.

The study by Kim (2008) is most relevant to the present study because the author focused on the study of lexical development through talk. Other studies that relate to language acquisition do not examine the lexicon as their primary research objective but rather examine it as they study LREs or collaborative talk in general (e.g. Swain & Lapkin, 1998; Swain, 2001b). Kim's (2008) study compares the effects of collaborative talk versus individual talk on vocabulary acquisition among Korean L2 learners. The collaborative group performed the intervention task (dictogloss) with a partner. Learners in the individual group performed the same task but on their own, and were encouraged to think aloud. Prior

to the intervention, learners saw models for interaction, including metatalk, which they were encouraged to replicate during the intervention. Learners' audio transcriptions were analyzed for LREs, and the study also included a pre- and post-test. Results indicated that learners in both groups produced a similar number of LREs; however, the collaborative group outperformed those working on their own when assessed for target word knowledge (meaning and function) in post-tests.

Nevertheless, when critically assessing Kim's research, there are areas in the work that need further discussion and consideration. There are four main faults in Kim's (2008) study on the lexicon. First, the author claimed to embrace SCT as her theoretical background; however, in her analysis, she discussed only language as mediation. Even though she emphasized SCT as crucial to her analytic framework and cited authors that support this mode of analysis (e.g. Leeser, 2004 & Williams, 1999, 2001, as cited in Kim, 2008), no further connections were made between learners' lexical development and interactive patterns and SCT. Thus, her analysis presents a poor and even skewed picture of SCT and the research falls short of its potential. As discussed previously, SCT provides the researcher with a window into development and acquisition processes that are lacking in other frameworks, but Kim (2008) lacks such analysis.

Second, in terms of design, learners in her study completed a pre-test to assess their knowledge of potential target words in order to choose those that were unknown for the study. As is often the case with this type of design, learners may have been primed by the pre-test content. This priming would have made them more alert to the target words on subsequent tasks, which is a problem when the researcher later claims acquisition solely through intervention. Another concern with the design is that learners heard the text three times (instead of twice as is standard for dictogloss tasks) due to the difficulty of the task, which raises two concerns. First, learners were able to take notes twice on the text they

were tasked with reconstructing. This procedure raises the question of how much difficulty they really could have had in reconstructing the text if they were able to listen to it three times and take notes twice, thus giving them much opportunity to copy large chunks of the text as it was being read. As a consequence, if learners had already gathered much of the text during the readings, what moved them later to discuss lexical items at all? Why would they not merely focus on putting pieces together, especially those learners working collaboratively who would have had two sets of notes? The second concern in terms of design is task difficulty. The author reports that the text was read three times because the task was too difficult to complete. As it has been reported, a task that is too difficult can discourage learners' performance and production of MT (Suzuki & Itagaki, 2007).

Third, Kim's LREs' analysis was limited to a series of categorizations that tell us little about how lexical LREs occurred. The author focused on meaning, spelling, pronunciation (Swain & Lapkin, 1998) and LREs resolution; i.e. correctly resolved or unresolved (Swain, 1998; Leeser, 2004). With such vague categorizations, it is not clear in practical terms how collaborative talk promoted lexical acquisition or even how collaborative talk developed. Fourth, the experiment consisted of two groups, one in which learners worked in dyads and collaboratively, and the second in which learners were asked to think-aloud (or talk to themselves). Think-aloud data are problematic. Researchers have warned that, by thinking aloud, participants' internal processes may differ from what they would have been had they not performed the verbalization (Gass & Mackey, 2000). Additionally, Kim reports on the learners' discomfort in having to produce think-alouds, which may have had an effect on their performance. As it will be seen in Chapter 3, the methodological pitfalls identified in Kim's study are addressed in this dissertation by, for example, implementing a broad range of categorizations that include SCT notions beyond mediation, such as roles and regulation.

In conclusion, in this study MT, is defined as a cognitive activity during which learners speak of language as an object of inquiry. This talk process is assumed to support the internalization of new features of the L2 that first emerge in the social and shared setting of the interaction and then move to the individuals' cognitive sphere. Through the analysis of learners' external expression of MT, researchers and teachers can observe how internal L2 development is constructed.

1.2.4. Metatalk: Language choice, proficiency, and task design

The learners' language choice, their proficiency, and the task design also play important roles in the quantity and quality of MT that learners produce. From a SCT viewpoint, the learners' language choice is not particularly relevant to their cognitive development; after all, either the L1 or L2 can be equally effective in mediating knowledge. For example, in Swain et al. (2009) MT was carried out in the learners' L1, and it was found that learners' MT mediated L2 development nonetheless. DiCamilla and Antón (1997) and Antón and DiCamilla (1998) researched learners' language choice and function in MT. They found that MT produced in the L1 is more prevalent in the speech of lower proficiency learners than in that of more advanced speakers. Also, MT in the L1 appears to fulfill unique functions, including helping to establish a common goal in the task and scaffolding, and serving as an outlet for inner speech. Additionally, it has been noted that MT can include metalinguistic terms or not, and it will not make a difference in mediation (Alegría de la Colina & García Mayo, 2007; Fortune, 2005; Swain, 1998). Just as with language choice, what matters is that learners verbalize aspects of the target language with which they are actively working regardless of the language or terminology with which they do so.

Learners' proficiency in the L2 also plays a role in MT. Fortune (2005) showed that advanced and intermediate learners produced similar quantities of LREs; however, advanced learners utilized more metalinguistic terminology and focused more on form and the reference to rules compared to intermediate learners. Suzuki and Itagaki (2007) noted an interaction between MT and learners' proficiency that favors advanced learners in the production of metalinguistic output produced in writing. Antón and DiCamilla (1998) found that lower proficiency learners prefer to use their L1 because it is too difficult for them to express complex ideas through MT in the L2. Ohta (1995) also commented on characteristics of teacher-fronted and peer-peer interaction with learners of varying proficiency levels in the target language. Her analysis supports the notion that both learners benefit in pair interaction, and not just the learner with weaker skills. Ohta calls this concept 'collaborative learning'.

Learner proficiency and quantity of LREs seem to correlate. Fortune (2005) and Suzuki and Itagaki (2007) found that more advanced learners produced more LREs than those at lower proficiency levels. More advanced learners are also able to gain more from such exchanges. When considering LRE quality and its connection to learning, it has been concluded, predictably, that when learners are more engaged in MT production and produce a higher number and better quality LREs (as when both learners are equally engaged), there is more learning.

Task difficulty affects MT production. Suzuki and Itagaki (2007) found that if a task is too difficult or too easy, MT is used less. Hence, learners need to engage in reasonably challenging exercises in order to produce MT. Furthermore, some types of tasks trigger more lexical MT (e.g. scrambled sentences) while others shift the learners' focus towards form (e.g. translation exercises). Both Storch (1999) and Vanderheijden (2010) evaluated types of tasks in relation to MT. In the former study, Storch traced the

relationship between type of task and grammatical development. The author focused on three types of tasks; namely, cloze exercise, text reconstruction, and short composition. She compared exercises learners do on their own versus those done with a classmate. Findings support collaborative talk and MT as having a positive effect on overall grammatical accuracy. However, resulting improvements varied according to the grammatical target, thus suggesting that MT may have a more positive effect on certain linguistic items, such as derivational morphology, than others. Vanderheijden (2010) explored tasks that promote MT and that are usually employed in the foreign language classroom, including information gap tasks, narration jigsaw activities, and cloze texts. The author concluded that (1) using the L1 during collaborative work targeting cognitive resources about the L2 is beneficial; (2) having students work with a variety of peers is necessary for them to have the opportunity to perform expert and novice roles at different times; (3) the task should make learners accountable for the learning objective; (4) key elements of language acquisition intended during the task should be reviewed beforehand; and (5) if the task is to promote new or previously-learned knowledge, this should be established beforehand and made clear to learners.

Two tasks commonly utilized in the study of language development through MT are dictogloss and jigsaw activities. Both require that learners work jointly in collaborative writing during which much interaction and learning take place. LREs resulting from such tasks can include a variety of linguistic targets; e.g. grammar, lexicon, and discourse (Lapkin et al. 2002). Tasks that are narrower in scope, such as asking learners to comment on grammatical explanations written on cards, have also been implemented (Swain et al., 2009). These tasks result in LREs that are narrower in focus and can help learners concentrate on particular targets, thus promoting learning of particular linguistic objectives as intended by the teacher.

As discussed, language choice, proficiency and task design play important roles in MT. In the current study, participants are rated as having an intermediate proficiency level in Spanish; for that reason they are requested to produce MT in their L1. Otherwise, they might not be able to verbalize as much MT as they intend to and, according to SCT notions, the L1 can be just as effective in the mediation process. In terms of task design, as discussed in Chapter 3, this study incorporates the dictogloss, which has been successfully employed in the study of MT.

1.3. WORD KNOWLEDGE

In this final section, I address *word depth* vs. *word breadth*, a dichotomy often introduced together in lexical research. Further consideration on vocabulary, the lexicon, and word knowledge are fully addressed in Chapter 2.

1.3.1. Defining word knowledge

To know a word is to know more than its primary meaning. In terms of degrees of word knowledge, a word can be 'unknown', 'acquainted', or 'established'; and it can be known either receptively or productively, or both. These categorizations imply that knowing a word in its full sense is an intricate process. Additionally, there are many different aspects of word knowledge—syntactic, semantic, lexical, and stylistic, declarative and procedural, receptive and productive—that come into play when learning a new word and assessing how well a word is known (Laufer, 2006). The terms *breadth* and *depth* have been utilized to divide lexical knowledge into two kinds of that individuals possess.

While *breadth* refers to the quantitative aspect of vocabulary knowledge, *depth* is concerned with quality. *Breadth* is related to the size of the lexicon (i.e. the number of words known by the speaker) including words that are superficially known. If an individual

knows a word only in 'breadth', or superficially, there is a high probability that the word will be forgotten and new words will replace it. *Depth* refers to awareness of all properties of a word, including phonetic, graphemic, morphemic, syntactic, semantic, collocational and phraseological (register, frequency) as opposed to knowing only its basic meaning. Therefore, to attain word depth knowledge entails not only knowledge of the word's referential meaning—that is, the link between concept and referent—but also a sense of the word's position in a sentence, its morphological characteristics, and grammatical standing (word class, antonymy, synonymy, hyponymy, gradation, and collocational restrictions) (Henriksen, 1999; Morin, 2006; Richards, 1976).

Although breadth and depth are interrelated, studies have shown that they play different roles in learners' performance. Findings on breadth (Laufer, 1991; Read, 1993; 2000) claim that learners with greater vocabulary knowledge are more successful in communication than those with smaller vocabularies, and that vocabulary size correlates positively with proficiency in reading, writing, and language proficiency in general (Anderson & Freebody, 1981; Engber, 1995; Meara & Jones, 1987). As can be expected, in terms of depth, L2 speakers have less profound lexical knowledge in their L2 than in their L1 (e.g. Verhallen & Schoonen, 1993; Wolter, 2001).

The breadth and depth constructs can be challenging to manipulate in their pedagogical and research applications. Researchers often consider breadth by referring to the number of lexical tokens a learner needs to know in comparison to a native speaker. A common way to carry out comparisons is through reading comprehension tasks. With respect to depth, it is difficult to assess at what point a learner has depth of knowledge of a word (Ma, 2009). Read (2004) explains that in order to assess the depth construct, the researcher needs to elaborate beyond a simple dichotomy. The author goes on to map out three lines of development in the application of depth to L2 vocabulary acquisition: (a)

precision of meaning, which refers to having an more elaborate and specific knowledge of its meaning; (b) comprehensive word knowledge, which includes semantic, orthographic, phonological, morphological, syntactic, collocational, and pragmatic knowledge of a word; and (c) network knowledge, which implies the incorporation of the word into a lexical network together with the ability to link to and distinguish it from related words.

In this study, the word depth knowledge is informed by the work of I.S.P. Nation (2001). As seen in Table 1.1, the author presents an overview of the various layers of knowledge that comprise a word; namely, 'form', 'meaning', and 'use'. Each category includes subcategories of analysis that refer to word properties. For example, when referring to 'form,' there are three major knowledge parts that make up the form of a word: spoken, written, and word parts. More specifically, 'form' includes how the word is phonologically formed (phonology), how it is pronounced (phonetics), how it is written (spelling), the parts that make up the word (morphology), among other characteristics.

The rationale for the study of the word depth knowledge construct in this study on lexical development through MT includes the following: (a) the word depth knowledge construct is an interesting aspect of the lexicon to study in connection to MT because, due to the nature of vocabulary items within which each represents several layers of knowledge (e.g. meaning), studying the development of vocabulary through MT sheds light on its effectiveness in mediating and organizing layers of knowledge about a single word; (b) the word depth knowledge construct is efficient in organizing knowledge developed through MT because such learning can be observed and analyzed through SCT notions; and (c) the word depth knowledge construct has been described as the least studied aspect of a learner's lexicon (Henriksen, 1999; Haastrup & Henriksen, 2000; as cited in Lafford, Collentine, & Karp, 2003), which this study on word depth knowledge and MT addresses.

Table 1.1 I.S.P. Nation's (2001) Word Depth Knowledge

Note: R = receptive knowledge, P = productive knowledge

Kinds of Knowledge	Knowledge Parts	R/P	What it involves
Form	Spoken	R	What does the word sound like?
		P	How is the word pronounced?
	Written	R	What does the word look like?
		P	How is the word written and spelled?
	Word Parts	R	What parts are recognizable in the word?
		P	What word forms can be used to express this meaning?
Meaning	Form and meaning	R	What meaning does this word form signal?
		P	What word form can be used to express this meaning?
	Concepts and referents	R	What is included in the concept?
		P	What items can the concept refer to?
	Associations	R	What other words does this make us think of?
		P	What other words could we use instead of this one?
Use	Grammatical functions	R	In what patterns does the word occur?
		P	In what patterns must we use this word?
	Collocations	R	What words or types of words occur with this one?
		P	What words or types of words must we use with this one?
	Constraints on use (register, frequency)	R	Where, when, and how often would we expect to meet this word?
		P	Where, when, and how often can we use this word?

The main focus of the current study rests on the observation and analysis of the effects of MT on lexical development. The word depth knowledge construct allows the

data on lexical development through MT to be quantified and qualitatively analyzed to observe the process of learning.

1.4. PURPOSES AND SIGNIFICANCE OF THIS STUDY

My goals in this dissertation are: (1) to observe if a given group of L2 learners can achieve gains in Spanish lexical knowledge of certain lexical items by measuring their MT according to the word depth knowledge construct; (2) to observe if and how learners' MT reveals features proposed by SCT (e.g. ZPD, roles) to promote lexical gains; and (3) to further develop categories within the SCT framework for the analysis of lexical development through interaction.

In Figure 1.1, the conceptual framework of this study is graphically represented and summarized. The main theoretical framework, SCT, and other pivotal theoretical constructs, such as MT and word depth knowledge, are located in relation to each other; their function and themes are displayed, and their connection to each other in terms of the purposes and foci of the study are presented. Starting on the far left, the three main theoretical pillars of this study are listed: MT, SCT, and word depth knowledge. Their functions and exploratory concepts are listed as well. I introduce how constructs are studied by means of the application of categories in the analysis of learners' interactions. In the last column to the right shows how all parts of this study come together in answering the three main questions in this research: the role of MT in lexical development, how MT is shaped when targeting vocabulary, and areas of the lexicon developed by MT.

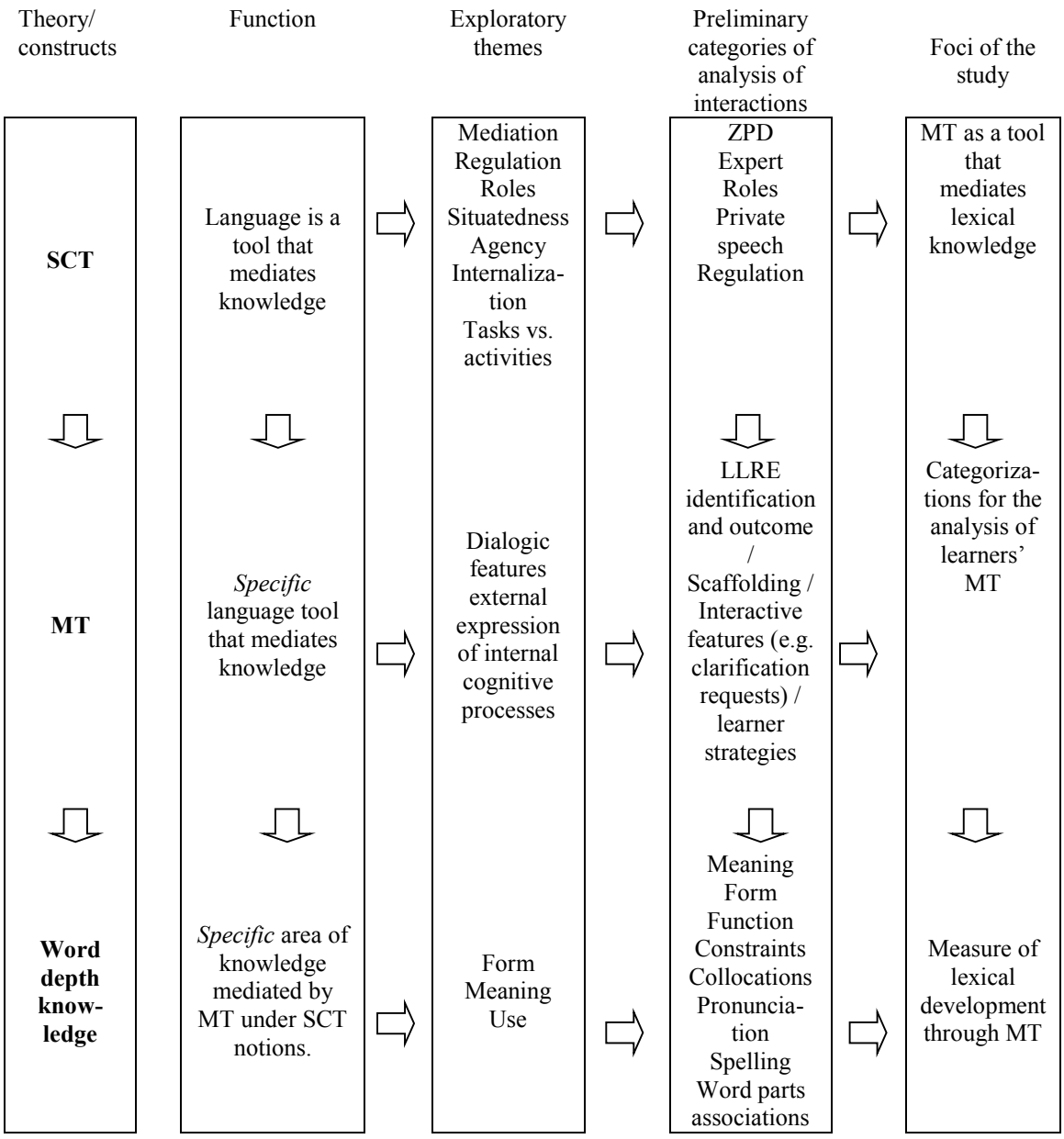

Figure 1.1 Conceptual Framework for the Current Study

Possible contributions to the SLA field that emerge from this study are: (1) further knowledge regarding the role of interaction in language development within the SCT framework; (2) a description/analysis of vocabulary development within the SCT framework, an area previously unexplored; (3) the systematic analysis and categorization of interactions centered on the lexicon; (4) the use of the word depth knowledge construct as a tool to measure lexical development; and (5) a thorough analysis of how MT in particular mediates cognitive development.

Furthermore, this study presents two components of pedagogical significance: First, it illustrates how these L2 learners produce MT when presented with a communicative task conducive to lexical development (Donato, 2007). As we learn about strategies that learners develop in MT and their usefulness and efficiency in promoting lexical development, these same strategies can be explicitly taught and encouraged in the L2 classroom when learners work collaboratively. This study can inform researchers' and teachers' understanding of the manner in which learners use language to solve lexical problems (Brooks et al., 1997).

1.5. DISSERTATION OUTLINE

In Chapter 1, I introduced the current investigation by addressing the problem to study, my purpose in pursuing this topic, and the three primary components of this study: SCT, metatalk, and word depth knowledge. In Chapter 2, I consider the existing literature on the topic of the lexicon in L2 acquisition and current research on the subject in order to identify unexplored areas in the study of lexical development that this research investigates. The review of the literature on the lexicon ends with a restatement of my study, my research questions, and hypotheses. In Chapter 3, I address how data have been collected and analyzed in order to answer the research questions posed in Chapter 2. At this point, with

existing data in hand, research questions are revisited with the aim of testing previously-formulated hypotheses; this analysis is included in Chapter 4. In the conclusion section (Chapter 5), findings and analyses are discussed with an emphasis on how they contribute to the existing research on MT. In the appendices, all material employed during any stage of this study are included.

Chapter 2: Vocabulary in the Second Language Acquisition Field

In this chapter, I review previous literature relevant to the discussion of vocabulary in the field of Second Language Acquisition (SLA). As a starting point, I refer to the attention vocabulary has received over time regarding diverse teaching methods and theoretical approaches to language acquisition and research. Second, I define terms often employed in studies on vocabulary—such as *word*, *mental lexicon*, and *lexeme*—and explain their application in my study. Third, I revisit the question of what it means to know a word by introducing approaches to vocabulary knowledge, such as the *word knowledge model* (Wolter, 2001) and constructs such as *declarative* versus *procedural* knowledge (Ma, 2009). Fourth, I discuss theoretical approaches and hypotheses on learning other than SCT, and their application to L2 vocabulary, such as the Interaction Hypothesis. Fifth, I describe current research on vocabulary and reference studies on topics such as incidental and intentional vocabulary acquisition. Following this research overview on vocabulary acquisition and development, I explain how the current investigation addresses areas not yet explored in the SLA literature in relation to vocabulary development. Lastly, I present the details of my investigation and introduce the research questions that motivate this study.

2.1. VOCABULARY IN THE SLA FIELD: A CHRONOLOGICAL OVERVIEW

Vocabulary in the SLA field is a neglected area of study. Here I trace its development historically in terms of the role vocabulary has played in L2 teaching methods and research theories.

Zimmerman (1997) summarized the role that vocabulary has played in teaching methods over the last centuries. At the end of the 18th century, the Grammar Translation Method was the most common approach to teaching learners to read and write in Classical Latin and Greek in public schools in Prussia. To learn vocabulary, students were required

to memorize vocabulary lists. The Reform Movement, introduced by Sweet in the 1880s, adopted an emphasis on spoken language and phonetics; words were taught and practiced in context. With the introduction of the Direct Method by Sauveur and Berlitz around 1900, the use of the L1 was rejected, thus necessitating other tools to teach vocabulary, including the use of pictures and demonstrations. Abstract vocabulary was taught through the association of ideas. The direct method was followed by Bloomfield's Audio-lingual Method, which views language learning as a matter of habit formation. During that time, vocabulary instruction lost in importance to grammar teaching. Around 1977, the Natural Approach, developed by Terrell and Krashen, then followed with an emphasis on comprehensible input. In this approach, vocabulary is considered essential, because language acquisition cannot take place unless vocabulary is comprehended as part of input. Today, language teaching has embraced a communicative approach, which developed as a result of ideas by Hymes and Canale. This approach aims to engage the learner in meaningful and interactive oral language production. This method does not stress the study of vocabulary; rather, vocabulary is to be taught as it is needed (Zimmerman, 1997).

From a theoretical perspective, largely due to the advent of the Generativist movement (Chomsky, 1965), SLA research was dominated for decades by the study of the grammatical component of language (Laufer, 2009). This emphasis on grammar contributed to scant attention paid to other linguistic components like vocabulary even though "the major challenge of learning and using a language—whether as L1 or as L2—lies not in the area of broad syntactic principles but in the `nitty-gritty´ of the lexicon" (Singleton, 1999, p. 4).

Despite its importance in holistic L2 development, vocabulary has been one area in L2 acquisition that has been neglected by researchers over time (Gass, 1988; Laufer, 2009). This lack of concern for the lexicon is striking considering the major role vocabulary has

in language use and the challenges that its acquisition presents in comparison to other aspects of language learning (Gass, 1988; Wagner, Muse, & Tannenbaum, 2006). This study on vocabulary development through MT emphasizes the importance of the lexicon in SLA by focusing on lexical development.

2.2. DEFINITIONS

In this section, I define each of the terms commonly used, at times synonymously and interchangeably, in studies on vocabulary. These terms include the *lexicon*, *mental lexicon*, *lexemes*, and *lexical entries*.

2.2.1 The lexicon, lexical entries, lexemes, and the mental lexicon

The *lexicon* has been described as the store of words in long-term memory from which one constructs phrases and sentences through grammar (e.g. Jackendoff, 2002). It has also been described as a system of local mental depiction, a vocabulary storage that includes representations of sounds and meanings (Ouellette, 2006). Coltheart (2004) describes the lexicon as a system of local mental representations, or *mental lexicon*. Each of the elements in the system represents a stimulus form in a representational domain: (1) the phonological lexicon, where all phonological forms of all words a person knows are stored; (2) the orthographic lexicon with all the orthographic forms of the words a person knows; and (3) the pictorial lexicon, containing the visual forms or structural descriptions of all the objects whose visual appearance a person knows.

Levelt's (1989, 2001 as cited in Juffs, 2009) model describes the *lexical entry*. In this model a lexical entry represents four parts: meaning, syntax, morphology, and form (Figure 2.1). The first two elements of meaning and syntax are the *lemma*, and the last two of morphology and form are the *lexeme*. The information (form, meaning, etc.) contained in a lexical entry allows individuals to recognize and understand words.

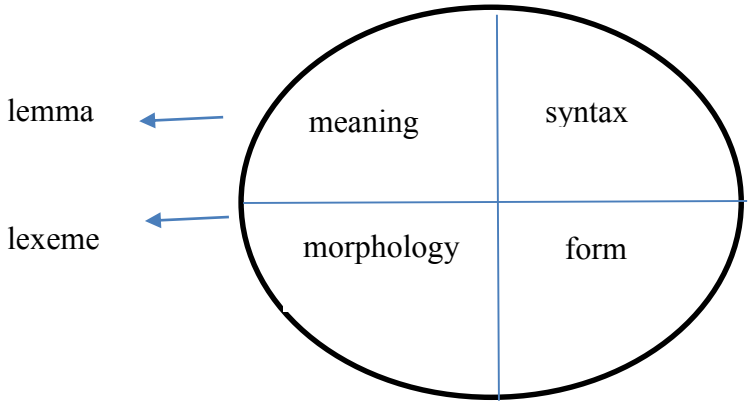

Figure 2.1. Levelt's (1989) model of the lexical entry (from Juffs, 2009, p. 2)

In addition to single-word units of meaning, or tokens, some researchers have identified clusters of tokens that function as a unit with specific meanings and functions. These word clusters are also known as *lexemes* or *lexical phrases*, and *set phrases.* Regardless of the number of words that make up each lexeme, they can still be treated as a unit because they are unified in meaning and function (Schmitt, 2000).

In this investigation, the terms *word, lexical unit*, *lexical token*, *vocabulary,* and *lexicon* are commonly employed and used as synonyms. Each word, lexical unit, or token is characterized by a series of components (e.g. spelling, function) that can be learned separately and stored in the *lexicon*.

2.3. VOCABULARY KNOWLEDGE

The question of what it means to know a word was raised in Chapter 1, and the *word depth knowledge construct* (I.S.P. Nation, 2001) (Table 1.1) was introduced together with the rational for its inclusion in this study. This section returns to the question of what it means to know a word, first by describing alternative frameworks to defining word knowledge by Richards (1976), Meara (1996), and Qian (2002), and second, by introducing theories on mental lexicon development and types of vocabulary knowledge (e.g. declarative vs. procedural knowledge).

2.3.1. Measuring word knowledge

Richards (1976) described what it means to know a word by listing a number of assumptions, including that: (a) vocabulary learning is a lifelong pursuit; (b) word knowledge means recognizing the probability of usage of that word, the context in which it appears, and its collocations; (c) lexical knowledge means being aware of its limitations in function and context and understanding its syntactic behavior; (d) such knowledge means being aware of its underlying form, derivations, and associations; and (e) knowing a word means knowing its semantic value and its multiple meanings. When postulating these assumptions, Richards' primary objective was to consider vocabulary in terms of teaching and curriculum design. Upon considering each of these assumptions in regards to word knowledge, it can be noted that the author connected the areas of semantics, word function, register, word associations, and collocations; however, he ignored other important areas of lexical knowledge such as pronunciation or spelling.

Meara (1996) argued that it is impossible to specify everything learners know about the L2 lexicon and that instead of determining what learners know, we should study the stages of development of words until they are fully integrated into the speaker's lexicon. The author suggested researching this lexical development by applying categories such as

the active/passive dichotomy or those introduced by Wesche and Paribakht (1996) in their word knowledge scale. The word knowledge scale, or VKS, includes options learners can choose from in order to measure their own word knowledge; one such option is: 'I have seen this word before, and I think it means_____'. Thus, in order to trace how well learners know a certain lexical item, Meara (1996) proposes a continuum approach. However, the application of a continuum appears to be rather simplistic in assessing word knowledge since the categories in the continuum can provide little detail on their relationship to learners' actual lexical competence.

Qian's (2002) framework on word knowledge represents a four-dimensional approach comprising vocabulary size (how many words the learner knows), depth of vocabulary knowledge (all word characteristics such as graphemic, phonemic, and syntactical), lexical organization (lexical organization, connection, and representation in the mental lexicon), and automaticity of receptive-productive knowledge in productive and passive processes (such as reading or speaking). Indeed, as the author acknowledged, this framework comprises aspects from different theoretical perspectives on word knowledge. As a result, the mixture of the components of Qian's framework makes it difficult to apply it fully in a single study on vocabulary. In fact, in Qian (2002), the author applied only the first two dimensions (size and depth) to his study on the relationship between vocabulary knowledge and reading performance, while he ignored the other two dimensions (mental lexicon organization and access) because they do not fit within the design of his study.

I.S.P. Nation's (2001) word depth knowledge framework is often compared to the approaches introduced in this section. I.S.P. Nation's approach, which was discussed in Chapter 1, involves main aspects of knowing a word, including receptive and productive levels (such as word form, word meaning, and word use). Categories of analysis considered important in understanding how lexical knowledge is developed as discussed by other

authors (e.g. Qian, 2002), are represented within the word depth knowledge construct. Categories of analysis in I.S.P. Nation's and word construct have an underlying purpose, which is to understand better how vocabulary is constructed in layers (e.g. meaning, spelling, function). This approach to understanding how lexical knowledge is built facilitates measuring lexical knowledge as it occurs through MT; for this reason, I.S.P. Nation's word depth knowledge construct is the one employed in the current study.

2.3.2. The mental lexicon and types of vocabulary knowledge

Within the psycholinguistic tradition, models of vocabulary knowledge have focused on how words are organized in the mental lexicon. Wolter (2001) describes a word knowledge model based on results from word association tests. Word association tests include three basic relationships between the target word and one of three types of response: *paradigmatic*, *syntagmatic*, and *clangs*. 'Paradigmatic responses' are words from the same word class as the prompt word and can perform the same syntactical function in a sentence. Paradigmatic responses represent different types of relationships; namely, superordinates, (*dog* triggers *animal*), coordinates (*dog* triggers *cat*), synonyms (*dog* triggers *canine*), and subordinates (*dog* triggers *terrier*). Syntagmatic responses have a sequential or collocational relationship to the prompt word and, as a consequence, can be of a different class type as the prompt word (*dog* prompts *bite*). Clang responses resemble the prompt word phonologically and bear no semantic connection to the prompt word (*dog* prompts *bog*). Wolter (2001) observes that native speakers produce a large number of paradigmatic associations, while L2 learners, notwithstanding different proficiency levels among them, produce fewer paradigmatic associations. Thus, a higher incidence of paradigmatic associations is assumed to reflect higher lexical development.

Based on word association studies, Wolter (2001) proposed that the mental lexicon comprises core vocabulary and peripheral layers (Figure 2.2). The core vocabulary includes well-known words while the surrounding layers of peripheral vocabulary comprise less-known words. The strength of the connections among words in this model depends on how close they are to the core of well-known words. Therefore, paradigmatic associations are formed between words located in the central circles, while other weaker semantic associations (e.g. phonological responses, or those associations based on sound and not meaning) are formed with words located in the peripheral circles. Wolter's (2001) word knowledge model proposes how mental lexicons are organized in the mind although it does not indicate how learners achieve such knowledge. However, it is of interest that Wolter's (2001) word knowledge model takes learner L2 proficiency into account in connection with a more or less developed lexicon, which is relevant to this study since I focus on how intermediate-low learners develop lexical knowledge through MT.

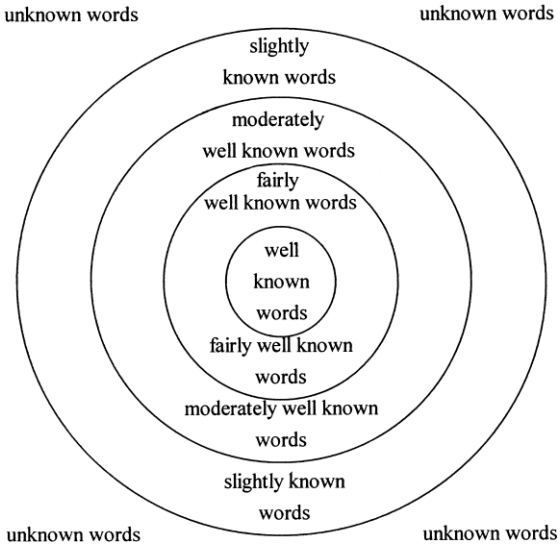

Figure 2.2. Representation of the mental lexicon (Wolter, 2001, p. 48).

Vanniarajan (1997) proposed an interdisciplinary and interactive model of vocabulary acquisition. This model captures the mental processes activated during the acquisition of vocabulary knowledge. In this model, the word 'interactive' refers to the interaction between learner external (contextual) and learner internal (cognitive) factors. Learner external factors include the learning setting (which can be incidental or intentional), the linguistic context (including contextual cues such as morphology) and moderating variables (e.g. the number of occurrences of the unknown word). Learner internal factors include innate ability (the ability to abstract features of a word) and motivation (the learner's drive to perform an action). Cognitive factors include working memory, higher order skills (e.g. the ability to gather meaning from context), and prior knowledge (e.g. morphosyntactic familiarity, and conceptual familiarity). Vanniarajan's (1997) model attempts to represent connections in the human mind in order to create a visualization of lexical acquisition. This model is broad and includes a large number of elements pertinent to aspects of the study of vocabulary acquisition. However, it is not clear how connections are established between these items when vocabulary development takes place. Also, the diverse nature of the components in the model described as interdisciplinary make it challenging to incorporate the entire model in a single study on vocabulary development.

Furthermore, Vanniarajan (1997) introduced a mental representation of vocabulary (Table 2.1). The author proposed that knowledge about a word can be divided into three areas: physical knowledge, morphosyntactic knowledge, and conceptual knowledge. Vanniarajan's three categories in the mental representation of word knowledge are comparable to three major fields of analysis described in I.S.P. Nation's (2001): word form, word meaning, and word use.

Table 2.1 A Mental Representation of Word Knowledge (Vanniarajan, 1997, p. 191)

Physical knowledge		Morphosyntactic knowledge	Conceptual knowledge
spelling	phonology	category	meaning
cognates	acoustic	morphology	association
	sound	etymology	collocation
	alliteration	paradigmatic	contrast
	assonance	syntagmatic	predication
		intra-categorical	similarity
			subordinate
			part-whole

Other approaches to vocabulary knowledge refer to vocabulary knowledge type. From a cognitive psychology perspective, vocabulary knowledge can take two forms: *declarative* and *procedural* knowledge. Both types of knowledge make up long-term memory. *Declarative knowledge* comprises what we know about the world and all factual knowledge; for example, knowing that Paris is the capital of France, even if one has never been there and does not recall how that knowledge was gained. *Procedural knowledge* refers to skills and how to perform various activities such as driving, reading, or writing (Ma, 2009).

Just as L1 vocabulary knowledge is thought to originate in declarative forms, eventually to become procedural through practice, L2 development undergoes the same process. Native speakers have procedural knowledge of their L1, which they use

automatically and spontaneously. At times, though, it is necessary for native speakers to consciously review their language in order to find a word or expression, thus relying on their declarative knowledge of the language. The same process occurs for L2 speakers who start learning declarative knowledge of lexical items. With time and practice, these lexical items can be proceduralized but it is possible that some terms that are seldom used remain in the declarative form or that some aspects of such unused lexical units remain in the declarative form. Thus, L2 learners might keep terms in the declarative form if they have insufficient input or output or suffer interference of the L1 semantic system. For example, Spanish L2 learners may be introduced to the names of body parts. Practice can make it possible for certain target words to be proceduralized. Frequency used words such as *manos* (hands) and *cabeza* (head) usually become proceduralized and learners can easily access such terms that have become innate to them. On the other hand, terms such as *cejas* ('eyebrows') or *pestañas* ('eyelashes') are less frequent and may remain as declarative knowledge, thus requiring learners to do additional work to bring back to memory the non-proceduralized items (Ma, 2009).

Other distinctions made in vocabulary knowledge refer to qualities such as *passive*, *controlled active*, or *free active;* and *productive* versus *receptive*. *Passive* knowledge entails understanding the most common meaning of a word (as in 'solution' in the context of 'solution to a problem' and not in 'chemical solution'). *Controlled active* implies cued recall or being prompted by a task (e.g. having to complete the word 'fragrant' in 'the garden was full of fra_____ flowers'). *Free active* knowledge involves spontaneous use of a word, without prompts, as in the case of a free composition. The distinction between controlled active and free active is necessary in L2 teaching settings to force learners to use words they would not naturally choose to use so that they can expand their lexicon (Laufer, 1998).

Ma (2009) argued that the distinction between *productive* and *receptive* vocabulary can be traced down to how words are utilized in connection to the four language skills: reading, speaking, listening, and writing. Receptive vocabulary is that which is recognized when encountered either in reading or listening while productive vocabulary is the vocabulary that one is able to use correctly either in speaking or writing. Productive knowledge of a word includes receptive knowledge.

In summary, I have introduced in this section additional models of vocabulary acquisition often compared to I.S.P. Nation's (2001) word depth knowledge construct since they all attempt to explain how the mental lexicon is learned and organized in the learner's mind. I.S.P. Nation's construct is employed in this study in order to measure aspects of a word in terms of function, meaning and form as developed through MT. The word depth knowledge components as conceived in this construct facilitate the analysis of lexical development as it occurs layer by layer through MT. Other models, such as Richard's (1976) or Wolter's (2001), are not as helpful for the study of MT as they do not consider the various individual components that make up a lexical unit. Additional definitions for kinds of knowledge within the learning continuum were also introduced as they facilitate the discussion proposed in this study on lexical development through MT.

2.4. HOW IS THE LEXICON ACQUIRED?

The lexicon has been studied within various theoretical frameworks. In Chapter 1, Vygotsky's Sociocultural Theory was introduced, together with its relevance to the current study on lexical development though MT. In this section, I introduce alternative theories and their views on lexical acquisition. As Juffs (1996, 2009) pointed out, psycholinguists have focused on nouns, the relationship between the L1 and the L2 lexicons, storage, and processing. Connectionists posit that learners form mental connections and extract the rules

of the language using exemplars found in input. They also emphasize the role of frequency in the acquisition of words, collocations, and morphosyntactic patterns. In addition, the Interaction Hypothesis (Long, 1996), the Input Hypothesis (Krashen, 1982), and the Output Hypothesis (Swain, 1985) have been extensively applied as theoretical frameworks to the study of vocabulary.

In subsection 2.4.1, I summarize the work of psychologists in relation to processing, accessing, and storing words, and the role of frequency and its effect on lexical development by connectionists. In subsection 2.4.2, I describe the Interaction Hypothesis, the Input Hypothesis, and the Output Hypothesis. Each of these hypotheses considers aspects of interaction, assuming it to be at the center of learning. This focus on interaction makes them particularly relevant to this study on vocabulary development through MT.

2.4.1 Psychological and connectionist notions on L2 vocabulary

In the psycholinguistics field, areas of research regarding the L2 lexicon include the establishment of and access to the L2 lexicon and how words themselves and their features play a role in how the lexicon develops.

Kroll and Tokowicz (2001) addressed cognitive processes and concept mediation (being able to access concepts for L2 words independently of the L1) by adult L2 learners through a review of prior research. Their objective was to observe the degree of interference and assistance between the L1 and L2 lexicons. They discussed four main areas: (1) the initial dependency of learners on lexical transfer from the L1 to access meaning of L2 words; (2) factors influencing the development of direct conceptual processing for L2 (e.g. learner proficiency in the L2 is one of those factors); (3) the representation of two languages in the bilingual mind; and (4) problems caused by creating L2 representations that allow access to meaning and forming control mechanisms that

modulate the L1 activity (e.g. L2 learners need to link new words to old concepts and deal with ambiguity that the new L2 information creates). Conclusions of this research are that during early stages of L2 acquisition, learners have limited access to concepts for L2 words so the L1 serves as a temporary scaffold for the L2. With increased L2 proficiency, conceptual processing appears to become more direct in the L2 and less dependent on the L1. However, despite increased L2 proficiency, the L1 continues to play a role in both lexical and conceptual access even after high levels of proficiency are achieved.

Although not an acquisition model per se, a psycholinguistic model, relevant to the interactions between lexical and conceptual representation in the bilingual lexicon is the Revised Hierarchical Model (RHM) (Kross & Stewart, 1994; Kroll & Sunderman, 2003). Experimental work motivated by this model has shown that beginning bilinguals access L2 word meaning indirectly through L1 translation; thus, despite being triggered by the L2, access to the conceptual system takes place through the L1, unlike processes in proficient bilinguals who have direct access to the conceptual system directly through the L2 and without any reliance on the L1 (N. Ellis, 2008). Thus, the RHM is a lexical developmental model in which language proficiency is a key element in changing the nature of lexical connections between words and their representation in the mental lexicon (N. Ellis, 2008; Finkbeiner, 2003; Kroll & Sunderman, 2003).

Connectionist psychology sustains that all linguistic units are extracted from language use; therefore, language learning constitutes the association of representations reflecting probabilities of occurrence of form-function. Based on this notion, frequency is essential to learning because it provides learners with regularities that result from learners' analysis of the distributional characteristics of the input they receive. This does not mean that individuals spend their time counting words as they listen or speak; rather, each time

a word is processed, the perceptual and motor systems become refined by the experience (N. Ellis, 2002, 2008).

Lexical features also are seen to play a role in the mental lexicon development. In particular, word frequency serves to explain the probability of some types of words being learned before others. For instance, high frequency words are named more rapidly than low frequency ones; they are more rapidly judged in lexical decision tasks, and they are better spelled and recognized in auditory tasks (N. Ellis, 2002). Just as single unit words are learned, the same applies to common sequences of words or formulas. Formulas are lexical chunks that result from binding frequent collocations (e.g. 'to save time', 'to make progress'); they present a fundamental role in L2 formulaic speech, prefabricated routine and patterns, and memorized sentences, among others (Hakuta, 1974; Wong-Fillmore, 1976; Pawley & Syder, 1983, as cited in N. Ellis, 2002).

Such notions on frequency present implications for theories of language acquisition; specifically, that language learning is exemplar based, and that knowledge underlying fluency in language use is not the application of abstract knowledge of grammar rules but a series of memories of past utterances. As mentioned before, frequency in language learning does not imply counting the number of occurrences of a word, rather, frequency in language implies that learning is implicit learning, much of it due to noticing. Nevertheless, other more complex associations do require more conscious and explicit learning and, at times, language acquisition can be enhanced by explicit instruction (N. Ellis, 2002). In section 2.5.1, I address implicit and explicit learning and instruction in regards to lexical acquisition in more detail.

Psycholinguistic views on language development are mainly concerned with the identification, interconnection between the L1 and L2 lexicons, and access to the developing L2 lexicon. These views are not concerned with learners' unique and social

behavior as learners work collaboratively and the effect such interactions have on the developing lexicon. On the other hand, SCT, the theoretical framework applied to the current study on vocabulary development through MT, is concerned with both learners' social interactions and the cognitive skills derived from such interactions, thus considering the learner both as a social and cognizant individual. Therefore, in comparison to other theoretical frameworks, SCT offers a holistic approach to understanding a learner's pursuit of L2 knowledge.

2.4.2. The Interaction Hypothesis, Input Hypothesis, and Output Hypothesis

The Interaction Hypothesis (Long, 1996), the Input Hypothesis (Krashen, 1982), and the Output Hypothesis (Swain, 1985) have been extensively applied to the study of vocabulary. Each of these hypotheses places interaction at the center of learning, which makes these hypotheses particularly relevant to this study on vocabulary development through MT. In this section, I review these hypotheses and address their applicability to vocabulary learning.

In the early 1970s, Krashen proposed five hypotheses with the purpose of explaining second language acquisition: (a) the Acquisition-learning Hypothesis, (b) the Natural Order Hypothesis, (c) the Monitor Hypothesis, (d) the Input Hypothesis, and (e) the Affective Filter Hypothesis. The Acquisition-learning Hypothesis makes a distinction between two ways of achieving competence: *learning* and *acquiring*. The *acquisition* process denotes a subconscious process identical to the one children go through as they learn their L1 and develop an innate sense for what is linguistically correct. Conversely, *learning* implies a conscious process; whatever is learned cannot be acquired.

The Natural Order Hypothesis simply explains that elements of language are learned always in the same order, even if instruction is available. It also argues that since

the acquired system is the one that initiates speech, the learned system serves as a monitor to check output of the acquired system. Thus, based on the Monitor Hypothesis, the learners' learned system acts as a monitor for what they produce. The Input Hypothesis, central to Krashen's acquisition concept, is a supplement to the Natural Order Hypothesis and explains how one moves from one point to the other in the order of acquisition. Krashen's view is based on learners receiving comprehensible input, which is described as $i + 1$, or input that is slightly ahead of the learner's current state of knowledge but still comprehensible. Key concepts in the Input Hypothesis include: (1) speaking emerges on its own as a result of competence, which was built through comprehensible input; (2) if input is comprehensible, and there is enough of it, the necessary grammar is automatically provided; and (3) in classroom settings, the teacher's main role is to provide the student with comprehensible input. Finally, the Affective Filter Hypothesis considers affective variables that can either reduce or instill learning, such as motivation, attitude, self-confidence, and anxiety. If the filter is up due to a learner's negative emotions, input is prevented from being received; if input is prevented, there can be no acquisition. If the filter is down, input reaches the acquisition device and acquisition takes place (Gass & Selinker, 2001).

Regarding vocabulary acquisition, Krashen (1989) explained that vocabulary development occurs as a result of exposure to comprehensible input. Therefore, words are learned in an unconscious manner, or implicitly, due to abstraction from repeated exposures (N. Ellis, 1995). Krashen (1989) found vocabulary learning to be vast because each word includes areas of word knowledge (e.g. spelling, collocation) that make vocabulary tasks and instruction insufficient as input. Based on others' research (e.g. Sternberg, 1987), the author concluded that other forms of comprehensible input, such as reading, are essential and more effective for vocabulary learning to occur (vocabulary

development through reading is more fully discussed in section 2.5.1 on implicit and explicit approaches to vocabulary learning). Krashen concluded that instruction and explicit vocabulary teaching are less effective for vocabulary learning than encouraging L2 learners to read more.

As discussed in Chapter 1, Swain (1985) found comprehensible input to be insufficient for the attainment of native-like proficiency in the L2, and proposed the Comprehensible Output Hypothesis. The author argued that in producing output, L2 learners may notice gaps between what they want to say and what they can actually say, they can experiment with the language, test their own hypotheses, and engage in metalinguistic reflections on their use and knowledge of the target language (Swain, 1998). Studies support the role of output in connection to vocabulary acquisition; for instance, Laufer and Girsai (2008) experimented with output produced in the form of translations and found positive effects on vocabulary development. Webb (2005) examined the development of word depth knowledge by comparing the effect of receptive and productive tasks. The author found that the productive tasks were more effective than receptive tasks in vocabulary development.

The Interaction Hypothesis includes aspects of the Input Hypothesis and the Output Hypothesis, but Long (1996) took a step further to propose that conversational interaction in an L2 forms the basis for the development of language; for that reason, this hypothesis has also been referred to as the '*input, interaction, and output'* model. The Interaction Hypothesis claims that learning occurs as a consequence of negotiation for meaning. Negotiations are modifications or adjustments that learners make during their communicative interactions with native and nonnative speakers alike (de la Fuente, 2002). Negotiation for meaning triggers interactional adjustments by the more competent interlocutor, thus facilitating acquisition. Excerpt 2.1 (from Gass & Selinker, 2001, p. 318)

illustrates negotiation during an interaction in English between a native Japanese speaker (J) and a native Spanish speaker (S). Learners' proficiency levels in English are not indicated.

Excerpt 2.1. Negotiation for meaning.

1 J: And your what is your mm father's job?

2 S: My father now is retire.

3 J: Retire.

4 S: Yes.

5 J: Oh yeah.

6 S: But he work with uh uh institution.

7 J: Institution.

8 S: Do you know that? The name is … something like eh control of the state.

9 J: Aaaaaaaah.

10 S: Do you understand more or less?

11 J: State is uh… what kind of state?

12 S: It is uhm.

13 J: Michigan State?

14 S: No, the all nation.

15 J: No, government.

16 S: All the nation, all the nation. Do you know for example is a the, the institution mmm of the state mm of Venezuela.

17 J: Ah ah.

18 S: Had to declare, declare? Her ingress.

19 J: English?

20 S: No. English no [LAUGH]… ingress, her ingress.

21 J: Ingress?

22 S: Yes. If for example, if you, when you work you had an ingress, you know?

23 J: Uh huh an ingles?

24 S: Yes.

25 J: Uh huh OK.

26 S: Yes, if for example, your homna, husband works, when finish, when end the month his job, his boss pay—mm—him something.

27 J: Aaaah.

28 S: And you family have some ingress.

29 J: Yes ah, OK OK

30 S: More or less OK? And in this institution take care of all ingress of the company and review the accounts.

31 J: OK I got, I see.

32 S: OK my father work there, but now he is old.

(Gass & Selinker, 2001, p. 318)

In excerpt 2.1, the speakers negotiate the meaning of three words: institution, state, and ingress ('income'). The meaning of these three words is crucial to maintaining successful communication. As learners work together in defining the target words, they use various linguistic features that are representative of negotiation for meaning among non-native speakers such as comprehension checks (lines 10 and 30) and clarification requests (lines 18 and 21) (Gass & Selinker, 2001).

During the interaction, the learners' attention can either be oriented to a discrepancy, possibly through negative evidence, between what they believe about the L2 and what they observe during the interaction; or they may be introduced to a linguistic element (e.g. a word) that was unknown prior to the linguistic encounter, a concept known

as *noticing the gap* (Gass & Selinker, 2001). When learners notice a gap between what is said by others and their own interlanguage, negotiation functions as an attention-focusing mechanism that is a first step in acquisition. Acquisition follows the process of noticing the gap when learners pay attention and engage cognitive processes that facilitate intake or further processing of the new linguistic element (de la Fuente, 2002). Cohen (1999, as cited in Gass & Selinker, 2001) exemplified how noticing the gap occurs and how it can lead to acquisition.

In Cohen's study, students were asked to keep interaction logs so that they could analyze their own interaction and language. In excerpt 2.2 from a student's log, the learner identifies a gap in her knowledge and describes the context in which such a finding took place. The learner's proficiency level is not indicated.

Excerpt 2.2. Noticing a gap.

> Last Friday, in the communication class, we talked about the interaction logs, one of the classmates mentioned when she went to the supermarket, the cashier asked her if she wanted to drive out or not. So I learned that phrase from her. Last Sunday, when I went to the supermarket, I was ready to hear that again and I was so excited about it. Because most of time, I was so nervous when the cashier asked me some questions and they all spoke quickly. But, not this time, finally, after the cashier packed all my stuff into the plastic bag, he asked "Do you want to drive _____?" "No, thanks." I said. But I noticed he seemed to say some word instead of "out". The last word sounded like "off" or "up" or I was wrong. But I checked it up in the dictionary, "drive out" has a different meaning.
>
> (Cohen, 1999, as cited in Gass & Selinker, 2001, p. 375).

In Excerpt 2.2, the learner noticed a preposition unknown to her in her interlocutor's speech. The learner looked up the term in a dictionary and was able to learn what the phrase

'drive out' meant. Thus, new knowledge was gained as a consequence of the learner noticing the gap in her knowledge during a communicative exchange.

The idea that language learning can result from interaction was first introduced by Krashen prior to 1980. However, this function of interaction in language acquisition became fully accepted with Long's (1996) publication of the Interaction Hypothesis. Since that time, it is commonly accepted within the SLA literature that there is a strong connection between interaction and learning (Gass & Mackay, 2007). Studies that support the Interaction Hypothesis in relation to L2 vocabulary learning include those by Gass and Alvarez Torres (2005), de la Fuente (2002, 2003), Yanguas (2012), Shintani (2012), and Mackay (2002), among others.

In Gass and Alvarez Torres (2005), learners were presented with several experimental conditions and were tested on both grammatical and lexical knowledge. Greatest improvement was recorded in the lexical area, through treatment that included a combination of both input and interaction. De la Fuente (2002) also investigated the differential effects of three conditions (e.g. negotiation plus pushed output) on the receptive and productive acquisition of words. Findings provide empirical evidence for the role of interactive negotiation in facilitating the acquisition of L2 vocabulary.

De la Fuente (2003) compared the acquisition of word meaning through face-to-face versus computer-mediated interaction. Her analysis of the learners' interactions and intake showed that they acquired target word meaning regardless of interaction modality. However, learners in the face-to-face group had increased opportunities for output production, negative feedback, and self-repair, which contributed to a richer interactive context for learning. Yanguas (2012) also researched vocabulary acquisition through computer-mediated communication (CMC) by exploring learners' interaction using Skype as compared to traditional face-to-face interaction. The author found that there was no

difference across groups in learners' productive and receptive lexical knowledge. However, there was a significant difference across groups when testing for oral comprehension, where CMC learners outperformed learners in the control group. After two weeks, all learners retained their receptive gains but not in their production. This study adds a new context for interaction with the inclusion of CMC in the design of the study. All in all, these studies exemplify how interaction, regardless of its form, does play an important role in language development.

Shintani (2012) studied lexical and plural -s acquisition by English as a Foreign Language learners through input-based instruction. The author noted that even though the tasks did not require language production, learners naturally participated actively in conversation, negotiation, and focus on meaning and form, which were conducive to the acquisition of both productive and receptive lexical knowledge. Interaction also led to plural -s acquisition, mainly in the form of receptive knowledge.

Lastly, the study by Mackey (2002) considers interaction from the learners' perspective and their roles in interactional processes. Learners participated in videotaped communicative tasks. Following the interactive activities, they participated in a recall session in which they watched their videotaped interactions and recalled their thoughts during the task. The author categorized the learners' recall data as well as transcripts of their interactions based on the following categories: obtaining comprehensible input, receiving feedback, being pushed to make target-like modifications in output, and testing hypotheses. Findings suggest that learners' insights generally overlap with researchers' claims about the interaction.

In summary, Krashen (1982) focuses on the quality of input and views vocabulary development as a result of exposure to comprehensible input. Words are learned implicitly, due to abstraction from repeated exposures. Swain (1985) argues that language acquisition

occurs as a result of learners' cognitive processes in output production. Long (1996) observes interaction from both the input and output angles and argues that interaction that involves negotiation of meaning contributes to language development. Therefore, each hypothesis emphasizes the importance of interaction in language learning but each one does it by stressing particular features of the process of interaction.

The theoretical approaches presented in this section, though valid on their own terms, are limiting, as they neglect aspects of the language acquisition process that relate to its social and dynamic nature and also ignore psycholinguistic ramifications of the learning process (Brooks et al., 1997; Platt & Brooks, 2002), a matter that SCT does address.

2.5. CURRENT RESEARCH ON VOCABULARY

Barcroft (2004b) summarized current major research strands in L2 vocabulary acquisition. The first area of study is incidental vocabulary learning, an area of research that covers a continuum between incidental and intentional vocabulary learning. It comprises points that represent additional subtopics of study within the field, including lexical requirements for comprehension, referring to the number of words learners need to know in order to achieve reading comprehension; text enhancement and a description of strategies for increased noticing, such as word frequency in a target text; vocabulary learning strategies (VLS), their relevance, effectiveness in L2 vocabulary learning, and descriptive taxonomies; the inquiry into combining an incidental approach to vocabulary learning with direct methods of instruction versus indirect and incidental instruction; and the effects of direct instruction on L2 vocabulary development.

Additional research subjects in the L2 vocabulary field listed by Barcroft (2004a) include: word-based factors on learnability and the study of effects word features have on

learning; receptive vs. productive vocabulary knowledge, including the study of how to measure and account for the distance between these two types of knowledge; and lexical input processing, the study of how learners allocate processing resources to different aspects of the vocabulary learning process, such as word form or word meaning.

In this section, major subjects of study in the area of vocabulary are discussed, thus showing how the current study fits within the existing literature on L2 vocabulary and also contributes new understanding to how the lexicon is developed through MT.

2.5.1. Implicit and explicit approaches to vocabulary learning

Incidental and intentional learning carry different connotations in different fields of study. In cognitive psychology, the terms refer to the learner's knowledge of a pre/post-test design in an experiment. If learners are warned beforehand that they will participate in a post-test, any learning that takes place is said to be intentional; if learners remain unaware of post-tests, learning is considered incidental. In the SLA field, these terms are defined differently. Intentional learning in SLA involves memorizing grammatical rules or word lists, while incidental learning is said to occur during meaning-focused communicative activities such as reading and listening (Ma, 2009).

In addressing vocabulary learning, these terms are often compared and contrasted: incidental vs. intentional and implicit vs. explicit learning. Even though these expressions —i.e. implicit and incidental, and intentional and explicit —are often used interchangeably, they convey different meanings. In establishing a difference between *implicit* and *explicit* learning, it has been argued that the presence of awareness or consciousness differentiates them. Implicit learning refers to learning without the learner being aware of the process or product, and explicit learning is learning with awareness of what is learned. The term *intentional learning* in relation to L2 vocabulary learning has a cognitive interpretation that

includes rehearsal and memorizing as learners place explicit attention on learning and retaining lexical information (Schmitt, 1997, as cited in Hulstijn, 2003).

In terms of L1 vocabulary learning, it is believed that most vocabulary is learned incidentally, especially through extensive reading (Nagy, Herman, & Anderson, 1985). Investigations in the L2 field have also tested the effectiveness of reading in vocabulary development. Some studies support this notion, while others have concluded that the efficacy of reading on incidental vocabulary learning, though real, has been overestimated (Ma, 2009). As mentioned in a previous section, Krashen (1989) favors vocabulary acquisition through reading and in connection with the Comprehensible Input Hypothesis. Krashen (1989) explains his view of the implicit vocabulary learning process through reading:

> Language is subconsciously acquired—while you are acquiring, you don't know you are acquiring; your conscious focus is on the message, not form. Thus, the acquisition process is identical to what had been termed 'incidental learning'. In addition, acquired knowledge is represented subconsciously in the brain—it is what Chomsky has termed 'tacit knowledge'. (p. 440)

Many researchers (e.g. Paribakht & Wesche, 1999 & Pulido, 2003) have approached the subject of incidental vocabulary learning and reading from different angles, such as reader-based factors and prior or post-reading activities that contribute to learning gains. Paribakht and Wesche (1999) explored how vocabulary acquisition occurs as a by-product of reading comprehension by analyzing learners' strategies. The authors reviewed these strategies in their report: (1) retrieval, or repeating the target word out loud (possibly in an attempt to retrieve phonetic or graphic cues); (2) appeals for assistance or asking for the meaning of the target word or looking up the term in a dictionary; and (3) inferencing, which learners carry out by using their knowledge of relationships among sentence

components (e.g. word-class information), word morphology (word derivations and grammatical inflections), punctuation, world knowledge, homonymy (sound relationships or phonetic similarities, at times across L1 and L2), word associations, cognates, etc.

Pulido (2003) focused on the impact of reader-based factors on L2 incidental vocabulary gain; namely, topic familiarity, L2 reading proficiency, and L2 passage sight vocabulary (vocabulary knowledge related to the passage at hand). Results showed an increase in vocabulary knowledge in association with L2 reading proficiency and passage sight vocabulary, though this last variable to a lesser extent than proficiency, while topic familiarity did not seem to have an effect. Hulstijn et al. (1996) reviewed incidental vocabulary acquisition under different text and reading conditions; e.g. marginal glosses and dictionary usage. Their findings indicate that incidental vocabulary learning is facilitated by increasing word frequency in a text, bilingual dictionary use (as compared to a control), and definitions in marginal glosses (as compared to dictionary use).

Nation and Waring (1997) stated that a large number of words can be learned implicitly through reading; however, in order for beginning learners to gain such knowledge from reading, they first need to reach the threshold where they can comprehend the text and start to learn from context, an issue also raised by Laufer (1997). The authors calculated that, with 2,000 words, a learner can reach 80% text comprehension. The authors suggested that learning the 3,000 most frequent terms in the language should be a priority in accomplishing reading comprehension. Paribakht and Wesche (1999) experimented with incidental vocabulary learning through reading and direct instruction. Learners in a control group read only the selected texts, while the experimental group followed their reading with vocabulary exercises. Even though both groups achieved vocabulary gains, findings showed that the group given reading plus vocabulary exercises presented an increased lexical gain in comparison to the reading-only group. Prince (1996) compared the effects

of vocabulary learning between two groups doing different tasks: context learning and translation learning. Variables considered were learners' proficiency and learning of productive vocabulary. Findings support the superiority of the translation task in producing greater lexical gains in terms of quantity among more proficient learners.

Finally, three issues have been raised in regards to implicit learning in experimental settings. They are: *implicitness*, *abstractness*, and *methodological problems* (DeKeyser, 2003). The *implicitness* issue relates to the lack of concrete evidence that learning without awareness does in fact take place; as it has been found that subjects in experimental settings become aware of some elements that make their learning explicit. The *abstractness* issue concerns the feasibility of learning concrete vs. abstract rules through implicit learning. In fact, DeKeyser (2003) has concluded that implicit learning is more likely to be associated with concrete rules, while explicit learning is better suited for abstract rules. In relation to vocabulary, word forms, which are concrete, are acquired implicitly as a result of frequency of exposure, while word meanings, which are abstractions, are acquired through explicit learning (N. Ellis., 2008). Also, *methodological problems* often arise from the first two issues listed above: implicitness and abstractness. One additional concern involves appropriate forms of assessment. So far, it has been challenging to develop a test that is sensitive in measuring both implicit and explicit learning.

In regards to intentional vocabulary learning, three main issues are of relevance: whether or not to use the L1 or L2 to learn vocabulary; how to present new lexical items, either in context or isolation; and which learning strategies are used to keep new L2 words in memory (Hulstijn, 2003). This last topic is discussed further in the next subsection on vocabulary learning strategies.

Several aspects of implicit and explicit vocabulary learning were discussed in this section, explaining the ways in which learners become aware of words and their features;

for example, through reading. While the study of implicit and explicit vocabulary learning contemplates how learners interact with the word as it is embedded in a context, it fails to recognize the value of social interactions as learners work together such as in reading a text or completing an exercise to target new words. Research on implicit and explicit vocabulary learning contributes to the current study with premises that are worth considering in terms of the nature of lexical units themselves and how they can facilitate or deter learning. For example, when learners approach an unknown word within a context that is familiar to them, it may be easier for them to grasp the meaning of the word.

2.5.1.1 Vocabulary learning strategies

Vocabulary learning strategies (VLS) are defined as resources or methods learners employ towards vocabulary learning. Research has found that successful L2 learners tend to utilize a larger and more varied repertoire of their VLS than less successful learners; thus, this matter is significant in vocabulary research (Ahmed, 1989). Early VLS research focuses on memory strategies, such as the *keyword method* or *verbal/imagery association*. These VLS are considered mnemonic in nature as they can include an image, a word, a poem or rhyme, or a sentence in order to help the learner remember a word (Ma, 2009). I.S.P. Nation (2001) discusses another common strategy: learning vocabulary from word cards. The author analyzes aspects of the target word that can be learned from this activity, including information on word meaning and written form. However, the author asserts that other areas of the word knowledge construct, such as pronunciation or associations, are beyond the scope of this strategy. In Table 2.2, a brief description is presented of cited VLS taxonomies introduced in the last two decades by different scholars.

Table 2.2 VLS Taxonomies (adapted from Waldvogel, 2011).

Scholar	VLS Taxonomy
Cohen (1990)	Strategies for remembering words (e.g. rote-repetition), semantic strategies (e.g. thinking of synonyms), and vocabulary learning and practicing strategies (e.g. grouping).
Rubin & Thompson (1994)	Direct approach (e.g. putting the words and definition on individual cards), mnemonics (e.g. using alliteration), and indirect approach (e.g. breaking up the word into components).
Sanaoui (1995)	Vocabulary learning styles: structured or unstructured, as determined by learners' self-initiated learning activities.
Stoffer (1995)	Fifty-three strategies within 9 categories, which include strategies involving authentic language use, creative activities, self-motivation, physical action, mental linkages, memory strategies, overcoming anxiety, visual and auditory strategies, and word organizers.
Gu & Johnson (1996)	Ninety-one strategies divided into 8 dimensions of vocabulary learning: beliefs about vocabulary learning, metacognitive regulation, guessing strategies, dictionary strategies, note-taking strategies, memory strategies, and activation strategies.

(Table 2.2 continued)

Lawson & Hogben (1996)	A 15-item taxonomy divided into four higher-level categories: repetitions (e.g. rehearsal), word feature analysis (e.g. word classification), simple elaboration (e.g. sentence translation), and complex elaboration (e.g. paraphrasing).
I.S.P. Nation (2001)	Planning (e.g. deciding where to focus), sources (e.g. sources of information about the target word), processes (e.g. strategies learners use to remember and make the word available, such as by noticing).
Schmitt (1997)	Metacognitive (e.g. planning), cognitive (e.g. manipulating learning material), memory (e.g. using flashcards), and social (e.g. interacting with a peer) categories. The taxonomy includes 59 strategies divided into two main areas: discovery strategies (meant to infer the new word's meaning) and consolidation strategies (meant to consolidate new word knowledge). Further categorizations of VLS are grouped these categorizations: discovery-determination (e.g. analyzing parts of speech), discovery-social (e.g. asking the teacher for meaning), consolidation-social (e.g. practicing with peers), consolidation-memory (e.g. using semantic maps), consolidation-cognitive (e.g. note taking), and consolidation-metacognitive (e.g. testing oneself with an online quiz).
Intaraprasert (2004)	Thirty-one categories based on students' objectives in terms of vocabulary learning: discovery of meaning of new words, retention of meaning of such words, and expansion of vocabulary knowledge. Each category contains additional subcategories.

(Table 2.2 continued)

Winke & Abbuhl (2007)	Based on Long's (1996) Interaction Hypothesis that includes three categories of strategies: input-based strategies (e.g. listening to native speakers of the L2), output-based strategies (e.g. taking notes), and cognition-based strategies (e.g. using associations).

Overall, VLS research aims to identify tools that learners can employ in order to acquire the L2 lexicon more efficiently and instruct learners on how to apply such VLS as part of their L2 learning process. In the current study, I analyze lexical developmental processes as they occur in interaction and identify vocabulary learning strategies that learners employ through MT. Strategies (e.g. drawing meaning based on the learners' observation of the morphology of a target word) develop naturally and over time as learners employ MT without prior training and without realizing that their use of language can be considered a 'strategy'. The identification of learner strategies naturally occurring in MT serves two purposes: (1) describing how these strategies are employed by learners, and (2), identifying how those strategies can be introduced to future L2 learners for their use in interaction (without learners developing those strategies by themselves over time and practicing with MT). An L2 classroom example can explain the validity of these purposes. In Spanish courses for beginners, learners are often introduced to 'cognates' as words that have morphological similarities in English and Spanish. Being aware of cognates can be useful as learners try to comprehend the meaning of unknown words and can serve as an L2 vocabulary learning strategy. When learners are introduced to cognates early on in their L2 studies, they can start utilizing that strategy right away, but when they are not, they eventually realize that some words have close morphological forms in the L1 and L2 and those similarities can help them understand the meaning of

the L2 word. The same can be said for strategies that emerge in MT because identifying and introducing learners to those strategies can be useful as they can start implementing them immediately instead of waiting for the skills to emerge naturally.

2.5.2. Word learnability

Factors that affect how easy it is to learn words include: whether they are similar to words in the L1; whether their meaning, length and regularity can be easily demonstrated, and whether they contain elements that are familiar to learners (O'Dell, 1997). I. S. P. Nation (2001) referred to learnability as 'learning burden'. He explained that the more a word represents patterns and knowledge that learners already possess, the lighter the learning burden. Such patterns may originate in the learners' L1, other languages they know, or prior knowledge of the L2. Patterns may refer to the word's sounds or orthography. If the term is a loan word, it may have the same grammatical patterns and similar collocations and constraints in the L1. I.S.P. Nation also explained that teachers can reduce the students' learning burden by calling their attention to systematic patterns and analogies within the L2 and by establishing connections between the L1 and L2. In addition, he encouraged teachers to assess the learning burden of lexical items so that they can focus their teaching on those matters.

Laufer (1997) also contemplated learnability but via the introduction of the concept of 'deceptive transparency'. Deceptive transparency applies to words that a learner is not able to recognize as unfamiliar. In fact, their appearance seems to provide the learner with clues as to their meaning, but these clues are false and misleading. Some of these false clues include a deceptive morphological structure (e.g. the term 'outline' can be interpreted as 'out of the line'), idioms (e.g. 'to sit on the fence'), false friends or cognates (e.g. the confusion between *embarazada*, or 'pregnant', and 'embarrassed' among L1 English

speakers learning Spanish), words with multiple meanings ('a state' vs. 'to state'), and 'synforms' or words that have similar forms but are completely unrelated in meaning (e.g. 'cute' and 'acute').

Two studies by Johnson and Hwang (1983) and N. Ellis and Beaton (1995, as cited in Barcroft, 2004a) exemplify the role of word learnability in lexical development. Johnson and Hwang (1983) considered the learnability of low frequency, technical vocabulary (e.g. 'camelopard' which is another word for 'giraffe') in terms of three factors: familiarity, comprehensibility, and imagery. The authors found that all three factors had a significant correlation with learnability, but familiarity (learners' prior exposure to the target form) was the most significant factor of the three. N. Ellis and Beaton (1995) studied how English-undergraduates without prior German knowledge learned German lexical items. The authors found that longer words and L2 words less phonologically similar to L1 words were more difficult to learn.

Information on word learnability is relevant to the current study, especially in terms of designing the instrument to be employed as part of this research. As it will be discussed in Chapter 3, target words for this study were selected in terms of word function, frequency, and morphology. Since the purpose of the study is for learners to infer lexical knowledge through MT, selected target words are low frequency and are not cognates that could reveal the meaning or other features of the term without learners having to rely on MT as a primary source of knowledge.

2.5.3. Productive vs. receptive vocabulary

The terms *productive* and *receptive* vocabulary are employed to distinguish two types of vocabulary knowledge. *Productive* vocabulary can be produced at will, while *receptive* vocabulary is limited to recognition. However, this dichotomy was criticized by

Teichroew (1982) who stated that productive and receptive vocabularies are ends of a vocabulary knowledge continuum, with the initial stage as passive recognition and the final one as production. The reasoning behind this proposed continuum is that word knowledge can be measured in degrees, and having higher degrees of knowledge of a word can place a word closer to productive knowledge. The one question that remains is at which point receptive vocabulary can be converted into productive vocabulary (Melka, 1997; Gass & Selinker, 2001).

In an attempt to explain and answer the question of distance between receptive and productive vocabulary, intermediate phases have been proposed (e.g. Belyayev, 1963; Clark, 1975, Keeney & Wolfe, 1972, as cited in Melka, 1997); namely, *imitation* and/or *reproduction without imitation*, *comprehension*, *reproduction with assimilation*, and finally, *production*. Imitation and reproduction without imitation are the first stages in *recognition*; comprehension is not activated at this point. This initial stage of reproduction is an active reconstitution of what has been read or heard. If assimilation is present, then the reconstruction activates memory. Reproduction with assimilation presupposes comprehension and is very close to production. What differentiates them is that production is more creative and complex than reproduction (Melka, 1997).

Several estimates on the size of productive and receptive vocabularies have been proposed. Marton (1977) estimates that L2 receptive vocabulary is twice as large as L2 productive vocabulary. Others conclude that the number of words learners use productively is almost as large as the total of words they recognize; in other words, learners know a word and use it or do not know it. Difficulty in assessing the size of these vocabularies lies in the fact that no 'ideal' assessment technique or test exists (Melka, 1997).

In the current study, no assessment is performed of learners' final uptake of the words because the main purpose is to analyze the process of developing vocabulary

knowledge. Thus, no assessment is performed on the status of words in learners' lexicon in their productive or receptive use. However, being able to assess the learners' lexical uptake through MT is an important aspect of study and, as discussed in Chapter 5 (section 5.5), I propose to perform follow-up studies on lexical development through MT that do consider measuring lexical uptake following MT.

2.5.5 Lexical input processing

Input processing (VanPatten, 2007) is not a comprehensive theory or model of language acquisition. Instead, it is a model of comprehension that describes what may later interact with other processes, such as intake. The model makes a number of claims about what guides learners' linguistic data processing as they experience the process of comprehension. These claims are: (a) learners are motivated to find meaning while comprehending; (b) during initial stages, comprehension can be difficult in terms of cognitive processing and working memory, which presents consequences for input processing mechanisms; (c) learners are 'limited capacity processors' and cannot process and store the same amount of information as native speakers can during moment-by-moment processing; (d) learners may make use of certain universals of input processing but may also make use of the 'L1 input processor' (or parser) (VanPatten, 2007, 2008).

These claims are codified into ten principles of the model as follows:

(1) The 'Primacy of Content Words' Principle: learners process content words in the input before anything else.

For example, when learners encounter a phrase such as "I went to the store yesterday", their attention tends to be directed to the noun *yesterday* rather than the verb *went*.

(2) The '(Revised) Lexical Preference' Principle: Learners process lexical items for meaning before grammatical forms when both encode the same semantic information. If grammatical forms express a meaning that can also be encoded lexically, learners will not initially process those grammatical forms until they have lexical forms to which they can match them. The same example discussed under (1) above applies to this principle since the noun *yesterday* encodes the same information in terms of time reference as the verb *went*.

(3) The 'Preference for Non-redundancy' Principle: Learners are more likely to process non-redundant meaningful grammatical markers before redundant ones. For example, if learners hear: (a) I flew to Chicago yesterday, and (b) I flew to Chicago; they are more likely to process phrase (b) before (a) because it contains a non-redundant past.

(4) The 'Meaning before Non-meaning' Principle: Learners are more likely to process meaningful grammatical markers before non-meaningful ones.

For example, in the phrase *los gatos negros* ('the black cats'), the masculine marker is non-meaningful while the plural 's' is meaningful.

(5) The 'First Noun' Principle: learners tend to process the first noun or pronoun they encounter in an utterance as the subject.

For example, in the sentence *A Juan no le gusta el helado* ('Juan does not like ice-cream'), learners tend to process the first noun or pronoun as the subject (in this example, Juan), even if in this particular structure Juan is not the subject but is part of a prepositional phrase that clarifies what the indirect object is.

(6) The 'L1 Transfer' Principle: Learners begin acquisition with L1 parsing procedures. In simple terms, parsing is defined as a microsecond-by-microsecond computation of the syntactic structure of a sentence.

For example, Isabelli (2008) observed that L1 Italian learners interpret OVS and OOVS Spanish sentences better than English L1 learners because L1 Italian learners transfer input processing procedures originating in the L1 (Italian has OVS and OOVS sentence structures just as Spanish does).

(7) The 'Event Probability' Principle: Learners may rely on event probabilities (or knowledge of context and participants), and what is more likely to happen, instead of processing the first noun or pronoun they encounter.

For example, when English speakers encounter the sentence 'The lion was killed by the hunter', they assign the semantic role of agent to the hunter and the role of patient to the lion. L2 English speakers may interpret that 'the lion killed the hunter' based on their cultural background.

(8) The 'Lexical Semantics' Principle: Lexical semantics refers to the requirements that the meanings of verbs place on nouns for an action or event to take place. Learners may rely on lexical semantics instead of the first noun/pronoun they encounter or on L1 parsing procedures to interpret sentences.

For example, the verb 'write' requires an inanimate object that is written. When learners encounter a sentence such as I write 'a message', they expect to find an object following the verb 'to write', such as, 'a message'.

(9) The 'Contextual Constraint' Principle: Learners may rely less on the first noun/pronoun they encounter (or L1 transfer) if the preceding context constrains the possible interpretation of a clause or sentence.

For example, when English speakers encounter the sentence 'The lion was killed by the hunter', they assign the semantic role of agent to the hunter and

the role of patient to the lion if the prior context introducing this sentence led learners to understand that the hunter was well prepared to face the lion.

(10) The 'Sentence Location' Principle: Learners tend to process items in sentence-initial position before those in medial or final position.

For example, in the sentence *yo quiero que tú hables español* ('I want you to speak Spanish'), learners tend to process the subject pronoun in the main clause before the subject pronoun located in the subordinate clause (VanPatten, 2007, p. 118).

Lexical input processing refers to how learners process words and lexical phrases to which they are exposed, and how they allocate their comprehension efforts and attention which will determine their final intake. Studies on lexical input processing focus on how learners allocate processing resources to different aspects of the vocabulary learning process, such as word form, word meaning, or additional factors that can increase or decrease processing levels. For instance, Barcroft (2002) distinguishes between 'semantic' and 'structural' elaboration. Semantic elaboration tasks can facilitate one's absorption of a word's semantic features while hindering one's ability to learn structural features and vice-versa, because it is difficult for learners to focus on both meaning and form in input. In Barcroft's study, this notion was tested when learners were asked to learn words through activities that implied varying degrees of processing and word features (e.g. counting the number of letters in a word, a task that targets structural elaboration). Results showed that increased semantic elaboration or processing was indeed inhibitory to learning word properties linked to structure.

In a subsequent study, Barcroft (2004a) observed the effects of word-picture repetition and writing sentences in the acquisition of L2 vocabulary among beginners. In these tasks, writing implied semantic elaboration—focus on meaning—and the production

of output. Following the intervention, learners participated in a vocabulary post-test. Results showed that sentence writing had an inhibitory effect on new word learning. Findings are explained from an input processing perspective as processes triggered by sentence writing seemed to inhibit form processing and learning, despite increasing semantic knowledge. Barcroft (2004a) comments that in order to emphasize lexical input processing as a framework for L2 vocabulary acquisition, teachers should adapt their activities in the classroom accordingly. These activities include presenting new words frequently and repeatedly in the input, using meaning-bearing comprehensible input when presenting new words, limiting forced output during the early stages of learning new words, limiting forced semantic elaboration during the initial stages of learning new words, and progressing from less demanding to more demanding vocabulary-related activities.

More recently, Pulido (2009) observed the nature of the Involvement Load Hypothesis (Laufer & Hulstijn, 2001) in connection with lexical input processing through reading by focusing on the effects of L2 reading proficiency and background knowledge. The tasks consisted of reading two narratives with nonsense words and completing an inference verification task that encouraged deeper processing of target words. One narrative represented context that was familiar to learners and the other was less familiar. This intervention was followed by a test of episodic memory, in which learners were tested on their ability to recognize new words, and a strategy questionnaire that inquired about learners' text comprehension and strategies for comprehension. Findings with regard to input processing showed significant contributions of L2 reading proficiency and background knowledge to lexical inferencing. As inferencing increased, so did efficient decoding skills and linguistic knowledge, which also helped to build knowledge of additional new words. Background knowledge also facilitated inferencing and allowed deeper processing in the practice of searching and assigning new meanings to words.

Input processing as a model of vocabulary acquisition presents concepts relevant to the current study on vocabulary development through MT. In the current study, as I analyze learners' focus on word features (e.g. meaning, spelling) during interaction, principles from the Input Processing model can aid in clarifying learners' preferred attention allocation during the task. For example, the Primacy of Content Words Principle can explain why, as they produce MT, learners deliberately focus on meaning of unknown target words before focusing on word function or other elements from the word depth knowledge construct.

2.6 CURRENT STUDY ON VOCABULARY DEVELOPMENT

In this literary review on the subject of vocabulary, the following topics have been considered: the essentialness of vocabulary in SLA; a chronological overview of teaching methods and the role vocabulary teaching has played in each one of them; the definition of terminology commonly employed in lexical research; the question of what it means to know a word; theoretical approaches on how the lexicon is acquired; and topics of study within SLA, such as incidental vocabulary learning, the L1 and L2 mental lexicon, and word learnability.

Research on the L2 lexicon so far has focused on (1) how vocabulary is taught, (2) what it means to know a word, (3) how vocabulary knowledge can be measured, (4) how the mental lexicon is organized and accessed, and (5) what additional factors play a role on learning vocabulary. However, research on L2 vocabulary has not yet considered the matter of developing vocabulary knowledge holistically; that is, how social interactions enable mental cognition. Thus far, vocabulary research has compartmentalized the study of the lexicon into various areas of study but has not considered both the learners and their social activity during linguistic exchanges and what can result from such exchanges in terms of lexical L2 development.

So far, SLA research has widely acknowledged the role of interaction in L2 development (e.g. R. Ellis, 1999; Mackey, 1999) and yet, that same role of interaction in the particular development of the L2 lexicon has not been explored. This study fills this gap in the research by studying how MT, a type of interaction, becomes a tool that enables lexical development. In so doing, this study presents a holistic approach to the study of vocabulary development by considering both learners and their social interactions, and what they gain through such interactions in terms of developing higher cognitive skills; in particular, L2 vocabulary.

Therefore, the current study on vocabulary development rests upon the assumption that language learning can occur during interaction (e.g. R. Ellis, 1999; Mackey, 1999; Suzuki & Itagaki & Itagaki, 2009; Swain, Brooks & Tocalli-Beller, 2002). In particular, this study proposes to observe how the feature of MT plays an essential role in learning vocabulary during peer-peer dialogue (Brooks et al., 1997). This function of MT as an enabler of knowledge during linguistic exchanges has already been researched in the L2 acquisition field, and it has been assessed as a tool that promotes language acquisition (e.g. Swain, 2005; Swain & Lapkin, 2002; Vanderheijden, 2010). However, no investigation to date has pursued the sole objective of analyzing L2 vocabulary development through MT. I propose that studying the development of vocabulary through MT sheds light on its effectiveness in mediating and organizing layers of knowledge about a single word, which is the essence of the word depth knowledge construct described in Table 1.1 (Grabe, 2009; I. S. P. Nation, 2001). Based on these assumptions, and in line with previous research on MT and language acquisition, I define my research questions in the following section.

2.6.1. Research Questions and Hypotheses

To guide the current analysis, the following research questions are posed.

(1) Is there a relationship between MT and L2 vocabulary knowledge development by intermediate L2 Spanish learners? If so, are there particular aspects of a word as described through the word depth knowledge construct (e.g. meaning or word class) that are more influenced by MT than others?

(2) What features of MT can be related to an increase in L2 vocabulary knowledge?

The first research question involves an analysis of the relationship between vocabulary knowledge and MT. Two concepts are fundamental to establishing a hypothesis with regard to this question and the relationship between MT and the development of vocabulary knowledge: (1) the effect of learners' proficiency on the production of MT; and (2) learners' approaches to solving linguistic tasks. In terms of proficiency, Leeser (2004) found that lower proficiency learners naturally focus on the lexicon, while more advanced learners often concentrate on grammatical aspects. This claim supports a hypothesis for this study, in which most participants are at the Intermediate-low Spanish proficiency level, that a large percentage of their interactions will be geared towards lexis.

The second concept of interest relates to learners' approaches to task solving and their own goals in their interactions. Swain (2001) posited that learners focus on aspects of the language that they need to communicate. Simply put, this claim leads to the hypothesis that learners will focus on the words and their features that they view as useful to complete the task at hand. Learners' approaches to the task can be further explained in terms of whether or not they have to understand and use key lexical terms or other aspects of them in order to complete the task. As Lantolf and Thorne (2006) explain it, "the function of any linguistic feature is very much task- and speaker-dependent" (Lantolf & Thorne, 2006, p. 87). Thus, it is expected that most learners will address features of the target words as long as they need them to complete the activity and not necessarily those aspects that are not

useful for the assignment format. For example, writing a composition mainly calls attention to spelling, meaning, or function of lexical items, while performing a role-play may trigger the exploration of aspects of pronunciation and register of a word. In this particular study, since learners' interactions focus on the reconstruction of a text (both written and oral), it is expected that the main aspects of a word they will pay attention to through MT are meaning, spelling, parts of speech, pronunciation, and, to a lesser degree, register, collocation, meaning associations, and specific uses.

The second research question examines the MT features that can account for vocabulary development. I propose that MT can serve as a tool to mediate vocabulary knowledge as learners focus on lexical problems. I also propose that the development of vocabulary as enabled through MT can be explored through SCT by applying its core concepts to my analysis. These concepts include the observation of learners' roles (novice and expert), other-regulation and the emergence of self-regulation, private speech, and ZPD.

It is hypothesized that the application of SCT notions towards the analysis of lexical development in interaction will develop generally as follows: as learners working in dyads encounter a linguistic problem centering on the lexicon, one learner will take the role of expert and provide the necessary assistance and guidance to the novice. One way experts can shape their assistance is by focusing the interaction on the word-depth component (e.g. meaning) that is needed to complete the task. At that point, learners as novices are unable to take charge of solving the lexical problem on their own; hence, they are guided by the expert, who has the ability to guide the task (other-regulation). Other-regulation and self-regulation; however, are not permanent phenomena and learners can alternate between them. Especially in terms of lexical development, it is hypothesized that learners will alternate roles and switch from being self- to other-regulated, and vice versa, depending on

the learners' knowledge of the particular lexical token being discussed. However, it is also possible that neither learner will be capable of assuming the role of expert. In that case, both learners join their current knowledge of the L2 and expertise is created through MT (J. Lantolf, personal communication, December 2, 2011). As learners interact, their shared and individual performance as a dyad can be characterized by private speech. Private speech can emerge as learners attempt to guide themselves through the task, a feature of self-regulation. As the interaction moves forward, cognitive knowledge develops, and the ZPD process is observed, which leads to development.

In conclusion, it can be hypothesized that learners in this study will in fact promote their lexical knowledge through MT as they use language to solve lexical problems. However, one caveat remains: I hypothesize that they will focus on aspects of a word related to the task at hand and not on all potential aspects of word knowledge (described in Table 1.1). Regarding the second research question, I hypothesize that core MT features that promote lexical development in terms of lexical knowledge are those proposed by SCT, such as learners' roles, self- and other-regulations, private speech, and ZPD. Additionally, I expect new categories to emerge as I analyze lexical development though MT under SCT parameters.

In summary, prior research has supported the development of language through interaction (e.g. Swain, Brooks & Tocalli Beller, 2002; Swain, 2005). Among SCT notions (Lantolf, 2000), MT is claimed to be a specific aspect of interaction that leads to language development (e.g. Swain & Lapkin, 2002; Swain, 2005). This study takes a step further in examining the relationship between MT and language development by inquiring specifically about vocabulary development, using SCT notions. In order to seek answers to the research questions of this study, Chapter 3 discusses the methods for collecting data on which to base answers to these questions.

Chapter 3: Methodology

This chapter offers a detailed description of how this investigation was designed to address the research questions introduced in Chapter 2. This chapter includes information on the research design, participants, instruments, data gathering, data analysis procedures and measures for qualitative rigor.

3. 1. RESEARCH DESIGN

3.1.1. Participants

Initially, 89 L2 Spanish learners at Texas State University, San Marcos, took part in this study in the Spring 2012, but due to incomplete or poor quality data (in terms of audio quality), results from 49 learners were discarded; thus, 20 dyads remained (40 participants). Of these learners, 18 were men and 22 were women. Their ages varied from 20 to 28 years of age. Participants were enrolled in fourth-semester Spanish courses, and their proficiency was estimated at the Intermediate-low level based on: the number of classes they had taken up to that point, my own judgment and experience in teaching this course, and my knowledge of *ACTFL Guidelines*. Participants comprised a homogeneous and typical sample of Intermediate-low learners taking a required fourth-semester Spanish course. In addition, participants were my own students, thus making for a convenient sampling with the following advantages: knowledge of the individuals taking part in this study and the ability to observe and document their reactions to the tasks that were part of this investigation.

An assistant, a Spanish lecturer at the same university and a colleague of mine, carried out the data collection process. The assistant was trained in the definition of MT applied in this study and shown how MT occurs in learners' interactions following modeling techniques applied by Swain (1998) and Storch (2008). However, despite the

modeling and training the assistant received, she did not in any way participate in, much less manipulate, the production of MT by participants during the recording sessions. During data collection sessions, her only function was to explain the activity, assist learners in technical matters (e.g. how to use the recording software), and collect their reconstructed texts at the end of the recording session. The assistant did not interact with learners in terms of language matters, and when she was asked for help, she encouraged learners to work with their partner in finding answers. Another assistant, who was a graduate student in the MA Spanish program at the same university, transcribed the recordings that resulted from the dictogloss tasks applying conversation analysis (CA) conventions to transcriptions. She carried out these tasks following my training and supervision. During the analysis process, I listened to each one of the recordings once more in order to ensure that the transcriptions were accurate.

3.1.2. Instrument

The dictogloss (Appendix B) was used as the instrument of data collection, based on its wide use in other studies on MT (e.g. Kowal & Swain, 1994; LaPierre, 1994), the explicit support this type of task has received from experts in the field because it encourages much collaborative talk and MT (Kowal & Swain, 1997; Swain, 2001b), and its successful implementation in a previous study on collaborative talk and vocabulary (Kim, 2008).

The dictogloss is an activity where learners are introduced to a topic and are required to work through the reconstruction of a text on the same topic with a partner. The text is first read by the teacher while the students listen. The second time the text is read, learners take notes of key words and ideas that they use to reconstruct the text. The text reconstruction process is done in dyads, an arrangement that is conducive to much

collaborative talk. Based on my own earlier pilot studies testing the dictogloss task in preparation for this study and following the advice of an expert in the field (R. Donato, personal communication, November, 15, 2011), one adaptation was implemented to promote collaborative talk on lexical items. This adaptation, known as dicto-comp (I.S.P. Nation, 2001), included the posting of target words from the text on the board and asking learners to make sure to include the target words in their text reconstruction. This priming technique helped learners focus on target words during the text reading. Priming techniques have been used before (e.g. Swain & Lapkin, 1998, Lapkin et al., 2002) in order to raise learners' awareness of the linguistic target. I wrote the dictogloss texts for this study together with a colleague at Texas State University who is familiar with the learners' capabilities at the Intermediate-low level.

Target words included in the dictogloss texts were low-frequency items, so it was assumed that learners were unfamiliar with them. To test this assumption, once target words had been selected, they were tested during the Fall 2011 semester with 52 Intermediate-low learners comparable to those taking part in this study. The word selection process consisted of multiple rounds of elimination that resulted in the set of target words employed in this study.

The eighteen low-frequency target words employed in this experiment were selected from *Corpus del Español* (Davies, 2002). These words were divided into two dictogloss tasks to be used in data collection sessions. Each dictogloss text contains about 165 words and 9 target words. Target words in this study are content words; in particular, verbs and nouns. Each dictogloss contains 4 verbs and 5 nouns. The occurrence ratio of each part of speech corresponds to their occurrence in natural language, which was calculated by consulting Davies' (2002) *Corpus del Español* for the 1000 most common words in the last 200 years of the corpus data. The query requested was for all words in

their token forms, each tagged by their part of speech, plus other morphological information in some cases. The corpus query returned a count of how many times each word occurs, allowing for a comparative analysis of the ratio of parts of speech of the words that comprise a very representative sample of written Spanish. Naturally, prepositions and conjunctions represent a very large portion (22.0 % and 14.9 %, respectively), whereas parts of speech such as interjections (0.2 %) and numbers (0.8 %) represent relatively few. The overall percentages of the occurrence of content words, i.e. verbs (8.9 %), nouns (11.9 %), and adjectives (2.3 %), translate to a three-number ratio of 4:5:1 when expressed in parts per ten. Due to the low number of adjectives to be included in each exercise, it was decided to exclude them in this study and focus only on nouns and verbs.

Target words (in italics) are listed with their English translation and function in parentheses: *acoger* (to take in, verb), *aderezar* (to garnish, verb), *anfitrión* (host, noun), *colación* (light meal, snack, noun), *cónyuge* (spouse, noun), *desestimar* (to reject, verb), *edredón* (quilt, noun), *encomiar* (to praise, verb), *escarbar* (to dig, verb), *greda* (white clay, noun), *increpar* (to rebuke, verb), *marfil* (ivory, noun), *merodear* (to prowl, verb), *pelaje* (coat, fur, noun), *pinta* (spot, noun), *poltrona* (armchair, noun), *travesear* (to play around, verb), *vallado* (fence, noun).

Learners also completed two practice dictogloss tasks to complete before data collection days to familiarize them with the dictogloss task. Target words included in practice dictogloss tasks are not part of my data for this study.

3.1.3. Data gathering procedures

The data collection part of the experiment was conducted over a six-week period during class time (students met for class twice a week). The data collection procedure is

summarized in Figure 3.1, reflecting Kim's (2008) and Swain's (1998) procedure for introducing the dictogloss to learners and collecting data in their studies.

Week 1

Session 1→ Practice dictogloss 1

Week 2

Session 2→ Practice dictogloss 2

Week 3

Session 3→ Data collection 1

Weeks 4 & 5

No study-related activities

Week 6

Session 4→ Data collection 2

Figure 3.1 Data Collection Chronogram.

In weeks 1 and 2, students were introduced to the dictogloss task. Two practice dictogloss tasks were carried out during regular class time to show learners the task procedures since this was not a task usually employed in the teaching of L2 Spanish at this university. These practice dictogloss tasks did not include any of the 18 target words selected for this study. Also, practice tasks were recorded in order to familiarize participants with recording procedures. Recording sessions were carried out in a smart classroom located at the university's main library building. In this classroom, each dyad used a computer equipped with the recording software Audacity and a microphone.

Since at times there were more than twenty dyads interacting at the same time, and the students' voice loudness varied from one individual to the other, some recordings were impossible to transcribe and analyze accurately and were discarded from the study. Another reason for discarding data was due to student attrition, because some participants were absent on certain data collection dates, whether on a practice session or a real data collection event. The last reason why some data were lost was due to the fact that some participants failed to save their audio files and upload them to the course site so their recordings were lost. Thus, data consist of recordings of 20 dyads (40 participants).

In previous studies employing the dictogloss format, the text was often read twice at a normal pace (e.g. Swain, 1998). In Kim (2008), based on the difficulties learners encountered during practice sessions, the text was read three times. In this study, the text was read twice, as learners were able to complete the task successfully with this number of repetitions during the practice sessions. They were given 30 minutes to work on the reconstruction task. As the task concluded, each learner was asked to record the reconstructed text and to turn in a written copy of it (one per individual) because having a collaborative writing task as the ultimate goal has been found to increase the occurrence of LREs (Ross-Feldman & Gass, 2005). Collaborative writing also has often been used in studies comparable to this one as a measure of learning (post-test) (Swain & Lapkin, 2000); however, in this study on lexical development and its processes, the reconstructed text was not used for that purpose except to trigger a higher number of LREs, as explained before.

As a final task, after the conclusion of the dictogloss activity, learners completed a short form in which they defined or translated the nine target words included in the text. This activity was added beginning with the second practice session when I noticed that learners were more concerned with reconstructing the text as if it were a puzzle (and words were pieces that they moved around) rather than focusing on target words and the text as

whole in terms of contextual meaning. This form was meant only to focus learners' attention on contextual meaning and words, like the priming strategies explained earlier, and the data generated were not included in the analysis section of this study.

The first data collection session occurred on session 3 of week 3, while the second data collection session occurred on session 4 of week 6. The data collection procedure was the same one followed during the practice sessions, but the dictogloss texts and their target words were different. The second data collection session was repeated two weeks after the first one to avoid an effect of improvement based solely on the proximity of the two collection procedures. Due to the large quantity of data that resulted from the two data collection sessions, I decided to utilize only the second set of recordings in this research. These resulted in more audio files than those in the first recording session because by now, learners had learned how to use the audio recording program and to upload their audio files correctly. All recordings from the second recording session were transcribed and analyzed in full as part of this analysis. In order to control for additional variables, learners were asked to produce their interactions in their L1 English, a practice previously reported by Woodland (2001).

Since the participants were my own students, the activities listed as part of the data collection process in this study were briefly described in the course syllabus as a series of oral activities worth 6% of the final course grade. Learners were also told that their grade was based solely on completion of the tasks and not on any other factor (e.g. how well they completed the task or how proficient they were in the language).

3.1.4. Procedures of data handling and categorization

3.1.4.1. Data handling

As the sole researcher, and in order to maintain qualitative rigor in my analysis and findings, the following steps and considerations were observed. These considerations reflect Lincoln and Guba's (1985) model of trustworthiness in its verification process. The model includes the four components applied in this study of credibility, transferability, dependability, and confirmability.

Credibility measures included triangulation, negative case analysis, and referential adequacy. The triangulation method was made possible by using two data sources: transcriptions and regular memos I wrote in an effort to document the research process and analysis. I moved through data sources (transcriptions and memos) in a systematic manner as I researched vocabulary development through MT under SCT. Triangulation allowed me to check the consistency of my findings. Negative case analysis occurred when I looked for deviant data that seemed to contradict general findings and patterns. These deviant data allowed me to reframe, reconsider and revisit general findings and hypotheses. Referential adequacy was implemented as I put aside a portion of the data prior to analyzing it. After a period of time, I revisited that data, analyzed it and compared my findings for that portion of the data to my general findings. This step allowed me to check my own consistency in handling data as well as the validity of my conclusions.

Transferability was accomplished in this study through thick description, which was done via 'memoing'. That is, I kept detailed descriptions of participants and settings and a close account of reactions, patterns, attitudes, and experiences as they emerged in the participants' comments, answers, and actions during recordings.

Dependability was fostered through external auditing. This method evolved naturally in this dissertation which was reviewed and challenged by my faculty advisor and

later by my dissertation committee members. Input from these sources provided an external check for my research process.

Confirmability was made possible through elements previously discussed: triangulation, reflexivity accomplished through memoing, and external auditing by my faculty advisor. These elements allowed me to keep my own biases under check and allowed for the data to shape the findings rather than my own preconceived notions and expectations.

3.1.4.2. Data categorization

As a first step, recordings were transcribed using transcription conventions adapted from the CA tradition and commonly adopted in sociocultural research (Smith, 2007) (see Appendix C for transcription conventions).

The analysis of transcriptions included traditional categories in the SCT literature such as participation roles, regulation, and private speech. However, in order to perform a thorough analysis of lexical development through MT, SCT categories were found to be insufficient. For that reason, other categories discussed in the literature review in Chapter 1, also widely employed in research of learners' interactions (e.g. interactive features from the Interaction Hypothesis), were included in this analysis. At times, however, even these additional categorizations were not sufficient because they did not reflect what was observed in the interaction. Thus, new categorizations emerged from the analysis in this study and are unique to the analysis of lexical development in MT, which is one of the contributions of this study to SCT and SLA studies on lexical development.

All categorizations, whether adapted from other studies or newly created, add a new layer of analysis. For example, interactive features (Table 3.3), such as clarification requests and scaffolding, provide important information on how learners interact, assume

roles, and regulate each other and themselves. Lastly, the LLRE categorization proposed by Fortune (2005) includes three ways in which learners can assist one another (other-regulation), such as when they explain to their partner the meaning of a lexical word or provide an example of the term. In conclusion, SCT categorizations provide a primary level analysis that, in this study, are complemented by additional categories that help elucidate in more detail how the interaction occurs and what it accomplishes in terms of lexical development through MT.

In order to answer the first research question (whether L2 lexical development is in fact promoted by MT, and which aspects of a word are most influenced in terms of development by MT), transcriptions were analyzed using the identification of (1) SCT categories (Table 3.1); (2) LLREs, the unit of analysis where learners verbally pay explicit attention to language itself through MT (Storch, 2008; Swain, 1998; Swain & Lapkin, 1995; Swain & Lapkin, 1998); (3) target content relating to components of the word depth knowledge construct (I.S.P. Nation, 2001); and (4) outcomes of the LLRE in terms of developing the word depth knowledge target at hand (Swain, 1998) (in Table 3.2).

Table 3.1 SCT Categories

SCT categories and sub-categories	Description
Participants' roles:	How learners assume the roles of expert and novice; how they position themselves in solving a lexical problem.
Expert	More experienced learner who assists the novice.
Novice	The apprentice who needs assistance.
Regulation:	A description of how learners take charge for themselves and/or the other learner in solving the lexical problem.
Other-regulation	The learners are unable to take charge of their own learning and rely on others for regulation.
Self-regulation	A learner becomes independent in the learning process.
ZPD:	The emergence of lexical development rooted in social interaction.
Private speech	Speech meant to aid the individual in solving a difficult task. Private speech is not intended for anyone but the individual.

Table 3.2 LLRE Outcome (adapted from Swain, 1998)

LLRE outcome categorization	Description
Type 1:	Problem solved correctly.
Type 2:	Problem not solved.
Type 3:	Problem solved incorrectly.
Type 4:	Disagreement about problem solution.

I address the first research question of lexical development promoted by MT by focusing on the lexicon in LLREs. In this analysis of LLREs, I took note of the areas of lexical development learners explored through MT in order to determine which lexical

aspects were most influenced through MT and the characteristics of these lexically-oriented exchanges. I also noted how such lexical developments were accomplished in terms of SCT categories.

The second research question refers to the MT features that account for an increase in lexical development. In order to answer this question and analyze the nature of MT in lexical development, these two steps were followed: (1) LLREs as analyzed by SCT categories were examined once more; and (2) LLREs' functions were investigated in terms of the lexical aspect being explored by the learners and how this was done through the use of interactive features (Table 3.3) and LLRE categorizations proposed by Fortune (2005) (Table 3.4).

Table 3.3 Interactive Features of LLREs (Gass & Varonis, 1985, as cited in R. Ellis, 1999)

LLRE Interactive features	Description
Clarification requests	Learner calls for clarification of an earlier utterance.
Confirmation check	Learners check their own understanding of what their conversation partner said.
Comprehension checks	Learners suspect that their partner did not understand, so they check whether he did or not.
Repetitions	Learner restates another learner's utterance as a type of confirmation check.

(Table 3.3 continued)

Requests for repetitions	Learners request that their partner repeat a previous utterance.
Scaffolding	Learner co-constructs lexical knowledge through collaborative talk by recruiting interest in the task, simplifying the task, maintaining pursuit of the goal, marking critical features and discrepancies between what has been produced as the ideal solution, controlling frustration during problem solving, and demonstrating an idealized version of the act to be performed.

Note: 'Scaffolding' as described in Donato (1994).

Table 3.4 LLRE Categorizations (adapted from Fortune, 2005)

Categorization	Description
Meaning	An explanation of the meaning of the lexical item by one of the learners.
Association + meaning	The provision of a synonym or antonym.
Example + meaning	An example of the item used in another context or reference to another context to illustrate meaning.

Moreover, features of LLREs that did not fit under already established SCT notions and other categorizations were analyzed. In other words, ways in which learners mediated lexical knowledge by the implementation of strategies not previously explored in the SCT literature, which might be specific to MT and lexical development, were analyzed. This step resulted in new categorizations specific to the subject of study of this investigation. The addition of categories targeting lexical development through MT is an important contribution of the current study to the SCT literature in SLA. This analysis of both coded and non-coded LLRE features ultimately allowed me to determine the specific ways in

which MT can have an effect on lexical development. New LLRE categorizations drawn from observations during my pilot study of learners' collaborative talk are listed in Table 3.5. These items have been labeled 'learners' inferencing strategies' because they exemplify the ways in which learners build knowledge either by relying on contextual clues, their own knowledge and understanding of the L1 and L2, or their knowledge of the world. It must be noted that some of these inferencing strategies match those discussed by Paribakht and Wesche (1999) in their study on incidental vocabulary acquisition through reading for comprehension. What their study and this one have in common is the collaborative talk factor as a conduit to infer unknown vocabulary. This commonality suggests that these strategies are indeed effective when dealing with unknown words regardless of the contexts in which learners encounter them as long as they can use interaction to resolve difficulties.

Table 3.5 Learners' Inferencing strategies

Strategy	Description
Analogies	Learners compare the morphology, spelling, and phonetics of two items within the L2 or across languages.
*Cognates	Learners use their knowledge of cognates across the L1 and L2.
Fixed phrase or collocation	Learners recognize that the lexical token is part of an idiom or expression; collocations.
*Knowledge of the world	Learners make informed guesses as to the meaning of a word based on their general knowledge of the world and awareness of context.
*Morphology	Learners may address derivations, suffixes, stem, inflection, etc., as they discuss the morphology of an item.

(Table 3.5 continued)

Phonetics	Learners address phonetic features of the token; for example, by comparing it to homophones or minimal pairs.
*Punctuation	Learners focus on sentence or paragraph punctuation in order to understand lexical features.
Syntax	Learners may discuss the word's linguistic category (e.g. noun, verb, adjective).
Translation	Learners produce translations into either the L1 or L2 in order to analyze the lexical tokens.
*Word associations	Learners produce word associations based on different features of a lexical token.

Note: Categories identified with an asterisk were adapted from Paribakht and Wesche (1999).

Excerpts[2] 3.1 to 3.9 exemplify the inferencing strategies listed in Table 3.5. Excerpts 3.1, 3.6 and 3.8 originate in data from the current study, while the other excerpts are from various studies; the source is indicated in each excerpt.

Excerpt 3.1. Phonetics and morphology as inferencing strategies.

1 S: *Escritor* [writer] must be related to *escribir* [to write].

2 A: *Escritor, doctor* [writer, doctor].

3 S: = *Profesor* [professor].

4 A: = *Pintor* [painter].

5 S: *Escritor* [writer] refers to somebody who writes as a profession.

(Data from the current study)

The exchange in Excerpt 3.1 illustrates how learners make use of the phonetic and morphological features of the target word *escritor* 'writer'. In particular, learners create

[2] In all excerpts, translations into English and notations about the interaction are placed in brackets, including the abbreviation INT to signify that a word was unintelligible. Additional information on transcription conventions can be found in Appendix C.

analogies by comparing such features across similar sounding words. They compare the target word first to a word in the same family (*escribir*, to write). Next, they compare the word *escritor* to other terms that have the same suffix, thus concluding that the target word refers to a profession, like *doctor* 'doctor' or *profesor* 'professor'.

In Excerpt 3.2 from Paribakht and Wesche (1999), learners make use of their L1 French to guess the meaning of the French word *controverse* 'controversial'. This understanding is facilitated by the fact that 'controversial' and *controverse* are cognates.

Excerpt 3.2. Morphology and cognates as inferencing strategies.

> S: The paragraph 4 say that perhaps the...acid rain is...is most controversial environment issue. But the study...has... make, has made...to here, is not... *suffisant* [sufficient], in French. For clear the effect of...effect of this...question means acid rain on the environment. But I don't understand very well controversial. I think it, it don't have the means of *controverse* [controversial] in French. Because the *controverse* in the French is...don't understand controversial. I can guess, but, so... (from Paribakht and Wesche, 1999, p. 209)

In Excerpt 3.3 from Tocalli-Beller and Swain (2007), learners target the meaning of the term '(to) lean', as in 'to incline' and 'free from fat'. As part of the exchange, L uses the target word in the phrase 'to lean against the wall' which indicates the particular collocation of the verb in that context. L uses this collocation to exemplify an understanding of the term 'to lean' as related 'to incline'.

Excerpt 3.3. Collocation as inferencing strategy.

> 1 H: I don't understand what is lean.
>
> 2 L: Uh…lean can mean uh not fat, not fatty.
>
> 3 H: Oh. And also uh…you lean on something. That direction or that direction.
>
> 4 L: Oh, lean against the wall?

5 H: Yeah. And lean is not fat?

6 L: Yeah.

7 H: There is no fat in the meat.

8 L: Yes, I think so [THEY CHECK THE DICTIONARY]

9 H…

10 L: Yes.

11 H: Lean mean does not have much fat on it. OK, I got it!

(from Tocalli-Beller & Swain, 2007, p. 160)

In Excerpt 3.4 from Paribakht and Wesche (1999*)* learners compare the verbs 'melt' and 'smell' phonetically in order to gain new knowledge of the meaning of the word.

Excerpt 3.4. Phonetics as inferencing strategy.

1 I: Melts?

2 S: Uh hum.

3 I: So what did you do with these words?

4 S: Yes, this is *sentir* [smell]...I know this word. No, no. I don't know melts. I smell, oh smell, no it's smell. I think smell uh I don't know this word.

(from Paribakht and Wesche, 1999, p. 209)

Learners take notice of the capitalization in the word 'Adirondacks' in Excerpt 3.5 from Paribakht and Wesche (1999). Thus, punctuation can serve to provide lexical information.

Excerpt 3.5. Punctuation as inferencing strategy.

1 S: Oh, about ah...oh, that is the name of the lake, no? "Adirondack." Is not the name of the lake?

2 I: Not the name. Here's your lake.

3 S: Lake. Oh, Panther.

4 I: But Adirondacks you can see it's a name also?

5 S: Because is capital letter A.

(from Paribakht and Wesche, 1999, p. 208)

The target word function is discussed in Excerpt 3.6, showing that learners make use of their syntactic knowledge of the L2. They examine the word ending to determine if it is a verb or an adjective.

Excerpt 3.6. Word function as inferencing strategy.

8 S: No, it has to be an adjective.

9 A: Yeah.

10 S: Because it is not a verb, unless it is conjugated. So I don't know.

(Data from the current study)

In Excerpt 3.7 from Paribakht and Wesche (1999), the learner uses his knowledge of the world to understand the meaning of 'to melt', since he understand that snow melts and the water flows into lakes and rivers.

Excerpt 3.7. Knowledge of the world as inferencing strategy.

1 S: Oh...when the liquification...liquide devient [liquid becomes]...the snow become liquid...and it go liquid...I think so, I think I see the meaning.

2 I: How did you figure out the meaning? Or how did you see the meaning?

3 S: You know when the snow comes and where sun and the snow become liquid...

4 I: Okay, but how did you decide that that's what this word meant? Melts. You're describing it to me, but how did you, how did you...?

5 S: Oh, because I see "enters lakes and rivers" and because fall snow go to enter lakes and rivers.

(from Paribakht and Wesche, 1999, p. 208)

Excerpt 3.8, showing data from the current study, demonstrates how a translation can be employed to gather meaning. D translates a phrase in line 53 that includes the target word,

escarbar ‘dig up’, which helps D understand the meaning of *escarabajo* ‘beetle’. Underlined sections indicate the speaker’s emphasis of those terms.

Excerpt 3.8. Translation as inferencing strategy.

53. D: I wasn’t sure of how old the dog was, and also I wasn’t sure if the verb was escarbar, to dig up the plants and flowers.

54. K: Yea, to dig up, beetle is escarabajo.

(Data from the current study)

In Excerpt 3.9 from Paribakht and Wesche (1999*)* the learner associates ‘to yield’ with ‘cars’. The use of word associations provides clues as to the meaning of ‘to yield’.

Excerpt 3.9. Word associations as inferencing strategy.

1 S: Maybe to yield, like the cars...yield. But I can’t found the exac...maybe pass it over could help me. I don’t know the word, that’s all.

(from Paribakht and Wesche, 1999, p. 209)

In summary, in order to address which MT features can account for increased lexical development, previously coded transcriptions were reviewed once more. Further categorization was employed in the analysis. Uncategorized utterances were also examined and new categories emerged from the data. Appendix D includes a summary of all categorizations utilized in NVIVO in order to analyze the data.

Sample analysis

Excerpt 3.10 illustrates how data analysis was carried out in this study and how the categories described in this chapter (Tables 3.2, 3.3., 3.4 and 3.5) were applied. To facilitate the analysis, details about the interaction are included in parentheses and in bold.

Excerpt 3.10. Sample analysis.

1 S: First things first, let’s try to figure the… **(S takes the expert role)**

2 A: The definitions. **(Scaffolding starts)**

3 S: Yeah, the definitions.

4 A: See, I got, I got a few. On … it says, where it belongs, *vive con su cónyuge*. They live with something. **(Lexical target is meaning/ Translation into the L1 to infer meaning)**

5 S: She lives with Fernando. I believe the first one says Ida, *ella es* [she is], twenty-seven years old. *Cónyuge* [spouse] [PRONOUNCED WITH DIFFICULTY] Fernando. I don't know how to say that. And then they are married for two years and one year with Mufasa. **(S focuses on the target word pronunciation and asks for other-regulation from A)**

6 A: So what would…

7 S: To live with? **(Clarification request)**

8 S: No, it has to be an adjective. **(Learner infers meaning from word function)**

9 A: Yeah.

10 S: Because it is not a verb, unless it is conjugated. So I don't know. **(Learner infers meaning from word function/morphology)**

11 A: A partner maybe? **(Confirmation check)**

12 S: But that's *esposa* [wife].**(Translations into the L2 / synonyms)**

13 A: Well, esposa [wife] is spouse. **(Providing metalinguistic information)/ scaffolding ends and LLRE is solved correctly)**

(data from the current study)

Excerpt 3.11 starts with S taking the expert role (SCT category) by trying to organize how the task is to be performed (Line 1). In Line 4, an LLRE starts as learners discuss the meaning of the word *cónyuge* 'spouse' and the LLRE extends until Line 13. The word depth component targeted in the LLRE is the meaning of the target word *cónyuge* 'spouse'. The LLRE is solved correctly as learners arrive at the correct definition of the term after

much MT, which is rich in strategies that facilitate the outcome. In Line 4, the inferencing strategy applied is translation into the learners' L1. In Line 4, a secondary word depth component for the target word *cónyuge* arises. Because S has difficulty pronouncing the target word, S does ask for help indirectly as indicating that he does not know how to pronounce the word. S attempts and maybe expects some scaffolding and other-regulation from his partner but A does not respond. This area of the target word goes unresolved.

The interaction continues and, in Line 7, an interaction feature is noted as S produces a clarification request. In Line 8, A responds to the clarification request with an inferencing strategy in the form of the analysis of a syntactic category. At this point, learners address through MT another aspect of the target word: its function. Even if mistaken, learners ponder the function of the target word employing metalinguistic terminology. Through the analysis of syntactic categories, this inferencing strategy extends until Line 10. In Line 11, learners again focus on the target word meaning through A's confirmation check. Lines 11 to 13 can be observed as a scaffolding session in which learners build knowledge together in order to conclude that the meaning of *cónyuge* is spouse, a close synonym to *esposa*, as S explains in Line 12. Additionally, other-regulation is observed as learners rely on each other to build lexical knowledge jointly through MT. Thus, this excerpt exemplifies how learners take roles, regulate each other (other-regulation), and build knowledge through scaffolding to reach a successful outcome to the LLRE. Along the way, learners make use of interactive strategies such as confirmation checks, clarification requests, and inference through the observation of syntactic categories.

In conclusion, Chapter 3 offers a description of the methods established to answer the research questions posited in this investigation. In summary, data were first gathered during a dictogloss activity, a task conducive to MT production. The interactions were

transcribed and analyzed through the application of SCT categories (e.g. regulation, roles). Because SCT categories were insufficient to carry out a thorough analysis of the interaction, a secondary layer of categories was added to analyze the details on how learners build lexical knowledge. Some of these categories have been employed previously in SCT studies in the SLA field to analyze language development (e.g. interactive features). As the categorization and analysis of learners' interactions were done, other new categories emerged that relate to the particular application of MT to lexical development, one of the contributions of this study to SCT studies.

In Chapter 4, I discuss my findings for (1) areas of the word depth knowledge construct most influenced by MT, (2) categories of analysis of MT and the emergence of new categories of analysis of lexical development through MT as seen through SCT, (3) the role of MT in vocabulary development, and (4) additional matters on the use of MT for lexical development as observed through SCT.

Chapter 4: Data Analysis and Results

The current chapter presents results of the experiment described in Chapter 3, intended to answer the research questions of this study. The data analysis is divided into two main sections. Section 1 addresses the relationship between vocabulary knowledge and MT and includes these subareas of analysis: (a) elements of the word depth knowledge construct that learners focus on; and (b) areas of the word depth knowledge construct enhanced through MT. Section 2 addresses the way in which MT develops when the ultimate goal is lexical development, including (a) learners' inferencing strategies and (b) learners' interaction strategies when producing MT. The analysis of learners' inference and interaction strategies also includes a discussion of emergent categorizations of analysis not previously accounted for in SCT that resulted from the participants' use of MT in confronting lexical problems.

4.1. VOCABULARY KNOWLEDGE AND MT

4.1.1. Word depth knowledge targeted through MT

This section addresses areas of the word depth knowledge construct that intermediate learners focused on during the interactive task. SCT concepts such as situatedness, agency, task vs. activity, and orientation are reintroduced in this section as we examine learners' participation and linguistic targets during the task.

4.1.1.1. Areas of word depth knowledge targeted.

It had been hypothesized that learners would focus their MT on areas of the word depth knowledge construct that they needed to complete the task. Since the task involved reconstructing a text in both the oral and written modes, my selected framework predicted that learners would concentrate mainly on meaning, spelling, parts of speech, and pronunciation. In order to determine if these hypotheses were accurate, I analyzed the

recordings to see which word depth knowledge construct areas (Table 1) learners targeted through MT.

My analysis of learners' LLREs found that learners did indeed focus on meaning, spelling, pronunciation, and word function of target words; however, the vast majority of LLREs focused primarily on meaning as seen in Table 4.1.

Table 4.1. Areas of word depth knowledge targeted

Word depth knowledge element	Percentage of LLREs where element was observed (n = 149).
Meaning	55%
Word function	21%
Spelling	14%
Pronunciation	8%
Word parts	0.9%
Target word association	0.5%

Meaning was the main aspect of a word they targeted, which at times was followed by a discussion of the terms' spelling, pronunciation, or function. The opposite process did not occur in which learners would first focus on spelling, pronunciation, or function and only later address meaning generally. The instances in which learners focused the LLRE on the function, spelling, or pronunciation of a word without first addressing its meaning occurred when they were targeting a word whose meaning they already knew. By choosing what to target during MT, learners shaped their learning experience. In section 4.1.1.2, I further discuss meaning in learners' MT.

Excerpts 4.1 to 4.4 exemplify the word depth knowledge construct areas targeted by learners in this study: meaning, word function, spelling, and pronunciation (word parts and target word associations are not exemplified due to their low occurrence in the data).

In this first excerpt learners targeted meaning through MT as they analyzed the term *travesear* 'to play around'.

Excerpt 4.1. Learners target meaning.

51 A: I can't remember that either. I know *travesear* [to play around] has to mean like…

52 M: To travel.

53 A: No…

54 M: To traverse.

56 A: No. Did you hear that the dog is what…Mufasa I believe is *travieso* [mischievous]. That means mischievous.

57 M: Mischievous.

58 A: So *travesear* probably means to be mischievous.

Excerpt 4.1 demonstrates how learners target meaning for the term *travesear* 'to play around'. Learner A initiates the LLRE asking what *travesear* means. She tries to make a connection between the target word and another word she cannot remember. In a series of scaffolded moves in which M is eager to discover the word that A is trying to remember in order to define *travesear*, they finally get to a point (Line 56) in which A explains what her thinking is in deciphering the term *travesear*. She believes that *travesear* means 'to be mischievous' (Line 58), based on morphological similarities between the terms *travieso* and *travesear*, an association that is accurate and leads to a successful LLRE resolution. It is worth pointing out that M also attempted to infer the meaning of the term *travesear* by observing morphological patterns (Line 52), but he tried to do so by connecting the term

travesear with what he believed to be cognates: 'to travel' and 'to traverse'. The use of cognates can be a productive inference tool; in this instance, though, the inference of meaning through the identification of apparent cognates renders an unsuccessful outcome for the LLRE.

Excerpt 4.2 illustrates how learners targeted word function in their MT.

Excerpt 4.2. Learners target word function.

48 A: *Ellos se casaron*… [they got married].

49 P: *Casaron por* [married for], I think it's *por* [for], I hope it's *por, por dos años* [for two years].

50 A: Yeah.

51 P: They got married for two years, I don't know.

52 A: No.

53 P: *Casaron* is a past tense verb. They got…I think it's to marry. I hope it is. *Casaron*…

54 A: I think you're right.

55 P: I think you can say *por dos años* [for two years].

56 A: Yeah.

57 P: Por dos años y aco…

In Excerpt 4.2, learners briefly address the meaning of the verb *casarse* 'to get married' and its verbal function as well as the verbal function and usage of the accompanying preposition *por* 'for'. Possibly as a function of its morphology (Line 53), learners notice that the verb *casaron* is conjugated in the past tense. Then they turn their attention to the preposition *por* as head of the prepositional phrase, *por dos años* 'for two years'. P questions the use of the preposition *por* (Line 49) and concludes that it is correct to say *por dos años*. The LLRE is solved correctly as learners settle for the phrase *por dos años*.

The following excerpt, Excerpt 4.3, demonstrates how the learners targeted spelling.

Excerpt 4.3. Learners target spelling.

85 S: *Blanca* [white]…do you know how to spell *blanca*?

86 E: Yeah, that's it. [E WATCHES S WRITE]

87 S: *Blancas y grises* [white and grey] is G-R-I-S-E-S? [SPELLING OUT]

88 E: With an e?

89 S: Pardon me?

90 E: With an e? *Grises* [grey]?

91 S: Oh, yes.

When focusing on spelling, often learners openly asked how a word was spelled, thus looking for other-regulation. Other times, because of the nature of the task in which they had to write a text jointly, learners would spell words out without actually being asked to do so by their partner. In the latter instance, it is possible that certain gestures, such as pausing and looking at the partner while writing, may have signaled the need for help with spelling. This supposition cannot be verified without actual video footage of the learners working together. Though not addressed in this study, the study of gestures in mediation is relevant to SCT knowledge development in linguistic interaction, an area worth exploring in SLA contexts (McCafferty & Ahmed, 2000).

Next, targeting pronunciation in MT is exemplified in Excerpt 4.4.

Excerpt 4.4. Learners target pronunciation.

111 G: *Vive con su cón…* [she lives with her…], I can't even say that…*cónyuge* [spouse]. Oh that's definitely spouse!

112 B: Yeah, it makes sense.

113 G: Yeah, now that I think of it, yeah, it definitely is 'cause I've heard my mom say it before…now that I can say *cónyuge*…

114 B: How do you say it?

115 G: *Cónyuge…con*…[PRONOUNCED WITH DIFFICULTY]

116 B: *Congu*…

117 G: *Señorita* [INT] can you tell me how to actually say the first word? Is it *congu…conyugue*? [TURNING TO PROCTOR]

118 B: ¿*Cónyuge Fernando*?

In this excerpt, meaning is touched upon very briefly as G defines the word *cónyuge* 'spouse'. Starting in line 114, the LLRE focuses on pronunciation as B asks how the word is pronounced. Both learners attempt to pronounce it but are not successful. Thus they turn to the proctor for help and regulation. The proctor gestures that she cannot participate in the interaction and the learners continue working. The LLRE is not adequately solved because learners were not able to clarify the correct pronunciation for the word *cónyuge* without the involvement of a third party in the role of expert.

SCT views learners as acting as their own agents, so even though they might be presented with a specific activity and instructions on how to perform it, they are still free to decide how they will position themselves in their interactions towards others (peer, teacher, or researcher), how they will ultimate carry out the task, and what they will gain from it. The freedom learners have to shape their participation ultimately leads to constructing their own learning. As seen in the data, learners produced MT to target meaning, word function, spelling, and pronunciation, in which cases the role of MT in mediating lexical development was apparent in the learners' dialogic activity. Other lexical features such as collocations were not addressed, which resulted in no data on the role of MT as mediating tool for additional aspects of word knowledge. Ultimately, as learners

determined their targets and their participation, they shaped the task and built their own learning.

4.1.1.2. Meaning in MT

Considering the large number of LLREs that target meaning, understanding what words meant was essential to the completion of the task and for learners to be able to sustain a comprehensible interaction with each other as they discussed the text and target words.

Thus, as learners worked together to understand the meaning of the words they needed, they turned their attention towards matters of morphology and word function with the idea that such clues would help them figure out meaning, their ultimate goal (more on inferencing strategies is discussed in Section 4.2.1). As they followed this procedure, they targeted additional aspects of the word depth knowledge construct (e.g. word function). Excerpt 4.5 exemplifies how learners analyzed word function in order to understand meaning.

Excerpt 4.5. Using word function for meaning.

173 B: I think it was the other way around. Yeah I think it was *escarbó* [dug] in the flowers.

174 G: ¿*Escarbó*?

175 B: *Escarbó* or whatever it was conjugated [INT].

176 G: Okay. And what would *merodear* [to wander around] mean? 'Cause it's *vallado* [fence]…

177 B: Maybe he goes into the garden maybe to like roam around and so he digs the flowers.

178 G: Oh yeah, yeah. He…

In discussing the verb *escarbar* 'to dig', B introduces the target word in its context (the dog digs the flowers). G asks for a repetition, which could also be interpreted as a request for further clarification of the target word. B responds to G's request with an explanation and indicates that the target word is a verb, because of its morphology as a conjugated verb. These morphological observations, in addition to contextual clues (the dog does something in the flowers), lead to the identification of the meaning of *escarbar,* as noted in Line 177.

These findings on learners' focus on meaning and word function support those of Swain (1998) and Storch (2008), who found that MT is conducive to an understanding of how meaning, form, and function relate to each other, thus making MT essential to creating links in language development.

If meaning for a key word was not attained, learners looked for other options to deal with the uncertainty, such as ignoring the unknown word. Ignoring words whose meaning they were not able to interpret, and leaving them out of their discussion and reconstructed text allowed learners to retain control over the task. This behavior also serves as an example of learners' orientation as learners controlled the activity. Indeed, the strategy of ignoring a word has already been identified in the L2 reading comprehension literature as a strategy to handle something unknown (e.g. Nassaji, 2003).

The following excerpt from learners' interactions shows how learners ignored what they did not know as a way to cope with the challenge and maintain control over the task.

Excerpt 4.6. Ignoring unknown words.

32 E: Yeah, I got something familiar, I didn't get what was before that though.

33 C: I didn't either, I have a blank. And the next thing is Mufasa *tiene* [has].

34 E: Un, um *pelaje suave* [soft fur].

35 C: Yeah.

36 E: Y *color de café* [and brown color] or something like that?

37 C: He has a brown coat, yeah, or a brow…oops.

38 E: Yeah.

39 C: We'll just skip the familiar part then 'cause we don't know what it is or do you want to make up something for it?

40 E: I don't, I don't know what it would be. I think it was something about like they were getting familiar but…

41 C: Yeah.

In Excerpt 4.6, learners realize that they did not have the information they needed to describe the family introduced in the dictogloss text. In Line 39, C suggests that they either make up something or they skip that section. They finally chose the latter option.

Learners found that word meaning was the most essential element for task completion. In their pursuit for meaning, learners often targeted word function, another component of the word depth, as a means to understand meaning. When meaning was unreachable, they resorted to ignoring the word in order to maintain control over the task. It is by making these decisions about the task that learners ultimately shape their participation and learning.

4.1.1.3. Targeted words

Regarding the words that learners targeted through MT, it is important to note that they worked with a variety of lexical items and their features and they did not narrow their scope to target words alone. Instead, they targeted words and features they needed to complete the task. This behavior defines in essence the concept of situatedness, or building one's own learning by employing agency in the learning setting.

One of the uses of MT was to address previously-learned knowledge. This adds a new dimension to the function of MT in vocabulary development since in the SLA

literature, MT is usually connected to learning or acquiring, which implies that learners transition from not knowing something to 'knowing'. The knowledge does not necessarily imply full acquisition, but rather a new awareness of a linguistic matter that they did not have before. Findings in this study indicate that learners used MT to discuss lexical items that they had previously been taught and that are familiar to them. As learners work with old terms through MT, they can remember features of the item they had forgotten or even learn a new aspect of the word depth knowledge construct that they had not known before. Excerpt 4.7 shows how learners target previously-learned knowledge.

Excerpt 4.7. Targeting previously-learned knowledge.

69. G: *Suave* [soft] and then [INT], and then I heard something about, something about the color grey 'cause he said, she said, about grey, *gris* [gray]. That means grey?

70. B: Yeah.

In Excerpt 4.7, learners target the meaning of the term *gris* 'gray'. Even though this is a term learners usually encounter early on in their Spanish learning, G asks about the meaning of *gris* (Line 69) and B confirms that it means 'gray' (Line 70). This interaction shows how learners utilized MT to address 'old' linguistic knowledge.

Hence, MT can be utilized to develop new knowledge and also to aid in the development of knowledge depth of a previously learned token as a way to recycle knowledge in the L2 classroom.

4.1.2. Word depth knowledge enhanced through MT

In order to examine the relationship between MT and lexical development, I analyzed the outcome of LLREs. In this section, I introduce the various LLRE outcomes

present in the data and their frequencies and I describe the role of MT both in successfully resolved LLREs and unresolved ones.

I categorized LLREs into four types: correct solution, no solution, incorrect solution and disagreement about the solution (as adapted from Swain, 1998). These categories allow for the analysis of MT as learners collaborate on lexical targets and work toward consensus on a lexical problem, whether successfully or not. Table 4.2 summarizes LLRE outcomes.

Table 4.2. LLRE outcomes.

LLRE outcome	Percentage of LLREs where element was observed (n = 149).
Solved correctly	41%
Not solved	28%
Solved incorrectly	26%
Disagreement about solution	4%

As seen in Table 4.2, almost half of the total number of LLREs produced by the learners were solved correctly. Twenty-eight percent of LLREs were not solved and 26% percent were solved incorrectly. It is also important to point out that of these successfully resolved LLREs, 69% targeted meaning, 17% targeted spelling, and the remaining focused on word function, pronunciation, and word parts.

Considering the large percentage of LLREs that concluded with a solution to the lexical problem, it is possible to assert that MT was instrumental in learners achieving a successful outcome conducive to lexical development and learning by means of discussing consciously the language they were producing. However, over half of the total number of LLREs had an unsuccessful outcome. Even though MT was present in all LLREs in this study regardless of their outcome, at times it did not seem to be enough for learners to solve

the lexical problem successfully with just the use of MT and the use of their current L2 skills and knowledge. As I discuss in Chapter 5, further research is necessary in order to isolate factors that can contribute to increased positive outcomes in MT when it is produced by learners of lower L2 proficiency in targeting the lexicon. Based on the current data, one such factor appears to be the absence of a 'true' expert, that is, a dyad member that possesses the necessary skills to solve questions and confirm findings. This idea is further developed in section 4.1.2.1. The next excerpts illustrate the four possible outcomes or LLRE types observed in this study and how learners executed MT during each.

In Excerpt 4.8 learners discuss the meaning of the word *poltrona* 'armchair'; the LLRE was resolved correctly.

Excerpt 4.8. LLRE resolved correctly.

34 P: Yeah, something along those lines. And then *sientan en una poltrona* [they sit in an armchair]. That was described as the color green and in front of a TV. So I'm guessing it's a couch or a big seat.

35 A: *Acolchonado* [cushioned]? A big chair?

36 P: Yeah, something like that.

37 A: What about a doggie bed?

38 P: Well, it said that the three of them sit.

39 A: Oh, so, then it would probably be a large couch.

40 P: Yeah, probably a big couch maybe a pull-out couch. Yeah something in the living room. The only one missing is *merodear* [to wander around].

In Line 34, P proposes that *poltrona* refers to an armchair. Both learners use the context as well as the particular location and role the word occupies in a sentence to assert their hypotheses about the word meaning (Line 34). The LLRE is solved correctly, as seen in lines 39 and 40 when learners determine that the word refers to a type of couch or seat. The

presence of MT in this LLRE is materialized in the discussion of the meaning of *poltrona*. P plays the expert role and regulates A, who is the novice but also participates actively, although the value of her input is minimal as observed in the LLRE development. It is possible that A's contributions were of little value to the dyadic interaction due to the fact that even as the LLRE started, P was already quite certain about the target word meaning and did not need any further confirmation through dyadic activity (Line 34). Thus, since P was already certain about the meaning of *poltrona*, the rest of the LLRE was mainly instrumental in creating a ZPD for A in which she could also cognize the target word meaning by means of other-regulation by P.

In Excerpt 4.9, an unresolved LLRE, learners address the meaning of *acoger* 'to embrace, to welcome'.

Excerpt 4.9. Unresolved LLRE.

10 H: [INT] *Escarbar* [to dig]. 'Cause actually I'm starting to think that *escarbar* goes here. *Poltrona* [armchair] [INT], *vallado* [fence]. What does *acoger* [to embrace] mean?

11 G: I don't know (.) but that word so sounds familiar. Like (..)

12 H: Isn't it like 'to welcome' or 'welcoming'?

13 G: *Acoger* um (…) what is *pintas* [spots]?

G believes that he is familiar with the word but does not offer anything concrete to resolve the LLRE; H then offers a definition in the form of a question. G is not sure how to answer H's question and after a pause he moves to the next target word. Thus the LLRE targeting *acoger* is unresolved. MT is used as learners address aspects of the target word; first, by expressing familiarity with the term and second, by introducing a possible definition. It is possible that the LLRE could have been resolved had the learners allowed for further MT. Also, since the learners were already contemplating a potential definition of the term, if

one of them had momentarily taken the expert role, perhaps they could have continued exploring the feasibility of H's proposal (Line 12) and reached a more definite conclusion.

In Excerpt 4.10, learners B and G arrive at an incorrect conclusion for the lexical problem.

Excerpt 4.10. Incorrectly solved LLRE.

88 B: So what are we missing? Well we got the [INT] so *merodear* [to wander around], I did not get that one at all.

89 G: Neither did I.

90 B: I don't even know where it's at. It's…

91 G: Yeah, I didn't hear that one. It had to be before the *poltrona* [armchair], I guess the seating area and before the, before the digging in the garden.

92 B: Yeah. Digging in the garden and the plants and flowers. Maybe he was like chewing on the chair [INT].

93 G: Oh well, that makes… 'cause he's a dog…so he could chew, to bite, to scratch

94 B: Scratch…it's a verb right?

95 G: Yeah it ends in –ar.

96 B: So (.)

97 G: So, it could be to chew, to bite, to scratch.

98 B: To play, it could even be to play.

99 G: No, *jugar* is play.

100 B: Well not play like that…to frolic.

101 G: Frolic…to frolic yeah that's going to [INT].

102 B: To run around like a dog.

103 G: A dog frolics.

104 B: Hits its own [INT]. Okay let's try to get this one.

105 G: Okay. I've got the first sentence for sure.

106 B: Alright.

Excerpt 4.10 presents an LLRE that is not resolved correctly. Learners talk about the general and the specific context in which the word is located. They also address the target word morphology and its function, and conclude that it is a verb (Line 94). Based on their knowledge of the world, particularly on the manner in which dogs behave, they conclude that *merodear* 'to wander around' means 'to frolic', which is incorrect.

This LLRE in Excerpt 4.10 is particularly lengthy and rich in MT, showing a variety of inferencing strategies that learners use as they attempt to solve the problem. Learners review the context, the overall content of the text, and its organization; they observe the target word morphology and function; and they produce synonyms and translations. Learners work as peers, building a scaffolding sequence, with both individuals moving comfortably within their ZPDs. Even though the outcome is not successful in terms of defining the target word, the LLRE produces rich MT for determining meaning. As to why such an LLRE did not have a successful outcome, it is possible that learners took so many turns as they addressed the meaning of *merodear* that, towards the end, they gave up on it and decided to concentrate on more practical matters like producing a sentence. They probably felt this aspect was more in line with the overall dictogloss goal (Line 105), instead of their own discussion about the meaning of the word in question.

Excerpt 4.11 shows how learners are unable to agree on an LLRE solution.

Excerpt 4.11. Disagreement on LLRE resolution.

1 A: *Es un perro muy* (…) *es un perro muy curioso y le gusta escarbar* [It's a very…dog… it's a very curious dog… and he likes to dig].

2 D: How do you say it?

3 A: *Le gusta escar…escarbar, escarbar* [he likes to dig up]. They like, at first I thought it meant like [INT] or something but they weren't saying (…) but I feel like that's one of the few I've heard before.

4 D: Um [INT] I don't think so.

5 A: Hm?

6 D: Why would a dog [INT].

7 A: No, like, like 'groom'.

8 D: Oh, 'groom'?

9 A: Like, he likes to get groomed.

10 D: Oh, no, I think,

11 A: But this is reflexive so.

12 D: Well.

13 A: Explore? [INT]

14 D: I think it's like scratch.

15 A: Oh, okay. I was going to say groom.

16 D: Yeah.

17 A: That's close enough.

18 D: Like, he like [INT] he likes to scratch. I'm just thinking about my dog it's like I can't stop my dog from like just like keep on scratching.

19 A: So would you consider it more like just scratching or grooming, like, he's like.

20 D: Like self-grooming.

21 A: Like, yeah, like when they scratch lick their fur to get it like.

22 D: Yeah.

23 A: I don't know.

24 D: It could be the same.

25 A: Okay. Either way *le gusta escarbarse* [he likes to dig up himself]. He likes to whatever…whatever.

In Excerpt 4.11 learners explore the meaning of *escarbar* 'to dig', and the excerpt concludes with learners showing disagreement about the LLRE resolution. A believes the term means 'to groom', and D thinks it means 'to scratch'. Learners refer to their knowledge of the world, in particular their knowledge about how dogs behave. In Lines 22 to 25, learners express their inability to agree. Finally, to end the LLRE and the disagreement, A minimizes the importance of agreeing on the meaning of the target term (Line 25) so that they can move on with the overall text reconstruction task. After all, according to A, the verb they are trying to understand does not necessarily need to be defined since it will be placed in the reconstructed text in the infinitive form following *gustar* 'to please'. A's tone implied that any verb, no matter what it means, can follow *gustar* in the infinitive form and create a grammatical sentence.

Despite its unsuccessful outcome, much MT is observed in Excerpt 4.11. Learners address pronunciation early on (Lines 2 and 3), and then they address both meaning (Line 3) and function (Line 11). Each learner provides translations and examples of the meaning that each believes is correct until A assumes the expert role by taking charge of the task and asking D which definition he believes is the right one. Because D is in doubt, A continues in the expert role and concludes that no matter what they think the definition is, they will still be able to reconstruct that portion of the text by using the construction *gustar + infinitive*. A sees this structure as lacking much weight in terms of meaning, which is exactly what they need in order to find a solution for the disagreement. Thus, it is possible to conclude that even though meaning for the target word was not reached, learners benefited from MT production as they targeted additional aspects of the target word

(pronunciation and form) as well as other linguistic elements that emerged during the interaction (e.g. using the verb *gustar*). Also, learners' linguistic awareness concerning the target word and its linguistic features increased through MT even though a specific meaning was not reached.

As noted in the data, learners produced MT as they worked together to solve linguistic problems. Almost half of the LLREs concluded successfully, thus possibly promoting lexical development. Collaborative talk in which learners consciously addressed features of the word mediated understanding about the meaning, function, spelling or pronunciation of the lexical target. Mediation was implemented by brainstorming ideas, proposing solutions, repeating and negotiating. Thus, these findings support the effect of MT to L2 vocabulary development and this research further demonstrates the positive effects of MT in linguistic development in general as seen in Leeser (2004) or Storch (1999), for example. For the remaining LLREs that were not resolved successfully, there are benefits that result from interacting and producing MT collaboratively, such as improved metalinguistic awareness and even increased practice in producing MT, a skill that can be beneficial to language learners as they inquire about L2 features that they are exposed to inside and outside the L2 classroom.

4.1.2.1. Lacking an expert

As seen in the LLREs analyzed here, learners were able to accomplish much in terms of mediating knowledge with a partner but, at the same time, they often were unable to rely completely on their own conclusions. As a consequence, LLREs remained unresolved or were resolved unsuccessfully. In her research, Kim (2008) encountered similar findings, as participants reported having concerns about their own MT results without receiving additional input from the teacher to confirm their LRE outcomes.

In my data, when LLREs were inconclusive, cognitive mediation seemed to be truncated. Learners appeared to believe that they or their partners were not knowledgeable enough to regulate each other; thus they looked for a more reliable expert or a 'true expert'. True experts are defined in this study as more L2 proficient partners or a knowledgeable person such as a teacher who is willing and able to regulate other learners and provide the necessary regulation for the novice to reach ZPD.

Excerpts 4.12 and 4.13 exemplify how having a true expert in the dyad could have facilitated solving lexical problems and promoted lexical development through MT.

Excerpt 4.12. Lack of an expert.

34 G: How do you say 'live together'?

35 H: *Vivir con* [live with], yeah. This is what we're going to say, we're going to say *Ida y Fernando viven* [Ida and Fernando live]… together.

36 G: [INT]

37 H: Yeah, how do we say 'together'? Can we ask her? [TURNS TO PROCTOR]

In Excerpt 4.12, G poses a question that H answers correctly. G may have misunderstood H's answer and, instead of working with H to clarify his answer, G immediately turns to the proctor for an answer and solution to the linguistic problem, even though participants had been told to keep the interaction within their dyads. This excerpt illustrates how learners turned to a more proficient speaker, a potential expert, for regulation.

Excerpt 4.13 shows how the interaction could have benefited from including an expert.

Excerpt 4.13. Lack of an expert.

27 G: Traves…

28 H: Traves…

29 G: Travesar (..) I know it said era *muy travies*- [LEARNER DOES NOT UTTER WORD IN FULL] [was very mischievous] whatever, whatever, and then it talks about sports.

In this excerpt, learners target the pronunciation of the verb *travesear* 'play around', attempt to pronounce it, and fail. G also tries to say the associated word *travieso* 'mischievous' and also fails, which frustrates her; thus she stops trying to pronounce the words correctly, decides to ignore the word(s) altogether, and moves on. It is possible to surmise that if the dyad introduced in Excerpt 4.13 had included a true expert, learners might have been able to arrive at a more profitable outcome. After all, learners did focus on the linguistic problem, attempted a solution and, when they were unable to reach one, they gave up on the task and the problem remained unresolved. Having an expert available could have led them to find a solution for the linguistic problem and to reach ZPD.

Thus in terms of pedagogical applications for MT and lexical development, these findings point to the need for an expert who is willing and can provide mediation for novices. In the findings presented in this study, the most suitable subject to play the expert role seems to be another more proficient learner or teacher. However, learners could be equally successful in being mediated in another way, such as through a dictionary, textbook or the activity itself. This matter is further discussed in Chapter 5.

4.2. FEATURES OF MT

In order to identify features of MT produced by intermediate learners, I analyzed their interactions to observe both the inferencing strategies and interaction features they employed to solve lexical problems.

4.2.1. Learners' inferencing strategies

Inferencing strategies are defined as a cognitive or metacognitive activity that the learner turns to for help while trying to derive an aspect of the word depth knowledge construct. This section presents the inferencing categories found in the data as well as patterns observed in *how* intermediate learners used such inferencing strategies in MT.

In the analysis of the frequency of learners' interactions and inferencing strategies, I found that learners relied mostly on two strategies that are new to the analysis of lexical development through MT: (1) the analysis of the immediate context of a target word, i.e. the words surrounding the target word in a sentence; and (2) the overall content of the complete text.

Other commonly used strategies were the use of translations (e.g. learner A translates a word/phrase into the L1 for learner B to understand its meaning); observations of the target word morphology (e.g. learner A notices that an unknown word in Spanish ends in –ó and concludes that the unknown word is a verb conjugated in the past tense), use of learners' knowledge of the world (e.g. learner A, when analyzing a text on dogs, turns to her knowledge about dogs to define an unknown term in the text), analyzing syntactic cues (e.g. learner A observes that the target word is a verb), observing cognates (e.g. learner A compares an unknown word in Spanish to a morphologically similar term in English to attain meaning), analyzing phonetics (e.g. learner A notices that an unknown word sounds similar to a familiar word), and creating analogies (e.g. learner A compares the morphology of a target word to that of a morphologically related term in order to infer meaning).

There were no examples in the data of learners observing punctuation, making word associations, or analyzing fixed phrases as inferencing strategies. Table 4.3 summarizes inferencing strategies and their frequency in this study.

Table 4.3. Inferencing strategies

Inferencing strategy	Percentage of LLREs where element was observed (n=214)
Word location	**29%**
Overall context	**23%**
Translation	17%
Morphology	11%
Knowledge of the world	8%
Syntax	5%
Cognates	3%
Phonetics	3%
Analogies	0.5%

Note: New categories identified in this study are in bold.

Next, examples for each inferencing strategy from this study data are introduced. I then draw conclusions on the use of inferencing strategies and their patterns in MT and conclude this section with an analysis of LLREs exemplifying the rich inferencing process that was part of the MT produced by learners in this study as they targeted the lexicon.

Excerpt 4.14 shows how learners analyze the immediate context surrounding the target word *pintas* 'spots' and also translate it into the L1 in order to find meaning.

Excerpt 4.14. Word location and translation as inferencing strategies.

18 A: I heard her say something; I heard her say *pintas* [spots].

19 M: Yeah, I heard that too.

20 A: And it went after the…after describing him. After describing the color of his fur.

21 M: Right around the *atlético* [athletic] part?

22 A: No, it came [INT]. It was within this. *Suave* [soft] and then *café* [brown] color, and I heard *pintas* [spots] and I heard something about the color grey.

23 M: They were in the same sentence right?

24 A: Yeah, 'cause she said something about grey. She said *gris* which means 'grey'.

In Excerpt 4.14, learners target the meaning of *pintas* 'spots'. They address the location of the target word at the sentence level in Lines 20 to 23, also commenting on the content and function of the text (e.g. Line 20, description of the dog) and provide a definition through translation in the L1 (Line 24). Thus, they start inferring the meaning by looking at the location of the target word in the sentence and then broadening their focus to consider the overall context of the text. At this point, the LLRE is left unresolved. After several turns, they resume their discussion about *pintas* as follows:

Excerpt 4.15. Word location and translation as inferencing strategies. A & M .

40 A: *Pintas* [spots]…

41 M: *Pintas*?

42 A: That can't be it.

43 M: It might be that. [INT]

As learners resume their discussion of *pintas* 'spots', they seem to have encountered somehow a definition of the word (as seen especially in Lines 42 and 43). Even though it is unclear how they arrived at the definition, they were able to include *pintas* in their reconstructed text successfully by using the word to describe the dog's appearance.

In the following excerpt (4.16) learners make use of the overall context in order to draw meaning.

Excerpt 4.16. Overall context as inferencing strategy.

15 G: *Escobar? Escarbar* [to dig].

16 B: It was conjugated, though cause it was um::

17 G: Oh, escape, is that what you said?

18 B: In the plants and flowers so he was probably like digging.

19 G: Oh, he's digging. Oh, yeah, yeah. Oh no that's..

20 B: What's the [INT].

21 G: That one's *travesear* [to play around].

22 B: That's…I thought if you *travesear*, it was en el parque [at the park].

23 G: Maybe that's what it was because I remember there was two that I kind of, 'cause it sounded the same…

24 B: He said this once, he said *travesear en el parque pero muy travieso* [to play around in the part but very mischievous] [INT].

25 G: Maybe that was…I think that's where I messed up.

26 B: [INT].

27 G: That's where it was.

28 B: Alright.

Learners are targeting both *escarbar* 'to dig' and *travesear* 'to play around' in Excerpt 4.16. The meaning of *escarbar* is understood by referencing the word's immediate context (Line 18). Learner G confuses *escarbar* with *travesear*, but by broadening their discussion of the context, they are able to separate both terms and define them accordingly. The use of inferencing strategies in MT allows learners to solve the lexical problem together, especially as they consider the overall meaning of the text.

The analysis of context in order to infer meaning has been studied in the SLA literature in the areas of reading comprehension and incidental vocabulary acquisition (e.g. Nagy, Herman & Anderson, 1985). As in those studies, participants in this experiment

received input and used contextual clues to infer knowledge; however, differences in terms of accessibility to the context are remarkable. In experiments on incidental vocabulary acquisition through reading, learners have continuous access to the text and can study it as much and for as long as they wish (e.g. Paribakht & Wesche, 1999). In the current investigation, learners heard the text only twice; they were able to rely on their notes, their memory and, most importantly, on each other and their collaborative work. Thus, considering the comparison, it can be hypothesized that regardless of the input mode, learners (at least at this proficiency level in the L2) can draw meaning for unknown words from context as they work together and produce MT collaboratively.

Additionally, in the SCT literature, Brooks and Donato (1994) identified learners' reliance on contextual clues as object-regulation. This type of regulation has been described as a metacognitive strategy often articulated in the L1 by novice learners. Thus, it is not surprising that learners in this study, at the intermediate L2 proficiency level, utilized object-regulation as their main means of inferring knowledge. The subject of object-regulation is further discussed in Section 4.2.1.1.

Excerpt, 4.17, illustrates how learners use their knowledge of the world to infer meaning.

Excerpt 4.17. Knowledge of the word as inferencing strategy.

13 A: *Pintas* [spots]…

14 P: I know we learned that before, stripes. Probably stripes.

15 A: Yeah.

16 P: I don't think dogs have multiple colored spots.

17 A: I think they do.

18 P: I don't know.

19 A: Go with stripes.

20 P: Go with stripes.

21 A: White stripes.

22 P: And grey stripes. *Le gusta correr y travesear con otros perros* [he likes to run and play around with other dogs].

23 A: So it makes him run and…

In several LLREs analyzed thus far, learners have relied on their knowledge about dog behavior and features in order to gather meaning of the words used to describe Mufasa, the dog depicted in the dictogloss text. In Excerpt 4.17, learners discuss the meaning of *pintas* 'spots' by referring to their knowledge of the world and dogs. First, P wonders if *pintas* refers to stripes (Line 14), and A agrees. Then, P wonders if *pintas* might be spots. A also agrees with this possibility, but P is doubtful; he does not know if dogs actually have multiple colored spots (in the original text learners heard, the dog is described as having small white and grey spots). Even though learners do not reach a satisfactory definition for the term *pintas*, they are still very close to attaining the true meaning. Their knowledge was elaborated based on their knowledge of the world.

It is advantageous for learners working with world knowledge that such knowledge be common to both dyad participants, even if that knowledge is not exactly the same. For example, in this dictogloss context, learners know what dogs look like and how they behave, which aids in the task. In addition, experts can use their shared knowledge of the world to regulate novices and create a ZPD for them.

In Excerpt 4.18, learners discuss word function and morphology as they consider how the target word fits in the context.

Excerpt 4.18. Word function (syntax) & morphology as inferencing strategies.

45 P: *Dos años* [two years]. Then we could say *por un año acojan* [for one year they embrace] A-C-O-G…[SPELLS OUT THE WORD] well why did they use a… in *acojan* [embrace]. It's *acoger* [to embrace] with an –er.

46 A: Yeah. We're saying it's in past tense?

47 P: It would be *acogieron* [they embraced]. But they didn't use that in the text so I'm wondering what they said. *Acojan* [they embrace] would be subjunctive.

48 A: Right. *Acojan*…

49 P: But I know *acoger* is to welcome. So I think we could use the past tense.

50 A: You are welcome…

51 P: Or put a, *le acogieron* [they embraced him], 'cause they welcomed someone. Aco.(.) A-C-O-G-I-E-R-O-N [SPELLS OUT THE WORD]. *Acogieron* [they embraced].

In this excerpt, the LLRE takes a peculiar shape as P's dialogue resembles private speech more than MT. P seems to be simply verbalizing his thoughts without taking A's responses into account (Lines 49 and 51). In the dialogue, the target word *acoger* 'to embrace, to welcome' is scrutinized in terms of function. P deliberates over the verb's morphology (Line 45), and the function of the term in relation to accompanying elements in the sentence (Line 51). As the learners perform this exercise and address syntactic matters, the target word function is observed successfully. P's speech, whether it be considered private speech or MT, on morphological and syntactical aspects of the target word serves to mediate knowledge for A.

In excerpt 4.19, learners consider phonetics as they disambiguate two homophones and define target words.

Excerpt 4.19. Phonetics as inferencing strategies.

22 B: And they all watch TV [LAUGH].

23 G: Yeah. What does this mean? I thought that, maybe she said …

24 B: *Haber* [there is/are]?

25 G: What does that mean?

26 B: [INT] that what it says?

27 G: Yeah. Maybe she said *a ver* [let's see].

28 B: *Ver* [to see], 'to watch'.

29 G: Yeah. That makes more sense. What does it *haber* mean?

30 B: I don't know. *Haber*.

31 G: Okay let's just say that.

The words the learners discuss are *haber* 'there is/are' and *a ver* 'to see, to watch'; which are homophones in the given context. Learners have a particular section of the text in mind (Line 22) in which the family is said to watch TV together. Thus, the verb they need is *ver*. The LLRE is solved correctly (at least partially), as B (Line 28) explains that *ver* is 'to watch'. G, after hearing B's definition of *ver*, and considering the context of the story, concludes that it is exactly the verb they need (Line 29). The question remains as to the meaning of *haber* but the learners do not deliberate any further on its meaning because they do not need it for the task at hand. As a result of this LLRE, learners become aware of the different meaning of the homophones, and are able to define one of them (*ver*) correctly.

The next excerpt shows the use of cognates to define meaning, even though the LLRE outcome was incorrect.

Excerpt 4.20. Cognates as inferencing strategies.

294 C: *Merodear* [to prowl]? Ugh. I heard *travesear* [play around]. I didn't hear *merodear*. Yeah, *travesear* was before even before you got into the plants.

295 M: Oh, so, he, *travesear* that sounds something like um like 'traverse'.

296 C: 'Traverse', what does 'traverse' mean?

297 M: To like [INT] uh, traverse [INT] maybe to like, uh, okay so say he was getting in the flowers. So maybe it's about him like um, what's it called when you go onto somebody else's property? Trespass?

298 C: Yeah maybe it is.

299 M: So maybe he.

300 M: Yeah, yeah, yeah…

301 C: Trespassed into the flowers.

Upon preparing the dictogloss text for this study, besides including target words that were unknown to learners, I avoided including cognate words. The absence of cognates can serve to explain why, when learners attempted to use cognates as an inferencing technique, the outcomes were unsuccessful. Excerpt 4.20 illustrates how learners C and M use both their understanding of the context (the dog is doing something in the flowers, Line 297) and cognates to define *travesear* (play around), even if incorrectly. M proposes that *travesear* is 'to traverse' (which is a conclusion a few learners arrived at in this study by guessing that it was a cognate with 'traverse', or 'to trespass'). Given the context of the flowers and the learners' understanding of dogs' behavior (knowledge of the world), they concluded that the text described the dog trespassing into the flower garden and that *travesear* means 'to trespass'. Had it not been for the fact that these terms were not cognates, this inferencing strategy present in their MT could have contributed to a successful outcome in defining *travesear*.

Excerpt 4.21 was introduced earlier in this chapter as Excerpt 4.1. It is worth repeating in order to illustrate how one learner attempts to use his understanding of cognates to define *travesear* as 'to traverse'. However, on this occasion, the LLRE is solved correctly as A proposes a solution to the linguistic problem by using a different inferencing technique that involves a morphological analogy.

Excerpt 4.21. Cognates as inferencing strategies.

51 A: I can't remember that either. I know *travesear* [to play around] has to mean like…

52 M: To travel.

53 A: No…

54 M: To traverse.

56 A: No. Did you hear that the dog is what…Mufasa I believe is *travieso* [mischievous]. That means 'mischievous'.

57 M: Mischievous.

58 A: So *travesear* probably means to be mischievous.

In Lines 52 and 54, M is eager to find a definition for *travesear* 'to play around' and attempts to translate the term as 'to travel' or 'to traverse'. A has a different perception of the word based on morphological similarities between *travesear* and *travieso* 'mischievous', which leads him to define the term correctly based on such a morphological association (Line 58).

The next LLRE, Excerpt 4.22, illustrates the inferencing strategy of analogy to draw meaning.

Excerpt 4.22. Analogy as inferencing strategy.

76 H: But how do you say Mufasa is, or, has a brown coat?

77 G: Mufasa *tiene* [has].

78 H: Mufasa *tiene* [has].

79 G: Brown. How do you say brown?

80 H: Um, or we could even say. Oooh actually I think that's it, *pelaje* [fur]. 'Cause uh *pelo* is 'hair' isn't it? *Pelo, pelaje* [hair, fur].

81 G: Yeah.

82 H: So I want to say *pelaje* is coat. Mufasa *tiene un pelaje* [Mufasa has fur].

Here learners define the meaning of the target word *pelaje* 'fur' by comparing it to *pelo* 'hair'. Learner H makes a morphological analogy using L2 words in order to define the target word (Line 80).

Therefore, as seen in these sample excerpts, learners made use of a wide range of inferencing strategies in their MT. The analysis of contextual clues was the learners' most prevalent strategy at either the sentence- or context-level. Other relevant features of learners' inferencing strategies in MT include (1) the use of translations by more proficient learners, and (2) the application of inferencing strategies to target both new and previously-learned knowledge through MT.

The more proficient learners (experts) used translations as a common strategy that aided in regulating novices as they inferred knowledge. Indeed, the experts used a variety of strategies in order to regulate the novice; for example, in mediating vocabulary meaning, an expert could provide a definition, a synonym, an antonym, etc. However, stating a translation in the L1 is more straightforward, less prone to confusion, and more efficient than other techniques in moving the less proficient learners towards their ZPD.

The effectiveness of MT and inferencing strategies is not limited to the development of new knowledge. Inferencing strategies in MT can lead to confirming, rejecting, and refining previously-learned knowledge; i.e., linguistic items that learners were exposed to earlier either in the current course, in previous courses, or in interactions in the L2. Several excerpts included in this analysis show how learners target aspects of the language they need rather than those aspects that I, as the researcher, emphasized in the task design (e.g. target words); this includes recycled L2 knowledge.

Finally, and as seen in most of the excerpts introduced in this section, one LLRE can include several inferencing strategies (e.g. Excerpt 4.22 includes an analogy and a

translation). Multiple inferencing strategies contribute to creating a scaffolding structure in the LLRE in which knowledge is built and ZPDs are created that are conducive to gaining new understanding of the target word.

To conclude this section, I present two complete LLREs (Excerpts 4.23 & 4.24) in which learners implement various inferencing strategies. In order to facilitate the analysis, I indicate features of the interaction pertaining to SCT as well as inferencing strategies throughout the LLRE in parentheses and in bold.[3]

Excerpt 4.23. Inferencing strategies combined.

56 S: I didn't hear *vallado* [fence]. (**Learner takes expert role and starts a new LLRE**)

57 A: Or maybe 'to venture'. (**Learner is still referring to their previous LLRE**)

58 S: OK. I'll put slash to venture. (**Learner continues in expert role**)

59 A: OK. *Vallado de la casa* [fence of the house]. This is kind of where it fit into the context. So it's something on the house. (**Learners observe the target word location and object-regulate**)

60 S: *Vallado de la casa* [fence of the house].

61 A: But at least we know it's a noun. (**Learner observes the target word morphology and word function**)

62 S: Could it be the type of house? (**Learners consider their knowledge of the world and houses)**

63 A: Yeah, it could be.

64 S: Two-story house?

65 A: Yeah, or maybe [INT].

[3] Interaction features are discussed in the next section, 4.2.2; for that reason I do not include them in the analysis of Excerpts 4.23 and 4.24.

66 S: The paint? No, that's *pintura* [paint]. (**Translation is provided by S. and learners continue to consider what they know about houses)**

67 A: Tell me a little bit about the context so maybe I can figure… how it fits in there. (**Learners observe the target word overall location and object-regulate. S assumes the expert role as he controls the task**).

68 S: OK. So what I got is Ida, 27 years old, and she lives, or with the partnership of Fernando, and they have a dog, Mufasa, OK. Something about marriage for two years. And one year with Mufasa. Mufasa is brown, he is three years old. He's active and athletic. He likes to go the park with dogs. He likes to *escarbar* [dig] in the flowers and at night Ida and Fernando watch basketball. Fernando is a Spurs fan. And then they go to bed.

69 A: OK. OK. It would be some sort of dog house even. It seems like the whole thing is centered on Mufasa. (**Learners observe the overall context and object-regulate)**

70 S: Yes, there is a big part of the sentence, it's mainly Mufasa. (**Learners observe the target word location and object-regulate**).

[INT]

71 S: *Vallado* [fence]. (**Learner repeats the target word, a form of private-speech, thinking out-loud**)

72 S: OK, what do we know about -ado and -ido? Could it be a past participle or something? (**Learners observe the target word morphology and function**)

73 A: Hm, I would say no just because I didn't hear a verb in front of it. I didn't hear *haber* [perfect tense auxiliary verb] in front of it. I remember that. (**Learner observes the word morphology/function)**.

74 S: OK. *Vallado* [fence]. (**Again learner repeats the target word, a form of private-speech, thinking out-loud**)

75 S: I think it's a good assumption that it's a dog house, some type of. But see it's blank of the house. Man of the house. A man of his dog house. Fernando is the man of the house. (**Learners observe the target word location and object-regulate. S uses his knowledge of the world to gather ideas**).

76 A: Possibly, yeah.

77 S: But wouldn't it be…

78 A: I think. Let's not focus on the literal translation 'cause *de la casa* [of the house] could be just like something describing instead of [INT] *ve a casa* [go to the house]. You know what I mean? (**Learner translates into the L2)**.

79 S: No, I don't.

80 A: I'm trying to think of the best way to… Then it would be *casa* [house]. I don't know. (**Learners achieve no resolution)**

81 S: All right, we don't have much time, let's go to *merodear* [to wander around]. (**S in expert role leads the task**).

The excerpt starts with S taking the expert role, and as he tries to lead the task, he brings up the term *vallado* (fence) (Line 56); however, A is still considering the term they discussed in their previous LLRE, *travesear* 'to play around', which they concluded to be 'to travel'. A proposes it means 'to venture' and S accepts the additional definition. At this point (Line 59), both learners start focusing on *vallado*. The first inferencing strategy they utilize is target word location, and in Line 59 A connects the target word with the section of the text in which the house is described. In Line 61, A observes that the target word is a noun, possibly as a result of observing its morphology. They discuss potential meanings in connection to the term 'house' by considering their knowledge of the world and houses but

are unable to find a satisfactory answer. A (Line 67) then proposes looking at the context again; this time they focus on the overall context. Their analysis of the context serves to object-regulate themselves.

After reviewing the complete context, S suggests that they observe the morphology of the word more carefully, particularly the suffix –ado (Line 72). He proposes that the target word could be a past participle, so they consider the word function. In Line 73, A rejects that idea saying that there is no auxiliary verb preceding the target word, so *vallado* cannot be the past participle to a perfect structure. In Line 75, learners examine the target word location once more and brainstorm words that could complete the phrase 'blank of the house'. This is another example of object-regulation. After multiple attempts, S suggests they move on and the LLRE remains unresolved.

In this excerpt, the learners attempted to understand the meaning of the target word *vallado* mainly through two strategies: understanding the target word location and its morphology. Indeed, their interaction followed the pattern: location, morphology, location, morphology, morphology, and location. This pattern, especially their reliance on contextual clues, suggests a way in which learners at the intermediate proficiency level process the meaning of unknown words because more complex inferencing strategies (e.g. word association) might require a higher proficiency level than that which these learners command.

Even though the LLRE remained unresolved, the use of inferencing strategies encouraged metalinguistic awareness and the continuous use of MT increased their growing and individual self-regulation. Learners engaged in an analysis of the target word in which they produced ideas out-loud about its morphology, function, and contextual meaning; they brainstormed hypotheses which they tested and rejected based on making what appear to be original connections between morphology, syntactic knowledge, and

their understanding of the text. Learners also made decisions on which strategies to use to infer knowledge (in Line 67, A requests S to go over the context), which shows how they were moving towards self-regulation as they attempted to rely solely on themselves for linguistic answers. In addition, the two private-speech samples (Lines 72 and 76) also demonstrate the emergence of self-regulation as the learners verbalize the key term, a reflection of inner metalinguistic thoughts occurring simultaneously.

In this final excerpt, learners utilize inferencing strategies that mediate a successful resolution to the LLRE.

Excerpt 4.24. Inferencing strategies combined.

131 K: Religion? *Acoger* [to take in]? Belief? No. (**Learner observes the target word morphology**)

132 A: Yeah, I think it was, it was something in the chapter, I really think so. Maybe 'to save'? (**Learners consider their knowledge of the world; in this case, what they learned in class**)

133 K: No, *ahorrar* is 'to save'. (**Learners offers a translation to regulate A**)

134 K: Hmm, it makes me sad, I should know this, I should know this word.

135 A: OK. Let's look at this. So Ida lives with Fernando. She is 27. They've been married for two years, and one year they've had Mufasa. One year. Acoger is to… they really talk about Mufasa. Mufasa is brown… (**Learners look at the target word overall context and object-regulate**)

136 A: Maybe, maybe it's 'to get'? They 'got' Mufasa. **(Learners translate into the L1)**

137 K: 'To acquire'? **(Learner translates into the L1)**

138 A: Yeah, 'to acquire'.

139 K: Because it's in that [INT] when they talk about Mufasa. **(Learner confirms the solution by considering once more the target word context)**

140 A: Yeah, I think that's something we can go for. (**ZPD is observed**)

141 K: OK.(**ZPD is observed**)

In this excerpt, learners target *acoger* 'to take in.' They observe the morphology of the target word and, because learners had recently covered the subject of religion and beliefs in class, they have that knowledge in common. They both feel that *acoger* sounds like a word that fits that topic but they cannot recall what it means. Then, A proposes, with a translation, that *acoger* means 'to save' but K rejects that idea (Line 133). This exchange is followed by an analysis of contextual clues (Lines 135) and object-regulation, and concludes as they agree that the target word means 'getting' or 'acquiring'.

By means of the analyses of morphological and context clues, the application of the learners' knowledge of the world, and translating terms between the L1 and L2, the learners built an interaction in which they co-constructed knowledge by means of inferencing strategies. Particularly useful was the analysis of context or object-regulation; first at the overall content level (Line 135), which leads A to suggest that the term means 'to get', and later at the sentence level when learners confirm the definition of *acoger* as they contemplate how well it fits in relation to the particular context of the text (Line 139). The LLRE is solved correctly and ZPD is observed.

From a SCT perspective, the analysis of inferencing strategies demonstrates how MT develops as learners work collaboratively. As seen in these excerpts (4.23 and 4.24), learners did not utilize additional tools such as dictionaries or even the help of a more proficient speaker, and yet they were able to target language metalinguistically which resulted in new understanding of the lexicon. MT mediated new knowledge about previously unknown words and was instrumental in triggering cognitive processes of

vocabulary learning that were observed in the learners' dialogic activity. As MT unfolded, learners relied on various strategies that helped them build an understanding of the language. In particular, learners relied on contextual clues. Context provided learners at this proficiency level a much needed source of regulation, or object-regulation. As learners became more experienced in MT and confident in their inferencing skills, self-regulation emerged prominently in the use of private speech.

4.2.1.1. Strategies and successful LLREs

In order to identify inferencing strategies that appear to promote the successful resolution of linguistic problems most often, I analyzed the strategies that learners commonly utilized in successfully solved LLREs and compared them to those more commonly employed in unsuccessful LLREs. An analysis of successfully-resolved LLREs indicated that learners relied mostly (42%) on an analysis of context to infer meaning. Learners observed the immediate context of the target word (at the sentence level) and also considered the subject of the overall text. Based on their understanding of the ideas conveyed in the text, they reached conclusions on the meaning of the target words. On the other hand, in my analysis of unsuccessfully-solved LLREs, I found that the analysis of contextual clues was not as commonly practiced as it had been in successful MT (20% of the unsuccessful MT samples), and when learners used this strategy, they often misunderstood or failed to grasp the message of the context.

Hence, inferring meaning from contextual clues is an aspect of MT that makes the mediation of meaning possible through this psychological tool. However, there are additional factors that play a role on how effective this strategy can be. For instance, if learners lack sufficient knowledge of the words contextualizing a target word, they would find it challenging to infer meaning. Indeed, Gardner (2004) concluded that in order for

learners to understand the message of a written text, they need to know approximately 95% of its words, and that the meaning of an unknown word is more easily derived from context when about 19 of its surrounding words are known.

Besides the learners' overall L2 lexical knowledge, literature on inferencing strategies in incidental vocabulary learning has identified additional factors that play a role in inferring knowledge from context. Some of these factors refer to the features of the target word and the context that contains it (e.g. word frequency and subject), and the importance of the word in adding significance to the overall context. Other features concern the learners, such as their commitment and involvement with the task, the learners' attention to detail (e.g. morphological cues), and preconceptions of the word meaning (Nassaji, 2004). Thus, it can be concluded that even though the analysis of context was the most prevalent inferencing strategy both in successful and unsuccessful LLREs, there are a variety of components regarding the target word, the text in which the word is included, and the linguistic skills of the learner that determine both the complexity and success of the strategy in MT.

From a SCT perspective, the observation of contextual clues as an inferencing strategy fits under the concept of object-regulation (Lantolf & Frawley, 1985). When object-regulation was first introduced as a means of regulation by L2 learners, the behaviors associated with this concept (e.g. noticing aspect and tense) were identified in the learners' private speech. In this study, as learners considered contextual clues, they did so in their MT; that is, the social speech that was meant to be directed to their partner and not directed to themselves, though both parties benefited by metatalking.

In conclusion, successful and unsuccessful LLREs share characteristics in their progression such as the presence of object-regulation by means of the analysis of contextual clues. However, there are a number of additional factors that play a role on how successful

the application of this strategy is. In Chapter 5, I reconsider the question of what makes MT successful in solving lexical problems and present hypotheses for further study.[4]

4.2.2. Learners' interaction features in MT

In this section, I discuss the ways in which learners interact when producing MT. In Chapter 3, I introduced several categories for analysis, the most important of which relate to SCT concepts, such as roles, regulation, and ZPD (Table 3.1). I also introduced a second layer of analysis that serves to build a detailed examination of how SCT concepts take shape in interaction (Tables 3.3 and 3.4). As I describe learners' interactive behavior in MT, I identify new categories of analysis; namely, providing metalinguistic information, offering hedged opinions, and asking unauthentic questions, which further describe how MT develops in interaction that targets lexical development. Findings on interactive features are summarized in Table 4.4.

[4] The question of inferencing strategies taken up or abandoned over time by learners remains unanswered. Due to the nature of the data (a single data gathering section) it is not possible to make observations regarding the development of strategies over time. A longitudinal study in which inferencing strategies are compared over time is necessary to answer this question, which is to be addressed in Chapter 5 under Future research.

Table 4.4. Interaction features.

Interactive feature	Percentage of LLREs where element was observed (n = 217).
Asking unauthentic questions	33%
Offering hedged opinions	17%
Scaffolding	12%
Providing meaning	10%
Clarification requests	7%
Repetition	5%
Providing metalinguistic information	5%
Request for repetition	4%
Confirmation checks	3%
Providing an example + meaning	2%

Note: Newly-identified categories in this study are in bold.

In the data, the most prevalent interaction features were asking unauthentic questions, offering hedged opinion, scaffolding, and providing meaning. Other less used interaction features included clarification requests, repetition, providing metalinguistic information, confirmation checks, and providing an example + meaning. Two features introduced in Chapter 3 that were not present in the data were providing an association + meaning and comprehension requests. The excerpts to follow illustrate how interactive features function in MT wherein vocabulary is targeted.

Excerpt 4.25 illustrates various interaction features, including: scaffolding, offering hedged opinions, providing meaning, requesting clarification, and providing metalinguistic

information. In order to facilitate the analysis of the LLREs, interaction features and other relevant categories of analysis in this section have been noted in parentheses and in bold throughout the LLRE.

Excerpt 4.25. Interaction features.

47 S: OK. (**Scaffolding sequence starts**)

48 A: So in my opinion, it's describing something that Mufasa did. What do you think? (**Offering hedged opinion**, **asking opinion**)

49 S: I think it's a type of activity that makes him want to go to the park. Makes sense? (**Offering hedged opinion, comprehension request**)

50 A: Yeah.

51 S: That wants him, want to be with dogs. Like something with dogs to the park. That's something that so, it's an activity. Travel? (**Comprehension check**)

52 A: Yeah.

53 S: But that's *viajar* 'to travel'. (**Providing metalinguistic information**)

54 A: Well, you got to keep in mind that in every language there are very different words to say the same thing. So, maybe. That's what I had on my mind. To travel. (**Providing metalinguistic information**)

55 S: To travel? OK. (**Confirmation check. Scaffolding sequence ends. ZPD is reached**)

In this excerpt, S and A work as peers; no one is taking expert/novice roles. In Line 48, A starts the LLRE and scaffolding sequence by proposing an idea about what the target word *travesear* 'to play around' might mean. He ends his turn with a question, a type of clarification request, in which he expects S to scaffold to show that he has understood what A was trying to convey. In Line 49, S adds to what A had stated in the previous turn and concludes with a comprehension request; in Line 50, A confirms his understanding of S's

ideas and implies agreement. In Line 51, S continues building on the previous turns and ends his own turn with a question that proposes a meaning for *travesear*. The turn concludes with a one-word comprehension check in the form of a question in which S asks A to show either approval or disapproval for his proposal. A agrees with S's proposal in Line 52, but then in Line 53 he wonders if *travesear* could mean 'to travel' just like *viajar*. In the next line, A assumes the expert role for a moment and makes a comment carrying a metalinguistic reflection on the nature of languages and the possibility that several terms are synonymous. By making this comment, A other-regulates S for a moment. Other than the moment in Line 54 in which S regulates A, learners work together as peers in building a scaffolding sequence (Lines 48 to 55). They build a ZPD, and lexical knowledge (even if incorrect) is mediated through MT.

In Excerpt 4.26, G and V used other interaction features including repetitions, requests for repetitions, and a request for confirmation in order to define the target the word *plantas* 'plants'.

Excerpt 4.26. Interaction features.

67 G: *En el jardín con los plan…las plantas* [in the garden with the plants]? *Las plantas* [the plants]? (**Request for confirmation**)

68 V: What? [INT] say *plantas*? (**Request for repetition**)

69 G: *Plantas* like plants. (**Meaning clarification. G assumes the expert role & other-regulates V**)

70 V: Yeah, okay, I think, yeah. (**Confirmation and agreement**)

71 G: Plants. (**Repetition**)

72 V: I couldn't tell if you were saying *plantos* or *plantas*. (**Clarification and confirmation. ZPD is reached, learners understand the target word meaning**)

In Line 67, G utters a statement as part of retelling the content. V asks for a repetition to clarify understanding (Line 68). In the next line, G provides an L1 translation for *plantas* 'plants' to solve the misunderstanding. V confirms in Line 70 that he understands. G repeats one more time that the word he had uttered originally, and which had caused confusion, was *plantas* (Line 71). In Line 72, V explains the origin of his prior confusion and the LLRE is solved correctly. Through repetitions, requests for repetitions, comprehension checks, and questions, learners were able to solve the lexical problem. G as the expert, at least momentarily, regulates V as he provides G with both a definition and context for the word they are analyzing together. In doing this, learners build a ZPD for the development of lexical knowledge.

In Excerpt 4.27 learners target the word *travieso* 'mischievous'. Their interaction includes utterances in which they repeat the target word but, each time, the same utterance fulfills a different interactional purpose.

Excerpt 4.27. Interaction features.

32 A: *Un perro* [a dog]….(**Scaffolding sequence begins**)

33 B: ¿*Travioso*? (**Offering a possible word**)

34 A: *Traayverstro* [TRYING TO PRONOUNCE WORD CORRECTLY]

35 B: ¿*Traviestro*? (**Clarification request**)

36 A: *Tra:::vi:::* [TRYING TO PRONOUNCE WORD CORRECTLY]

37 B: I think it's an adjective. *Travieso* [mischievous]? (**Offering an opinion/confirmation check**)

38 A: ¿*Travierso*? (**Clarification request**)

39 B: With no R? (**Request for more detail**)

40 A: ¿*Travieso*? (**Clarification request**)

41 B: *Traveierso.* (**Confirmation**)

42 A: *Travie:::so.* (**Repetition of target word**)

43 B: 'Cause I remember it being… (**Offering information**)

44 A: *Trasvierso*. I remember it being *travierso.* 'Cause you conjugate it irregularly and then you make it into an adjective. (**Providing metalinguistic information**)

45 B:*Tra:::vi:::* [ATTEMPTS TO PRONOUNCE CORRECTLY]

46 A:*Travi::::siero:::o* [TRIES TO HELP WITH PRONUNCIATION]

47 B: *Travisiero*. And then I have Mufasa. (**Final confirmation of target word. Scaffolding sequence ends**)

In Excerpt 4.27, learners target *travieso* 'mischievous', its pronunciation, function and form. In Line 33, B offers a solution to the lexical problem presented by A in the previous line: a missing adjective to describe the dog. In Line 35, B responds to A's need for a pronunciation model. B attempts to regulate A, but fails to do so when he also struggles in determining the correct pronunciation (Line 36). In Line 37, B offers metalinguistic information in the form of an opinion. He also ends his turn with a question, again, using the target word, to request a confirmation from A. In Line 38, A requests a clarification on the matter of the target word function. Instead of responding to A's request, B produces a new question regarding spelling. Again, A asks for a clarification (Line 40). In lines 41 and 42, learners repeat the target word as they attempt to decipher its form and pronunciation together. In Line 44, A offers an opinion containing metalinguistic information. A's utterance in Line 44 is partially correct, and since B does not return to this matter, it is possible that A's opinion served to clarify the word's function as an adjective. In Lines 45 and 46, learners continue working on pronunciation through repetitions. Finally, the LLRE concludes when in Line 47 learners move on with the reconstruction of their text.

It is curious how the target word was repeatedly used with different functions in Excerpt 4.27. At times, this one-word utterance served to ask for clarification while at other

times it was used to request a repetition. Sometimes, by simply repeating the word, learners seemed to be searching for a solution to the lexical problem. Besides repetitions, learners used requests for repetition, opinions, and the provision of metalinguistic knowledge as part of their interaction. These interactive features allowed learners to create a scaffolded exchange in which they worked as peers and created a ZPD conducive to lexical development of the pronunciation of the term *travieso.*

In Excerpt 4.28, interaction features include providing meaning + an example (from context) and clarification requests.

Excerpt 4.28. Interaction features.

90 I: What does *poltrona* 'armchair' mean? (**Asking for a definition. I requests to be regulated**)

91 M: *Poltrona*, it's vocabulary, it means like a chair, an arm-chair. (**Providing meaning + an example. Providing metalinguistic information. M assumes the expert role and provides regulation**).

92 I: An armchair? (**Clarification request**)

93 M: Oh, it's something to sit. So he sits on an armchair while they watch TV. (**Meaning + example. Confirmation check**).

94 I: Yeah. (**Confirmation**)

95 M: They watch basketball. (**Providing contextual information**)

96 I: So he sits on the green armchair and watches TV. Oh. So that makes sense. (**Providing contextual information. Object-regulation. ZPD is reached**)

In this excerpt, learners' interaction takes a different shape as compared to those highlighted in the previous excerpts in this section. Here, there is a clear distribution of roles: M plays the expert while I is the novice. A ZPD is created and M regulates I. I is able to achieve knowledge that would have been impossible without M's regulation. Their

LLRE targets the meaning of *poltrona* 'armchair' starting in Line 90 when I asks for the meaning of the target word. In Line 91, M answers by providing a definition. Additionally, M states that 'it's vocabulary' in an apparent reference to the word being a noun, because the nominal classification is the one L2 learners know of most often in terms of lexical and function. In Line 92, I poses a clarification request while in Line 93, M repeats the word's meaning and adds context from the dictogloss text in order to illustrate how the word is used in context to clarify its meaning further. With this definition of the target word meaning and a contextual example to illustrate its use, I is clear on the meaning of *poltrona,* and the LLRE is resolved correctly. In this excerpt, interaction features include questions, the provision of meaning + an example (from context), and clarification requests. These interaction features were instrumental for M to provide regulation and create a ZPD for I.

The excerpts in this section demonstrate interaction features in learners' MT; namely, scaffolding, providing meaning, clarification request, repetition, providing metalinguistic information, confirmation check, and providing an example + meaning. In the next section I define and exemplify in detail the new MT interaction features I introduce in this research.

4.2.2.1. New interaction categories in MT.

I propose three new categories in this analysis of interaction features: (1) providing metalinguistic information, (2) offering hedged opinions, and (3) asking unauthentic questions. In the remainder of this section, I offer definitions of these three categories, examples from the data, and an explanation of their role in MT and interaction.

Metalinguistic information.

Metalinguistic information not only describes the content of an utterance in which learners address a metalinguistic concept but it also refers to how learners interact with

each other as they review metalinguistic features of a word. In other words, these learners do not limit themselves to informing each other of linguistic rules as they utter metalinguistic information; instead, they articulate rules or conjugate verbs as a tool to regulate their partner and mediate joint knowledge. Thus, the utterance itself might describe a linguistic feature on the surface but, at an implicational level, it is conveying a message akin to, for example, 'no, you are wrong, this is the right way to conjugate this verb' or 'yes, that is the way we pronounce that word'. The following excerpt exemplifies the use of this interaction category.

Excerpt 4.29. Interactive features (metalinguistic information).

43 B: They all sit down, at night they sit and watch TV.

44 G: Yeah. What would you say? *Se sientan, se siente* [they sit, they feel].

45 B: [INT]

46 G: She said Ida, Fernando and [INT] y Mufasa *sien*… oh wait at night first.

47 B: Okay at, oh yeah, *anoche* [last night].

48 G: *A la noche Ida, Fernando y Mufasa se sientan* [at night, Ida, Fernando, and Mufasa sit].

49 B: Well, siéntate ['sit'-second person singular- command form] is …

50 G: That's like, that's like a command. [INT]

51 B: Yeah so it's …

52 G: *Sien…ten*?

53 B: *Sienten* ['sit'- third person plural- present subjunctive form]?

54 G: I don't know.

55 B: *Sientan* ['sit' - third person plural- present tense]? Yeah, 'cause it's [INT] and [INT]. *Sienta, sienta, sientan* [he sits, he sits, they sit].

56 G: Okay. Let's just, they sit down.

57 B: And they all watch TV.

In Excerpt 4.29, learners try to understand how to say 'they sit' as posited by G in Line 44. B presents an option, *siéntate*. G does not agree or disagree with B's proposal; instead, she explains that the form is a command. Indeed, the metalinguistic information she provides does not respond to B's question but really was meant to indicate her disagreement with B. However, by using this interactive strategy in which she addresses grammatical information instead of openly expressing her disagreement, G is subtly rejecting B's attempt. In Line 52, G proposes *sienten* in a question format, thus implying that she is not sure of the accuracy of her proposal. B repeats G's attempt in Line 53. This repetition could be classified as a clarification request or a request for repetition but this is not evident from the transcription. It is clear that B is not certain about G's proposal. In Line 55, B thinks of the correct answer. She first proposes the answer and then, within the same turn, she confirms her own statement by conjugating the verb *sentarse*. Thus, B shows G that this answer is in fact the correct one. G accepts B's proposal and they move on.

Providing metalinguistic knowledge allowed learners to trade roles at different points during the interaction and regulate each other. In Line 50, G shows B that her proposal is seemingly incorrect by providing metalinguistic information that refutes her idea. In Line 55, B provides metalinguistic information as a way to clarify her own proposal and confirm its correctness. The learners build a ZPD together as they gain knowledge from the interaction that is not limited to the target word form since the interaction as it unfolded was conducive to reviewing different aspects of the target word; e.g. the command form for *sentarse* and even the metalinguistic terminology associated with these forms.

Offering hedged opinions.

I have labeled the second interactive categorization that emerged in this study 'offering hedged opinion'. The most common phrases with which learners introduced their opinions or beliefs were such expressions as 'I think ...,' 'I don't think…,' and 'I want to say…' Often these structures can signal uncertainty; however, as it will be seen in this context, learners utilized them to share their opinions and beliefs about how to proceed in solving the linguistic problem without being too imposing on their interlocutor. Also, learners often used the 'inclusive we', thus including both themselves and their interlocutor in statements requiring some form of action, also with the purpose of softening the interaction (Scarcella & Brunak, 1981).

The following excerpt illustrates how an expert shares knowledge and offers hedged opinions with the novice but does so in a tactful manner by employing hedging elements. Hedged opinions are highlighted in bold.

Excerpt 4.30. Interaction features and offering opinions.

1 P: Okay. **I think I got most of them**. I did not get *merodea*r [to prowl] or, yeah, actually that's it. Three, two…cool. Okay, here we go. So there's the word I'm looking for. *Cónyuge* [spouse], said that Ida is twenty-seven years old and *vive con su cónyuge* [lives with her spouse] Fernando so I'm guessing that's like husband 'cause then it said *se casaron por dos años* [they married for two years]. **I think that's married for two years.**

2 A: Yeah, when [INT].

3 P: So **I think *cónyuge* is 'husband'.**

4 A: **I don't think that's husband. I thought 'husband' was *esposo* [husband].'**

5 P: Yeah but…

6 A: Is that another word for 'husband'?

7 P: Maybe 'partner' or…unless I'm using *casaron* [they got married] wrong. 'Cause it said *se casaron por dos años* [they got married for two years]. It said *vive con su cónyuge Fernando* [lives with her spouse Fernando]. So it's describing Fernando. So it can't be marrying. It's not a verb, we know that.

8 A: Partner?

9 P: Partner, something along those lines. **We can pretty much just rewrite that** and still get the same meaning, I think.

10 A: Yeah.

Excerpt 4.30 starts with P recounting the target words they need to include in the text. He reviews them and feels confident he has all the information he needs to complete the task. His attitude indicates that he is ready to handle the task and will guide A through it. He starts with the first item on the target words list, *cónyuge* 'spouse'. He indicates that, based on his understanding of context, *cónyuge* means 'husband', which he reiterates in Line 3. As he presents his opinion, he uses phrases that soften the interaction such as 'I think' and 'I'm guessing'. A, in Line 4, attempts to take the expert role and contradicts P. Her tone[5] is also mitigated by her word choice as she expresses her thoughts and uses the phrase 'I don't think…' In Line 5, feeling quite confident about the meaning of the target word, P does not give in. A compromises with P by saying 'maybe *cónyuge* is another word for husband'. In Line 7, even though P is certain that *cónyuge* means husband based on contextual clues, he cautiously compromises in order to avoid a face-threatening situation. P explains that no matter what they decide about the meaning of the target word, once the text is rewritten, it will not make a difference to the meaning of the overall text. In Line 9,

[5] A's utterance starts with a shift upward in her pitch level and lengthening of the first syllable, which also describe hedging intonation patterns.

P uses an 'inclusive we' in order to signal that this is a joint task and that he respects her differing opinions. A agrees with P's proposal of not needing to commit to one definition.

Learners express their opinions by using such expressions as 'I think …' or 'I want to say…' and use of the 'inclusive we'; thus, they are able to soften the interaction. These buffers or hedging features can foster a sense of camaraderie among learners as they work together and regulate each other without sounding too imposing.

Asking unauthentic questions.

Nystrand, Wu, Gamoran, Zeiser, and Long (2003) introduce the construct of 'authenticity' to examine questions. An authentic question is one for which the speaker has no prespecified answer and an unauthentic question is formulated with an expected outcome. The authenticity of a question is often revealed by cues in the interaction surrounding the question and not necessarily by the wording of the question itself. For example, when a teacher starts an interaction by saying "Okay, class, let's check the answers to your study questions", the questions that follow are considered 'test-questions' that are formulated in order to assess the students' completion of their homework and not necessarily authentic questions about the content of the assignment.

In this study, there was a connection between the formulation of authentic information questions and the novice role; that is, the learner seeking to be regulated (e.g. a novice that asks the expert about the meaning of a word). However, it was also noted that a number of those questions produced by novice learners were unauthentic because they function to request information; rather, the learners formulated their message in question form as a way to soften their utterances when addressing their partners. In these instances, learners wanted to bring something to their partner's attention but preferred not to use a more direct construction, so they used questions. This use of questions by a novice in a

momentary expert role was a non-confrontational way of bringing something to their partner's attention.

Excerpt 4.31 identifies an information/wh-question utilized as an unauthentic question to get the partner's attention focused on the wrong word in the reconstructed text. As discussed before, since it is not always possible to identify the unauthenticity of questions by looking only to the LLRE, it is useful to summarize the profile of the participants (here, A & P) and their overall participation and interaction.

A and P produced a total of seventeen LLREs. Eleven of the LLREs were resolved with P taking the expert role and regulating and leading A towards ZPD; three LLREs were resolved jointly through scaffolding sequences, and the remaining three included unauthentic questions conducive to resolution of the LLRE. Excerpt 4.31 is one of these LLREs in which unauthentic questions were utilized. Details about the interaction are included in parentheses and in bold in the LLRE.

Excerpt 4.31. Asking unauthentic questions as interaction features.

78 A: What is this word? (**A calls P's attention to a word written in their reconstructed text by means of an information/wh-question).**

79 P: *Equipaje* [luggage]. (**P answers the question**)

80 A: Okay. (**A accepts P's response**)

81 P: Oh, wait. That's not correct. (**P realizes that there is a mistake in the word that A brought to his attention**).

82 A: *Equipe* [LEARNER MEANS *EQUIPO* 'TEAM'], right? (**A offers what she believes is the correct form of the target word 'equipo'; ending with a tag question to request confirmation**)

83 P: It's *equipe*. You're right. I wrote…that's like luggage. The suitcase, Fernando's favorite suitcase is the Spurs. Oh well, you can do that and fix that in your recording.

In Excerpt 4.31, A is aware of P's confusion of the terms *equipo* 'team' with *equipaje* 'luggage'. A does not mention the problem openly and directly; instead, she poses a question that has the appearance of an information question but it is actually a non-face-threatening way of bringing the problem to P's attention (Line 78); that is, an unauthentic question. P answers the question in Line 79 without recognizing his mistake. In Line 80, A still has not pointed out the mistake openly and is waiting for P to recognize the problem himself. Finally in Line 81, P understands his confusion. Not until this point does A openly demonstrate that she did in fact know that there was a problem all along, and she knows the way to solve it as well. In Line 82, she offers an answer to the problem, though not completely accurate (the word she was looking for is *equipo* 'team', not *equipe*), and she does it by means of a confirmation question. Finally P sees the mistake in Line 83 and acknowledges that A was correct.

As seen in this excerpt, A knew there was a problem, but P had been the obvious expert during the interaction thus far; A was not confident about being able to fill the expert role and address the problem openly. In this instance though, she needed to point out that there was a problem that P was overlooking, so she did bring it up by asking an unauthentic question, which helped her reach her desired objective without imposing on P, the expert throughout their collaborative activity.

Upon considering Excerpt 4.31 in isolation, it is possible to suggest that A did not really know the correct word and that she was showing her own uncertainties by the way in which she interacted; however, an earlier LLRE demonstrates that A and P did review the target word together. In fact, it was during that earlier LLRE that both learners

concluded (incorrectly) that the correct word for 'team' is *equipe*. Their earlier interaction follows:

Excerpt 4.32. Targeting word meaning and spelling.

15. A: And what's 'team'? *Equipe?* (**Learner means to say 'equipo' for 'team'**)

16. P: E-L-E-Q-U-I-P-E… [SPELLING IT OUT]

17. A: Did you say *el* (the – singular/masculine)?

18. P: *El* and then *equipe*, E-Q-U-I-P-E [SPELLING IT OUT], *equipe favorito de Fernando es o son* (Fernando's favorite team is or are) I guess, or team is just one, *es* (is) yeah, *es* (is)…

19. A: *Es el Spurs*? (Is the Spurs?)

20. P: *Es el Spurs*. I mean we covered it all. So…

Excerpt 4.32 precedes Excerpt 4.31 in A and P's interaction and demonstrates how learners had focused on the meaning and spelling of the target word *equipo* 'team' earlier. Later on, when A brings up the confusion between the target word with *equipaje* 'luggage' by means of an unauthentic question, she does so based on the knowledge she gathered of the target word in the earlier LLRE (as seen in Excerpt 4.31). The formulation of unauthentic questions was instrumental to A in her interactions with P as she was able to discuss features of the target word in a non-imposing or face-threatening manner.

In conclusion, in this section I discussed learners' interaction features of clarification requests, confirmation checks, examples + meaning, meaning, repetitions, requests for repetition, and scaffolding. Also, three new categories were introduced that served to mediate lexical knowledge: providing metalinguistic knowledge, offering hedged opinions and asking unauthentic questions. These categories were also identified as face-saving tools learners employed in their MT as they took roles and interacted with each other.

4.2.2.2. Roles and face saving strategies

Despite the extensive study of L2 classroom interaction, there is still much that has not been researched regarding student-student interaction (Hewett, 2000). Most studies that deal with classroom discourse often focus on teacher–student talk because it can be difficult to obtain data on student–student communication in comparison to the more open interaction among students and teachers (Adel, 2011) Findings from the current research on dyadic interaction contribute to the study of L1 English student-student interaction with the identification of interactive patterns in MT that have the function of effectively participating in a collaborative task, building linguistic knowledge, and mitigating discourse that could otherwise sound imposing or harsh.

By means of unauthentic questions, providing metalinguistic information, and offering hedged opinions, learners softened instructions and requests, and attenuated the impact of the speech act regardless of the roles of each participant (Yates, 2010). By replacing direct requests or assertions with vague language, as seen with the use of hedges that denote uncertainty, the content of the utterance diminished its impact, politeness increased, and learners created intersubjectivity (Fraser, 2010)

These face-saving strategies also performed an interpersonal function, implying that the speaker and their interlocutor in each dyad understood each other well, whether they worked as peers or assumed expert and novice roles (Drave, 2001). In other words, and from a SCT standpoint, the use of face-saving interaction techniques allowed learners to work with each other productively despite being aware of their partner's linguistic limitations in the L2 and the absence of 'true' experts who could have provided the regulation that novice learners often need from a position of authority conferred by their more advanced L2 knowledge

4.3. SUMMARY OF FINDINGS

I discussed findings in this chapter that lead to answers for my research questions: (1) Is there a relationship between MT and L2 vocabulary knowledge development by intermediate L2 Spanish learners? If so, are there particular aspects of a word as described through the word depth knowledge construct that are more influenced by MT than others? And, (2) What features of MT can be related to an increase in L2 vocabulary knowledge?

In order to answer these questions, the analysis has comprised two main areas: (1) the relationship between L2 vocabulary knowledge and MT; and (2) features of MT that contribute to increased L2 vocabulary knowledge. Each section also includes subareas of analysis. The first section addresses: (a) areas of the word depth knowledge construct that learners target during interaction, and (b) areas of the word depth knowledge construct enhanced through MT. The second section relates to the various forms and content of MT when the ultimate goal is lexical development. Subsections of analysis include: (a) how learners infer knowledge through MT, and (b) how learners interact when producing MT. The analysis of learners' interactions and inference strategies also includes a discussion of emergent categorizations that result from the use of MT in lexical development not previously accounted for in SCT.

Figure 4.1 presents a visual representation of the two major areas of analysis and their subsections: vocabulary knowledge and features of MT that contribute to vocabulary knowledge. In the vocabulary knowledge section, I observed the lexical elements learners targeted through MT and what they accomplished in terms of lexical development. As I observed features of MT, my focus switched from the lexical target to how lexical elements were targeted by means of inferencing strategies and interaction features.

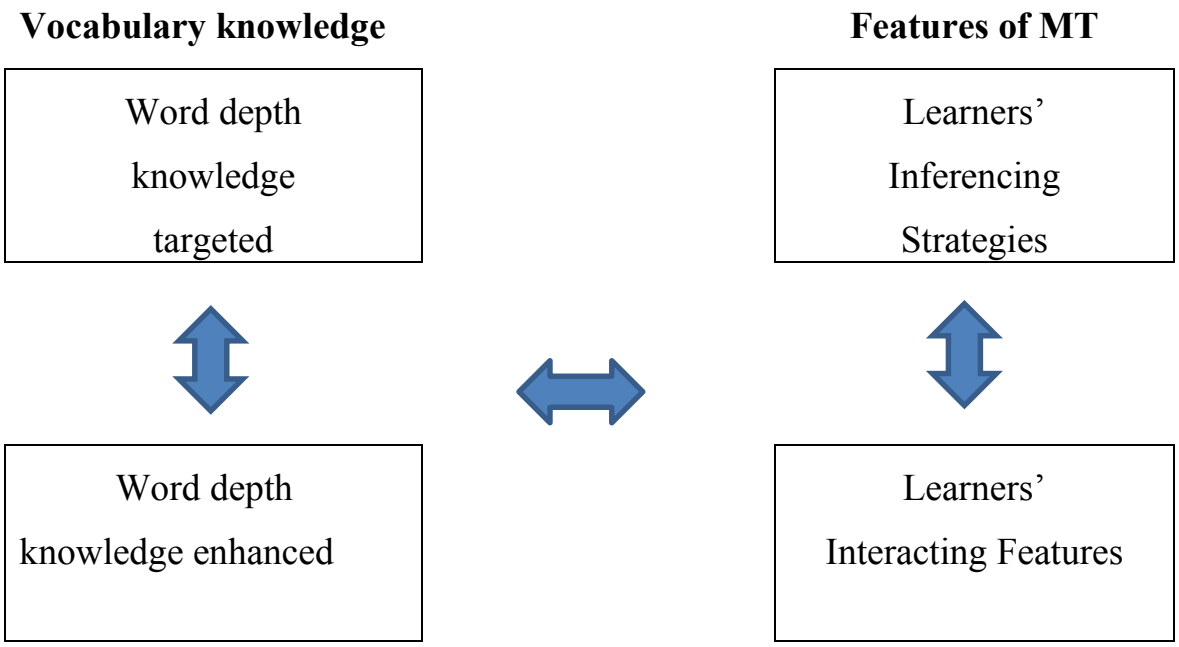

Figure 4.1 Main areas of MT analysis and subareas

4.3.1. Word depth knowledge targeted and enhanced through MT.

Learners mostly targeted meaning in their MT, followed by pronunciation, spelling, and word function. Understanding meaning was essential, allowing learners to control the task. Often, they targeted additional areas of word-depth knowledge, such as word function, in order to attain the target word meaning. Learners did not focus on areas of word-depth knowledge such as collocations because they were not needed to complete the task at hand. This behavior is understood as making use of their agency by building their own learning (situatedness) and doing what is necessary to control the given task (orientation). Another strategy learners employed to control the task was to ignore

unknown words they were not able to understand. This behavior served as a coping strategy as well.

Upon hypothesizing what could have made the MT more effective in targeting vocabulary development, I conclude that often learners need a true expert to confirm hypotheses and erase doubts; otherwise, knowledge mediation is truncated.

In order to observe the effect of MT on areas of the word depth knowledge construct, LLREs were analyzed in terms of the outcome of the LLRE (resolved or not resolved, solved incorrectly, or disagreement). In these learners' interactions, almost half of the LLREs produced were resolved correctly and, even when the LLRE outcome was not successful, learners still produced a good deal of MT. The use of MT in itself served to mediate higher cognitive skills regarding a variety of linguistic features. MT also created an awareness that the learners did not have prior to their verbalizations and interactive exchanges, thus allowing MT to serve as a cognitive tool that mediates language.

4.3.2. Features of MT: inferencing strategies and interaction features

The most prevalent inferencing strategies were to analyze context either by observing words surrounding the target word at the sentence level or by noticing the overall meaning of the text. These strategies are linked to object-regulation in the SCT literature and were particularly useful when gathering meaning, the most targeted word depth knowledge element in this study. Inferencing strategies learners used to build knowledge include translation, morphology, knowledge of the world, syntax, and cognates. Other matters discussed include how learners apply multiple inferencing strategies per LLRE and use MT and inferencing strategies when targeting previously-learned knowledge.

Interaction features of learners' speech during MT include: (1) clarification requests, confirmation checks, examples + meaning, meaning, repetitions, requests for

repetition, scaffolding; and (2) the introduction of three new categories including providing metalinguistic knowledge, offering hedged opinions, and asking unauthentic questions. The metalinguistic information category refers to ways learners interact with each other as they review a metalinguistic component. These learners articulate linguistic rules to show the interlocutor what the answer is (e.g. a learner conjugates a verb to show their interlocutor that the way they had conjugated the verb was incorrect). The category of hedged opinions is characterized by phrases such as 'I think ...,' 'I don't think…,' 'and the inclusive 'we' to soften the interaction. Unauthentic questions were also used in connection with softening the interaction. Learners asked information type questions that were used to draw their peers' attention to the task instead of openly discussing the problem. These findings contribute to our understanding of student-student interaction in their L1 English as they produce MT and how learners interact with each other when taking roles.

To conclude this dissertation, Chapter 5 answers the research questions, evaluates the implications of findings for this study in the second language acquisition field and addresses limitations for this study and potential future research.

Chapter 5: Discussion and Conclusions

The purpose of this final chapter is to discuss the results from this investigation on vocabulary development through MT and draw final conclusions. As an overview of this chapter, Section 5.1 addresses the research questions introduced in Chapter 2, and presents concluding remarks on this research. Section 5.2 evaluates the implications of findings for this study in the language field, Section 5.3 summarizes conclusions and contributions, Section 5.4 reports limitations for this study, and Section 5.5 suggests future research.

The research questions that guided this study on the role of MT in lexical development were: (1) Is there a relationship between MT and L2 vocabulary knowledge development by intermediate L2 Spanish learners? If so, are there particular aspects of a word as described through the word depth knowledge construct that are more influenced by MT than others? (2) What features of MT can be related to an increase in L2 vocabulary knowledge?

5.1. VOCABULARY KNOWLEDGE AND MT

In the SLA literature, MT has been identified as a cognitive or semiotic tool that mediates language development (e.g. Donato, 1994; Swain, 1985, 1998; Swain & Lapkin, 1995, 1998). In this largely qualitative study, I describe how MT was instrumental in developing L2 lexicon knowledge by analyzing Spanish L2 learners' lexical targets and outcomes in MT and the manner in which MT developed.

5.1.1. Research question 1: MT targets

Findings in this study show that learners concentrated on lexical features over grammatical ones. The learners' concern for the lexicon agrees with input processing notions about what guides L2 learners' linguistic attention and data processing (VanPatten, 2007). In the first principle of his model, VanPatten (2007) argues that L2 learners choose

to concentrate on lexical content because the lexicon affords them more comprehension gains than grammatical features. This principle helps explain why learners focused on the lexicon over grammatical ones as they needed to comprehend the text first and foremost in order to reconstruct it.

As it had been hypothesized, regarding the lexicon, learners addressed mostly meaning followed by pronunciation, spelling, and word function. These findings agree with those of Leeser (2004), who found in his research on collaborative talk that over half of the lexical LREs produced by learners were built on word meaning. Just as in Leeser's study, participants in this research have low L2 proficiency levels; thus they narrow their scope to fundamental lexical features that are within their comprehension and that are essential to the communicative purposes of the task.

But is it productive in terms of lexical development that students only focus on meaning? According to VanPatten (2000), MT during LREs assists a learner in relating a meaning to a form so that when the form is encountered in input again, it has more chances of being processed and becoming part of the learner's intake. Based on this idea, establishing meaning could be an important step towards fully learning the word. De la Fuente (2002), on the other hand, suggests that if learners are able to decode meaning during MT without paying much attention to form, it is possible that sufficient cognitive resources were not deployed in processing the word, which in turn may lead to fewer chances of acquiring the word all together. This statement by de la Fuente appears to be contradictory since if learners gathered information on meaning, it implies that they were cognitively invested in achieving that objective.

Although it is not possible at this time to show evidence that increased awareness of a lexical unit and its meaning is sufficient to learn the word later when it is encountered again, the current study suggests that awareness has the potential to become knowledge.

Awareness can be particularly important when learners face an impediment as they target the word through MT (Vygotsky, 1962). In other words, if there was an obstacle (e.g. not understanding the message of the surrounding target word context) for learners to infer meaning during MT that made the word become salient for them, it is possible that, if encountered again, deeper knowledge of the word could be attained as based on the foundation and awareness established before. A research design that addresses uptake through follow-up activities after meaning-focused MT could determine how much initially being aware of only meaning can promote a more holistic acquisition of the word later on.

The analysis of learners' focus on meaning is facilitated by sociocultural concepts. From an Activity Theory perspective (introduced in Section 1.1.3.5), the concepts of *task* vs. *activity* contribute to understanding how learners manage a task, produce MT, and solve LLREs based on their own agency, needs, and learning objectives. In this study, learners were instructed to reconstruct a dictogloss text that included a number of unknown target words; these were expected to create many opportunities for MT and to trigger discussions about their linguistic features. Learners focused on certain target words and a few of their features, mainly meaning. Additionally, learners did not only target the key words intended by the researcher but also additional targets selected by the learners themselves. By making these decisions, learners adapted the task into their own activity and shaped their own MT. As learners have agency to shape the task and create their own activity, they also shape their learning, which is the definition of *orientation* (Donato, 2000).

The concepts of *situatedness* and *agency* explain learners' behavior as they take control of the task and shape their own learning based on the circumstances that frame their participation. In this study, many researcher interventions could have concretized the activity and its settings, but the results would not have shown what MT by itself can do for

vocabulary development. Instead, in this research, learners were free to develop higher cognitive skills that involved realizing their limited knowledge, planning, and even purposefully ignoring words as a strategy to keep control over the task. These processes are mediated activities fueled by the interaction happening among individuals. Linguistic targets were based on the needs they identified as part of the task itself and were also a reflection of the learners' individual goals and abilities. What was observed in the learners' behavior towards the task demonstrates how mental and social activity come together in a symbolically mediated relationship. Therefore, neither learners nor task design by themselves determine learners' MT performance. It is rather the interaction between learners and the task that shape MT. More on the subject of factors that play a role in MT production is discussed in Section 5.1.2.

As learners targeted word meaning, they not only focused on new target words, but they also considered words previously learned. In the SLA literature, MT is usually connected to learning or acquiring, which implies that learners transition from not knowing something to 'knowing' it; this process does not necessarily imply full acquisition but rather a new awareness of a linguistic matter. In this study, learners did not narrow their scope to new words; they focused on the words that they needed to complete the task, some of which were tokens that they could not remember or about which they had doubts. This use of MT to target previously-learned knowledge adds a new dimension to MT, an extension in its application to vocabulary development. That is, learners used MT to discuss lexical items that they had previously been exposed to or learned, and by means of MT they remembered features of the item they had forgotten and even learned a new aspect that they had ignored (e.g. spelling). This usage has important pedagogical implications because MT can be encouraged in classroom interactions with the objective of remembering and recycling vocabulary, and not only working with new vocabulary targets.

In conclusion, MT served as a psychological tool in the mediation of lexical knowledge that emerged in dyadic interaction. It was instrumental in gaining knowledge about word meaning as well as other lexical features such as pronunciation, spelling, and word function. It also was useful in targeting previously-learned knowledge such as by reviewing concepts learners had been exposed to or learned before. As MT was produced, learners' awareness of linguistic features of the L2 was heightened, which can be the foundation to further learning and internalization.

5.1.2. Research question 1: MT outcomes

In successfully resolved LLREs, learners were able to infer the information they were seeking about the lexical item in question during their interaction. Aspects of MT in successful lexical mediation included: learners built knowledge together in scaffolded interactions, used a variety of inferencing strategies such as identifying the target word function, object-regulated by observing contextual clues, other-regulated by assuming roles, interacted with each other by means of face-saving discourse that aided in creating intersubjectivity while building lexical knowledge, and were engaged in the task. In these successful instances, it was clear that MT served as a semiotic and mediating tool that enabled vocabulary development.

Although a large percentage of LLREs were solved correctly, some LLREs were not. At times, despite much MT production, learners either reached wrong conclusions or LLREs were left unresolved. These findings lead to the questions of (1) what is the effect of MT as a meditating tool when the LLRE outcome is unsuccessful, and (2) what are some factors that contribute to successful MT aimed at lexical difficulties.

As discussed in Chapter 1, many studies support the idea that MT is instrumental in mediating L2 knowledge (e.g. Donato, 1994; Swain, 1998; Swain & Lapkin, 1995,

1998). LaPierre (1994, as cited in Swain, 1998) considered both the effect of correctly and incorrectly resolved LREs on L2 development through MT. The author reported that when LREs had successful outcomes, 79% of the post-test items discussed during dyadic interaction were answered correctly. When LREs were solved incorrectly, 70% of follow-up items were answered incorrectly as well. It appears that the same dialogic and cognitive processes that enable development through MT can also contribute negatively to language advancement when LLREs outcomes include erroneous conclusions and resolutions that are mediated. Unsuccessful LLRE outcomes, however, do not undermine MT in its potential towards L2 development.

Indeed, MT can be compared to other forms of speech that serve as tools for mediation such as inner speech or private speech, in that they do not always guarantee successful outcomes (J. Lantolf, personal communication, September 27, 2013). Like other forms of speech, MT can enable higher cognitive skills but it can result in problems that are unresolved or resolved incorrectly, and in those instances, additional tools for mediation that provide supplementary regulation might be necessary.

There are various factors concerning the learner, the target word, the collaborative task setting and the interaction between them that influence MT. Many of these factors represent additional sources of regulation that can increase successful MT outcomes, such as the task type and the learners' experience in producing MT. There are discussed in the next sections.

5.1.2.1. Task type

Task type has been researched in connection to MT. For example, Storch (1999) and Vanderheijden (2010) evaluated types of tasks and MT and concluded that activities such as cloze exercises or text reconstruction tasks are conducive to MT. In terms of text

reconstruction tasks in particular, several studies (e.g. Kowal & Swain, 1994; Kowal & Swain, 1997; LaPierre, 1994; Swain, 2001a) have implemented and shown explicit support for this type of task on the basis that it encourages much collaborative talk and MT. However, the issue does not seem to be MT quantity, but rather effectiveness in successfully solving lexical problems.

When learners participate in a task that requires collaborative talk, they generally produce much MT but, as discussed before, that does not guarantee successful LLRE outcomes. In order to make up for deficiencies in tasks that employ MT, additional regulating tools may need to be introduced in the task design. Two experiments discussed in Chapter 1, Swain et al. (2009) and Tocalli-Beller and Swain (2007), exemplify how the task itself can provide additional regulation to learners.

Swain et al. (2009) assessed both product and processes in the development of the concept of voice through languaging. In addition to participating in pre-tests, participants had additional tools that guided their languaging process. These aids included: an explanation of the process of languaging and its effectiveness in language learning, key words they would encounter during the task, and information on the concept of voice as provided in explanatory cards. Hence, in Swain et al. (2009), learners' languaging was guided throughout the intervention with various elements that contributed to a more effective and assertive MT and that provided additional regulation.

In Tocalli-Beller and Swain's (2007) study, learners solved humorous lexical games through languaging. During the collaboration process, learners used a dictionary and received input from teachers. Moreover, when learners solved the lexical problem correctly, they could understand the humor in the riddle; if they solved the LLRE incorrectly or the LLRE was left unresolved, learners could not make sense of the riddle. As a result, learners received regulation from teachers and object-regulation from the

context of the lexical games (McCafferty, 1994). The studies by Swain et al. (2009) and Tocalli-Beller and Swain (2007), exemplify additional tools that can strengthen mediation through MT and its accuracy in solving lexical problems by means of additional regulation. In the current study, additional regulation could have been provided by (1) allowing learners to use a dictionary, (2) providing learners with cards with either synonyms, antonyms, or even definitions that they would match with the target words in the dictogloss, and (3) showing a video or pictures retelling the story in the dictogloss in order to increase learners' comprehension of the context in which target words were included.

5.1.2.2. Nature of lexical items

Not all words are equal in vocabulary learning. Word features can have a positive or negative impact on MT targeting the lexicon. From the literature on vocabulary acquisition and vocabulary attrition, we know that factors such as word frequency, morphology, L1 resemblance, and meaning play an important part in learning words through conversation or reading (Ludwig, 1984). For example, Hulstijn et al. (1996) reported that high frequency words are easier to learn incidentally during reading than low frequency words. Nouns are also easier to learn than verbs as a function of their weight in communicating meaning (Kweon & Kim, 2008). The nature of words surrounding the target word also play a role on MT. As seen in this study, learners object-regulated by inferring knowledge through the analysis of contextual clues. A context that provides sufficient clues represents an additional source of regulation. The nature of lexical items is a topic that remains to be researched in connection to MT and lexical development.

5.1.2.3. Learners' experience with MT

Learners' prior experience with MT implies having received instruction on MT, its effects on language learning, and modeling on how MT is produced. Past studies have

included either instruction on MT or instruction plus modeling in their design. For example, Swain et al. (2009) explained to the participants that talking through the task would be beneficial to learning. Kim (2008) instructed and modeled MT in her study. Benefits from instruction and modeling include higher and more elaborate levels of engagement in the MT task (Storch, 2008). Therefore, instruction and modeling on MT could also contribute to resolving more LLREs successfully as learners understand how to perform MT efficiently and how they can benefit from it.

Although learners in this study did not have explicit instruction on MT and how to produce it, they did have opportunities for practice. As reported in Chapter 3, learners participated in four dictogloss activities and data from their fourth dictogloss was used for analysis in this study. It is possible that these practice sessions had a positive effect on their MT production because learners may have become more comfortable with the task of addressing language metalinguistically.

This idea that learners may have developed their ability to produce MT can be viewed from a Dynamic Assessment (DA) perspective (introduced in Section 1.1.3.2). As learners in this study participated in a series of practice dictogloss activities, they might have developed the ability to produce MT and then transferred that skill from one task to the next one. These ideas are tentative and a study design with an additional post-study task that presents learners with a slightly different and more difficult task could demonstrate if the skills to produce MT have been developed, internalized and transferred, as described in the DA model.

5.1.2.4. Engagement

'Engagement' (introduced in Section 1.2.4) describes the quality of the learners' MT as it enables cognition. When there is elaborate engagement, the learner deliberates

over language items and seeks and provides confirmations, explanations, and alternatives. When there is limited engagement, the learner does not contribute further deliberation (Kuiken & Vedder, 2002; Storch, 2008).

Two examples from this study illustrate how social factors are intervening variables in levels of engagement and ultimately play a role in MT production. In one example, a more proficient learner ignored her peer's comments as the novice sought to be regulated. The more proficient learner had the linguistic capacity to regulate the less proficient learner but decided against it, and no positive outcome or regulation emerged from the interaction. In the second example, a heritage speaker remained silent and did not interact with his peer despite the latter's questions and comments, which ceased after a few attempts to start a conversation. In circumstances such as these, engagement is minimal, impeding cognitive development. Certainly, these examples contrast with many other successful MT examples in the data in which learners were highly involved in the task and in solving the lexical problem, thus showing the connection between social factors, MT, and cognition.

One of the central claims of SCT is that individuals co-construct the activity they engage in based on their own socio-history and goals (R. Ellis, 2000; Roebuck, 2000), to which I would add mood and interpretations of the task. Different learners bring different socio-histories, goals, moods, personalities, and interpretations to the interaction, which affect the level of engagement and resulting MT. In ideal settings, more proficient learners would be happy to regulate a novice to the best of their abilities and low proficiency learners would be happy to be regulated; however, as seen in this study, personal circumstances and learners' perceptions can result in low engagement and little or no MT.

5.1.2.5. True expert

In this study, learners worked mainly as peers, while at other times they took expert-novice roles momentarily as described by Lantolf (2000). When there was a more proficient learner in the dyad who assumed the expert role, this learner often attempted to regulate the novice but faced some resistance or at least distrust. Novices did not always openly welcome the expert's regulation, possibly because the expert was a peer and they did not always trust their partners' suggestions. As reported by Kim (2008), learners often think that they cannot rely completely on their own conclusions or that of their partners due to their perceived proficiency of each other. Thus, the expert-novice role distribution is not always beneficial to successful knowledge building through MT in the L2 setting because novices do not see the expert as a 'true' expert (and with good reason, since the expert might not be knowledgeable enough in the L2 to successfully regulate).

Based on these findings, it is proposed that learners who possess a lower L2 proficiency level might improve their MT outcomes if they have a 'true' expert's regulation available to them. As discussed in Section 4.1.2.1, a true expert is defined as a more proficient partner or a knowledgeable person, such as a teacher, who is willing and able to regulate other learners and provide the necessary regulation for the novice to reach ZPD. The 'true expert' role can be further analyzed by considering important tenets within the SCT framework, particularly, ZPD.

Vygotsky believed that learning occurs at its peak when it is done within the ZPD. In order for learners to reach ZPD, there is an expert who regulates the novice by guiding and enabling knowledge, like a mother who enables her child to reach ZPD by guiding and mediating (Ohta, 1995). The ZPD metaphor has been adapted in the SLA field with the presence of two equally proficient participants who regulate each other and take turns at performing the novice and expert roles (Lantolf, 2000). With these adaptations in the L2

setting, learners regulate each other, reach ZPD, and achieve higher cognitive skills in the process. However, as noted in this study, it is possible that L2 learners work within their ZPDs and reach wrong conclusions or no conclusions at all despite much MT and regulation; it is also possible that learners might not be open to other-regulation from their peers.

Therefore, I suggest a slight caveat to Vygotsky's original ZPD in terms of roles and its application to L2 lexical acquisition in low proficiency learners. Based on my findings, I propose that MT enables lexical development most effectively when it is produced in dyads (or small groups) in which there is a novice who is regulated and a 'true' expert who exercises regulation and encourages the novice to reach ZPD. A 'true' expert is able to create the necessary settings for the novice to work within the ZPD and successfully attain lexical knowledge. A 'true' expert possesses the L2 knowledge necessary to mediate the novice; the novice knows of that expertise and can trust the expert's regulation.

Even though the definition of a 'true' expert is introduced in this study in the particular context of lexical development through MT, the basic concept of a 'true' expert is seen in previous studies on MT in the relationship described between a tutor who knows and works closely with the tutee. For instance, Aljaafreh and Lantolf (1994) studied advanced ESL learners who wrote essays and had weekly meetings with a tutor who provided them feedback on their writing. Prior to each meeting, the tutor—or mediator—read the essay and made a plan with corrective procedures to be negotiated in the ZPD with the student. Tutors regulated learners based on their individual characteristics and ZPD; some students needed much regulation to correct their errors while other, more independent, learners were able to self-regulate. Nassaji and Swain (2000) also identify the effects of negotiated help in collaborative talk as learners work on writing assignments

with a tutor. Negotiated help framed within learners' ZPDs was possible thanks to tutors who embodied features of a 'true' expert, which include being knowledgeable on the target subject (and novice learners being aware of that expertise), understanding novices' ZPDs, and realizing how to regulate novice learners best based on their needs and individual characteristics.

Further evidence of the advantages of having a 'true' expert can be found in studies on DA (e.g. Ableeva & Lantolf, 2011; Poehner, 2007). In this model, a learner's ZPD is assessed through dialogue in order to provide an adequate level of assistance (Lantolf & Thorne, 2007). Poehner (2007) observes how individuals composing oral narratives in French develop writing skills with the aid of a tutor or mediator. The mediators were aware of learners' individual characteristics in tasks that increased in difficulty over time. Poehner's study shows that a 'true' expert in MT settings can assess how to help a novice learner and provide the right amount of regulation at the right moment.

Therefore, considering MT's productivity and deficiencies in the development of the lexicon, the incorporation of a 'true' expert can contribute to solving a higher number of LLREs successfully and mediating knowledge effectively.

5.1.3. Research question 2: Features of MT

The second research question inquires about features of MT that enable lexical development. SCT categorizations are useful in describing features of MT when lexical development is at its core. In their interactions, learners filled roles (expert and novice), regulated each other, and produced private and inner speech. Additional categorizations of analysis, some emerging from the data and others borrowed from the literature on interaction, describe in detail how SCT categorizations developed in MT.

5.1.3.1. Roles

Learners in this study assumed roles momentarily and at times worked as equal partners and there was no role taking. As learners assumed roles, they made use of an array of interaction features. Three new categories emerged in the MT data that describe how learners interacted, assisted each other, and filled roles: offering hedged opinions, asking unauthentic questions, and providing metalinguistic information. The category identified as 'offering hedged opinions' was often linked to the expert role. Whoever was taking the expert role utilized that categorization to express ideas or opinions, or to indicate how the task should be approached. 'Asking unauthentic questions' was often employed by novices. These were informative questions on the surface, but implicitly they were used by the novice to bring something to the expert's attention in a subtle and face-saving manner. 'Providing metalinguistic information' consisted of uttering linguistic information in order to indicate how to solve the language problem. This category was linked to the expert role.

By means of unauthentic questions, providing metalinguistic information, and offering hedged opinions, learners mitigated the impact of their speech since they were able to replace direct requests or assertions with vague and inclusive language. Since learners lacked a 'true' expert that could regulate them, with the use of these interactive features, learners worked with each other despite their limitations in the L2, and created an intermental setting in which shared activity transformed mental processes.

It is worth noting that these discourse tools are connected to the cultural background of the participants in this study whose L1 is English; hence, these categories would not be as common in interactions between speakers from other cultures (Nurmukhamedov & Kim, 2010; Wilamova, 2005). Additionally, considering the nature of the categories and their purposes in interaction, it is not likely that they would be used exclusively in lexical MT but in MT in general within an L1 American English cultural background.

Other interaction features were more naturally connected to one learner role in particular while others involved both roles. Experts provided meaning + examples, and novices requested repetitions, while experts clarified the message through confirmation checks. Scaffolding sequences included the participation of both learners working side by side in building knowledge without necessarily taking roles (Donato, 1994).

The use of inferencing strategies was connected to roles as well. Translations as an inferencing strategy were often linked to experts, since offering translations represents an efficient way to regulate the novice by providing a definition or synonym of the target word in the L1. Other inferencing strategies based on information, such as morphology, knowledge of the world, cognates, phonetics, and analogies, could be linked to either the novice or expert. In fact, some of these inferencing strategies allowed novices to add much to the interaction since their contributions did not depend on L2 knowledge per se. This was the case with the category 'knowledge of the world'. The dictogloss was about a dog and his owners, so when learners discussed the context of the story, both novice and expert could contribute with their own experience and knowledge about the way dogs look and behave. Inferencing strategies based on something other than L2 knowledge empowered novice learners, who could take the floor for a moment and control the task.

Inferring knowledge by means of the analysis of contextual clues, either at the sentence or discourse level, contributed to building scaffolding sequences in which learners worked as equal partners to identify the surrounding context of the target word. Thus, there was no apparent role distribution when the learners applied these strategies.

5.1.3.2. Regulation

Other-regulation, object-regulation, and self-regulation were identified in the data. Other-regulation is naturally connected to interactive features between participants such as

requests for repetition, scaffolding, clarification requests, confirmation checks, and repetitions intended to confirm an idea, understand a message, and create meaning. These features shaped interactions between novices and experts.

Learners object-regulated as they relied on lexical and contextual meaning to draw knowledge. In the literature, object-regulation (introduced in Section 1.1.3.4) has been described as a series of mainly grammatical features (e.g. aspect) that can aid learners in the process of regulation. I suggest that object-regulation features that depend on an understanding of grammatical rules and syntactic structure enable regulation by more proficient learners in the L2 who can infer meaning from them. Lower proficiency learners, like the participants in this study, also have the capacity to object-regulate but they rely on comprehending meaning through the lexicon in order to achieve object-regulation. This is a matter of pedagogical importance as object-regulation can be fostered by providing learners with this type of regulation within the design of an activity (as discussed in Section 5.1.2.1). In terms of future research, it would be of interest to strengthen contextual clues rooted in the lexicon in order to observe and assess how learners utilize these built-in artifacts for regulation purposes as they produce MT and target the lexicon.

5.1.3.3. ZPD

Since in this study I have adopted a more progressive view of ZPD (as discussed in Section 1.1.3.2), the transformative process that results from participation is fleshed out through interactive features.

Learners created scaffolding sequences comprised of interaction features such as definitions of meaning, examples, and comprehension checks in which they raised a lexical question that they tried to solve. These sequences identify moments of learners' interactions that conclude with outcomes that indicate a transformation and development,

or at least the initial stage of lexical development, and a step forward towards lexical knowledge within the learners' ZPDs. Interaction features mark a microgenetic analysis of actions that can unfold within seconds in learners' interactions and transform the learners' cognition.

5.1.3.4. Private speech

Learners' interaction relied heavily on MT to mediate knowledge; however, there are some instances in which private speech was utilized as well. First, learners repeated their partner's utterances and attempted to rehearse language (Broner & Tarone, 2001). This kind of behavior manifests aspects of imitative behavior in children that is considered a form of private speech at that young age (Lantolf & Thorne, 2007). Imitation in this sense does not imply mindless copying, but emulating that which is within the individuals' ZPD and within their understanding. When learners repeated and rehearsed language to themselves they were creating comprehension and meaning as they worked within their ZPDs. The identification of private speech amidst MT marks learners' initial stages of self-regulation as they gradually stop relying on their partner's regulation and start taking charge of their own regulation.

5.2. IMPLICATIONS OF THIS STUDY IN THE LANGUAGE FIELD

Vygotsky observed how experimental methods on vocabulary acquisition were flawed, noting that traditional methods fail to observe inner dynamics of the process and focus on concrete results (Vygotsky, 1962). This study has observed how language in interaction plays a role in the dynamics of a developing vocabulary by analyzing MT produced in dyadic settings as learners target lexical problems.

Through oral verbalization, learners were able to discuss and become aware of lexical elements from the word depth knowledge construct that came to the surface. MT

was conducted within the subjects' own agency and abilities as learners adapted the task as their own, considering what was important to them. Learners focused their attention, designed their own learning, and made decisions based on their own abilities to control the task. From this research, I highlight four ideas that contribute to the application of Sociocultural Theory in the study of L2 vocabulary learning; namely, the development of MT as a skill, the comparison of MT to other forms of speech, the need for a 'true' expert, and ZPD as transformation.

MT occurs naturally as learners encounter lexical problems and it is possible that over time and with practice, MT can go through a transformation process that refines it as a psychological tool and makes it more efficient in mediating knowledge. The transformation process includes an increase in learners' taking charge and controlling the task by becoming aware of role distributions and the regulation that becomes possible by means of inferencing strategies. The production of MT is a skill that is developed and learned, just as language in general is developed and learned to become a powerful mediation tool.

Due to its mediation function, MT is comparable to other forms of speech such as inner or private speech in that it can mediate knowledge but it does not always result in successful LRE resolutions. Therefore, in L2 settings, additional measures need to be taken in order to promote successful outcomes and reinforce regulation. One such measure is the inclusion of a 'true' expert who can exercise regulation on the novices and encourage them to reach ZPD and lexical development. Other combinations, in which L2 dyads are equally proficient learners, are productive for some areas of SLA development, like pushed output or negotiation; however, in creating ZPDs and mediating knowledge, a 'true' expert is desirable. Moreover, proficiency in the L2 does not guarantee that a more proficient learner will know how to mediate or even be willing to regulate the novice. After all, providing

regulation is not an easy task; it is a skill (M. Poehner, personal communication, September 27, 2013). Thus, it is suggested that a 'true' expert must be capable and willing to regulate, and lead novices to develop lexical knowledge within their particular ZPDs. Also, in the interaction with the 'true' expert, the novice needs to recognize the expert as such, which might require an explicit distribution of roles so that the novice will not resist other-regulation from the expert.

Concerning the application of SCT to the SLA field, it is necessary to allow the theory to adapt without distorting its essential concepts. In Section 1.1.3.2, I compared the traditional view of ZPD (Lantolf, 2000) with a more modern one (Wells, 1999). A more traditional approach ignores any transformation within ZPD that can be part of lexical development, while a more modern view of ZPD acknowledges that those transformations are the origin of development. Based on the results of this study, a more general ZPD construct in the SLA field is fitting for the study of the lexicon through MT. A more general ZPD is applicable to any situation in which, by means of participation, learners are in the process of developing mastery of a practice or topic (Wells, 1999), including vocabulary or reading comprehension skills. This adaptation in the ZPD is still coherent within Vygotsky's (1986, p. 188) take on learning because he believed that "whatever the child can do in co-operation today he can do alone tomorrow"; what learners can build in their ZPDs today marks the beginning of long lasting learning.

5.2.1. Additional implications in the SLA field

Practical implications to the L2 classroom are drawn from this study; namely, the teaching of inferencing strategies, the design of tasks and its effect on MT, MT used to target previously-learned knowledge, pair work in which learners work with a true 'expert',

and designing context-rich activities that facilitate object-regulation. These are discussed as follows:

First, learners benefit from identifying the strategies they use, and teachers, once aware of the strategies learners are using, can anticipate problems learners might encounter and suggest additional strategies that can work in combination with those currently employed by the learners (Beena, 2010). In this study, inferencing strategies surfaced without any teacher instruction, which speaks of the ecological nature of such strategies in MT. Inferencing strategies that emerge naturally in learners' MT can still be introduced to them early on, and because they are strategies that emerge naturally in MT, their adoption should be easier to implement than that of more structured strategies (like those introduced in Section 2.5.1.1.). By introducing learners early on to strategies they would have developed on their own over time and with practice, learners can accelerate the incorporation of these strategies in their MT or, if they are already using such strategies, they can become aware of them and perfect the way they currently use them.

Second, in designing this study, I gave much consideration to the task that would trigger MT. As discussed in Chapter 1, the dictogloss task is an activity that has been supported in prior research since it was found to promote much MT. With the application of the dictogloss task, the study design ensured that learners would produce much MT, but it also led them to focus on only a handful of target word lexical features due to the fact that they needed only certain aspects of the word to complete the task, and since there were no contingencies built in to the task to encourage learners to broaden their scope. In order for learners to focus on various aspects of the word, some aspects of the activity targeting MT need adaptations, which might include: making learners aware of the intended targets (e.g. discovering collocations) beforehand or including a pre- and post-test type of exercise to the collaborative activity so that learners become aware of the features they need to

target through MT. However, it is worth noting that the dictogloss was very effective in eliciting large amounts of MT through which learners targeted linguistic problems that they needed to solve. In other words, the dictogloss has much pedagogical value in MT production but it is insufficient to target particulars that a teacher or researcher might select. In Appendix E, I introduce a sample activity that targets word depth knowledge elements that learners would not target naturally through MT, such as register and frequency.

Third, as discussed in Section 5.1.1, as learners created their own task, they developed their own goals and objectives. Often, those objectives were previously-learned L2 knowledge. Therefore, an important application of MT in the L2 classroom is to encourage students to metatalk about lexical subjects they learned before as a tool to recycle information. As hypothesized, an existing awareness of a lexical item might become the foundation for learning once the word is encountered again. Thus, if MT targets previously-learned knowledge, it can build on that earlier awareness of the lexical token and expand the knowledge the learner currently possesses.

Fourth, as it has been argued, the presence of a 'true' expert might be necessary for more effective MT and L2 vocabulary learning. In the L2 classroom, this concept can be translated as teachers determining dyads and small groups based on the learners' L2 skills, motivation and engagement in class activity, as well as regulation skills. By carefully selecting dyad members based on the distribution of roles, there are increased chances that novice learners will gain the regulation they need during class time and MT will be more effective.

Lastly, it was found that L2 learners at this low proficiency level rely extensively on contextual clues for object-regulation. Teachers can provide learners with rich contextual activities from which they can draw the clues they need on which to base their inferencing during MT. Indeed, Gardner (2004) argues that in order for learners to infer

meaning for one unknown word, they need to know approximately the 19 words that surround the target word. Thus, lexical content must be carefully planned in order to feed learners' object-regulation and promote accurate MT outcomes.

5.3. CONCLUSIONS AND CONTRIBUTIONS

This study has embraced the participation metaphor (Sfard, 1998) as it has considered MT to be a semiotic process attributed to participation in socially-mediated activities instead of merely focusing on the final product (Donato, 2000; Swain & Deters, 2007). Through the consideration of participation in the learning process, it has been possible to focus on the individual mind and the internalization of lexical knowledge as it happens during interaction, particularly through MT. This holistic approach provides insight into the language learning process by focusing on the learner and the social actions that use language to accomplish it (Hellermann, 2008).

Important contributions to the SLA field that emerge from this study are: (1) a deeper understanding of the role of interaction in language development, particularly the previously unexplored area of the lexicon within the SCT framework; (2) the systematic analysis and categorization of interactions centered around the lexicon; (3) the observation of how interaction within the social plane transforms lexical development; (4) the use of the word depth knowledge construct as a tool to observe lexical development; and a thorough analysis of how MT in particular mediates cognitive development.

Furthermore, this study presents results of MT use of pedagogical significance: (1) it exemplifies how L2 learners can produce MT when presented with a communicative task conducive to lexical development; (2) it identifies strategies learners employ in MT and their usefulness and efficiency in promoting lexical development; (3) it informs researchers' and teachers' understanding of how learners use language to solve lexical

problems; and (4) it presents a series of practical applications of MT in vocabulary learning activities in the L2 classroom.

5.4. LIMITATIONS

There are factors in the experiment design that may have played a role in how learners interacted and behaved in this study, and which could present unintended and unexpected results in shaping the data. These additional factors—discussed in this section—include the fact that students knew that the teacher would later listen to their recordings, that they would receive a grade for participation in the task, as well as the nature of the dictogloss task which targeted a broad range of word depth knowledge areas.

5.4.1. Learners' interactions recorded and monitored

Interaction patterns may have been affected by learners' awareness that their interactions were being recorded and monitored. A few learners commented on the teacher listening (or not) to their recordings. On some occasions, learners even addressed the teacher and even apologized for not knowing a word, or being unable to pronounce a word correctly. At other times, they greeted the teacher at the end of the recording as if they had been aware that she would listen to their conversation throughout their interaction. Thus, learners' awareness that their interactions were being recorded may have led to better and more MT. Or, quite the contrary but also plausible, it may have led them to relax in their interactions if they thought nobody was going to listen to them anyways, or even to limit their MT production out of fear of making mistakes.

This kind of behavior and the limitations it imposes on the study could potentially be reduced or mitigated if learners became accustomed to being recorded. For instance, if they were to participate in more language lab activities in which their performances are recorded and graded, novelty might turn to normalcy and they would pay less attention to

it. Though language lab activities are common in many language programs, participants in this study did not have that experience. Thus, in future studies, providing learners with additional recording activities can help them become familiar with the procedure and less aware of it.

5.4.2. Learners' interactions graded

An issue related to learners' awareness of the teacher listening to their recordings is that many learners were also concerned about their grade for their participation in this task. Prior to their participation in any data collection session, the activity had been explained and learners were told that they would receive a grade only for participating, and nothing else. Still, many were nervous about not knowing what the activity entailed and how it would be graded. This concern for their grade may also have played a role in how they interacted and produced MT. For example, if learners were nervous about making mistakes that would impinge on their grade, it is possible that they were not as open to take risks, and to make linguistic moves that might lead to different results than those observed. In future studies, this issue could be addressed by recruiting volunteer participants in the experiment instead of working with students in formal classes.

5.4.3. Dictogloss and word depth knowledge

Even if conducive to MT production, which was one of the focal points of this study, the dictogloss task was a poor stimulus of MT in a variety of lexical issues. In this study, learners focused mainly on meaning and, to a lesser extent, on pronunciation, spelling, and word function. Consequently, there were other areas of the word depth knowledge construct that were left unexplored such as collocations, constraints of use,

associations, or word form.[6] In part, it could be said that had the learners been more engaged with the task, they could have approached the analysis of these areas as well; after all, learners are their own agents and can frame their learning themselves. Even if this idea is true to the theory, it is not in necessarily true to classroom dynamics in which learners expect to have specific goals for a task in which they know exactly what to do. Consequently, due to the fact that no MT was produced in the pursuit of word depth knowledge outside of meaning, spelling, pronunciation, and word function, no conclusions can be drawn about the potential aptitude of MT to mediate lexical knowledge in those areas. It is possible that a different task design with narrower steps and more explicit expectations could encourage learners to produce MT on more diverse aspects of the word depth knowledge construct. Appendix E includes a suggested activity in which learners are directed to produce MT on a wider range of word depth knowledge elements.

5.5. FUTURE RESEARCH

This research has shown how MT served as a psychological tool in the mediation of lexical knowledge that emerged in dyadic interaction. Future research can shed more light on how additional aspects of the lexicon are learned and which L2 classroom practices are more conducive to learning through MT.

Future related studies might address: (1) the effects of teaching inferencing strategies, especially encouraging learners to make use of context as a source of object-regulation; (2) inferencing strategies that are taken up and abandoned as learners produce MT; (3) how learner proficiency affects MT in its targets, outcomes, and development; (4) observing how initial meaning development and heightened awareness gained through MT can be the foundation for further development with the application of pre- and post-tests

[6] Section 5.1.1 explores reasons why learners had a limited scope in their interaction and provides explanations from a SCT perspective.

(e.g. the Vocabulary Knowledge Test by Wesche & Paribakht, 1996) that can assess the varying breadth and depth of lexical knowledge over time; (5) observing how MT itself develops as a skill through a DA perspective by observing how learners enhance their metatalking in order to reach their desired objectives (e.g. by increasing the use of inferencing strategies) across a varying difficulty range of activities; (6) the effects of the inclusion of a true expert (either person and/or object) in augmenting successful MT outcomes; (7) vocabulary learning and MT from a DA perspective with the end goal of transferability by including pre- and post-tests that assess vocabulary learning; (8) observing how individual differences in the participants (e.g. being a heritage speaker) play a role in how MT develops; and (9) the nature of target words (and surrounding context) as a factor that contributes (or not) to mediating knowledge through MT and providing object-regulation. The analysis of lexical features in target words (e.g. word frequency, L1 resemblance, length, function) combined with the addition of pre- and post-test instruments could provide information on which lexical features correlate with successfully-resolved LLREs, resulting in lexical knowledge gains.

Appendix A: Abbreviations and key terms defined

The following is a list of abbreviations and terms used extensively throughout this study:

L1 (First or Native Language): used in the field of language acquisition and pedagogy to refer to the first language (or mother tongue) that humans develop first.

L2 (Second Language): used in the field of language acquisition and pedagogy to refer to any language that is learned after the first language.

LRE (Language related episode): the unit of analysis in interaction.

LLRE (Lexical language related episode): an LRE that in terms of function and content focuses on a lexical matter, e.g. meaning or spelling.

MT (Metatalk): one feature of learners' interaction, through which learners talk about their language or that of others; and by doing so, they look at language as an object of inquiry.

SCT (Sociocultural Theory): a theory of mind applied to second language acquisition to shed light on the inseparable connection between social interaction and cognition. SCT contemplates how interlocutors work together in solving problems and gaining linguistic knowledge. Knowledge is constructed by interaction, and learning is the internalization of the social interaction.

SLA (Second Language Acquisition): refers to the study of processes that underlie learning of a non-native language.

ZPD (Zone of Proximal Development): refers to the distance between what learners can accomplish on their own and the potential development they can achieve when working under the guidance or tutelage of a more capable peer.

Appendix B: Dictogloss

Instructions for students:

- As a first step, please find a partner to work with during this task.
- Now that you have a partner, please sit facing each other and place your recorder between the two of you.
- The purpose of this task is for you to work together with your partner in reconstructing a text that you will hear twice.
- I will read the text twice. The first time you will just listen to what I read. The second time, you will take notes that will later help you reconstruct the text. As you reconstruct your text, you need to make sure to include the words listed on the board.
- You will have 30 minutes to complete the text reconstruction with your partner. As you work with your partner in reconstructing your text, I ask that your interactions with each other be in English.
- Once you finish reconstructing the text, each of you will take turns in recording the reconstructed text in your recorder.
- As a final step, you will submit a written copy of your reconstructed text to me.

Dictogloss

Mufasa

Ida es una chica de 27 años que vive con su cónyuge, Fernando, y un perro que se llama Mufasa. Ida y Fernando se casaron hace dos años y hace un año que acogieron a Mufasa como mascota familiar. Mufasa tiene un pelaje muy suave color café con pequeñas pintas blancas y grises. Mufasa tiene 3 años y es un perro muy activo y energético. Le gusta correr y travesear con otros perros en el parque. Mufasa es muy curioso y le gusta escaparse por debajo del vallado de la casa y merodear por las casas de los vecinos. Es un perro muy travieso. A Mufasa le gusta escarbar entre las plantas y las flores y a veces hace hoyos bastante profundos en el jardín.

Por la noche, Fernando, Ida y Mufasa se sientan cómodamente en una poltrona de color verde a ver televisión. Generalmente ven partidos de básquetbol; Fernando es fanático de los Spurs. Después de ver televisión, todos se van a dormir.

Appendix C: Transcription conventions

Conversation analysis conventions adapted from Smith, 2007.

[INT] → unclear speech

WRITING IN CAPITALS IN BRACKETS → comments about the discourse, but not part of it. Example: [LAUGH] [ANXIOUSLY] ETC.

[ ] → simultaneous speech

We:::::ll → the immediately prior syllable is prolonged. The number of colons is an attempt to represent the length of prolongation

<u>Underscoring</u> → heavier emphasis (in speaker's stress) on utterances

(.) → a brief pause (the more periods, the longer the pause)

Appendix D: NVIVO coding

This chart summarizes all codes for categorizations used in this study in the analysis of transcriptions in NVIVO software. Elements in the table have already been defined in Chapter 3 in Tables 3.2, 3.3., 3.4 and 3.5 and exemplified in Chapters 1 and 3.

SCT	
EXP ROLE	expert role
NOV ROLE	novice role
ZPD	zone of proximal development
PRIV SPEECH	private speech
O-REGULATION	other regulation
S-REGULATION	self-regulation
LLRE Resolution	
T1	problem solved correctly.
T2	problem not solved
T3	problem solved incorrectly
T4	disagreement about problem solution.
LLRE Interaction Features	
CLARIFICATION RQ	clarification request
CONFIRMATION CK	confirmation check
COMPREHENSION REQ	comprehension request
REPETITION	repetition
REQUEST REP	request for repetition
SCAFFOLD	Scaffolding

MEANING	Meaning
EX + MEANING	Example + meaning
ASSOC + MEANING	Association + meaning
Inferencing Strategies	
SYN	Syntax
MORPH	Morphology
PHON	Phonetics
FIXED PH	Fixed phrases
KNOW WORLD	Knowledge of the world
PUNCT	Punctuation
WORD ASSOC	Word association
COGNATE	Cognate
ANALOGY	Analogy
TRANSLATION	Translation

Appendix E: Word depth knowledge activity

Target students: Intermediate Spanish L2 learners.

Objective: The students will be able to infer information about meaning, word function, frequency and register of lexical targets through MT.

Instructions for the teacher:

Step 1: Introduce learners to the concepts of meaning (word definition), word function (adjective, verb, etc.), frequency (high or low frequency), and register (formal, informal).

Step 2: Illustrate how these concepts apply to the analysis of the terms *mamá* 'mom' and *progenitor* 'parent'.

Mamá	Progenitor
Meaning:	Meaning:
Function:	Function:
Frequency:	Frequency:
Register:	Register:

Step 3: Instruct students to gather the same type of information about the words *compinche* 'buddy' and *cómplice* 'accomplice'. Learners work in dyads and discuss lexical features through MT.

Step 4: If learners need further regulation, provide them with the following text. Encourage students to find the missing information from contextual clues as they metatalk.

La policía descubre banda de narcotraficantes

Este mañana un grupo de narcotraficantes de heroína fue detenido por la policía en un restaurante en la ciudad de San Diego. Los delincuentes estaban en el proceso de cruzar la frontera e ingresar a la ciudad de Tijuana con una importante carga de la droga.

El jefe principal de la banda es conocido como Juan Pirata y ha estado prófugo de la justicia estadounidense por más de una década; sus cómplices fueron identificados como Mark Antonio y Stefan Hunter, ambos de 28 años. Mientras era arrestado y trasladado por la policía en un automóvil policial, Juan Pirata exclamó '¡están locos si piensan que vamos a ir a la cárcel!! ¡Mis compinches y yo no vamos a la cárcel! ¡No! ¡Nosotros no vamos a ir a la cárcel! Ya verán'.

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