An Inquiry into Language Use in Multilinguals’ Writing:

A Study of Third-Language Learners

Dissertation

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Abstract

In recent years, globalization, migration and mobility, the digital revolution, the predominance of English as the lingua franca, and the prominence of writing and written communication have reshaped the linguistic landscape in many regions worldwide, including the U.S. Hence, nowadays, to be literate in more than two languages is rather a necessity and multilingualism is rather the norm for many people around the globe. Consequently, the increasing permeability of cultural and linguistic boundaries demands new types of writers who can shift among languages, discourses, styles, genres, texts, semiotic systems, ideologies, cultural paradigms, and identities (Canagarajah, 2006). Yet, despite the growing body of knowledge in second language (L2) writing research addressing increasingly diverse writing contexts, little is known about multilingual writers; even less is understood about how they construct texts and negotiate meaning as they shift among languages.

Hence, the purpose of this dissertation was to examine the nature of multilinguals’ writing with respect to language use and language-switching (L-S). The participants were three second language (SL) and three foreign language (FL) students at a US university who, in addition, were studying a third language (L3) as an FL. They performed three writing tasks, one in their L2 and two in their L3. The complexity theory approach provided the conceptual framework of the study. Data were collected using a background questionnaire, think-aloud protocols (TAPs), written texts, logfiles,
stimulated recalls, and retrospective interviews. Triangulation, statistical, and qualitative analyses indicate quantitative and qualitative differences between (a) multilinguals’ L2 and L3 writing; and (b) SL and FL third language learners’ L3 writing. These distinctions are regarding the amount of L1, L2, L3 use, and L-S frequency and direction. Furthermore, the results point to quantitative and qualitative differences between multilinguals’ L2 writing and the L2 writing of individuals with knowledge of two languages. In addition, it was found that L2 proficiency and L3 development did not seem to have influenced L-S frequency in L3 writing. Moreover, the study identified types of L-S and conditions that seemed to favor mono-, bi-, and multilingual utterances in multilinguals’ composing. Thus, it revealed qualitative differences between multilingual as opposed to bilingual writers that are further confirmed by a finding pointing to the distinct roles of L1 and L2 in multilinguals’ L3 writing.

However, although group averages pointed to the above trends, intra-group and intra-individual analyses from a complexity theory perspective revealed salient individual patterns. The present study thus generated a model of multilingual writing which conceptualizes it as a complex, dynamic, open, non-linear, and adaptive system, comprised of components that are complex dynamic systems themselves. This model made it possible to focus not on single variables and linear cause-effect relationships, but instead to discern relationships among all the components of the system. Consequently, the model was used to depict each writer’s dynamic configurations in order to capture his/her idiosyncratic patterns of language use and the mechanisms related to how changes in interactions of the parts generated emergence of new writing patterns.
Hence, the findings imply that multilingual writers’ languages are dynamically interconnected parts of their writing system. Thus, their L2 and L3 writing are not isolated entities and cannot be understood completely if examined separately. Therefore, L2 writing theory, research, and instruction will not be accurate and inclusive if they do not take into consideration the context of multilingual writers, their writing, and the phenomenon of switching among languages, which permeates the whole process of L2/L3 writing.
To my parents
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The work on this dissertation turned out to be a complex and dynamic process that took place at various levels and at various times. This process began well before my admission to the Ph.D. program at OSU and my studies in the USA. It was informed by the significant body of knowledge of pioneers in the fields of second language writing and second/third language acquisition, L2/L3 researchers, and educators. It occurred at interpersonal and intrapersonal levels. It involved the effort and contributions of a great number of people who shaped its trajectory and without whom I would certainly never have finished the journey. Although it is hard to trace its origin, undoubtedly many people made an impact on its trajectory.

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I hope that the result of this joint effort will be an important contribution to L2/L3 writing theory, research, and practice.
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Chapter 1: Introduction

“Don't think about why you question, simply don't stop questioning. Don't worry about what you can't answer, and don't try to explain what you can't know. Curiosity is its own reason,” (A. Einstein, 1983, p. 138)

Nowadays, bilingualism and multilingualism are the norm for many people throughout the world. Although these phenomena were known to be widespread in early times, currently we have been witnessing unprecedented linguistic diversity and heterogeneity. Learning a second, third, or even fourth language (L4) occurs often in natural acquisition settings within the many multicultural communities around the world. However, increased literacy expectations worldwide, and the spread of English as a global language, have impacted on the importance of learning to read and write in more than two languages in formal contexts.

The USA is not an exception in a world where multilingualism “likely will become almost universal in the future” (Larsen-Freeman & Cameron, 2008a, p. 134). The phenomena of bilingualism and multilingualism have been expanding with the continuing increase of international students in U.S. higher education and the rising number of immigrants.

Yet, despite the considerable growth of the field of L2 writing, little is known about multilinguals’ writing; even less is understood about how they use their languages or shift among them during the process of composing. These are the issues that guided
the present study. They have arisen out of my personal experiences as a multilingual speaker, reader, and writer and have long been for me a source of doubts and inspiration, anxiety and fascination. They have defined my path as a future second language writing (SLW) and third language acquisition (TLA) researcher. They point to new writing trends in today’s multilingual and multimodal world.

1.1 Context of the Study

1.1.1 Multilingualism in the world

It has been widely recognized by scholars and world organizations (e.g., Cenoz & Genesee, 1998; Grosjean, 1982; Larsen-Freeman & Cameron, 2008a; Sanz & Lado, 2008; UNESCO) that bi- and multilingualism are not an exception but rather “a normal and unremarkable necessity for the majority of the world today” (Edwards, 1994, p. 1). The processes of globalization, the migratory movements across the world, the spread of English as a lingua franca, the growth of media and the widespread access to information and communication, are some of the reasons that bring forth not only the need to speak and understand more than two languages but, moreover, the need to read and write in more than two languages. Hence, the phenomena of multilingualism and TLA are enmeshed with education. In this regard, it is noteworthy to mention the significant efforts undertaken by the many governmental and world institutions (e.g., European Union; UNESCO, 2008; UNICEF, 2009; the United Nations, 2003; the Council of Europe) to develop and implement worldwide policies aimed at eradicating illiteracy, maintaining linguistic/cultural diversity, protecting people’s linguistic heritage, promoting literacy in multilingual settings, enhancing the role of minority languages in education, supporting mother-tongue based bilingual and multilingual approaches in
education, and encouraging the acquisition of at least two (as in the case of Europe) foreign languages.

Hence, in today’s world, where linguistic and cultural diversity is considered an asset, where education is a fundamental right and access to it has been increasing in many countries (UNICEF, 2011), where English dominates the academic world, and the digital revolution reshapes the virtual global linguistic landscape, to be able to read and write in more than two languages is not a luxury but rather a necessity.

1.1.2 Multilingualism in the USA

Demographic figures indicate that bilingualism and multilingualism are becoming a reality in the U.S. schools, colleges, and society. For instance, according to the National Center for Education Statistics (NCES, 2007a) the number of foreign born people living in the U.S. increased 55% between 1990 and 2005. Additionally, according to U.S. Census Bureau (2009), around 20% of the American population 5 years and older speak a language other than English at home. Moreover, the percentage of American children 5- to 17-year-olds for whom English is not their native language has been steadily growing, from 8.5% in 1979 (i.e., around 4 million) to 20.3% in 2006 (i.e., approximately 11 million), as reported by the NCES (2007b). Consequently, this diversified young population may engage in reading and writing in two or more languages either in U.S. instructional settings or in their own out-of-school composing activities. According to the NCES, the number of U.S. high school students who have studied FLs has risen from 80.6% to 84.5% between 1998 and 2004, thereby creating increased opportunities for use of more than one language. Moreover, enrollment of English language learners in U.S. higher education rose steadily in recent years (Harklau,
in Matsuda et al., 2003). In fact, at some colleges, students with immigrant backgrounds represent the majority of the undergraduates (Douglass et al., 2007).

Although these tendencies have certainly been shaping the current U.S. language map, they seem to be overlooked by TLA and L2 writing researchers. There is an urgent need, therefore, to address and explore issues related to multilinguals’ writing in formal U.S. contexts in order to gain a better understanding of the process of composing in an L3.

1.2 Background of the Study

1.2.1 Research on multilingualism and TLA

As an emerging area of scholarship, TLA was subsumed under the umbrella of second language acquisition (SLA) and bilingualism (Aronin & Hufeisen, 2009; Cenoz, 2000; De Angelis, 2007). While at the end of the 1990s there was still a paucity of empirical and experimental research on trilingualism (Hoffmann, 1999), the last decade has seen a considerable upsurge of interest and awareness of multilingualism and TLA. However, within the TLA research field, investigating code-switching (C-S) and/or language-switching (L-S) has emerged only recently as an object of inquiry. This seems rather perplexing, since it has been widely acknowledged that for people who live, study and work in multilingual environments, C-S or L-S is the norm. For instance, conversational C-S (i.e., in oral production) has been one of the essential foci of research in bilingualism (Muysken, 1995) and from the 1970s onward has been continually drawing the attention of SLA researchers and educators. Nonetheless, the abundance of research that has explored C-S as manifestations of bilinguals’ and FL learners’ speech behavior contrasts with the relative paucity of research that has investigated L-S in L2/L3
writing contexts. To date, only a small number of studies have examined multilinguals’ writing (e.g., Buell, 2004; Canagarajah, 2004, 2006, 2007, 2011). Moreover, to my knowledge only a few have reported on the use of three languages during the composing process (e.g., Cohen & Brooks-Carson, 2001; Jessner, 2005, 2008). However, since language use and switching have not been their primary foci, these studies do not provide a comprehensive picture of multilinguals’ writing regarding the interplay of languages during the composing process.

1.2.2 Research in L2 and FL writing

The SLW literature provides a wealth of information, but mainly on L2 rather than on FL use (e.g., Cumming, 2009; Leki et al., 2008; Manchón, 2009; Ortega, 2009; Reichelt, 1999, 2009). Hence, while the body of research on ESL writing reveals the complexities of the writing process in that particular context and explores cognitive, textual-linguistic, social, and educational issues (as outlined broadly by Ortega, 2009), little is still known about writing in a language other than English in U.S. context, where FL as a third language is taught, learned, and used for educational purposes, as well as professional, academic, and technical communications. With respect to the focus of the present research, it should be noted that only a handful of studies (e.g., Cohen & Brooks-Carson, 2001; Knutson, 2006; Woodall, 2002) have examined the role of languages and L-S in L2 writing in the U.S. context.

Therefore, more research that aims at exploring the roles of second and foreign languages and their interaction during the L3 composing process is needed in order to further advance our understanding of multilinguals’ writing in a formal context in the U.S.
1.2.3 Research in language use and L-S in L2/ FL writing

Language use in L2 writing and switching between languages while performing a writing task in L2 has been reported in a number of studies (e.g., Cohen & Brooks-Carson, 2001; Friedlander, 1990; Jones & Tetroe, 1987; Kobayashi & Rinnert, 1992; Qi, 1998; Roca de Larios et al., 1999; van Weijen et al. 2009; Wang, 2003; Wang & Wen, 2002; Woodall, 2002). The most conspicuous finding that emerges from this body of research is the dynamic nature of switching between languages during the composing process. Nevertheless, these studies differ significantly in their research goals, methodology, and the extent to which they investigate L1/L2 use or L-S. Some of the studies report on the functions both languages serve during the composing process. Additionally, researchers have explored the functions of switching between languages during L2 composing. Furthermore, a small number of studies have focused specifically on L-S and the amount of L1 and L2 use. A few others have aimed at investigating the effects of L1/L2 use and L-S on the quality and the quantity of the final text and factors that might prompt L-S. Nevertheless, while most studies shed light on the nature of L-S and its beneficial effects (although not in all situations and for all writers), they fall short of reaching a consensus about the factors that affect L1/L2 use and L-S and their impact on writing processes and written product.

Hence, although the above mentioned studies provide important insights into the roles of L1/L2 and L-S in L2 writing, the picture that emerges seems to be blurred, implying a highly multifaceted and complex phenomenon. Consequently, fundamental questions with regard to the intricate relationships between two or more languages during
composing remain unanswered or, in some cases, contradictory findings raise more questions than provide answers.

However, this previous research on TLA and on language use in L2 writing provided two key assumptions that shaped the research questions addressed in the present research: (a) the distinct nature of TLA with respect to SLA; and (b) language-switching as one of the salient characteristics of L2 writing. Hence, the present study endeavored to explore multilinguals’ writing and the interrelationships among their languages during that process.

1.3 Statement of the Problem

Undoubtedly, the afore-discussed economical, social, cultural, demographic, educational and post 9/11 political changes worldwide and in the American society have started to alter the U.S. linguistic landscape. Consequently, the increased permeability of cultural and linguistic boundaries demands new types of writers who can shift among languages, discourses, styles, genres, texts, semiotic systems, ideologies, cultural paradigms, and identities (Canagarajah, 2006). Hence, in an attempt to shed light on multilinguals’ writing, the present study sought to explore the phenomenon of L-S and the interplay of languages during this process. This focus of the dissertation on multilinguals’ composing and their use of languages during that process was shaped as well by the above-identified current gaps in the fields of TLA and L2/FL writing. Little is known about how multilinguals create a written text, how they use their languages, and how they negotiate meaning as they switch between them. Indeed the present study and its theoretical framework were informed by the significant body of research in L2 writing. However, the few studies that have addressed issues concerning the roles of
languages and L-S during the writing process in an FL (e.g., Qi, 1998; van Weijen et al. 2009; Wang, 2003; Wang & Wen, 2002; Woodall, 2002) and in an L3 (Jessner, 2006, 2008) present contradictory findings. Thus, it is difficult to integrate their findings into a conclusive and comprehensive portrait of L3 writing.

Moreover, important insights advanced by TLA and SLW researchers raise a fundamental question regarding multilinguals' writing. If learning an L3 is quantitatively and qualitatively different from learning an L2, as claimed by TLA researchers, and if the distinct nature of L2 writing (as opposed to L1 writing) has long been asserted by SLW researchers, then a closer examination of multilinguals’ writing is needed in order to shed light on similarities and differences not only between L2 and L3 writing, but as well between L2 writing of learners of one and of learners of two FL/SL languages.

Therefore, this dissertation was designed to explore the dynamics of the three languages in L2 and L3 composing in order to fill in a gap in our current understanding of multilinguals’ writing with respect to language use and language-switching.

1.4 Research Questions

Based on the motivations and purposes articulated above, and in light of the scholarship that has explored issues in relation to L3 writing, as well as taking into consideration the reported findings from studies investigating the phenomenon of L-S and the roles of L1 and L2 in L2 writing, this explanatory mixed-method study addressed the following research questions:

1. What are the dynamics of languages in multilinguals’ L2 and L3 writing?
   i. What is the amount of L1, L2, and L3 use in L2 and L3 writing?
   ii. What are the L-S frequency and direction in L2 and L3 writing?
iii. What is the average length of L1, L2 and L3 utterances in L2 and L3 writing?

2. Is there a relationship between L-S frequency and
   i. L2 proficiency in L3 writing?
   ii. L3 development?

3. What conditions favor L1, L2, L3 use and L-S in L2 and L3 writing?

4. What types of L-S are used by multilinguals in L2 and L3 writing?

5. What is the role of L1 and L2 in L3 writing of FL and SL multilinguals?

   Building upon these questions, this study is an exploration into the complex nature of multilinguals’ composing process. It examines possible connections between their L3 composing and the tenets of complexity theory. In the process, a dynamic model of multilingual writing is presented in order to provide a lens through which we could further understand the dynamics of languages in use in L3 writing.

   To summarize, the overall purpose of the present study was to explore L-S and language use in multilinguals’ writing in order to identify quantitative and qualitative differences between L2 and L3 writing. It aimed to fulfill four goals. The first was to explore the dynamics of languages in relation to the amount of language use, L-S frequency and direction, and length of utterances in multilinguals’ L2 and L3 writing. The second objective attempted to investigate a possible relationship between L-S frequency and multilinguals’ L2 language proficiency in L3 writing, as well as between L-S frequency and their L3 development over a course of 10 weeks. The third aimed to identify types of L-S and conditions that create a favorable environment for monolingual and mixed utterances to occur. The fourth goal was to examine the role(s) of L1 and L2 in L3 composing.
1.5 Significance of the Study

The present work emphasizes the need for further inquiry into multilinguals’ L2 and L3 writing and the way they use and shift between their languages during these processes. Through its findings, the study identifies possible avenues for further research into the interplay of languages in multilinguals’ writing and generate more informed hypotheses to test in future research. In addition, seeing L3 composing from a complexity theory perspective provides an alternative approach to conceptualizing multilingual writing. Furthermore, the study provides valuable insights into the nature of L-S and L3 writing with regard to educational practices in the FL classroom.

Although theoretical issues essential for SLW development as a field of inquiry have been addressed in numerous articles and papers, what is still missing is a coherent and comprehensive theory (or theories), as well as adequate models, that could further inform L2 writing research. The findings of the present study point out that such a theory would not be accurate and inclusive if it does not take into account writing in an FL/L3 and, as well, the phenomenon of switching among languages, which permeates the whole process of bilinguals’ and multilinguals’ writing. Thus, it contributes to the conversation about the nature of L2 writing theory. Moreover, within the complexity theory framework, the study provides further evidence that L3 composing is a complex, dynamic process that involves continually changing interrelationships among a multitude of interconnected and interdependent elements which constitute the whole system. Hence, L1, L2, and L3 will be seen as interdependent and open language systems (Jessner, 2008). Thus, conclusions from the study will help reconceptualize the notions of L-S, L2/L3 writing, and multilingual writers.
With respect to previous L2 writing research, this study contributes to confirming some of the current hypotheses in the field and rejecting others. Thus, it empowers future L2 and L3 writing researchers by depicting a more comprehensive picture of L2 and L3 writing and the spectrum of phenomena that take place while producing a written text. Furthermore, regarding implications for future research in the field of TLA and multilingualism, the present dissertation sheds light on the distinct nature of L3 writing in relation to SLW, namely, that L3 learners display a unique dynamic behavior, since they tend to resort to all of their languages while producing a written text. Considering the dearth of research on L3 writing, the present study helps broaden the scope of investigation in the field of TLA and multilingualism.

From a pedagogical perspective, this dissertation contributes to rejection of the myth of the ideal monolingual speaker/writer. As we are witnessing nowadays, more and more teachers and administrators around the U.S. face learners with diverse linguistic and cultural background. Hence, the findings of the study reinforce the belief that a multilingual approach would be beneficial in pedagogical practices, SL/FL methodology, and educational policies. Furthermore, the study helps to advance the view that writing instruction in L2 and L3 should be modulated according to a writer’s linguistic background and to reorient educators’ focus from multilingual writers’ language deficiency to their language development.

1.6 Definition of Key Terms

1. Bilingual and multilingual: the traditional view is followed, that is, a bilingual and multilingual person as an individual “having some degree of fluency” (De Angelis, 2007, p. 8) or familiar with respectively two or more languages.
In the present study, L1, L2, and L3 shall be defined according to level of language proficiency.

2. **First language (L1)** denotes the native language or mother tongue of the participants or the language they are most proficient in.

3. **Second language (L2)** refers to an SL or an FL studied in educational settings. Participants’ level of proficiency in L2 speaking and writing is lower than their corresponding proficiency in L1.

4. **English as a second language (ESL):** among individuals for whom English is not the native language, they use the language in settings in which English is commonly employed in institutional and daily life settings (as opposed to English as an FL where English is used on a limited basis, usually only within classroom settings).

5. **Third language (L3)** is defined as the first foreign language for ESL learners or a second foreign language studied in a formal context. The participants’ L3 speaking and writing proficiency is lower than the corresponding L2 proficiency.

6. **Third language acquisition (TLA)** refers to the research field or the process of acquiring an L3.

The complexity of the otherwise seemingly straightforward terms (L1, L2, and L3) has been addressed by many researchers. In order to minimize the negative impact of generalizing research findings, there is a need to provide additional details for each participant about (a) their age, sequence of acquisition and number of languages; (b) proficiency level in each language and the method of measuring it; (c) exposure to language environments; (d) modes of language learning; and (e) contexts in which languages are currently used and how. These parameters are modified from De Angelis
(2007, p. 12) who calls for providing factors that research has shown to have an impact on multilinguals’ cognitive and psycholinguistic processes.

7. **Second language writing (SLW):** a discipline, a research field, or the process of writing in a second or foreign language.

8. **Third language writing (TLW):** following the definitions of TLA and L1, L2, and L3, TLW refers to the process of writing in a third language.

9. **Language-switching (L-S):**

   Given the aim of the present study, L-S shall be defined as any non-instructed, spontaneous, intentional or non-intentional alternative use of two or more language systems in the think-aloud discourse during the process of writing.

   In the present study, language-switching is distinguished from code-switching (C-S). Code-switching, which emerged as a field of inquiry in a variety of disciplines some five decades ago, enjoys a plethora of definitions. Within SLA, C-S has been traditionally defined as alternate use of two or more languages in the same utterance or conversation (Grosjean, 1982). Hence, researchers use the term C-S when they refer to oral production (e.g., Auer, 1995, 2005; Grosjean, 1995; Milroy & Muysken, 1995). However, in some instances of oral production, the term L-S is preferred for identifying occurrences of lexical transfer (Ringbom, 2001) or lexical selection and access in learners’ comprehension and production (Kroll & Dijkstra, 2002). Moreover, for Green (1998), L-S refers to occurrences in both receptive and productive tasks. Contrary to this trend, Williams & Hammarberg (1998) make use of the term L-S for exploring switching between languages in oral communication. They distinguish between C-S as being intentional and prompted by sociopsychological factors and L-S as non-adaptive.
Furthermore, within the SLW field, researchers resort to the term L-S to denote the act of switching from L2 to L1 “as a language of thinking in the cognitive process” (Qi, 1998, p. 414) or to designate any “spontaneous, non-prescribed use of L1” (Woodall, 2002, p. 8) while the learner performs a writing task. Hence, SLW researchers address the distinction between C-S as indicating a sociolinguistic and/or anthropological perspective in a conversational context and L-S as denoting psycholinguistic perspective in a written discourse context. Thus, the definitions of C-S and L-S employed by researchers lie at the intersection of two dichotomies, the oral/written and the sociolinguistic/psycholinguistic.

Hence, for the present study, the definition of L-S moves beyond the constraints of cognitivism and considers it as an activity influenced as well by sociocultural, sociolinguistic, and semiotic factors.

10. **Language-switch:**

A language-switch is considered the point of juncture between two language system segments in the think-aloud protocols. It should be stressed here that there is a distinction between language use and language-switching. While the former refers to the amount of L1, L2, and L3 calculated as number of words/lexemes in writers’ TAPs, the latter refers to the frequency of switching between languages during the writing process calculated as a total number of language-switches.

11. **First, second, third language systems:**

For the present study, multilinguals’ L1, L2, and L3 are seen not as stable autonomous entities, but rather as developing language systems, a view which is line with Herdina & Jessner’s (2002) dynamic model of multilingualism (DMM) and complexity
theory (Larsen-Freeman & Cameron, 2008a, 2008b). In this light, it is assumed that an individual does not ‘know’ a language (e.g., French, English); rather, he/she uses a language in his/her own way, thus creating his/her individual language systems. For instance, while writing her first L3 composition, one of participants in this study directly borrowed a linguistic element (the preposition “di”) from her SL (Italian) and used it in lieu of the corresponding L3 (Spanish) preposition. Therefore, at that point of her L3 language development, the L2 item “di” was integrated into her L3 system. However, when she wrote her second L3 composition, the participant still used on a few occasions the preposition “di” but made immediate revisions, which suggests that the L2 preposition was no longer part of her L3 system.

12. L1, L2, L3 segment:

In the verbal protocols, an L1, L2 or L3 segment could contain at least one word or a sequence of words belonging to one language system. In this context, a lexeme, the smallest meaningful unit, served as a unit of analysis of the TAPs. Elements not counted as units include interjections such as “mhm”, “aha”, “waw”, “oops”. It should be noted however, that in no way is the lexeme unit used here as a measure of syntactic accuracy or complexity nor as a measure of speaking/writing fluency.

13. Types of L-S:

Data from the present study contain examples of unintentional “incidental language switches” identified by Poulisse & Bongaerts (1994, p. 37) as slips of the tongue. These are considered by Muysken (2000) as instances of interference. Probably the most widely accepted among sociolinguists typologies of bilingual code-mixing are put forth by Muysken (2000). Since the context of the present study is not bilingual and
conversational (Muysken, 2000), but rather multilingual and writing, for which no typology of L-S has been advanced, I’ll broadly draw on his three types of code-mixing. The first type is defined as an insertion, i.e., when an item from one language is embedded into “a structure from the other language” (p. 3), which is the matrix language. The second type, the alternation, which involves entire sentences or clauses, is a “form of mixing in which the two languages remain relatively separate” (p. 121). In the third type, called congruent lexicalization, “the grammatical structure is shared by languages A and B, and words from both languages a and b are inserted more or less randomly” (Muysken, 2000, p. 8). In these instances of switching back and forth, both languages share the grammatical structure of the sentence. Lexical borrowing (i.e., incorporation of items from one language into the lexicon of another) could be related to the three types of code-mixing (p. 75).

1.7 Basic Assumptions

The assumptions that were the basis of the study were the following:

The American Council on the Teaching of Foreign Languages (ACTFL) proficiency guidelines for listening, speaking, reading, and writing were assumed to be an appropriate and accurate measure for evaluating the proficiency language level of the participants.

The participants of the study were assumed to have voluntarily engaged and completed the tasks conscientiously, responsibly, and to the best of their ability and knowledge.

It was assumed that the participants would have at least an advanced-mid level of proficiency in English as an L2. Therefore, it was assumed that they would comprehend
and complete the writing tasks designed for the study and participate capably in a face-to-face interview.
Endnotes:
Chapter 2 : Review of Related Research

“This ne cherchons jamais les choses, mais la recherche des choses”
(Pascal, 1670/1962)

This study sought to explore the nature of multilinguals’ writing by investigating language use and L-S in L2 and L3 composing, the relationship between L-S frequency and L2 proficiency and L3 language development, the conditions that favor L-S and L1, L2, L3, and the role of L1 and L2 in L3 writing. The present chapter offers the conceptual and methodological grounds for the study. It provides insights into the theoretical frameworks in which research on language use and L-S in L2/L3 writing has been embedded and discusses the findings that have emerged. First, theoretical issues related to L2 writing theories and models, and the way they have informed research on language use and L-S, are addressed. Next, issues related to the field of TLA are addressed in order to illuminate the context of L3 writing. The subsection is followed by a review of research on L-S and the role of FL/SL languages in L2/L3 writing. Finally, the fourth section puts forward the rationale for investigating the interplay of languages and the view that switching among languages while writing in L2 and L3 represents a dynamic aspect of L2/L3 composing, a feature that should be addressed by L2 writing theory and included into L2/L3 writing models.
2.1 Writing in a Second/Foreign language: Theories and Models

2.1.1 L2 writing theory

Currently, it is widely recognized by scholars and educators that L2 writing is a complex activity which involves not only cognitive processes and linguistic, discourse, and rhetorical features, but is also regarded as a sociocultural activity embedded in geopolitical and ideological contexts. SLW research has grown significantly over the last three decades, leading to its being established as an independent field of inquiry (Cumming, 2001; Leki, 2000; Matsuda, 2003a, 2003b). Nonetheless, despite the wealth of information on L2 writing, it still lacks a “tidy corpus of conclusive theory and research on which to base a straightforward introduction to processes of learning and teaching” (Ferris & Hedgcock, 2005, p. 3). More than two decades ago, the need for such a theory was addressed by Silva (1990), who challenged the assumptions that L1 and L2 writing were identical and emphasized that an L2 writing theory that takes into account the multifaceted nature of SLW would enhance and enrich L1 writing theory (Silva, 1993). For him, a model of L2 writing should “regard[s] writing as an interactive activity, … reflect[s] an understanding of historical development of the field; [be] informed by current work in relevant discipline; and [be] sensitive to the cultural, linguistic, and experiential differences of individuals and societies” (Silva, 1990, p. 19).

Many SLW researchers have addressed the need for an L2 writing theory capable of explaining the processes involved in L2 writing as well as the role and the interaction among the multitude of variables that impact on the writing process itself. For instance, Grabe and Kaplan (1996) argued for a comprehensive and flexible theory aiming to improve L2 writing pedagogy. Additionally, Valdes et al. (1992) pointed out the lack of
a theory of writing development in L2 and FL writing, an issue addressed as well by Reichelt (1999), who stressed that an accurate and inclusive theory of L2 writing “must take into account information about foreign language” (p. 181). Taking into consideration the emergence of a new trend in L2 writing, namely, multilingual writing, Fitzgerald (2006) and Canagarajah (2006) underscored the need for positing a multilingual writing theory.

This array of multifaceted perspectives on SLW theory is followed by a more recent upsurge in issues of L2 writing theory, which represents a significant step forward in questioning epistemological assumptions of the concept, discussing the role of theories from other areas of inquiry in developing L2 writing theories, and raising practical issues related to working with various types of theories. For instance, the dichotomy between theory and practice was questioned, and the view that this dualism has been unproductive was emphasized by Atkinson (2010). He put forward a four-part schema that embraces both concepts: Theory with a big ‘T’ (i.e., universal, generalizable, predictive), and theory with a small ‘t’ (i.e., embodied in personal experiences and understandings in engaging with particular situations), Practice with a big ‘P’ (i.e., reflective, informative to theory), and practice with a small ‘p’ (i.e., people’ commonsense view of reality). Other researchers are more skeptical about building a single theory of L2 writing “which necessarily involves the full range of psychological, cultural, linguistic, political, and educational variables in which humans engage” (Cumming, 2010, p. 19). He stressed the need for a broad descriptive framework and practical heuristics, which have the potential to guide and inform pedagogy and practice across a variety of contexts around the world. Similarly, the need for and the usefulness of different content theories were advocated
(Harklau & Williams, 2010, p. 106). The researchers offered a detailed review of a wide range of content theories applied by scholars in the last decade, such as Activity Theory, the theory of process and post-process writing instruction, theories about the use of corpus analysis in teaching L2 writing, and theories on the cognitive aspects of the writing process (p. 98-100). Hence, while distinguished scholars and doctoral students agree on the importance of an SLW theory/theories (Belcher & Hirvela, 2010), a thread that runs across Silva & Matsuda’s (2010) collection of essays is that the concept of theory itself and in particular L2 writing theory, and its relationship to practice remains multifaceted, complex, abundant in dualisms (Hedgcock, 2010), even divisive and conflicting.

Hence, a theory of L2 writing has to overcome a variety of challenges. First, to build an L2 theory, researchers should consider whether it should overlap or be separated from a theory of learning to write as well as from a theory of teaching to write. Another difficulty for constructing L2 writing theory is to consider whether it should be a comprehensive one, meaning that it would be applicable to L1, L2, FL, and even L3 writing, or whether there is a need for further theories relevant to each of these separate contexts. Moreover, the recent debates among SLW scholars point to a lack of consensus about fundamental issues concerning basic epistemological assumptions such as the nature of L2 writing theory and its functions, its relationships to theories from other research fields, and its practice. Hence, despite the considerable research on L2 writing, some scholars remain skeptical about ever building a comprehensive L2 writing theory (Cumming, 1998, 2010; Cumming & Riazi, 2000; Ferris & Hedgcock, 2005; Grabe, 2001).
2.1.2. L2 writing models

This subsection traces back the theoretical growth of the SLW research, from its cognitive period to today’s postmodern/post-process era (Atkinson, 2003a, 2003b) in order to shed light on its current landscape. Since the theoretical framework of L2 writing draws upon composition research and applied linguistics (Leki, 2000; Matsuda, 1998, 1999, 2003a; Silva & Leki, 2004), major approaches to L1 writing have undoubtedly influenced the development of theory and praxis in L2 writing.

The inauguration of the science of modern linguistics is credited to Ferdinand de Saussure, who introduced a novel, synchronic perspective to the study of languages (1916/1969). The object of his study was the internal system of languages, identified as systems of arbitrary linguistic signs, which are conceived of as dyadic units (a signifier and a signified), that is, as a structural entity. He argued that linguistics must idealize its object in order to describe it. By introducing the dichotomies of ‘langue’ (i.e., language as an abstract system of signs adopted by a society) and ‘parole’ (i.e., speech as an individual act) and ‘langue’ and ‘language’ (i.e., human speech), he reserves the former as the object of linguistics which excludes the social dimension of language from the science of linguistics. Saussure’s line of abstracting ‘langue’ away from its context has continued to influence the field of linguistics nourished, more recently, by Chomskyian generative linguistics (1968). This linguistic trend has had its impact on research on writing, which has been traditionally seen as product. This conventional approach was replaced by the view of writing as process in the late 1960s and early 1970s (Matsuda, 2003a). The change has been accompanied by a movement to shift the focus from
composed product to composing processes. Furthermore, assumptions about writing as a linear, mechanical sequence of activities have evolved into a more complex view of writing, marked by the genesis of the cognitive approach.

Cognitivism, and in particular the cognitive process theory of writing advanced by Flower & Hayes (1981), has influenced greatly the focus of SLA and L2 empirical writing research (Atkinson, 2011) and has been considered influential in L2 writing research (Raimes, 1985; Zamel, 1985).

Flower & Hayes’ (1981) writing theory is based on four premises: (a) writing is seen as a cognitive activity of organizing different processes; (b) these processes have a hierarchical organization; (c) it is goals-oriented; and (d) goals are also hierarchically orchestrated by the writer into high-level goals and subgoals. Their model (1981) distinguished three main composing processes, that is, planning (i.e., generating, goal setting, and organizing), translating (i.e., putting ideas into written words or linguistic signs), and reviewing (i.e., evaluating and revising). It consists of three elements. This first is the composing processes, which are monitored and controlled by the writer. The second is the writer’s long-term memory, comprising knowledge of topic, audience, and writing plans. The task environment is the third element of the model; it includes topic, audience, motives, and text produced at any moment.

Research on the role of working memory in writing has also helped shape the evolution of writing theory. Drawing upon Flower & Hayes’ (1981) model, Kellogg (1996) and Hayes (1996) put forward two similar models. They are distinctive with respect to the role of working memory in writing. Kellogg’s model presupposes that a particular basic composing process (i.e., planning, translating, programming, etc.) makes
use of specific components of the working memory (i.e., spatial, central executive or verbal). On the contrary, Hayes’ model asserts that working memory (i.e., phonological, visiospatial, semantic) and long-term memory (i.e., knowledge about task, topic, genre, audience, linguistics) represent resources used during all the cognitive processes (i.e., text interpretation, text production). A similarity between both models is that they include a wider range of context factors such as writer’s goals, beliefs, attitudes, and motivation. For instance, Hayes (1996) recognizes the role of motivational factors and task environmental factors (collaborators, composing medium, etc.).

Both the contributions and limitations of the above-presented writing models have been widely discussed in the L1 and L2 writing literature. With respect to their contributions, it is worth emphasizing the point that Flower & Hayes’ (1981) model set up “the vocabulary most commonly used by researchers in dealing with the composing process” (Roca de Larios et al., 2002, p. 21). In addition, their model gave rise to the emergence of what Leki, Cumming, and Silva term “basic research on second language writing” (2008, p. 152), namely, writer characteristics and composing processes. Furthermore, Grabe and Kaplan (1996) pointed out that the strategic knowledge in writing, highlighted by cognitively oriented researchers, “opens the way for writing instruction” (p. 116).

Hence, within the cognitive/sociocognitive framework, writing is conceived of as problem-solving and decision-making behavior, an activity involving an interaction of a set of cognitive processes and mental representations (i.e., of lexical, syntactic, discoursal, or rhetorical nature) that writers implement in order to achieve writing goals. Writers shift among processes, for instance, among planning of ideas, evaluating, or
revising. The models postulate the existence of a monitor, which constrains the writer’s choices and controls the composing processes. From this perspective, it could be concluded that cognitive/sociocognitive theory has been predominantly concerned with the study of the cognitive processes that embody the production of written texts. Emphasis has been given to the role of working memory, level of cognitive load, and monitoring, while attention to the social and cultural meaning of writing has been widely neglected (Faigley, 1986). Although social context and writers’ environment have been seen as influencing the writing process (i.e., Hayes, 1996; Kellogg, 1996), writers have been depicted as “solitary individuals struggling mainly with their thoughts” (Nystrand, 2006, p. 20), and audience has been included, but only as a secondary element. Furthermore, more recently, Galbraith et al. (2007) declared that “there is a growing sense that they [cognitively based writing models] only provide a partial picture of the writing process” (p. 4) in terms of interaction between thought and text or thinking and putting thoughts into written linguistic signs. In this regard, they welcomed Hayes’ later (1996) sociocognitive model which, they argued, attempted to overcome this limitation. Nevertheless, with respect to L2 writing, Grabe (2001) called attention to a limitation of Hayes’ (1996) model: its failure to take into consideration L2 writers’ developing language proficiency, which might affect its appropriateness for L2 theorizing (Grabe, 2001, p. 47).

Regarding SLW, researchers have attempted to overcome some of the above discussed limitations of the cognitive/sociocognitive approach to writing. For instance, Grabe & Kaplan (1996) advanced a theory situated within a broad applied linguistic framework. They took into account issues such as varieties of writing, differences in
writers and in their knowledge, complexity of purposes for learning to write, and cross-cultural variation. Their model, adapted from the model of communicative language use (Chapelle et al., 1999), consists of two main components, namely, a context for language use and a representation of the writer’s verbal working memory (p. 226). Although this model is informed by the cognitive/sociocognitive approach to writing and is similar in many ways to that of Hayes (Grabe, 2001), a major difference is that it takes into greater consideration the writer’s linguistic knowledge and communicative competence. Hence, even though Grabe and Kaplan’s (1996) model is not based on empirical data, it goes beyond the cognitive domain in conceiving of writing as a communicative activity and in acknowledging a wider range of multifaceted factors that impact on the L2 composing process.

More recently, based on empirical findings from a study investigating L1 use in the L2 writing of advanced EFL learners and drawing upon Flower & Hayes’ model of L1 writing, Wang & Wen (2002) advanced an L2 composing process model. Similar to the former, Wang & Wen’s (2002) model contains three parts: the task environment (including the input for the writing task and the textual output), the composing processor, and the writer’s long-term memory (consisting of world, rhetorical, and linguistic knowledge). Differences with the L1 writing model are evident in the composing processor, which consists of five activities (i.e., task-examining, idea-generating, idea-organizing, text-generating, and process-controlling), replacing planning, translating and reviewing. The proposed five activities, which were depicted as interrelated, in order to denote the recursive nature of L2 writing, do not imply linearity and delimitation of the writing processes, features that have been criticized in Flower & Hayes’ writing model.
Another major contribution of Wang & Wen’s model is that it distinguished between cognitive processes carried out in L1, L2 and in both languages, thus incorporating unique features of L2 writing with regard to L1 and L2 use (i.e., the linguistic code for thoughts involves two languages). However, this model does not take into account the community of readers and the writers’ sociocultural background and practices, language learning experiences, perceptions, and attitudes.

This dynamic relationship between writer, reader, and text was put forward by Matsuda (1997) in the context of L2 writing pedagogy. He called attention to the limitations of the dominant L2 traditional pedagogy, with its focus on the written product as linguistic code or depiction of writers’ cognitive processes, its disinterest in writers’ backgrounds, agency, and autonomy, and its restricting the role of the reader to that of a decoder. His dynamic model of L2 writing features three integrated elements: writers’ and readers’ backgrounds, their shared discourse community, and writing. The model represented a step away from the widely previously accepted cognitive/sociocognitive perspective on writing, which considers writing as taking place in the writer’s mind. Matsuda’s view of L2 writing as emerging out of social interaction between reader and writer, their backgrounds, and the social community challenged the view of L2 writing as an individual cognitive act and indicated the emergence of a new approach to writing, the sociocultural. This new approach is reflected as well in Cumming’s view (1998) of writing as text, composing, and social construction.

Vygotsky’s sociocultural theory of mind which embodies cognitive processes in the whole person instead of only in his brain influenced L1/L2 writing theory by challenging the very notions of reader, writer, and the act of writing itself. According to
Vygotsky, cognitive development is not only an outcome of experience and biological maturation, but is also a result of social interaction with members from the same or different cultures. This concept is captured in his general genetic law of cultural development:

Any function in the child’s cultural development appears twice, or on two planes. First it appears on the social plane, and then on the psychological plane. First it appears between people as an interpsychological category, and then within the child as an intrapsychological category. … Social relations or relations among people genetically underlie all higher functions and their relationships. (Vygotsky, 1978, p. 57)

Hence, higher mental functions, such as voluntary memory, voluntary attention, planning, and learning have sociocultural origins and the development of these processes proceeds from the interpersonal (i.e., between people) to the intrapersonal (i.e., within the child) plane as a result of linguistically mediated interaction. Thus, the ontologies that underlie cognitive and sociocultural approaches are conflicting and, therefore, perceived as incompatible by many SLA as well as L1/L2 writing researchers. Sociocultural perspective conceives of writing as a socially situated act. Writing emerges out of a dialectic relationship between the writer and his/her environment. Namely, writer’s use of physical and semiotic tools changes his/her physical and social environment which, in result, brings about changes in the individual and his/her relationship with the environment. As Swain & Deters (2007) stated, the difference between cognitive and sociocultural approaches is fundamental, since “the social environment is not the context for, but rather the source of, mental development” (p. 821). From this perspective, Activity Theory, inspired by the seminal work of Vygotsky and Leontiev, emphasized the idea of distribution of human cognition in the social world and in time, and accounted for
the collective nature of activity. Haneda’s model (2007) drew on Activity Theory in order to explore FL writers’ modes of engagement. She advanced a view of FL writing as a social activity/practice embedded in a particular community.

It is evident that the distinction between sociocognitive and sociocultural is essential, since in investigating how a text comes into being, “we are studying not cognition alone or social context alone, but rather the intersection of the cognitive and the social in an activity that is distributed across individual acts, cognitive interactions, and many socially and historically developed tools” (Prior, 2004, p. 197). Sociocultural theory, which challenges the Cartesian dichotomy of body and mind that determines the cognitive/sociocognitive line of inquiry in L2 writing, had a tremendous impact on L2 writing research. It opened up new ontological (i.e., referring to the nature of being and the structure of reality as defined by Silva, 2005) and epistemological (i.e., referring to the origin, nature, and limits of knowledge as defined by Silva, 2005) perspectives of inquiry into L2 writing. Namely, the sociocultural approach contributed to the shift in inquiry paradigms from objectivist to subjectivist (epistemological) and from realist to constructivist (ontological). In addition, it introduced new means of inquiry into L2 writing, thus enriching SLW research methodology. More specifically, empirical quantitative and qualitative research design has been complemented by hermeneutic methodology including philosophical, historical, and narrative (Silva, 2005). With respect to the use of languages in L2 writing, both the sociocognitive and sociocultural frameworks do take into consideration and acknowledge the role of linguistic knowledge (e.g., Grabe & Kaplan, 1996) or linguistic resources (e.g., Haneda, 2007). Nevertheless, their models do not account for the intricate interplay of the languages during composing,
a feature which has been portrayed by a number of studies as a dynamic characteristic of L2/L3 writing.

2.1.3 Complexity theory: an alternative approach to L2 writing

2.1.3.1 The advent of chaos theory

Although the genealogy of chaos theory is well beyond the scope of the present chapter, it would be useful to provide some insight into its nature and potential to open up new ways of conceiving of language and learning and to challenge the traditional dichotomy of cognitive and sociocultural perspectives.

Edward Lorenz, known for his influential work in weather forecasting, is widely considered the father of chaos theory (Gleick, 2008). His work on weather patterns and his computer climate model (1963) led to the idea of the sensitive dependence on initial conditions, which challenged the feasibility of long-term prediction. Known as the “butterfly effect,” a term coined by Lorenz (1993, p. 14-15), it represents the essence of chaos theory. More specifically, the slightest changes in the initial condition of a system can evolve into considerably different behaviors of that system. This phenomenon “later came to be called “chaos”” (Lorenz, 1993, p. VII), a concept defined as a “seemingly random and unpredictable behavior that nevertheless proceeds according to precise and often easily expressed rules” (p. VII). Hence, the notion of ‘chaos’ in chaos theory denotes not disorder or lack of order, but processes or phenomena that seem to proceed randomly though their behavior obeys specific laws. Accordingly, chaos theory refers to the study of dynamic systems that exhibit complex, non-linear, and unpredictable behavior. “To some physicists, chaos is a science of process, rather than state, of becoming, rather than being,” as Gleick (2008, p. 5) emphasized in his popular book
Chaos: Making a New Science, in which he reflected on the importance of the emergent field. Although it was grounded in natural sciences, it spread widely in the social sciences (e.g., psychology, finance, economics, political sciences, social system management) and arts (Gleick, 2008; Lorenz, 1993). Hence, there is some overlapping of the terms chaos theory, complexity theory, system theory, and dynamic systems theory (DST) within the field of applied linguistics (de Bot, 2008; Larsen-Freeman & Cameron, 2008a). As evident from the growing number of publications in the last decade (e.g., the special issue of The Modern Language Journal, 2008), the interest in chaos theory, complex systems theory, and DST has been attracting increasing attention in the SLA field (de Bot, 2008).

2.1.3.2 Complex systems and SLA

Larsen-Freeman (1997) and Larsen-Freeman & Cameron (2008a) advanced complexity theory as an alternative approach of inquiry into SLA and language development. Drawing upon a diversity of fields of sciences, the researchers stated that complexity theory studies complex, dynamic, non-linear, open, adaptive, self-organizing systems, which are in perpetual state of flux. Hence, it is important to describe briefly their characteristics. The term complex deviates from its traditional connotation of complicated. A complex system refers to a system comprised of numerous components (i.e., elements, processes, or agents) which may themselves be complex systems. These components interconnect and interact “in particular ways to produce some overall state or form at a particular point of time” (Larsen-Freeman & Cameron, 2008a, p. 26). Consequently, the system is not a mere collection of components/subsystems, but rather is an interconnected whole that cannot be studied by reducing it into its parts. The
complex system is perceived as dynamic, since change and flux are the natural state of the system itself and its components. Hence, it changes synchronically and diachronically. Its behavior emerges from the interaction among its components, thus, any changes in the elements or the interactions among them bring about changes in the whole system, and vice-versa. Contrary to a linear system, in which alternations in one component produce proportional alternations in the same or other component at a later time, a complex system is non-linear. Namely, there is a discrepancy between the changes in its initial state and their effects in its subsequent states, a characteristic that makes the system prone to unpredictability. Moreover, in contrast to a closed system that can reach a state of equilibrium, the complex system allows for a flow of energy and matter from the outside (Larsen-Freeman & Cameron, 2008a, p. 31), which could lead to its dynamic stability. Its adaptation is evident in its ability to adjust to contextual changes, which can result in changes in its structure and self-organization. Hence, its context, defined by Thelen and Smith as “here-and-now in which the system is active is not separate from the system but an integral part of it and of its complexity” (as cited in Larsen-Freeman & Cameron, 2008a, p. 34). Hence, complexity theory puts emphasis on complexity, dynamics, non-linearity, openness, adaptation, unpredictability (in terms of expectations), and interconnectedness. With respect to multilingualism, languages are viewed as language-using systems that are “coupled, with the use of one affecting the use of the other” (Larsen-Freeman & Cameron, 2008a, p. 134). This view concurs further with the premises of Herdina & Jessner’s (2002) DMM.

A number of SLA researchers (e.g., de Bot, 2008; Ellis, 2008; Larsen-Freeman, 1997, 2002, 2011; Larsen-Freeman & Cameron, 2008a; van Geert, 2008) have attempted
to envision language, L1/L2 learning, language development and use as complex systems. For instance, L2 learning could be seen as a complex system consisting of various subsystems, elements or agents (e.g., L1 and L2, learning environment, physical and sociopolitical environments, books, language classes, lessons, teacher’s and learner’s perceptions, and attitudes). The system is in a permanent state of flux, and the subsystems are not stable but instead are continuously changing (e.g., L1 and L2 development, the learning environment at different timescales), thus altering the whole system. Hence, dynamics and interrelatedness are crucial features of the L2 learning system. Moreover, during a particular class session, for example (even on a macro timescale or at another level such as an L2 community), learners adjust and coadapt their L1/L2 resources to interact with other learners and the teacher or to meet specific evolving goals, which, in turn, results in changes in their L1/L2 resources and in the whole system. Hence, every use of L2 (inside or outside the classroom) alters the learner’s L2 system and his/her language resources at different timescales and system levels.

Furthermore, the L2 learning system of a person or a language class as a whole system is sensitive to initial conditions (e.g., learner’s age, goals, attitudes, previous knowledge or exposure to languages) that shape the system’s trajectory across its landscape. These variables, or elements of the L2 system, have not only their own particular impact on it, but also “interact, sometimes overriding each other, sometimes converging as powerful multiple effects ..... [and] they do so always as a function of time” (Larsen-Freeman & Cameron, 2008a, p. 133). L2 learning develops in a non-linear fashion, is permeable (e.g., L2 learners continually learn new L2 items), and sometimes is
unpredictable. If we move upwards, from the L2 learning system during a particular class lesson to larger systems (e.g., the level of a school’s or state’s FL curriculum) or downwards (e.g., the level of an individual as a dynamic system or a particular L2 activity), the complexity theory perspective would involve identifying particular subsystems, elements or agents that are connected and interact across levels and timescales.

In summary, complexity theory provides a unique conceptual tool that moves beyond the dualism of cognitive and sociocultural perspectives by embracing both, along with linguistic, sociocognitive, and ecological approaches (Larsen-Freeman & Cameron, 2008a). For instance, in line with ecological approaches (e.g., Kramsch, 2002; van Lier 2000, 2002, 2004), the complexity theory puts emphasis on interconnectedness, a relational view of language, and perspective on language use as embodied in people’s space and time, past and present, subjectivity, and historicity. Furthermore, along the lines of sociocultural theories (e.g., Lantolf, 2000, 2002), the complexity theory precepts include interrelatedness of mind and sociocultural contexts and the emergence of language and language learning from dialogic interactions and negotiation of meaning. A crucial distinction between both is that the complexity theory embraces a holistic view, which pushes away reductionism (Larsen-Freeman, 1997, 2002; Larsen-Freeman & Cameron, 2008a). Furthermore, it is distinctive from both sociocultural and ecological approaches, in that it “emphasizes a different facet, seeing learner and a complex context as interacting, coadaptive dynamic systems” (Larsen-Freeman & Cameron, 2008b, p. 205). In addition, complexity theory highlights the dialectic relationship between an individual and its group, namely, each learner and his/her learning context are unique, but
when participating in a group, “the group as a system both affects and is affected by the individual” (p. 240). Hence, by providing a new conceptual tool, it offers not only new ways for conceptualizing L1, L2, and language learning, use, and development, but also for exploring these phenomena, processes, changes, and continuities. In brief, it puts forward a paradigm shift in SLA (de Bot, 2008; Larsen-Freeman & Cameron, 2008a, 2008b; van Geert, 2008).

2.1.3.3 Complexity theory and L2 writing

Larsen-Freeman (2006) employed complexity theory to study L2 development through the written and oral production of ESL learners. She collected written and oral narratives on the same topic over a six-month period. Quantitative and qualitative data analyses on fluency, accuracy, vocabulary, and grammatical complexity at macro (group) and micro (individual) levels confirmed her expectations drawn on the principle tenets of complexity theory. More specifically, the researcher found that while the group’s path of development showed improvement in all four areas over time, the individual developmental pathways differed greatly from one another. Additionally, results showed that while some aspects of an L2 learner’s development might be progressive, others might be regressive or flat, and change might be gradual or sudden, thus, suggesting the iterativeness of L2 development. Furthermore, despite intra-individual variability, results of the study imply that an attractor, defined as preferred/stable mode or behavior of a dynamic system (Larsen-Freeman & Cameron, 2008a), can be identified within individual performances. With respect to the present study, this finding highlights the importance of exploring language use and L-S at macro and micro levels and of taking into account individual fluctuations and variability.
Regarding L2 learner’s language use, Larsen-Freeman (2006) emphasized that an improvement on a particular task does not necessarily lead to overall L2 improvement. As she argued, “from the vantage point of a complex systems approach, improved performance is not merely a question of a learner’s enhanced access to his or her steady-state competence. A learner/user’s language resources … change synchronously with their use.” (Larsen-Freeman, 2006, p. 613). With reference to the present study, Larsen-Freeman’s (2006, 2008a, b) work is valuable for showing the potential of complexity theory to inform research on L2 writing.

2.1.3.4 Dynamic model of multilingualism

In line with Larsen-Freeman & Cameron’s (2008a) sociocognitive perspective on L1, L2, and language use, learning, and development, Herdina and Jessner (2002) and Jessner (2008) applied the DST in order to develop their DMM. Drawing on the complexity theory premises, they conceived of multilingual acquisition and development as a non-linear and complex dynamic process that changes over time and is subject to the influences of a wide range of psycholinguistic and social factors. Therefore, DST, which espouses the view of language as a dynamic system and language development as a dynamic, non-linear, and reversible process (Jessner, 2008), provides the conceptual tool in Herdina & Jessner’s (2002) model for investigating multilingual phenomena. With respect to the present study, it should be noted that the DMM model influenced the view that the languages of a multilingual individual represents a language system that is formed not of separate languages (e.g., L1, L2, and L3), but of individual language psycholinguistic systems (LS1, LS2, LS3, etc.). These language systems are seen not as autonomous, but rather as dynamically interrelated elements that constitute the whole.
From this perspective, they can be investigated and understood only if considered as a part of the whole system.

2.2 Writing in a Third Language

2.2.1 TLA: new field of inquiry

Although the phenomenon of trilingualism and multilingualism is not a modern one, scholarship that attempted to explore TLA was scarce before the 1990s. With the exception of a handful of early studies (e.g., Ahukanna et al., 1981; Chamot, 1973; Cohen, 1989; Gulutsan, 1976; Mägiste, 1984; Odlin, 1989; Swain et al., 1990), it was not until the 1990s when theoretical, methodological, and empirical research began to investigate systematically and more thoroughly the nature of TLA. By the 1990s, when TLA research began its journey, SLA and bilingualism were already well established fields of inquiry. As an emerging area of scholarship, TLA was considered, until the end of the 20th century, under the umbrella of these two fields of language acquisition (Aronin & Hufeisen, 2009; Cenoz, 2000; De Angelis, 2007), and TLA researchers were still fighting for its proper space of inquiry (De Angelis, 2007). In fact, Cenoz & Genesee’s (1998) publication represented one of the first attempts to go beyond bilingualism (Hoffmann & Ytsma, 2004). It brought together works that addressed multilingualism in formal settings and case studies from around the world that demonstrate the multiplicity and complexity of multilingual education. The last decade brought increased interest in multilingualism and TLA as well as in theoretical and empirical research on psycholinguistic, sociolinguistic, and educational issues in TLA (e.g., De Angelis, 2007; Hoffmann & Ytsma, 2004; Marx & Hufeisen 2004).

2.2.2 SLA and TLA: is there a difference?

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TLA scholarship offers valuable insights into psycholinguistic and linguistic processes involved in the acquisition of more than two languages and sociolinguistic factors that influence L3 learning and use, thereby contributing to the enhancement of its distinct nature as opposed to SLA. It has been widely recognized within the TLA field that learning an L3 shares some characteristics with L2 learning. However, as pointed out by researchers, the processes are far more complex and qualitatively different (Cenoz, 2000). This view, reflected as well in the features of the DMM (Herdina & Jessner, 2002), implies that that learning an additional language entails the development of new skills, techniques, and metalanguage, which, in return, affect the system as a whole. Nevertheless, within the SLA field, the predominant assumption has been the ‘no difference’ postulation (De Angelis, 2007). Hence, the burden of exploring and demonstrating the distinction between SLA and TLA has been placed solely on those researchers who embrace the difference assumption (De Angelis, 2007).

One of the reasons for rejecting the distinction has been a terminological issue, since SLA has been defined as “the way in which people learn a language other than their mother tongue, inside or outside of a classroom” (Ellis, 1997, p. 4). What logically follows is an overgeneralization of the notion of the L2 learner as a learner of any language(s) beyond his/her native one. However, probably the TLA researchers have contributed themselves to disseminating even further the ‘no difference’ view, since they still have not reached a consensus on some of the key terms in the field, such as L1, L2, and L3, bilingual/bilingualism, multilingual/multilingualism, etc. (Aronin & Laoire, 2004; Cenoz & Genesee, 1998; De Angelis, 2007; Herdina & Jessner, 2000). Furthermore, TLA scholars have acknowledged and criticized some methodological
problems in TLA studies which have been contributing to the ‘no difference’ view (De Angelis; 2007; de Bot, 2004; Jessner 2006). More specifically, these issues have been lack of rigor in controlling L2 and/or L2 proficiency as a variable, especially in studies with low proficiency in one of the additional languages. Although one might argue that two months or two years of learning of or being exposed to an L2 could influence learning an L3, redrawing learners’ language configuration could call into question the validity of the findings. De Angelis (2007) pointed out that “scenarios of this kind are undoubtedly rather common in the SLA literature” (p. 7), especially in Europe, where learning a second and a third FL is compulsory for school aged children in many countries.

Besides validity issues, failure to take into consideration all learners’ languages could raise technical difficulties in locating studies that have focused on multilingual population. Nevertheless, the insufficiency of research that has focused exclusively on exploring the distinctive nature of TLA and multilinguals’ characteristics might have accounted as well for the ‘no difference’ view that is still widely embraced by SLA scholars.

The distinction between SLA and TLA has been perceived mainly in terms of the complexity and diversity of the TLA phenomenon. SLA has already been widely recognized by the scholarly community as a multifaceted complex phenomenon (e.g., Ellis, 1994, p. 678; Gass & Selinker, 2008, p. 479; Saville-Troike, 2006). When an additional language enters the framework, it would sound plausible to regard the new phenomenon as a different and a more complex one. The greater complexity of L3 acquisition and use versus L2, with respect to factors that bring about changes in the
process, has been acknowledged by TLA researchers. For instance, Hufeisen’s (Marx & Hufeisen, 2004) factor model outlined in broad terms the distinction between SLA and TLA. As put forth in her model, the similarities between SLA and TLA lie in the following factors: (a) neurophysiological factors (e.g., age, general language acquisition capability); (b) learner external factors (e.g., type, learning environment, amount of input); (c) learner affective factors (e.g., motivation, anxiety, perceived distance between languages); and (d) learner cognitive factors (e.g., language awareness, metalinguistic awareness, individual learning experiences). According to Hufeisen’s model, TLA differs from SLA with regards to linguistic factors (two previously learned languages vs. one) and the emergence of an additional set of factors absent in SLA (e.g., ability to compare, transfer, and make interlingual connections). In addition to the above, the distinct nature of L3 learning is related as well to a greater temporal diversity, such as the order of acquisition of languages, which covers a broader range of possibilities than in learning an L2 (Jessner, 2006, 2008).

In addition, differences between SLA and TLA persist in terms of contexts of acquiring and using the languages, especially if the phenomena are seen from a sociocultural perspective. Moreover, while the combinations of settings in which SLA can take place are two (natural or a combination of natural and formal), L3 learners might face multiple settings. Another factor that could add to the complexity of TLA is the level of L2 and L3 language proficiency. For instance, whereas in SLA both languages could be differentiated in terms of dominance (even in the case of bilinguals), L3 researchers are faced with the difficult task of measuring and comparing prior language knowledge in order to control it as a variable. The picture could get even more
complicated when language attrition processes are taken into account in multilingual development (Jessner, 2008).

Hence, research on TLA has provided valuable insights concerning the diversity and complexity of TLA in contrast to SLA, showing these phenomena are not only quantitatively but also qualitatively different. The main qualitative differences have been related to an increased level of multilinguals’ cross-linguistic knowledge (e.g., Cenoz et al., 2003; Clyne, 1997, 2003), strategic knowledge (e.g., Kemp, 2007), and metalanguage awareness (e.g., Jessner, 2006, 2008). Thus, the diversity of learning contexts, routes of learning, and learners’ characteristics entails intricate interactions among a multitude of factors that point to a more complex nature of L3 learning. As Jessner (2006, 2008) concludes, the growing body of research in TLA over the last few years, especially in cross-linguistic influence, early trilingualism, and tertiary education, has been crucial in identifying its distinctiveness with relation to SLA.

2.2.3 Research on multilinguals’ writing

Despite the growing body of scholarship that illuminates our understanding of cognitive, psycholinguistic, and linguistic processes involved in the acquisition of more than two languages, as well as sociocognitive factors that underlie L3 learning and use, it appears that writing in an L3 has been a neglected area of TLA research.

To my knowledge, only a handful of studies have focused on multilinguals’ writing. One of the studies, informed by constructivist and sociocultural-historical perspectives, examined how eight-year olds construct their identity, develop a sense of agency and reflexivity, and voice their opinion in their L3 writings (Maguire & Graves, 2001). Furthermore, Buell (2004) put forward an approach to explore hybridity in
multilingual texts. Combining interpretive, intertextual analysis, and ethnographic methodologies, she studied C-S as a feature of L3 texts written by an ESL learner. In addition, Sagasta (2003) investigated the effects of bilingualism and models of schooling on acquiring L3 writing skills by school-aged bilingual students learning English as an FL. The findings, based on data from a background questionnaire and from two types of written texts in the three languages, illustrated that greater and active use of the L1 minority language promoted L2 and L3 acquisition. On the other hand, Canagarajah’s (2004, 2006, 2007, 2011) research on multilingual writing and writers goes beyond the view of writing as process of text construction by challenging the traditional notion of writing, writer, and writing theory. His postmodern approach to studying multilinguals’ writing puts emphasis on studying writer’s movements among languages instead of studying multilingual writing as static and locating the writer within a language (Canagarajah, 2006). Regarding the text, the need to study the process of composing in multiple languages replaces the focus on the product. As for the writer, this approach shifts the focus from his/her stability to versatility and to a view of the writer as an agent not conditioned by one language and culture but shuttling between identities, voices, discourses, communities, languages, and cultures. Hence, Canagarajah (2006) raised his voice against the “monolingualist assumption of literacy as a unidirectional acquisition of competence” (p. 589).

It is evident that the plethora of studies that have explored issues in L2 writing contrasts with the dearth of research in L3 writing. Although these few studies on multilingual writing provide valuable insights into L3 composing and, more importantly, put forward a tendency to re-conceptualize multilingual writing, writer, text, and context,
L3 writing remains an underexplored field, especially with respect to multilinguals’ use of languages.

2.3 Research on Language Use and L-S in L2/L3 Writing

Research on characteristics of L2 writers, composing processes, and texts represents one of the three major categories of the SLW foci (Leki et al., 2006). Inquiry into the role of languages in L2 composing has been a part of this line of research since its early steps in the 1980s. By that time, the view of writing as process had replaced the conventional approach to writing as product (Matsuda, 2003a) and was accompanied by a movement of focus from product to composing processes. Thus, assumptions about writing as a linear, mechanical sequence of activities had evolved into a more complex view of writing, reflected in the tenets of the cognitive approach in L2 writing research. As reviewed in the previous subsection, cognitively/sociocognitively oriented research conceives of L2 writing as a problem-solving task, a goal-oriented activity, a recursive process, characterized by back and forth movements along a continuum of subprocesses (e.g., planning, translating, and reviewing) hierarchically organized, governed and controlled by a monitor, and embedded in a social context shaped by a number of factors such as writing task, reader, writer’s motivations and attitudes (Grabe & Kaplan, 1996). From this perspective, two main foci of research into language use and L-S during the L2 composing activity seem to emerge. The first concerns the effects of L1/L2 use and L-S on the quality and the quantity of the final text and the second pertains to the factors that could trigger L1 use and L-S such as language proficiency, writing expertise, writing topic, writing task, language typology, and mode of writing.
Language use in L2 writing has been reported by a handful of studies over the last three decades (e.g., Cohen & Brooks-Carson, 2001; Cumming, 1989, 1990; Friedlander, 1990; Gosden, 1996; Hanada, 2007; Jones & Tetroe, 1987; Knutson, 2006; Kobayashi & Rinnert, 1992; Lally, 2000; Lay, 1982; Lei, 2008; Manchón et al., 2000; Qi, 1998; Roca de Larios et al., 1999; Sasaki, 2000; Uzawa & Cumming, 1989; van Weijen et al. 2009; Wang, 2003; Wang & Wen, 2002; Woodall, 2002). Nonetheless, they differ significantly in their research goals, methodology, and the extent to which they investigate the use of L1, L2 and L-S. In addition, while the majority of the above-mentioned studies have explored L1/L2 or L-S in writing from a cognitive/sociocognitive perspective, only a few (e.g., Haneda, 2007; Lei, 2008) shed light on the phenomena from a sociocultural point of view. Furthermore, whereas some researchers delved deeper into the intricacy of the phenomena of language-switching (e.g., Qi, 1998; Wang, 2003; Woodall, 2002) and language use (e.g., van Weijen et al. 2009; Wang & Wen, 2002), others merely reported on L1 use or L-S with respect to the specific primary goals of their studies, such as comparing L1 and L2 writing (e.g., Uzawa, 1996; Whalen & Ménard, 1995), exploring L2 writing strategies/practices (e.g., Friedlander, 1990; Jones & Tetroe, 1987; Gosden, 1996; Roca de Larios et al., 1999), and examining modes of writing (e.g., Cohen & Brooks-Carson, 2001; Kobayashi & Rinnert, 1992). Nevertheless, findings from this research suggest a dynamic nature of language use in L2 composing.

Studies that have explored the use of languages by bilingual writers while composing are reviewed in the following subsection. They are grouped based on their research foci, more specifically: studies that merely reported on or had research questions related to language use and those which investigated particularly L1/L2 use and L-S.
during L2/L3 composing. At the same time, as discussed above, different epistemological frameworks bring with them different perspectives on a phenomenon. Hence, research on L1/L2 use and L-S is reviewed from cognitive/sociocognitive and sociocultural perspectives.

2.3.1 Cognitive/sociocognitive perspective on language use and L-S

It should be noted that language use in L2 writing was not the main focus of inquiry in the early 1980s. Only a few studies reported on these issues. Lay’s (1982) case study of four native Chinese speakers ESL writers is probably one of the first to explicitly focus on language use during the composing process. Her research questions focus on the amount and patterns of L1 use in the L2 composing process. Based on TAPs and an interview with the participants the researcher concluded that more language switches lead to better compositions in terms of ideas, organization, and details. However, Lay’s (1982) study, available in the form of notes published in Research Notes Abstracts of TESOL Quarterly, does not provide detailed information about the methodology and measurement procedures employed.

Conclusions in terms of relationships between L2 proficiency and L1/L2 use in L2 writing were drawn by Jones & Tetroe (1987), although their study was limited only to planning behaviors in L1 and L2 composing. Their findings revealed that most proficient L2 writers did extensive planning in L2, contrary to lower English proficiency participants, who planned less and mostly in L1 while composing in L2. Data from TAPs of six Spanish-speaking ESL students also indicated that insufficient L2 vocabulary did influence an increase in L1 use for planning (at global and local levels) as well as that less abstract writing tasks required less L1 use. The findings suggest that switching
between languages might be influenced not only by L2 proficiency in terms of lexical knowledge, but also by the nature of the writing task (i.e., concrete vs. abstract). However, Jones & Tetroe (1987) posited a limited view of L1 use “as being principally a matter of vocabulary” (p. 54).

Embracing similar goals, Cumming (1989) investigated the influence of writing expertise and L2 proficiency on the quality of L2 writing. Analyses of data from TAPs of 23 ESL native French-speaking students revealed that occurrences of L1-L2 switching were frequent (p. 89) in L2 writing. This “directed translation or code-switching” defined as “deliberate uses of cross-linguistic resources in order to find, generate or assess an element or elements” (p. 94) was viewed as one of the six heuristic search strategies. Nevertheless, C-S itself was left largely unexplored, although overall findings suggested that proficiency did not seem to affect the type of writing strategies while writing expertise did account for more heuristic searches (and therefore, probably more switching between languages). Looking at a subset of data from his 1989 study, Cumming (1990) explored the potential of metalinguistic and ideational thinking in L2 writing for learning an L2. Results showed that writers switched between languages to search out, evaluate, and assess appropriate words or phrases, compare cross-linguistic equivalents, reason about L2 linguistic choices, or verify the intended meaning. Results did not point to a relation between writer’s L2 proficiency and the extent of their L1 use, but indicated that writers’ metalinguistic and ideational behavior, which involved frequent cross-language switches, seemed to be related to their L1 writing expertise.

Taking a different perspective on the factors that could influence L1 use, Uzawa & Cumming (1989) examined the composing behaviors of students learning a non-
cognate language, their experience from writing in an FL, and their difficulties. Data from a questionnaire survey, TAPs, and an interview revealed that the intermediate FL learners composed mainly in their L1, thus suggesting a large role of L1 writing in a non-cognate FL. In addition, results showed that L1 was used for generating ideas, searching for topics, developing concepts, and organizing information (p. 180).

Another line of research focused on the effects of language use on the written text and writing process. From this perspective, Friedlander (1990) provided evidence for the beneficial effects of L1 use on the planning process in L2 composing. In an attempt to overthrow the widespread belief that L2 writers should avoid thinking and writing in their L1, he examined the effects of L1 on L2 composing. Although the conclusions are limited to the planning stage, analysis of his quantitative data indicates a relationship between language use and writing topic. More specifically, the use of the language of topic knowledge acquisition facilitated instead of constrained the writing process and contributed to producing longer and more detailed plans and texts, and compositions of better quality and content (i.e., richer in information). In conclusion, Friedlander put forward the idea that “some knowledge is stored in language-specific form” (p. 122) and that translation from L1 to L2 facilitates L2 composing.

Kobayashi and Rinnert (1992) drew similar conclusions about the effect of L1 use on L2 writing. They carried out a study with 48 less and more proficient EFL learners in order to explore the effect of L1 on L2 writing but with respect to direct versus translation mode. Their study is probably one of the first that report on the amount of L1 use in L2 composing. Data from questionnaires revealed that students with a lower level of L2 proficiency tended to depend more on their L1 in contrast to more proficient
students. With respect to the participants’ perceptions of both writing modes, results showed that a few students preferred the direct mode in order to be able to think in their L2. However, this finding was not developed further. Results implied that L1 use benefited the development of ideas and enhanced richer L2 uses and vocabulary for students below a certain threshold of proficiency. An interesting finding was that L1 use also facilitated the writing of four more proficient students who were unable to express their complex ideas directly in L2. The researchers correlated this finding with Uzawa & Cumming’s (1989) observation that some FL writers set unrealistically high standards for their writing task and consequently might experience blockage and lose control over their writing (p. 207). Furthermore, the researchers stated that too much L1 use might hinder L2 writing performance and fluency, and thus delay the development of L2 reader awareness. Thus, they concluded that more proficient writers should be encouraged to think and write directly in L2.

Conversely however, data from interviews with Japanese novice researchers about their writing practices in English gathered and analyzed by Gosden (1996) showed a strong preference to the translation writing mode. This conclusion points to a greater use of L1 in L2 writing, which, as emphasized by Gosden (1996), was due to the prevailing grammar-translation method and the use of L1 in FL instruction in Japan (p. 121).

On the other hand, Manchón et al. (2000) focused exclusively on one strategy of L2 the writing process, namely backtracking, which involved switching between languages. With respect to the present study, it should be noted that Manchón et al. (2000) calculated the percentage of L1 and L2 words in the think-aloud data. The
findings implied that writing expertise and writing genre did not seem to influence the language for backtracking.

Also worth discussing is a study which, although not explicitly focused on L-S, shed light on multilinguals’ language use during the process of writing in L3. Cohen & Brooks-Carson (2001) examined the effect of the direct versus translation writing mode on the quality of the final text of intermediate level L2/L3 learners. They stated that the reason to include Spanish-English bilinguals for whom French was their L3 was to explore whether their learning experience was different from that of monolinguals. Conclusions about the differences in both writing modes were based on students’ comments, background questionnaires, strategies checklists, and quality of the compositions. With respect to the FL writers, even when explicitly asked to engage in the direct writing mode (e.g., writing directly in L2), 80% of the native English participants reported thinking in L1 always or often while writing in French (p. 179).

However, students who self-assessed as more proficient writers stated that the direct mode was more helpful for them. Findings also suggested that higher quality of L2/L3 essays was related to less use of L1 when writing in the direct mode, although the translation mode could be beneficial for some students. Furthermore, a surprise finding for the researchers was that bilinguals reported thinking in L1 less often than in L2 while engaged in the direct mode in L3 writing. Cohen & Brooks-Carson (2001) suggested that the choice of language was the consequence of their living and studying in an English language context and using English-French textbooks. Nevertheless, it remains unclear why eight out of ten bilinguals chose to write their text for the translation mode first in Spanish, their native language, instead of in English (their L2). In addition, the
researchers did not report specific findings about the other four participants who did not have Spanish as their second language. Moreover, some vagueness remains with regards to the concept of “thinking in L1.” As the researchers noted “there was no mechanism … for discovering” how students defined thinking in L1, leading to a general concept that refers to “a complex mix of ideas about content, about the organization of ideas, about the selection of language material, and about the conversion of that material into French” (p. 183).

The above-reviewed studies are important in terms of recognizing the importance and functions of language use in L2/L3 composing and acknowledging that L1 use is a frequently employed strategy by L2/L3 writers. Although the latter has not been their primary focus, the studies shed light on the factors that might prompt L-S during the composing process. However, they revealed only a partial picture of the dynamics of the relationships between L1 and L2 during L2 writing.

Wang and Wen (2002) explored L1 use in the L2 composing process by investigating the amount of L1 use, its relation to different composing activities, types of writing task, and L2 proficiency. They collected data from TAPs of sixteen intermediate and advanced EFL native Chinese speakers. Quantitative data demonstrated that a less-demanding task (i.e. narrative) was related to higher percentage of L1 use than the argumentative task. Concerning occurrences of L1, results revealed that learners relied on L1 for activities such as generating/organizing ideas and process-controlling and on L2 for task-examining and text-generating. Hence, students resorted less to L1 for text-generating activity, which was found to be the most difficult, cognitively demanding, and most directly related to textual output. On the contrary, since idea-generating and idea-
organizing activities were less directly related to the text they invoked more L1 use. Thus, the researchers suggested that L1 use was not related to the difficulty level of the composing activity, but to its relatedness to the textual output. Regarding the relationship between L1 use and L2 proficiency, Wang & Wen (2002) implied that contrary to more proficient learners who wrote directly in L2 less proficient students tended to generate text in L1 and then translate it into L2.

Knutson’s (2006) findings also point to a relationship between L2 proficiency, L2 use, and the quality of the written product. Qualitative data from verbalized protocols, retrospective interviews, and a questionnaire of six intermediate and advanced FL learners suggested that higher L2 proficiency entailed more L2 use. However, while some of the most proficient participants showed a tendency to rare mental translations from L1 others used extensively the mental translation strategy similarly to the less proficient students. Thus, the researcher concluded that mental translations (defined as “reformulation in [FL] of a message, thought or idea initially represented in English in the writer’s mind” (p. 89) and thinking in L1 might be beneficial also for more proficient writers to produce better quality texts. In addition, Knutson (2006) reported on purposes for using L1 such as expressing concerns, discourse-level issues, reviewing and evaluating meaning, and rereading the emergent text through back-translating.

In line with previous research on L1 use in L2 writing, van Weijen et al. (2009) conducted a study which focused exclusively on investigating the extent of L1 use for carrying out cognitive activities (e.g., self-instructions, goal setting, structuring, generating ideas, metacomments) during L2 writing. Statistical data from TAPs and four L2 argumentative essays of twenty EFL students gave a more detailed picture of L2
writing. Regarding L1 and L2 use, findings showed that whereas, for the most part, the amount of L1 was below 50% for all the cognitive activities, metacommments and self-instructions seemed more likely to be carried out in L1. In addition, results indicated a correlation between L1 and these activities. That is, if writers use L1 for self-instruction, they are more likely to use L1 also for metacommments. The researchers explained the findings as being caused by cognitive overloading prompted by experiencing difficulty orchestrating all the conceptual activities at a specific moment. With respect to relations between L1 use and L2 proficiency, results suggested that the former does not influence the writing process, but does have a direct effect on the quality of the written text. In addition, regarding the relationship between L1 and L2 use, writing proficiency, and text quality, the researchers concluded that less skilled writers were more likely to experience a cognitive overload, thus relying more on L1. On the other hand, more proficient writers would use less L1. Moreover, van Weijen et al. (2009) stated that while L1 use for metacommments and L2 use for self-instructions and metacommments had a detrimental effect on L2 text quality, L1 use for goal setting, generating ideas, and structuring seemed to have a positive effect on the quality of the composition. The study, which included a large number of participants, contributed to the discussion by providing more details regarding the cognitive processes in L2 writing with respect to L1 and L2 use. However, the process of formulating (i.e., text production) perceived as a linguistic activity, was not included in their data analysis.

Although L-S has not been the primary focus of the above-reviewed studies, they shed light on L-S behavior in L2 writing and provide evidence indicating that the interplay of L1 and L2 is affected by task difficulty, L2 proficiency, and L1 writing
expertise, and cognitive L2 composing processes. Nonetheless, Woodall (2002) claimed that previous research had offered a “partial look at L-S behavior within subprocesses of L2 writing” (p. 9). Qi’s (1998) case study, Woodall’s (2002) quantitative study, and Wang’s mixed-method study focused exclusively on the issue of L-S.

To my knowledge, Qi’s (1998) study is the first that was specifically devoted to investigating the factors that influence L-S as a cognitive phenomenon in L2 writing. The participant, a Chinese-English bilingual student, completed three different types of writing tasks, namely writing essay (narrative and argumentative), translation from L1 to L2 (two texts at different cognitively demanding levels), and solving math problems (two sets at lower and higher cognitive levels). For the purposes of his study, the researcher defined L1 and L2 sequences as “think-aloud utterances in the protocol data that were made successfully in one language” (p. 423). Data regarding the percentage of L1 and L2 sequences indicated that a higher level of cognitive demand prompted an increase in L1 use and L-S. Additionally, Qi (1998) identified four factors that influenced the writer’s L-S behavior. More specifically, L1 was used to initiate an idea, to facilitate the development of a thought, to verify a lexical meaning, and to minimize the overloading of the working memory due to processing a more complex task.

However, as emphasized by Woodall (2002), Qi (1998) failed to identify the causal factors that might affect L-S in L2 writing. Woodall (2002) explored the reasons for L-S, the effects of L-S on L2 text, and the relationships between L-S and L2 proficiency, task difficulty, language typology, and L2 text quality and length. The twenty eight participants, intermediate and advanced learners of a non-cognate and a cognate language, wrote two essays (narrative and expository genre). Similar to Wang &
Wen (2002) and van Weijen et al. (2009), Woodall (2002) identified general writing behaviors related to L-S, namely silent writing, simultaneously writing and talking, talking about writing, reading the prompt or the already written text, pausing, editing, and dictionary searches. Findings based on statistical analyses of TAPs showed that L-S was used by both groups for a variety of purposes, such as planning, revising, editing, spelling, and transcribing. However, while some participants resorted to L1 as a tool for self-regulation, others appeared to lack control over their L-S and relied on L1 as “a crutch to obtain cognitive stability” (p. 20), which, in turn, reduced their efficiency for language processing. Woodall (2002) suggested that a possible reason for the L-S variance might be a combination of three factors, namely, language group, L2 proficiency, and task difficulty. On the other hand, the findings imply that L2 proficiency affects L-S, since in both tasks the intermediate students switched more often to L1 than the advanced students. Furthermore, with respect to L-S frequency and duration, the researcher found that while L-S frequency was not affected by task difficulty, the more difficult task brought about longer periods of L1 use. Conclusions suggest that L2 proficiency and language group seemed to affect L-S duration. That is, lower L2 proficient non-cognate learners used their L1 longer than the higher proficiency group, a finding contrary to the cognate group’s L-S duration. Thus, the researcher concluded that L-S frequency was more related to L2 proficiency, whereas L-S duration was more related to task difficulty. However, findings implied that the effect of language group might mitigate these trends since the non-cognate group’s L-S frequency and duration were higher for the intermediate learners while the cognate group’s L-S duration was higher for the advanced learners. As for the effect of L-S on text length and quality,
results demonstrated no relationship for the easier task, but that L-S duration had a negative effect on the quality and length of non-cognate learners’ essays. Hence, along with the findings that level of L2 proficiency, task difficulty, and language group affect L-S behavior, Woodall (2002) concluded that the increased use of L1 (in terms of duration) had a positive effect on the quality of the written text in a more difficult genre for learners of a cognate language (p. 19).

Along the same lines, Wang (2003) investigated the L-S in two types of essays (a personal letter and an argumentative) focusing on the effect of L2 proficiency on L-S, purposes for L-S, and qualitative differences in L-S processes. Findings are based on analyses of quantitative and qualitative data of eight less and more proficient Chinese-native ESL learners. It should be emphasized that Wang’s (2003) approach to defining L-S was limited to “mental operations that went from L2 to L1 as cognitive processes of problem-solving and decision-making” (p. 456). In the same vein, a switch was identified “as an idea unit in the L1 prompted by an idea unit in the L2” (p. 456). Additionally, Wang (2003) distinguished six categories for classifying L-S sequences in order to investigate the purposes of L-S, i.e., discourse, idea generation, language use, lexical searching, translation, and metacomments. Contrary to Woodall’s (2002) results regarding the relationship between L-S frequency and language proficiency, this study suggested that L-S did not decrease with the increase of L2 proficiency. Nevertheless, findings pointed to qualitative differences between L-S behavior of less and more proficient writers, illustrated by differences in purposes for using L-S. For instance, it was found that less proficient writers used L-S to reduce their content-generation processes, to simplify the writing production at lexical, syntax, and semantic levels, to
consult dictionaries, and to retrieve grammatical rules. Conversely, more proficient participants had recourse to L-S for problem-solving and ideational thinking, such as formulating and monitoring contextual meaning, consulting discourse plans, and considering task constraints and readers. Wang (2003) concluded that less proficient learners might benefit from L-S for generating content and reviewing the text, whereas L-S would be beneficial to more proficient writers for rhetorical choices and discourse. Although Wang’s study offers an innovative way of looking at both quantitative aspects of L-S incidences and their qualitative facets, the findings should be regarded with caution. As the researcher explicitly acknowledges, it is not clear whether some of the differences in the L-S behavior of both groups are the result of differences in L2 proficiency or L2 writing expertise (p. 369).

2.3.2 Sociocultural perspective on language use and L-S

Whereas from the cognitive/sociocognitive perspective, L1/L2 use in L2 writing is seen as taking place in the writers’ mind and as influenced from a variety of factors related to task or learner’s characteristics, the sociocultural view goes a step further to establish dialectical relationships between cognitive functioning and writers’ social, cultural and historical context. A few recent studies (e.g., Haneda, 2007; Lei, 2008) took a sociocultural perspective on L2 writing processes using the activity theory framework. Although language use was not the primary focus of both studies, they provide evidence for a dialectical relationship between L1/L2 use and the context of the writing task.

Haneda (2007) examined L2 and L3 learners’ modes of engagement in writing (i.e., how they approach and perform an FL writing task). Data from bilingual and multilingual participants studying Japanese as an FL were interpreted from the
perspective of writing as a socially situated activity/practice. Regarding the use of linguistic resources as a writing strategy, Haneda (2007) concluded that a higher level of L2/L3 speaking proficiency brought about less L1 use (or English as an L2 for multilinguals), while less-advanced learners relied exclusively on L1 or both L1 and L2 (for multilinguals). However, despite his advanced level of spoken FL proficiency, one heritage language learner was reported to have relied exclusively on his dominant language of literacy in approaching the FL writing task, even undertaking a sentence by sentence translation while writing an argumentative essay. This approach to writing was explained by a lack of “mental model of written text in that particular genre [and] of the associated language register” (p. 324) and the participant’s effort to maintain his own standards of an already accomplished L1 writer.

Likewise, Lei (2008) explored L2 writing strategies, including language use from a sociocultural perspective. Four types of writing strategies, namely, artifact-mediated, rule-mediated, community-mediated, and role-mediated strategies were identified. Lei’s participants reported an extensive use of L1 in the phase of preparation for the writing task to gather information online, “to organize ideas, to express thoughts, and to think profoundly” (p. 225), and to find the accurate word meaning in English. In addition, it was found that one participant tended to use L2 in order to avoid Chinglish. This view of L2 as a psychological tool emphasizes the relationship among writer’s strategy use, L2 writing ability, and L2 proficiency but, unlike previous studies carried out within sociocognitive framework, Lei (2008) regarded it as mediated action toward conscious goals that sought fulfillment in writer’s communities. However, probably because language use was not the primary focus of Lei’s (2008) study, she left unexplored the use
of L1 and L2 for the other types of strategies, especially for those that were closely related to the use of linguistic resources, such as the rhetoric-mediated and role-mediating strategies.

2.3.3 Complexity theory perspective on language use and L-S

With respect to multilinguals’ writing, to my knowledge, only one study (Jessner, 2008) elucidates distinctive features of language use and L-S while composing in L3, although only in regard to metalanguage.

As discussed previously, Herdina & Jessner (2002) and Jessner (2008) developed their DMM drawing on DST. This approach allowed the exploration of multilingualism as consisting of dynamic complex language systems in constant flux. In their model, metalinguistic knowledge and awareness of that knowledge are emphasized as fundamental factors that can impact on language use, development, and maintenance. Consequently, Jessner’s South Tyrol study (1999, 2005, 2008) investigated the use of metalanguage in order to find whether multilinguals display increased metalinguistic awareness in their L3. Bilinguals learning a FL completed three writing tasks (a letter, a summary, and an argumentative essay) in their L3. Data elicited through TAPs and subjected to quantitative and qualitative analyses of lexical searches revealed that metalanguage was expressed in the three languages. Nevertheless, while the dominant language (L1) was used mostly to question or comment on style, grammar, alternative phrasing, language choice, and lexical difficulties, metalanguage was expressed twice less frequently in the less dominant language (L2) fulfilling fewer functions. The researcher suggested a relationship between the dominant language and higher L-S frequency. With regard to the place of instances of L-S, findings demonstrated that while
switches to L1 occurred in most of the cases before the L3 lexical item, the majority of the switches after the L3 item were to L2. This finding led to identifying the roles of languages in L3 production. Jessner (2008) concluded that L1 held the main support role, functioning as a “springboard” (p. 279) for solving lexical problems, whereas L2 was used to confirm the lexical choice. In addition, Jessner (2005, 2008) reported that most switches related to metalanguage took place in combined (L1-L2) strategies, which implies a dynamic relationship between crosslinguistic interaction (i.e., awareness of the interaction among the languages) and metalinguistic awareness. She put forward a distinction between both and pointed to their different roles in learning several languages. Although it provides a partial look into L-S in L3 writing because of its focus, the study contributes to understanding the roles of languages in L3 composing.

2.3.4 Summary of research findings on language use and L-S in L2/L3 writing

To summarize, the above reviewed research points to a dynamic nature of L1, L2, and L3 use during the composing process and suggests that switching between languages is a significant feature of that process. A conclusion that could be drawn from the above review and discussion is that differences between L1, L2, and L3 use are not only quantitative in nature, but also qualitative in terms of the functions the different languages serve during the composing process, the effect on the quality of the written text and writing process, and the host of factors that come into play during that process.

Table 2.1 provides a summary of key information from the studies that examined language use and L-S in L2/L3 writing, including related research questions, participants’ characteristics, data collection, and findings.

2.3.4.1 Quantitative differences in L1 and L2 use and L-S in L2/L3 writing
Despite the attempts of a few researchers to calculate the amount of language use, it is difficult to draw conclusions due to highly disparate findings attributable to methodological differences. These include differences in L1/L2 measurement procedures and lack of or dissimilarity in defining L-S, L1, and L2 use. For instance, while Kobayashi & Rinnert (1992) took into consideration writers’ self-reported percentage of L1 use and estimated more than 50% L1 use for the LP group, Wang & Wen (2002) calculated statistically the use of L1 at around 50% for LP writers. Contrary to the latter, based on the amount of L1 and L2 in both writing tasks which excluded the number of words of the final text, Manchón et al. (2000) reported mixed findings for their three participants. On the other hand, van Weijen et al.’s (2009) statistical data indicated that the average proportion of L1 use was less than 50% for their advanced FL learners. Similar to Jones & Tetroe (1987), L1 use was calculated by taking into account the number of L1 occurrences.
<table>
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<tr>
<th>Author</th>
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<th>Data collection &amp; analysis</th>
<th>Findings relevant to language use and L-S</th>
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</thead>
<tbody>
<tr>
<td>Lay (1982)</td>
<td>• How much L1 is used in L2 writing?</td>
<td>• N=4</td>
<td>• TAP</td>
<td>• Translations to L1 are used for stronger impression &amp; association of ideas.</td>
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<td></td>
<td>• Is there a pattern of L1 use in L2 writing?</td>
<td>• L1: Chinese; L2: ESL college-student</td>
<td>• Interviews</td>
<td>• Relationships found: more L-S is related to better compositions.</td>
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<td></td>
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<td></td>
<td>• Essays: in L1 &amp; L2</td>
<td>between L1 use and WE.</td>
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<td></td>
<td></td>
<td></td>
<td>• WG: narrative &amp; argumentative</td>
<td>between L-S and topic</td>
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<td>Jones &amp; Tetroe (1987)</td>
<td>• In what ways L1 is used for planning while composing in L2?</td>
<td>• N=6</td>
<td>• Longitudinal study (7 months)</td>
<td>• Relationships found:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• L1: Spanish; L2: ESL Grad. school candidates</td>
<td>• TAP</td>
<td>LgP affects the language of planning (less L1 use by HP students).</td>
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<td></td>
<td></td>
<td>• LgP: increased during the study to a Marginal/Modest &amp; Competent</td>
<td>• Essays: L1 (N=4) &amp; L2 (N=6)</td>
<td>L2 vocabulary knowledge affects LPG’ L1 use (L1 is reduced when relevant vocabulary is provided).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• WG: narrative &amp; argumentative</td>
<td>L1 use and WG for HP writers (increased use of L1 in argum. task for organizational and rhetorical details).</td>
</tr>
<tr>
<td>Uzawa &amp; Cumming (1989)</td>
<td>• Explore writing strategies in FL composing with focus on planning stage.</td>
<td>• N=10</td>
<td>• Questionnaire survey</td>
<td>• L1 is used to write drafts, prepare notes, organize mentally, and search for ideas.</td>
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<tr>
<td></td>
<td></td>
<td>• L1: En.; L2: Jap. (FL)</td>
<td>• TAP (4 students)</td>
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<td></td>
<td></td>
<td>• LgP: intermediate, but different levels of speaking proficiency</td>
<td>• Observation notes</td>
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<td>• Interview (N=4)</td>
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<td></td>
<td>• Essays: 2 (L1&amp;L2)</td>
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<td></td>
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<td>• WG: expository</td>
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<tr>
<td>Cumming (1989)</td>
<td>• Do WE and LgP relate to writing performance (including problem-solving behavior involving heuristic searches)?</td>
<td>• N=23</td>
<td>• TAP</td>
<td>• Heuristic searches include code-switching (i.e., using of cross-linguistic resources) used to find, generate, or assess a linguistic item.</td>
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<tr>
<td></td>
<td></td>
<td>• L1: French; L2: English</td>
<td>• Written texts: 3 (L2)</td>
<td>• Writing expertise is related to heuristic searches.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• LgP: interm. &amp; adv.</td>
<td>• WG: letter, expository argument, summary</td>
<td>• C-S was frequent.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• WE: 3 levels (basic, average, professional)</td>
<td>• Analysis: multivariate</td>
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<tr>
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<tbody>
<tr>
<td>Cumming (1990)</td>
<td>• Describe the quality and frequencies of episodes of concurrent metalinguistic and ideational thinking.</td>
<td>• N=23</td>
<td>• TAP</td>
<td>• L1 and L2 used to search out, assess, and compare equivalent terms across languages; back-translation is used when writers are unsure about linguistic &amp; lexical items. • C-S served a compensatory purpose when problems in expressing ideas in L2 arise.</td>
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<tr>
<td>Friedlander (1990)</td>
<td>• What is the effect of L1 use in the planning stage? • Are effective planning and better essays related to the use of the language of topic knowledge acquisition?</td>
<td>• N=28</td>
<td>• Written texts: in L1 and L2; written plans • WG: narrative and expository • Analyses: plans &amp; essays • Interview</td>
<td>• The use of the language of topic knowledge acquisition: • enhances the quality of planning and compositions. • impacts on the choice of language: • Switches to L2 when planning in L1: mostly linked to culture-specific terms and concepts. • Switches to L1 when planning in L2: mostly related to lexical difficulties and culturally related terms.</td>
</tr>
<tr>
<td>Kobayashi &amp; Rinnert (1992)</td>
<td>• Does the mode of writing affect the quality of L2 text? • How do L2 writers perceive effectiveness of both modes? • What is the amount of L1 use in L2 composing?</td>
<td>• N=48</td>
<td>• Questionnaire</td>
<td>• L1 was used to explore more ideas. • L1 use might hinder L2 writing performance. • Extensive use of translation might: • inhibit L2 writing fluency; delay the development of reader awareness. • benefit development of ideas; enhances richer L2 uses and vocabulary for students below certain threshold of LgP. • Amount of L1 use in L2 composing: 50% of HPG used L1 more than 50%; 87% of LPG used L1 more than 50%.</td>
</tr>
<tr>
<td>Gosden (1996)</td>
<td>• What are the main stages in writing the first draft of an article aimed to be published in English?</td>
<td>• N=16 novice researchers • L1: Jap.; L2: EFL • LgP: not assessed</td>
<td>• Interview</td>
<td>• Translation writing mode (writing the draft in L1 and phrase-by-phrase translation into L2) is preferred among Japanese novice researchers (87%).</td>
</tr>
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### Table 2.1: continued

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<tr>
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<th>Participants’ characteristics</th>
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</tr>
</thead>
</table>
| Manchón et al. (2000) | • How does the dominant language of composing influence backtracking? | • N = 3  
• L1: Spanish; L2: EFL  
• LgP: intermediate (8 years) | • TAP  
• Written texts: 2  
• WG: narrative and argumentative  
• Quantitative analyses | • L2 is used extensively for backtracking.  
• WE and WG seem not to influence the language for backtracking.  
• Amount of L1 use was calculated for argum. task (between 43-80%) and for narr. task (between 16-60%). |
• Determine if bilinguals’ writing strategies are different from those of monolinguals in both modes. | • N=39  
• L1En./L2Fr. (N=25)  
• L1Sp./L2En./L3Fr (N=10)  
• L1/L2E/L3Fr. (N=4)  
• LgP: intermediate (3rd semester college-level FL course) | • Background questionnaires (2)  
• Strategy checklists  
• Written texts: 2  
• Writing modes: direct (in the FL) and translation (from L1/L2 to L2/L3)  
• WG: argumentative | • Majority of FL writers reported thinking always or often in L1 in both modes.  
• Bilinguals reported thinking less in L1 and more in L2 during L3 writing.  
• HP bilinguals were more likely to think through their ideas in L2 (English) before writing in L3.  
• Quality of essay is higher for bilinguals who reported thinking less in L1(S) than in L2.  
• Bilinguals’ strategy behavior is similar to monolinguals’. |
| Qi (1998) | • What are the factors that influence L-S during L2 writing?  
• What is the relation between L-S and effectiveness of L2 composing? | • N=1  
• L1: Chinese; L2: EFL & ESL  
• LgExp. - 10 years  
• LgP – bilingual; high proficiency (TOFL) | • TAP  
• Retrospective interview  
• Written tasks: 6  
• WG: narr. & argum.  
• WM: translations and problem-solving questions (at lower & higher cognitive level) | • Factors that influence L-S: use of L1 to initiate an idea, facilitate the development of a thought, verify a lexical meaning, and minimize overloading of working memory.  
• Relationship between tasks with higher level of cognitive demand and amount of L-S and L1 use (the latter increases with the increase of the former).  
• L-S facilitates the L2 composing process.  
• Conceptual knowledge is shared across L1 and L2 and might be accessed via both languages. |

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<tbody>
<tr>
<td>Woodall (2002)</td>
<td>• Does L-S decrease with increasing LgP.</td>
<td>• N=28 (17NES/11ESL)</td>
<td>• TAP;</td>
<td>• LgP in L2, task difficulty, and language group affect L-S.</td>
</tr>
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<td></td>
<td>• Does L-S increase in more difficult tasks.</td>
<td>• L1En./L2Sp. (N=8)</td>
<td>• Observations</td>
<td>• LPG switched to L1 more frequently than HPG.</td>
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<tr>
<td></td>
<td>• Is Lg. group a factor for L-S.</td>
<td>• L1En./L2Jap. (N=9)</td>
<td>• Video-recordings</td>
<td>• L1 duration is related to higher quality of L2 text of a cognate language, contrary to that of a non-cognate language.</td>
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<td>• Do L2 text’s length and quality decrease with an L-S increase?</td>
<td>• L1Sp./L2En. (N=5)</td>
<td>• Written texts: 2 in L2</td>
<td>• language group seems to play a role in L-S when combined with L2 proficiency and task difficulty.</td>
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<td>• L1Jap./L2En. (N=6)</td>
<td>• WG: narrative (letter)</td>
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<td></td>
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<td>• LgP in ESL and FL:</td>
<td>and argumentative</td>
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<td></td>
<td></td>
<td>interm. &amp; advanced (2 &amp; 4 years of college FL classes)</td>
<td>• ANOVA, multiple regression analysis</td>
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<tr>
<td>Wang &amp; Wen (2002)</td>
<td>• How much L1 is used when thinking while composing in L2?</td>
<td>• N=16</td>
<td>• TAPs</td>
<td>• Higher L1 use in the narrative than in argumentative task.</td>
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<td></td>
<td>• When is L1 used?</td>
<td>• L1: Chinese; L2: EFL</td>
<td>• Written texts: 2</td>
<td>• L1 is used in process-controlling, idea-generating, idea-organizing activities and less in text-generating.</td>
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<td>• Do the writing genre and L2 proficiency affect the L1 use?</td>
<td>• LgP: intermediate (1st &amp; 2nd year college students) and advanced (3rd &amp; 4th year students)</td>
<td>• Genre: narr. &amp; arg.</td>
<td>• L2 is relied on for task-examining and text-generating.</td>
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<td>• Auto recordings</td>
<td>• L1 use is not related to difficulty level of composing but to its level of relation to textual output.</td>
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<td>• Retrospective interview</td>
<td>• L1 use decreases with the increase of L2 proficiency.</td>
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<td>• Quantitative analysis</td>
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<th>Findings relevant to language use and L-S</th>
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<tbody>
<tr>
<td>Wang (2003)</td>
<td>• What is the L-S frequency while composing in L2?</td>
<td>• N=8</td>
<td>• TAP</td>
<td>• HPG switches more frequently to L1 than LPG.</td>
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<td></td>
<td>• What are the purposes for L-S?</td>
<td>• L1: Chinese; L2: ESL</td>
<td>• Questionnaires: 2</td>
<td>• Task difficulty is not related to L-S frequency.</td>
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<td></td>
<td>• What are L-S qualitative differences between HP and LP writers?</td>
<td>• (and previously EFL)</td>
<td>• Observation</td>
<td>• L-S might facilitate writing processes.</td>
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<td></td>
<td></td>
<td>• LgP: LP/HP (ESL course level 4, 5/7,8)</td>
<td>• Retrospective interviews</td>
<td>• Purposes for switches to L1: for idea-generation, metacomments; lexical searching (both groups)</td>
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<td></td>
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<td>• Written texts: 2</td>
<td>• Written: personal letter &amp; argumentative</td>
<td>• HPG: to consult plans, consider task constraints &amp; audience, for problem-solving &amp; ideational thinking;</td>
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<td></td>
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<td>• WG: personal letter &amp; argumentative</td>
<td>• Statistical analyses of TAP data</td>
<td>• Approaches to L-S:</td>
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<td>• Lexical searching for HPG is: cross-linguistic, concerned with rhetoric and meaning.</td>
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<td>• Lexical searching for LPG is with no rhetorical concerns, unidirectional, decontextualized.</td>
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<tr>
<td>Knutson (2006)</td>
<td>• What is the role of mental translation or “thinking in the L1” in L2 writing?</td>
<td>• N=6</td>
<td>• TAP</td>
<td>• L1 is used for text generating, addressing local &amp; discourse concerns, reviewing, reassessing, evaluating meaning, processing overload, back-translating.</td>
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<td>• Is L1 use related to the quality of the written product?</td>
<td>• L1: English; L2: French; L3: Spanish &amp; Latin (N=3); but no reports of L3 use.</td>
<td>• Questionnaires (background &amp; strategy)</td>
<td>• L2 proficiency is directly related to L2 use (HP writers generate text directly in L2 while LPG relied on L1).</td>
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<td></td>
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<td>• LgP: intermediate (2nd and 3rd year college)</td>
<td>• Retrospective interview</td>
<td>• HP group displayed more fluid L-S.</td>
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<td>• Written text: 1 (in L2)</td>
<td>• L1 use does not seem to influence text quality.</td>
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<td></td>
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<td>• WG: review of a movie</td>
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<tr>
<td>Haneda (2007)</td>
<td>• Explore students’ modes of engagement in writing in an FL.</td>
<td>• N=9</td>
<td>• Writing conferences</td>
<td>• LgP and L1 literacy influences L1/L2 use in L3 writing.</td>
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<td></td>
<td></td>
<td>• L1: Jap., En., Kor., Ch.</td>
<td>• Interviews &amp; conversations</td>
<td>• HP students use L2 (or L3) to generate ideas, make notes.</td>
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<td></td>
<td></td>
<td>• L2: En., Jap., Ch.</td>
<td>• Field notes</td>
<td>• LP students use L1 (or L2) to generate ideas, brainstorm, and write down ideas, drafts.</td>
</tr>
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<td>• L3: Jap.</td>
<td>• Written texts</td>
<td>• HP students depend less on L1 (or L2).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Multilinguals : 5</td>
<td>• Genre: narrative &amp; argumentative</td>
<td>• LP students compose in L2/L3 with loops back to L1/L2.</td>
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</tbody>
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Table 2.1: continued

<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Research questions related to language use and L-S</th>
<th>Participants’ characteristics</th>
<th>Data collection &amp; analysis</th>
<th>Findings relevant to language use and L-S</th>
</tr>
</thead>
</table>
| Lei (2008)    | • What strategies do L2 writers use to mediate strategically their writing?  
• N=2  
• L1: Chinese  
• L2: EFL  
• LgP: English majors | • Interviews  
• Stimulated recall  
• Process logs  
• Written text: 1 | • L1-mediated strategies: L1 used in the preparation phase to gather information, organize and express ideas, find the accurate word meaning.  
• L2-mediated strategies: view of L2 use and LgP as psychological tools to write better essays |
| Jessner (2005) | • What compensatory strategies L3 learners use to overcome their linguistic deficits?  
• What are the forms and functions of metalanguage (ML)?  
• How L1, L2, L3 are used for expressing ML?  
• What is the relation between ML and language choice in L3 production?  
• N=17  
• L1/L2: German/Italian bilinguals;  
• Dominant Language: L1 for most  
• L3: EFL  
• LgP: intermediate (8 years of L3) | • TAPs  
• Background questionnaire  
• Questionnaire  
• WG: narrative (letter), argumentative essay, summary  
• Quantitative and Qualitative analyses of C-S units that involve only ML | • Forms of ML: comments and questions that precede C-S.  
• Functions of ML questions: to express uncertainty about a lexical item, to search for alternatives.  
• Functions of ML comments: style, grammar, alternative phrasing, reference to use of languages, language choice, explicit deficit statement, lexical item postponement.  
• ML exerts a control function in multilingual processing.  
• Language use for expressing ML:  
• ML in less dominant language: less functions.  
• ML in dominant language: more frequent.  
• Language choice for ML is influenced by level of LgP and recency of language use.  
• Language systems are not independent entities but linked to a shared store. |
Table 2.1: continued

<table>
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<tr>
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</tr>
</thead>
</table>
| Jessner (2008)  | • Do multilinguals display increased metalinguistic awareness in the production of L3?  
• How multilinguals think in an L3?  
• How multilinguals think about languages? | • N=17  
• L1/L2: Italian/German bilinguals;  
• L3: EFL  
• Dominant Language: German for most of the participants  
• LgP: intermediate (8 years of L3) | • TAPs  
• Background questionnaire  
• Written texts: 3  
• WG: narrative, argumentative, summary  
• Quantitative and qualitative analyses based only on C-S units involving the use of ML | • Use of L1 and L2 in L1, L2 based and combined strategies to overcome linguistic deficits resulting.  
○ Most switches to dominant language precede the L3 item;  
○ Switches to less dominant language follow the L3 item;  
○ Most switches involving ML: in combined strategies.  
• Roles of L1/L2 in L3 production:  
○ dominant language: main supporter language functioning as a springboard to overcome lexical problems.  
○ less-dominant: confirmor of the lexical choice.  
• ML can precede switches and exert a control function.  
• The language of the ML indicates the dominant language.  
• Distinction between cross-linguistic awareness and ML awareness is identified. |
| van Weijen et al. (2009) | • Is L1 used to carry out conceptual activities in L2 composing?  
• To what extent does L1 use during L2 writing vary for individual writers?  
• Is L1 use related to WE, LgP, and text quality? | • N=20  
• L1: Dutch; L2: EFL  
• LgP: BA English Majors | • TAPs  
• Written texts: 4 in L1 and 4 in L2  
• WG: argumentative  
• Vocabulary test (to assess LgP)  
• Audio & video recordings  
• Statistical Analyses of TAP data | • L1 is used for metacomments and self-instruction.  
• L2 is used for content-oriented cognitive activity: goal-setting, structuring, generating ideas.  
• LgP is directly related to text quality  
• LgP does not influence the occurrences of conceptual activities in L1 and L2.  
• WE influences negatively L1 use (i.e., highly skilled writers use less L1 and vice-versa). |

Note: L1/L2/L3 = first, second, third language; NES = native English speakers; LgP = language proficiency in L2/L3; WE = writing expertise; WG = writing genre; WM = writing mode; LP(G) = less proficient (group); HP(G) = higher proficient (group); TAPs = think-aloud protocols.
2.3.4.2 Functions of language use and L-S in L2/L3 writing

Despite a wide variety of research goals and methodologies, the above reviewed studies shed valuable light on the use of L1 for:

1. Initiating/generating ideas, searching for topics, developing concepts, preparing notes, writing drafts, and organizing information (e.g., Knutson, 2006; Lei, 2008; Qi, 1998; Uzawa & Cumming; 1989; Wang & Wen, 2002).

2. Retrieval, generating, verifying, and assessing lexical items and syntagmatic choices (e.g., Cumming, 1990; Jessner, 2008; Knutson, 2006; Lay, 1982; Lei 2008; Manchón et al., 2000; Qi, 1998; Wang, 2003; Wang & Wen, 2002).

3. Backtracking, rereading through back-translating, and retracing written text (e.g., Cumming, 1990; Knutson, 2006; Manchón, et al. 2000).


Furthermore, the findings lead to the conclusions that L2 is mostly used for generating text (e.g., Knutson, 2006; Wang & Wen, 2002), planning (Jones & Tetroe, 1987), undertaking task-examining (Wang & Wen, 2002), backtracking (e.g., Manchón et al., 2000), retrieval and assessment of lexical items (Cumming, 1990; Manchón et al., 2000; Qi, 1998; Wang, 2003; Wang & Wen, 2002), and reasoning about linguistic choice, although in rare instances (Cumming, 1990).

In addition, the research indicates that writers switch during L2 composing in order to initiate ideas, search for a lexical item, confirm lexical meaning, revise and correct errors, plan the task, establish coherence (Cumming, 1990; Qi, 1998; Wang, 2003), generate text (Wang, 2003), facilitate the development of a thought (Qi, 1998),
minimize the overloading of working memory (Qi, 1998), and express metacommments (Wang, 2003).

2.3.4.3 Effects of language use and L-S on composing process and L2 text

The effects of L1/L2 use and L-S on the quality and the quantity of the final text and on the composing process have been investigated in a few studies carried out with ESL and FL writers. Conclusions about the beneficial effects of L1 use and L-S on the writing process and the composition quality are advanced by Lay (1982) and further supported by Friedlander (1990) with respect to planning, by Kobayashi and Rinnert (1992) regarding translation mode for students below certain threshold of proficiency, and by Cohen & Brooks-Carson (2001) concerning writing in the direct mode. With respect to bilinguals, the latter study’s conclusions imply that higher L2 proficiency is related to higher quality essay and more use of L2 in L3 writing.

With reference to L-S, its distinct effect on more and less L2 proficient learners is suggested by Wang (2003). This finding concurs with Woodall’s (2002) conclusion that more L1 use is related to higher quality of L2 text, but only for students with two cognate languages, and with Qi’s (1998) finding that L-S facilitates the development of thought and the pace of thinking. Lei’s (2008) study brings in a sociocultural perspective, viewing the development of L2 proficiency as a psychological tool used strategically by proficient EFL writers to fulfill their goals to write better essays.

However, some contradictions are brought up by Knutson’s (2006) conclusion that L1 use does not seem to influence text quality. In addition, van Weijen et al. (2009) depict a more complex picture of language use in L2 writing by affirming that L1 use might be detrimental to L2 text quality. Their conclusions suggest while L2 use seems to
be positively related to L2 text quality for goal setting, generating ideas, and structuring, it is negatively related to L2 text quality for self-instruction and metacomments.

2.3.4.4 Factors influencing language use and L-S

Another focus of the above-reviewed research into language use and L-S in L2/L3 writing has been factors that influence language use and L-S, such as level of L1/L2 proficiency and literacy, writing expertise, writing topic, nature of the writing task, mode of writing, and language typology.

1. Relationship between language use/L-S and level of language proficiency and writing expertise:

Jones & Tetroe (1987) concluded that insufficient L2 vocabulary, related to L2 proficiency level, prompts an increase in L1 use for planning. Their conclusions concur with Woodall’s (2002) findings that higher frequency of L-S is characteristic for less proficient L2 learners and with Haneda’s (2007) conclusion that higher level of L2 proficiency brings about a decrease of L1 use (or English as an L2 in multilinguals). Along the same lines, Wang & Wen (2002) claim that L1 use in text generating activities declines with the development of L2 writers’ proficiency. On the other hand, van Weijen et al. (2009) suggest that language proficiency does not influence the choice of language for conceptual activities (e.g., planning, generating ideas, etc.). In addition, their findings suggest that writing expertise does influence negatively L1 use (i.e., highly skilled writers use less L1) and positively L2 use. With respect to multilinguals’ writing, Jessner (2005) implies that language choice is influenced not only by level of language proficiency but also by recency of use.
Nevertheless, possible contradictions are suggested by Knutson’s (2006) finding that although L2 proficiency seems to be directly related to L2 use, the most proficient participant used extensively mental translations, hence more L-S. Moreover, Cumming’s (1989, 1990) studies suggest the view that while L2 proficiency is not related to cross-language switches in L2 composing, writers’ metalinguistic and ideational behavior, which involves frequent cross-language switches, seems to be related to their L1 writing expertise. Some of the reasons that could account for Cumming’s counter conclusions might be that his research goals were not explicitly focused on language use and C-S, as well that his participants were bilinguals. Furthermore, contrary to previous studies, Wang (2003) claims that the quantitative aspect of L-S (i.e., frequency of occurrences) is not affected by L2 proficiency. The contradictory findings could be the result of methodological differences, such as differences in defining L-S and in measuring and coding procedures. For instance, with respect to measuring L-S, contrary to Woodall, Wang (2003) did not include the participants’ L1 utterances that were directly translated into L2. Furthermore, Haneda (2007) discovered interwoven relations among L2 proficiency, L1 writing expertise, and the social construct of the writer’s identity.

2. Relationship between language use/L-S and writing topic:

Positive relationships between language use and writing topic (i.e., generating topic-area information in the language it has been acquired in) are suggested by Lay (1982) and Friedlander (1990). The latter study suggests as well that “some knowledge is stored in language-specific form” (p. 122). Going beyond only one aspect of writing (i.e., planning in the latter study) Jessner (2005), Cumming (1990), and Qi (1998) advance the view that bilinguals and multilinguals do not have L1, L2, L3 separate
conceptual stores, but rather a shared storage system of conceptual knowledge, which could be accessed via either language.

3. Relationship between language use/L-S and writing genre:

Lack of consensus remains regarding the effect of writing genre on language use and L-S. For instance, Qi (1998) and Woodall (2002) claim that tasks with higher level of cognitive demand increase the overall amount of L-S, L1 use (the former study), and the duration of L1 use (the latter). On the contrary, Wang & Wen (2002) did not find such a relationship between L1 use and writing genre. Similarly, Manchón et al.’s (2000), Wang’s (2003), and Haneda’s (2007) conclusions imply that the difficulty of the writing task does not influence L-S frequency.

4. Relationship between language use/L-S and writing mode:

Studies that look into the influence of modes of writing on language use and L-S also bring about conflicting findings. For instance, Cohen & Brooks-Carson (2001) present evidence that whereas translation mode might have positive effects on the quality and quantity of ideas, and better L2 text organization for certain students in certain writing tasks, the direct writing mode could be more helpful for more proficient learners. These findings are in line with Kobayashi and Rinnert (1992), who conclude that the translation mode might inhibit L2 writing fluency and delay the development of reader awareness but, at the same time, it could benefit development of ideas and enhance richer L2 uses and vocabulary for students below certain threshold of proficiency. Conversely, Gosden (1996) concluded that the translation mode was a widespread writing practice carried out by many Japanese researchers due to the teaching EFL practices in Japan (see also Sasaki, 2001)
5. Relationship between language use/L-S and language family:

Woodall (2002) brings into focus the effect of language group on L-S. Although he concludes that language group, as a single factor, did not influence L-S, the findings point to less switching by ESL learners. Similar to Cohen & Brooks-Carson (2001), the finding is explained with the influence of the English academic environment. However, conclusions related to the impact of language group on L-S raise questions about the psycholinguistic aspect of perceiving typological distance between languages, that is, taking into account not how researchers perceive language distance but how writers perceive that relationship between/among languages.

6. Relationship between language use/L-S and literacy:

Haneda (2007) draws attention to a possible relationship between multilinguals’ literacy and language use, that is, higher level of L1 literacy might entail more L1 than L2 use for formulating ideas while composing in L3.

2.4 Chapter Summary

Whereas Silva’s (1993) conclusion about the distinct nature of L2 writing with respect to writing in one’s native language has undoubtedly become a widely accepted assumption in the SLW field, the issue with respect to L3 and L2 writing remains an important point on the research agenda of TLA scholars (Jessner, 2005). Nonetheless, even within the SLW field, the limited understanding of the uniqueness of the use of both languages (Wang & Wen, 2002; Woodall, 2002) might have spurred the recent interest in L-S and the roles of L1/L2 while composing. A conclusion that could be drawn from the above discussion of related literature points to a dynamic nature of the interactions among first, second, and third languages during L2/L3 composing processes. However,
the picture that emerges remains incomplete, due in part to methodological differences and the extent to which this line of research explored language use and L-S. As mentioned above, while some studies merely reported on the phenomena, others investigated more closely some of the facets of language use and L-S. Yet, only a handful investigated in more detail the nature of L1, L2, and L3 use and L-S. Nonetheless, it is important to emphasize that the studies conducted to date offer valuable insights about the functions languages and L-S serve during the writing process, their effects on the quality and quantity of the written text, and the writing process itself, as well as the factors that bring about L1, L2, and L3 use and L-S.

However, as pointed out in the summary of the findings, the research has produced conflicting evidence concerning the nature of language use and L-S during composing. More specifically, contradictory results emerge as regards the influence of some variables (e.g., proficiency, writing expertise) and factors that trigger L-S or the use of a specific language. A disparity in the findings could be attributed to some of the following differences. For instance, some contrary findings might have been due to methodological issues, such as relying on a single-task design (e.g., Friedlander, 1990; Manchón et al., 2000; Uzawa & Cumming, 1989; Wang, 2003; Wang & Wen, 2002; Woodall, 2002). This feature could be problematic, since research has indicated that intraindividual variability could provide invaluable information and detect specific patterns in writers’ language use (Larsen-Freeman & Cameron, 2008a). Moreover, in other studies, L1/L2 use or L-S are not clearly defined, or there is some ambiguity in information provided regarding procedures for measuring duration, length, and frequency of L-S (e.g., Knutson, 2006; Qi, 1998). Yet, other studies that endeavor to measure
language use and L-S make use of different procedures. Hence, these methodological problems make it difficult to generalize findings with respect to the factors that impact on L-S and language use and the functions they play in L2/L3 writing processes. In addition, heterogeneity of contexts (ESL, EFL, FL in Europe and the USA) in which the studies have been carried out might have contributed to the discrepancy of findings. For instance, Reichelt (2009) reflects on some considerable differences in writing instructions, pedagogical practices, and teacher education that distinguish Asian and European countries, and the U.S. Another factor for the inconsistencies of findings might have been the great diversity in participants’ levels of L2/L3 proficiency. For instance, in the majority of studies with ESL students, they have been considered bilinguals. Similarly, most of the studies that have focused on FL and EFL writing analyze data from advanced level learners with generally more than six years of FL study. However, only a few researchers (e.g., Cohen & Brooks-Carson, 2001; Knutson, 2006; Woodall, 2002) have explored language use and L-S of intermediate and advanced-low FL writers. Therefore, the fact that only about one-third of the above-reviewed studies have been carried out in the U.S. context and merely a few collected data from intermediate language learners points to a gap in this line of research. Furthermore, it is important to highlight the paucity of research in L3 writing not only in the U.S. but also worldwide, and especially with respect to learners of two FLs. Therefore, the present study aimed to explore the intricate relationships among languages in L2 and L3 composing in order to fill in the gaps in our current understanding of multilinguals’ writing with respect to the roles languages and L-S play in the process.
Indeed, research methodology and conceptual frameworks are interconnected. The conceptual lens we choose guides our way of questioning, exploring, and describing the world. As evident from the review of related literature, cognitive, sociocognitive, and sociocultural theories have guided the inquiry in L-S and language use in L2/L3 writing. Even though the studies reflect different ontological and epistemological standpoints, they all provide, although to a different extent, valuable insights into the phenomena. At the same time, however, they raise questions related to the nature of interplay of the languages, the array of factors that might influence language use. In addition, the contradictory conclusions regarding the factors that bring about L1, L2, L3 and L-S challenge the conventional view of linear cause-effect relationship. From this perspective, complexity theory, as advanced by Larsen-Freeman & Cameron (2008a), provides an alternative framework to reconceptualize L-S and explore the intricate interrelationships among not only languages, but also other components of L2/L3 writing viewed as a dynamic system. Although the authors stress that their endeavor has aimed “not to have the last word but to open the conversation” (p. 255), some of the assumptions that underpin the complexity theory approach could alter the conventional way of conceiving of L-S and language use as cognitive phenomena.

The present study drew on sociocognitive, sociocultural, and complexity theory as proposed by Larsen-Freeman (1997, 2011), Larsen-Freeman & Cameron (2008a, 2008b) to explore language use and L-S in multilinguals’ L2/L3 composing. The main tenets are summarized below:

1. Mind, body, and world are integrative, inseparable, and one cannot be understood without the others. This is in light of the sociocognitive approach that views
them “as relationally and integratively, as constituting a continuous ecological circuit” (Atkinson et al., 2007, p. 170).

2. Sociocultural environment and cognitive processes form an organic unity as argued by Lantolf (2007, p. 31-33). From a sociocultural perspective, human activity, learning, and development are regarded as embedded in people’s interactions and sociocultural milieu. Thus, the interrelation between social and cognitive in this study is seen as bidirectional and dynamic.

3. Writer’s first, second, third, and any additional languages are seen as language systems, which is line with Herdina & Jessner’s DMM (2002). This view implies that an individual could react “differently to identical input in different situations” (p. 75). However, I expand on their view by emphasizing the relational view of language, which is in line with complex theory and ecological approaches. This view is succinctly conveyed by van Lier’s (2000) jungle metaphor:

What does it mean to know a language, if not to possess a store of linguistic structures, rules, words, phrases, and so on? What are the linguistic contents of the mind? This is not an easy question to answer, either for the cognitivist or the ecologist. I suppose that the ecologist will say that knowledge of language for a human is like knowledge of the jungle for the animal. The animal does not ‘have’ the jungle; it knows how to use the jungle and how to live in it. Perhaps we can say by analogy that we do not ‘have’ or ‘possess’ language, but that we can learn to use it and to ‘live in it’. (p. 253)

From this perspective, it could be assumed that a person does not ‘know’ a language (e.g., French, English), but rather he/she uses a language in his/her own way, thus creating his/her individual language systems.

4. These language systems are dynamic, interconnected, and in constant change. Contrary to the common view of L1, L2, and L3 as stable autonomous entities, in light of complexity theory, any change in one of writer’s language systems brings about changes
in the others and in the whole system (e.g., language development, language use). Furthermore, these systems are considered complex, non-linear, open, coadaptive, and always in flux.

5. A variety of methods of data collection is essential, as evident from the review of previous research on language use and L-S. This study employed a variety of data sources, such as background questionnaire, stimulated recalls, retrospective interviews, written essays, field notes, TAPs (used in most of the discussed studies), and Inputlog files. The need for diversity of data collection, emphasized also by Larsen-Freeman & Cameron (2008a, 2008b) entails mixed-method analysis, thus corresponding to SLW researchers’ call for multimodal inquiry (Silva, 2005) and multidisciplinary research in L2 writing (Cumming, 2010).

This study was motivated by the afore-identified limitations of previous research on language use and L-S in L2 writing, the discrepancies in the findings, and the paucity of research on multilinguals’ writing. Drawing on different yet complementary conceptual tools, this dissertation explored the nature of multilinguals’ writing, the interplay of languages, and their roles in L3 writing.
Endnotes:
1 “We never seek things, but the quest for things.” [My translation]. Pascal (1962, p. 109).
2 Sociocultural theories is used as an umbrella term. It includes a number of theoretical frameworks that focus on social and cultural factors in L2 learning and use (Lantolf, 2006, p. 69).
3 Larsen-Freeman & Cameron (2008a) state explicitly that complex systems approach implies a sociocognitive perspective. However, they identify a wide range of conceptual tools and theories (e.g., cognitive, sociolinguistic, sociocultural and ecological) they have drawn upon in developing their complexity theory approach.
Chapter 3: Research Methodology

“I think the next century will be the century of complexity.”
(Prof. Stephen Hawking)

This chapter describes the dissertation’s research methodology and the rationale underlying the methodological decisions made. Since only a few studies have investigated exclusively the phenomenon of L-S and language use in L2 and L3 writing, the present study is exploratory in nature. This is a mixed-method study that explored the nature of multilinguals’ writing with respect to L-S and language use while composing in L2 and L3. It was designed in light of scholarship that has explored issues in relation to TLA and L3 writing and with regards to findings reported in studies investigating L-S and language use in L2 writing. The study addressed the following research questions:

1. What are the dynamics of languages in L2 and L3 writing?
2. Is there a relationship between language-switching frequency and (a) L2 proficiency; and (b) L3 development in L3 writing?
3. What conditions favor L-S and language use in L2 and L3 writing?
4. What types of L-S are used by multilinguals while composing in L2 and L3?
5. What is the role of L1 and L2 in L3 writing?

3.1 Overview of Research Design

The rationale for the adoption of a concurrent mixed-method approach is that while quantitative data provide a useful general picture of the investigated phenomena
(i.e., language use and L-S, the role of the languages, and factors that influence their use), such data only tell part of the story. Given the nature of the phenomena being studied, it was deemed necessary to create space for the participants’ voices to be heard, particularly since a key component of the study was the ways in which the participants composed, i.e., their writing processes. It was felt that qualitative data and analysis would serve that need and thus offer meaningful context for the statistical data that were gathered. Thus, the qualitative findings were expected to complement the quantitative data. Toward this end, recruitment of students who would be willing to share their individual stories took place, and six individuals volunteered to participate in the study. Both the quantitative and qualitative data were gathered from these six individuals.

3.2. Summary of Procedures

To provide context for later description of the data gathering instruments used and data analysis procedures employed, this subsection provides a brief summary of how the study was conducted.

To initiate the study, a background questionnaire was administered in order to gather relevant demographic information about the participants, such as their language background, levels of language proficiency, exposure to and use of L1, L2 and L3, motivation for learning an L3, writing experience and prior writing instruction in their L1, L2, and L3. Subsequently, the participants were asked to carry out three writing tasks (which are described in detail later in the chapter). Each writing session involving these tasks took place in the researcher’s office. The first writing task was carried out in their L2 and followed two weeks later by a second task carried out in L3. Ten weeks
later they completed the third writing task in their L3. The table below presents the summary of the study’s timeline.

Table 3.1. Study timeline and stages

<table>
<thead>
<tr>
<th>Week</th>
<th>Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>Soliciting participants</td>
</tr>
<tr>
<td>3</td>
<td>Signing the consent form</td>
</tr>
<tr>
<td>4</td>
<td>Administering background questionnaire</td>
</tr>
<tr>
<td></td>
<td>Instructions and practice how to think aloud</td>
</tr>
<tr>
<td></td>
<td>Writing task 1 in L2</td>
</tr>
<tr>
<td></td>
<td>Retrospective interview 1</td>
</tr>
<tr>
<td>6</td>
<td>Writing task 2 in L3</td>
</tr>
<tr>
<td></td>
<td>Retrospective interview 2</td>
</tr>
<tr>
<td>15-16</td>
<td>Writing task 3 in L3</td>
</tr>
<tr>
<td></td>
<td>Retrospective interview 3</td>
</tr>
</tbody>
</table>

With respect to writing instruments employed, the participants were asked to use a computer instead of pen and paper, since they had been using the computer on a regular basis for their schoolwork. Thus, using pen and paper would have constituted a rather unfamiliar writing environment for them. The use of a computer is in line with van Weijen et al.’s (2009) study but contrary to Jessner’s (2005, 2008), Wang’s (2003) and Woodall’s (2002) studies. Similar to Wang (2003) and Woodall (2002) they were allowed to use a bilingual dictionary. However, in line with the participants’ writing experiences and in contrast to the latter studies, the writers had access to a variety of online dictionaries and/or resources (i.e., monolingual, bilingual, automatic translator). In addition to the fact that online resources were perceived by the participants as more efficient, concerning the goals of the present study it was assumed that the online access would have less influence on the writing process, since the participants could directly write the word or expression they were searching for instead of leafing through pages.
Prior to the first writing tasks, the participants were given instructions in English about the think-aloud procedure and the writing task (Appendix A). These instructions stated explicitly that (a) the think-aloud technique itself represents composing, namely, everything one would think during the composing process; and (b) the participants were free to use whichever language they chose during this aspect of composing. Subsequently, the participants practiced how to think aloud while writing on a topic different from those used in the study. When they felt comfortable about thinking-aloud, they proceeded to the writing tasks. Each writing session/task was video-taped and observed by the researcher. The writing session was recorded using a computer program called Inputlog, which registers every keystroke and mouse movement, as well as websites consulted by the participants as they composed. The program analyzes the writing data and generates a general logging file, text analysis, statistical analysis, and pause analysis. Upon completion of each writing task, a stimulated recall interview was conducted and audio-recorded. The interviews, enhanced by the videotape of the writing session, included questions related to pauses and managing of specific instances of L-S during the composing process. The stimulated recall was followed immediately by a retrospective interview addressing questions aimed at shedding light on L-S and language use from an emic (i.e., insider) perspective and provide additional data relevant to the research questions (Wang & Wen, 2002). The video recordings were transcribed, coded, and subjected to detailed quantitative and qualitative analyses concerning languages used during L2 and L3 composing, L-S location, frequency and length of language-switches and segments. The interviews were also transcribed. Collection of a variety of sources of data was intended to ensure triangulation of the data and strengthen the study’s
validity. Additionally, the written texts produced by the participants and the Inputlog files were analyzed in order to complement the transcription and analysis of the TAPs.

3.3 Participants

The participants for the study were solicited from the language department at a U.S. Midwestern university. This department was selected based on the primary focus of the study: investigating the interplay of languages. The decision as to the number of participants used was made for a few reasons, and concerns about the appropriate number for this kind of study were carefully considered during that decision making process. For instance, it is widely acknowledged that in order to elicit results that could lead to certain generalizations, a large-scale study is needed wherein variables should be controlled. This implies a need for homogeneous groups with regards to specific parameters such as L2 and L3 language learning background, level of proficiency, and writing experience. Hence, the major difficulty encountered was linked not to finding multilinguals, but rather multilinguals who displayed similar characteristics with respect to demographic, linguistic, social, and educational factors in order to “create a homogeneous testing population” (Jessner, 2005, p. 59). Taking into account the exploratory nature of the present study and the embraced view of writing as idiosyncratic, dynamic, complex, embedded in particular historical, social, and cultural settings, it was assumed that a case study with six participants would provide sufficiently rich information about multilinguals’ language use and L-S and offer a valuable foundation for further exploration of the phenomenon.

The participants were identified through classroom observations and an informal interview in order to achieve appropriate homogeneity with regard to demographic and
L2/L3 characteristics. The next step was to administer a background survey intended to reveal relevant information about the participants. Parameters that research has shown to have impact on L3 learning include the following: language background and sequence, language proficiency levels, language courses taken at the time of the study, language program background, context of language use, writing experiences, and attitude towards writing in L1, L2, and L3 (adapted from De Angelis, 2007).

In accordance with the present study’s aims, the participants were learners of L2 and L3 as FLs and learners for whom L2 was a second and L3 a foreign language. At the time of the study, their L3 instruction consisted of two 75 minute class meetings per week. The textbooks used for language instruction aimed to develop all four skills in the foreign language: speaking, listening, reading, and writing. With respect to developing writing skills students, depending on their proficiency level, were required to write essays in different genres (narrative, expository, and argumentative). Other writing assignments included online workbook activities with a focus on listening comprehension, pronunciation, vocabulary, grammar, and writing. The participants’ second and third languages were determined based on their level of speaking and writing proficiency, that is, their L2 proficiency was higher than their L3. At the beginning of the study, their L2 proficiency level varied from intermediate-high to superior. Their L3 proficiency was intermediate-medium (participants B, D, H) and intermediate-high (participants M, A, S) according to ACTFL (1999, 2001) proficiency guidelines. Participants’ speaking and writing language proficiency was assessed by their language instructors according to the ACTFL guidelines. It was further confirmed by: (a) participants’ enrollment in FL classes, which was based on results from FL placement test required for all students
taking FL courses; and/or (b) their continuous enrollment in subsequent FL courses. At the university which served as the research site, FL courses were designed for students to attain a minimum proficiency level based on the ACTFL guidelines:

1. novice-mid: by the end of first semester of FL studies;
2. intermediate-mid: by the end of second semester of FL studies;
3. intermediate-high: by the end of the fourth semester of FL studies;
4. advanced-low: by the end of the sixth semester of FL studies;
5. advanced-mid: by the end of the seventh/eighth semester of FL studies.

Tables 3.2 and 3.3 below present data compiled from background questionnaires and interviews: these show the profile of the participants studying, respectively, two foreign languages (FL group) and participants with L2 as an SL and L3 as an FL (SL group).

The participants M and H were American-born native English speakers who started studying an FL in high school and a second FL at the university. Participant A was an exchange student from France who started studying three FLs in her middle school in France. M., A., and H. identified their L1 as their dominant language, regardless of the country and/or context where they have/had been studying their FLs. Collectively, these three participants were considered FL learners and thus labeled the FL Group.
### Table 3.2. FL participants’ profile

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Participant 1 (M)</th>
<th>Participant 2 (A)</th>
<th>Participant 3 (H)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>22</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>Gender</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>Major &amp; minor</td>
<td>Italian &amp; French</td>
<td>Languages &amp; Marketing</td>
<td>Italian &amp; Spanish</td>
</tr>
<tr>
<td>Language background &amp; sequence</td>
<td>En.(^2) dominant En. / Fr. / It.</td>
<td>Fr. dominant Fr. / En. / Sp. / G.</td>
<td>En. dominant En. / Sp. / It.</td>
</tr>
<tr>
<td>Proficiency level (ACTFL)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>Advance-mid. (It.)</td>
<td>Advance-mid. (En.)</td>
<td>Intermediate-high (It.)</td>
</tr>
<tr>
<td>L3</td>
<td>Intermt.-high (Fr.)</td>
<td>Intermt.-high (Sp.)</td>
<td>Intermt.-mid. (Sp.)</td>
</tr>
<tr>
<td>L4</td>
<td>N/A</td>
<td>Intermt.-mid. (G.)</td>
<td>N/A</td>
</tr>
<tr>
<td>Language proficiency: self-evaluation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>Wr(^3): advance</td>
<td>Wr: advance</td>
<td>Wr: superior</td>
</tr>
<tr>
<td></td>
<td>Speak.: advance</td>
<td>Speak.: superior</td>
<td>Speak.: advance</td>
</tr>
<tr>
<td>L3</td>
<td>Wr: advance</td>
<td>Wr: advance</td>
<td>Wr: advance</td>
</tr>
<tr>
<td></td>
<td>Speak.: intermediate</td>
<td>Speak.: superior</td>
<td>Speak: advance</td>
</tr>
<tr>
<td>L4</td>
<td>N/A</td>
<td>Wr: novice</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Speak.: intermediate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL/SL courses (at the time of the study)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>L3</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>L4</td>
<td>N/A</td>
<td>1</td>
<td>N/A</td>
</tr>
<tr>
<td>Language program background</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>U(^4): 3 courses SA: Italy, 5 courses, (summer &amp; semester)</td>
<td>Middle &amp; HS: 9 yrs U: 4 courses SA: USA (semester(^5))</td>
<td>U: 4 courses</td>
</tr>
<tr>
<td>L3</td>
<td>HS: 3 yrs U: 2 courses SA: Italy, 2 courses</td>
<td>Middle &amp; HS: 8 yrs U: 2 courses</td>
<td>HS: 3 yrs U: 3 courses</td>
</tr>
<tr>
<td>L4</td>
<td>N/A</td>
<td>Middle &amp; HS: 7 yrs</td>
<td>N/A</td>
</tr>
<tr>
<td>Contexts of language use (at the time of the study)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>Formal</td>
<td>Formal &amp; informal(^7) (L2 discourse community)</td>
<td>Formal</td>
</tr>
<tr>
<td>L3</td>
<td>Formal</td>
<td>Formal (school &amp; tutor)</td>
<td>Formal &amp; informal (online)</td>
</tr>
<tr>
<td>L4</td>
<td>N/A</td>
<td>Formal</td>
<td>N/A</td>
</tr>
<tr>
<td>Writing experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>Grammar activities</td>
<td>Papers, translation</td>
<td>Grammar activities, compositions, notes</td>
</tr>
<tr>
<td>L3</td>
<td>Grammar activities, compositions</td>
<td>Grammar activities, composition</td>
<td>Grammar activities, compositions, notes</td>
</tr>
<tr>
<td>Attitude toward writing(^6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>L3</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: \(^1\)F = Female; \(^2\)En.= English; Fr.= French; It.= Italian; Sp.= Spanish; G.= German; \(^3\) Wr.=writing; Speak.=speaking; \(^4\) U=university; HS=high-school; SA=study abroad; \(^5\) Exchange student for one semester; \(^6\) On a scale of 1 (not at all) to 5 (very much).
The other three participants, B, D, and S, started learning their L2 in formal and informal bilingual contexts. As native speakers of Spanish, B and S had studied English as an SL in Puerto Rico, respectively, since kindergarten and elementary school. Although D was born in the U.S., she was raised in an Italian-speaking family and spoke only Italian until entering elementary school. At the time of the study, she continued to use it on a daily basis for conversing with family members and relatives as well as for academic purposes. She started formally studying Italian in high school, took college-level Italian courses in Italy, and at the time of the study was taking Italian courses at the university. D considered English as her L1, while B and S identified Spanish as their L1. However, the three participants stated that both their L1 and L2 could be dominant depending on the context of use. Hence, D’s language background slightly differed from that of B’s and S’s, since she did not receive formal bilingual education involving her L1 and L2. However, the three participants’ language backgrounds showed similarities, namely, all had studied and used their L2 as an SL, although in different contexts. Therefore, B, D, and S were considered the second language learners (SL Group) who, in addition, had been studying L3 as an FL. These students’ L2 and L3 writing and speaking proficiency levels were assessed by their professors and language instructors according to the ACTFL guidelines and further confirmed by their enrollment in L3 language classes. In the beginning of the study, B’s and S’s L2 (English) proficiency was evaluated as superior, while D’s L2 was assessed as advanced-high. Their L3 proficiency was intermediate-high (S) and intermediate-mid (B and D). The table below presents their profiles:
Table 3.3. SL participants’ profile

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Participant 4 (B₁)</th>
<th>Participant 5 (D₂)</th>
<th>Participant 6 (S₁)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>21</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Gender</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>Major &amp; minor</td>
<td>Marketing &amp; Int. business</td>
<td>Languages &amp; Int. studies</td>
<td>Political sciences &amp; French</td>
</tr>
<tr>
<td>Language background &amp; sequence</td>
<td>Sp./En.⁴ dominant</td>
<td>En./It. dominant</td>
<td>Sp./En. dominant</td>
</tr>
<tr>
<td>Residency in country of</td>
<td>L2</td>
<td>one semester</td>
<td>2 years</td>
</tr>
<tr>
<td>Prof. level (ACTFL)</td>
<td>L2 Superior (En.)</td>
<td>Advance-high (It.)</td>
<td>Superior (En.)</td>
</tr>
<tr>
<td></td>
<td>L3 Interm.-mid. (It.)</td>
<td>Interm.-mid. (Sp.)</td>
<td>Interm.-high (Fr.)</td>
</tr>
<tr>
<td>Language proficiency: self-evaluation</td>
<td>L2 Wr': native like</td>
<td>Wr: advance &amp; Novice</td>
<td>Wr: native like</td>
</tr>
<tr>
<td></td>
<td>Speak.: native like</td>
<td>Speak.: intermediate</td>
<td>Speak.: superior</td>
</tr>
<tr>
<td></td>
<td>L3 Speak.: interm.-adv.</td>
<td>Wr: interm.</td>
<td>Wr: interm. &amp; Novice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Speak.: interm.</td>
<td>Speak.: intern.</td>
</tr>
<tr>
<td>FL/SL courses (at the time of the study)</td>
<td>L2 4</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>L3 None</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Language program background</td>
<td>L2 Bilingual school: 14 yrs</td>
<td>HS: 4 years</td>
<td>Bilingual school: 12 yrs</td>
</tr>
<tr>
<td></td>
<td>U: 3 yrs</td>
<td>U: 4 semesters</td>
<td>U: 2 yrs</td>
</tr>
<tr>
<td></td>
<td>L3 HS: 3 yrs</td>
<td>U: 2 courses</td>
<td>Middle school: 2 yrs</td>
</tr>
<tr>
<td></td>
<td>SA: 2 courses</td>
<td>SA: 4 sem. courses</td>
<td>HS: 4 yrs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>U: 4 courses</td>
</tr>
<tr>
<td>Contexts of language use (at the time of the study)</td>
<td>L2 Formal &amp; informal</td>
<td>Formal &amp; informal</td>
<td>Formal &amp; informal</td>
</tr>
<tr>
<td></td>
<td>L3 Informal (online)</td>
<td>Formal</td>
<td>Formal</td>
</tr>
<tr>
<td>Writing experience &amp; attitude toward writing</td>
<td>L2 Creative writing, notes, emails, essays, papers;</td>
<td>emails, notes, to do lists;</td>
<td>Essays, papers, notes, emails;</td>
</tr>
<tr>
<td></td>
<td>L3 Emails, journal;</td>
<td>Compositions, grammar activities;</td>
<td>Compositions, notes, grammar activities;</td>
</tr>
<tr>
<td>Attitude toward Writing³</td>
<td>L2 5</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>L3 5</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: ¹ International student; ² Even though D was born in the USA she was raised in an Italian speaking family and spoke only Italian until first grade. It continues to be the language used within her family and with relatives; ³ F = Female; ⁴ En. = English; Fr. = French; It. = Italian; Sp. = Spanish; ⁵ Wr. = writing; Speak. = Speaking; ⁶ U = university; HS = high-school; SA = study abroad; ⁷ On a scale of 1 (not at all) to 5 (very much).

Looking at the entire research cohort, the participants, aged between 19 and 22, were American (M, H, and D) and international (A, B, and S) undergraduate students with majors and minors in FLs and marketing, business, or political science. Only one
participant (B) was not studying FL as a major/minor and was not taking FL classes at the time of the study. Although they had diverse language backgrounds, their L1, L2, and L3 were cognate languages (English, Spanish, French, and Italian). With respect to their L2 and L3 learning program background, most of them had studied L2 in the country of their L2 (M, B, D, and S). In addition, M had studied L3 in the country of her L2 and B had studied L3 in the country of her L3 as part of a study abroad program. Furthermore, even though the participants’ backgrounds in L2 and L3 differed in terms of learning context and years of formal language studies, their L2 speaking and writing proficiency was higher than their L3 level, which was intermediate according to the ACTFL guidelines.

Regarding writing, all of the participants declared that the context of the writing prompt was familiar to them due to their writing experience with weblogs, blogging, online forums, and social network sites (e.g., Facebook) not only in their L1 but also in their L2 or L3 (S, H, D, and A). At the time of the study, all participants but B had been using their L3 in formal, academic settings. Most of the participants were active members of an L2 discourse community (B, D, S, and A) or an online discourse community (H), using the language for academic coursework and for communicating orally and/or in writing with friends, other students, and family. Only H and B had been using L3 in informal contexts through Facebook. With respect to attitude towards L1, L2, and L3 writing, while in most cases the participants reported a positive attitude on a Likert-type scale of 1 (not at all) to 5 (very much), D expressed a somewhat unfavorable attitude (2) toward writing in L3. Regarding their writing experiences, the students reported more diverse L1 writing experience, including creative writing, whereas their L2 writing activities comprised taking notes and writing essays and papers. Their L1 and L2
writing experiences contrasted with their L3 writing, which had been limited mostly to 100-300 words compositions and the completion of vocabulary and grammar activities.

3.4 Data Collection

The present study relied on a multiple source data collection approach in order to enhance the reliability and validity of the research. Quantitative and qualitative data were elicited through the following mechanisms: (a) background survey administered before the writing tasks; (b) TAPs obtained by video-recording the participants’ writing sessions; (c) logfiles processed by a computer key-stroke logging program; (d) audio-taped follow-up stimulated recalls and retrospective interviews; (e) written compositions, and (f) field notes. These sources of data are described in more detail in the remainder of this subsection of the chapter.

3.4.1 Background questionnaire

The background questionnaire has been employed in other research of this kind (e.g., Cohen & Brooks-Carson, 2001; Jessner, 2005; Knutson, 2006; Uzawa & Cumming, 1989; Wang, 2003) in order to identify appropriate participants (e.g., Wang, 2003) and elicit demographic information about their age, gender, educational and L2 background, and writing experiences. The background questionnaire, which was administered in English (Appendix B), provided valuable information regarding participants’ demographic characteristics, as well as multifaceted educational and linguistic background related to their L1, L2, and L3 learning and writing experiences.
3.4.2 Think-aloud protocols

3.4.2.1 The method

Since Ericsson & Simon’s (1980) seminal article published over 30 years ago, the think-aloud method has been the major data gathering technique used for examining and analyzing L1/L2 writers’ composing processes, despite the criticism raised by a number of L1/L2 writing researchers (e.g., Faigley & Witte, 1981; Jessner, 2006; Manchón et al. 2005; Polio, 2003; Randsell, 1995; Roca de Larios et al., 2001; Sasaki, 2000, 2004; Smagorinsky, 1989, 1995, 2001; Zamel 1983). They pointed out some of the limitations of the think-aloud method related to its generalizability, validity, methodology, and nature. With respect to the latter concern, researchers addressed the issue of its artificiality and psychological/psycholinguistic problems it might entail. For instance, concerns have been addressed that writing and concurrently verbalizing their thoughts might alter writers’ thinking/cognitive processes, interrupt the line of thoughts, slow down the writing process, interfere with their beliefs about what to say aloud and/or in what language, and bring about different routes of language use. In addition, regarding the analysis of TAP data, concerns have been raised that differences between participants’ and researchers’ conception of the world, infiniteness of meaning potential of words, and subjectivity could impact on interpretations of verbal data (Smagorinsky, 2001). Furthermore, the focus of critique has shifted from verbal protocols to cognitive theories. For instance, Prior (2004) stressed the point that concurrent protocols have mainly been analyzed in order to obtain quantitative data or identify categories. Thus, he raised awareness about the limitations of the cognitive models of writing, which have been based primarily on findings from research using this methodology. It appears that
the distinction between the sociocultural view of think-alouds (i.e., as a dialectical relationship between thinking and speech) and the cognitivist (i.e., as a mirror of the thought processes) shapes the controversy of the method (Bowles, 2010). Based on findings from a meta-analysis of a number of studies, she concludes that whereas verbal protocols might alter learners’ thought processes and become a source of learning, for the most part, they are nonreactive. Nevertheless, Bowles emphasizes that one size does not fit all (p. 137), calling attention to the way the method is used and the host of factors that may influence its reactivity, such as type of report, language, language learning contexts, and type of task.

Although L1/L2 writing researchers acknowledge the shortcomings of the method, they point to its main advantages related to its validity in comparison with other methods and the comprehensiveness of data it generates. Cognitivists emphasized its main strengths to “reveal in remarkable detail what information [participants] are attending to while performing their tasks, ... provide an orderly picture of the exact ways in which tasks are being performed, the strategies employed, the inferences drawn from information, [and] the accessing of memory by recognition” (Ericsson & Simon, 1984, p. 222). This assumption has been widespread among L1/L2 writing researchers. They see TAPs as a glimpse or window into "cognition in context" (e.g., Flower, 1994, p. 262; Roca de Larios et al., 2002; Raimes, 1985; Weissberg, 2005). Hence, an important strength of the method, emphasized by researchers, is its validity and reliability, since it offers the closest connection between thinking and speaking and eliminates the lack of a time interval between occurrences of thought and its verbalization (e.g., Ericsson and Simon, 1998; Flower & Hayes, 1981; Manchón & Roca de Larios, 2007). Furthermore,
researchers argued that this method allows for gathering detailed information about the writing process and has the potential to unveil details from other discourse perspectives such as inner speech and dialogicality (Prior, 2004).

Indeed, with respect to studying language use and L-S in L2 writing, a number of researchers embraced the think-aloud protocol as their major research tool (e.g., Cumming, 1989, 1990; Friedlander, 1990; Jessner, 1999, 2005; Manchón & Roca de Larios, 2007; Manchón et al., 2005; Qi, 1998; Raimes, 1985; Roca de Larios et al., 2001; Wang & Wen, 2002; Wang, 2003; Woodall, 2002). It should be noted, however, that some writing scholars do acknowledge the flaws and limitations of the method, or, as Manchón et al. (2005) put it: “concurrent protocols are no different than any other methodology in that all methods involve potential threat to validity” (p. 192).

A significant advance in reconceptualizing the think-aloud method has been made by Smagorinsky (2001), who argued for a need to embed it in a theoretical framework, to regard the relationship between thinking and speech as dialectic, to triangulate the data, and to take into consideration a variety of variables that come into play instead of attempting to control them. This view of the verbal protocols has been embraced for the present study along with Vygotskyian view of language as a semiotic system and as a psychological tool. Hence, the think-aloud technique is seen not as an embodiment of mind reflecting exclusively cognitive processes, but rather as a semiotically mediated goal-oriented activity taking place in specific sociocultural and historical contexts. Thus, TAPs were considered of particular value for depicting how writing unfolds and how the text emerges. In order to strengthen the validity of the findings and with the purposes of the present study in mind, a decision was made to use a variety of data sources that
supplement the TAPs, such as stimulated recalls, retrospective interviews, final written texts, logfiles, and field notes. In addition, it should be pointed out that the transcripts of the TAPs were produced based on analysis of all of the above-mentioned data sources and the video recordings of the writing sessions that captured the gestures and any other non-verbal cues of the writers. Additional steps were undertaken to strengthen the validity of the think-aloud method. Contrary to other studies (Raimes, 1985; Wang, 2003; Wang & Wen, 2002; Woodall, 2002), no modeling of, neither training in the think-aloud method was provided. This is in line with Roca de Larios et al.’s (2001, 2006, 2008) concerns that such modeling could influence learners’ writing behavior or language choice for verbalizing their thoughts. However, before administering the writing tasks, the participants were briefly instructed on how to verbalize their thoughts before being given the opportunity to think aloud while writing on a specially designed topic (Roca et al., 2001, 2008; van Weijen, 2009).

3.4.2.2 Type of recording

Audio-recording of participants’ think-alouds remains widely used in writing research (e.g., Wang, 2003; Wang & Wen, 2002). Nevertheless, other researchers resorted to video-recordings (e.g., Woodall, 2002; van Weijen et al., 2009). For the present study, writers’ think-alouds were video recorded with a digital camcorder. This type of recording was selected based on the nature of the research questions being investigated and the theoretical assumption of the study (i.e., complexity theory) that required taking into consideration not only sound but also gestures and other non-verbal cues, which a simple audio recording would not provide. This feature of the video recording was important for producing more accurate and complete transcripts of the
TAPs. Furthermore, the video recordings were used during the stimulated recall interviews following immediately the writing sessions as a stimulus for the writers to recall details about their L-S and language (Sasaki, 2000, 2004; Wang, 2003; Wang & Wen, 2002).

3.4.3 Final written text

The participants wrote three compositions. The writing tasks were specifically designed for the purposes of the present study and were kept as a controlled variable across languages. They were controlled in terms of writing environment, length (250-300 words), time (30-40 minutes), genre, register, rhetorical form, writing goals, context, and intended readers. The prompts were provided in a monolingual format in the target language (TL) in order to avoid interference among languages. The TL of the first composition was L2. The participants wrote their second composition in L3 two weeks after the first one. The third writing task was also carried out in L3 after a period of 10 weeks. The decision about the use of the same topic and the time span between the writing tasks was not an easy one to make. While, on the one hand, the former lessens concerns about topic effect, on the other hand, the relatively short period (two weeks) between the first and the second writing task, probably even the longer period of ten weeks, as in the case between the second and the third one, raises concerns about remembering information, ideas, specific vocabulary, etc. It was considered that the different writing context of the second writing task (e.g., TL, audience, writer’s experiences and attitudes toward that specific language) might involve a change from the first task approach with respect to language use and L-S, which are the focus of the present study. It is important to note that the reason for this sequence was prompted by
(a) the level of the participants’ L2 proficiency; (b) the research question with regard to investigating the relationship between L-S frequency and L2 proficiency and L3 development; and (c) exploring the nature of L3 writing and changes in patterns of language use and L-S.

3.4.3.1 Writing genre

The participants of the present study were SL and FL learners studying a third language as an FL. Hence, the writing genre and prompts of the tasks were informed by SLW and FLW research. FL writing researchers point to the idiosyncrasy of FL in comparison with ESL writers as regards their linguistic, social, cultural, and educational background, motivation to write, goals of FL writing, and societal values placed on it (e.g., Leki, 2009; Manchón, 2009). Furthermore, different genres (descriptive, narrative, expository, and argumentative) require appropriate levels of linguistic, rhetorical and genre knowledge, ability to manipulate abstract knowledge, and different problem-solving strategies in an SL/FL (Grabe & Kaplan, 1996). Additionally, writing researchers point to a distinction between less and more cognitively demanding task, the former implying “knowledge-telling” and requiring retrieving of readily available to the memory information, instead of high-degree of complex thinking characteristic for the argumentative genre (e.g., Bereither & Scardamalia, 1987; Grape & Kaplan, 1996). These distinctions have been considered by L2 writing researchers who employed both narrative and argumentative writing (e.g., Cumming, 1989; Jessner, 2005; Jones & Tetroe, 1987; Manchón et al., 2000; Qi, 1998; Wang, 2003; Wang & Wen, 2002; Woodall, 2002) in order to investigate relationships between difficulty of the writing task and language use, L-S, writing expertise, etc.
Therefore, it was considered important that the writing tasks were consistent with the participants’ writing experiences and coursework assignments (Cohen & Brooks-Carson, 2001) and corresponded to their language proficiency. With respect to the former, it should be noted that the FL instruction at the research site incorporates the ACTFL writing guidelines, which includes description, narration, and expository writing, respectively at novel, intermediate, and advance-low level. Hence, it was considered that imposing the argumentative genre on intermediate language learners, who were not proficient enough in the TL and still not familiar with the TL rhetoric, might have run the risk of transforming the writing task into a mere translation activity. This, in turn, might have altered the writers’ usual patterns of language use and L-S. Therefore, the writing task for the present study was designed as a combination of descriptive and narrative genres.

3.4.3.2 Writing prompts

The writing prompts (Appendix C) for the dissertation were designed in line with a view of FL writing as a purposeful, socially situated, and socially constructed meaning making activity embedded in particular contexts and communities of readers and writers. The writing prompts for the three writing tasks were presented in the TL (i.e., English, Spanish, French, and Italian). They asked the participants to write a composition in the form of an initial weblog post. The prompts included the following points: (a) introduction of the blog and the writer; (b) recount of the most important event that had influenced his/her decision to study foreign languages; and (c) invitation to other students to join the blog. Although some of the information the participants included in their L2 and L3 compositions (i.e., posts) was similar (e.g., personal background, an important
event), the goal of each L2 and L3 post was closely related to their interests and personal experience with that particular language and culture. Therefore, it was assumed that writing in two different languages and taking into account different contexts and audiences would allow the writer to bring in personal attitudes, experiences and familiarity with the particular language, and would stimulate each participant to compose and use their languages in a different way while writing in L2 and L3.

### 3.4.4 Computer keystroke-logging technique

Keystroke logging is a relatively recent method for investigating reading, writing, and translating processes, strategies, and fluency. It consists of computer recording of all operations (e.g., scrolling, key presses, editing functions, cursor movements, pauses) as writers compose on a computer. For instance, this research method has been used for studying temporal features of writing activities (e.g., Miller, 2006), revision processes in L1 and L2 writing (e.g., Lindgren & Sullivan, 2006; Stevenson et al., 2006; Thorson, 2000), as well as relationships between L2 linguistic experience and revising, pausing, and fluency (e.g., Miller et al., 2008). In addition to writing research, Miller et al. (2008) outline avenues for the method’s contributions as a pedagogical tool. A number of different keystroke logging programs have been developed, such as JEdit, SciptLog, and TransLog. After reviewing the programs, InputLog was considered more appropriate for the purposes of the present study. Similar to the other programs, it registers every keystroke and mouse movement made by the writer, logs and analyzes the writing data, and generates a general logging file, text analysis, statistical analysis, and pause analysis. However, in contrast to the others, it records the data of a writing session in Microsoft Word and registers other activities, such as consulting websites in any Windows-based
program. Therefore, the data generated with the keystroke-logging software about time and occurrence of every keystroke, location and duration of pauses, location and type of revisions, and use of online resources, provided more detailed information about language use and the conditions that favor L-S. Thus, the use of a combination of both think-alouds and keystroke-logging technique helped produce a more complete and accurate transcription of the TAPs.

3.4.5 Interviews

Interviews as a method to explore participants’ experiences and interpretations have been widely discussed in the research literature (Hatch, 2002). With respect to retrospective interviews in L2 writing, in which participants are asked to discuss what they have done after they have done it, there have been some criticisms. For instance, Zimmermann (2000) claims that they “are much less revealing … since informants usually remember the kind of problem they had, but not the exact way they tried to solve it” and that they are not a reliable source of data (p. 90). In addition, Prior (2004) observes that “retrospective accounts of writing rely on people’s memory, and it appears clear that people remember relatively little of the moment-to-moment thinking and action they have engaged in” (p. 184-185). However, he pointed out advantages of stimulated recall protocols, since additional external stimuli could further enhance or trigger participants memory and, in addition could serve “as a source for new reflection” (Prior, 2004, p. 188). Therefore, for the present study, the interviews that followed up immediately the three writing sessions included stimulated recalls in order to enhance participants’ recollection of their writing process and language use and a retrospective
interview in order to elicit emic perspectives on the latter in addition to their linguistic and writing backgrounds, experiences, and attitudes.

3.4.5.1 Stimulated recalls

Upon the completion of each writing task, selected video-recorded segments from their think-alouds were played in order to help the participants recall their managing of the writing process, language use, and what they were thinking about during pauses longer than 3 seconds (Wang, 2003; Wang & Wen, 2002). The data provided valuable information with respect to the research questions related to the dynamics of languages in composing. In addition, the stimulated recalls helped ensure triangulation of data, needed for strengthening the validity of the study.

3.4.5.2 Retrospective follow-up interviews

After the stimulated recalls, a retrospective interview was conducted. During the retrospective interview following the first writing session and the stimulated recalls, the participants were asked to elaborate on their management of the writing task, their writing goals, attitude toward the writing task and prompt. In line with Wang (2003), explicit questions about the reasons for their language use and L-S were not asked in order to avoid influencing their approach to language use during the second and third writing tasks. Hence, this information, which was important relative to the study’s goals, was obtained during the retrospective interview following the third writing task.

All stimulated recalls and retrospective interviews were audio-taped, transcribed, and analyzed.
3.4.6. Field notes

Direct observation of the participants was conducted while they were performing the writing tasks (Roca de Larios et al., 2001, 2006; Sasaki, 2004). Observation was assumed to be needed in order to ensure consistency in the writing environment and conditions of recording for all participants across all three writing tasks. In addition, when the participants stopped to verbalize their thoughts, a beeper sound was given by the researcher to remind the writer to think aloud. The main reason to choose a beeper was to encourage the participants to think aloud without interfering with the language they were thinking in or expressing themselves. Wang & Wen (2002), who also used this technique, did not report any adverse effects arising from it. Moreover, field notes were invaluable for identifying specific instances of L-S and language use during the composing process, which were used for the stimulated recall interviews in order to gather more detailed information about these occurrences.

3.5 Summary of data gathering sources

The following table outlines the data collection instruments employed in relation to the research questions addressed.
<table>
<thead>
<tr>
<th>Research questions</th>
<th>Data collection instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ 1: What are the dynamics of languages in multilinguals’ L2 and L3 writing?</td>
<td>• TAPs</td>
</tr>
<tr>
<td>• What is the amount of L1, L2, and L3 use in L2 and L3 writing?</td>
<td>• Final written text</td>
</tr>
<tr>
<td>• What are the L-S frequency and direction in L2 and L3 writing?</td>
<td>• Computer logging program Inputlog</td>
</tr>
<tr>
<td>• What is the average length of L1, L2 and L3 utterances in L2 and L3 writing?</td>
<td>• Field notes</td>
</tr>
<tr>
<td>• TAPs</td>
<td>• Stimulated recalls</td>
</tr>
<tr>
<td>RQ 2: Is there a relationship between L-S frequency and:</td>
<td>• TAPs</td>
</tr>
<tr>
<td>• L2 proficiency in L3 composing?</td>
<td>• Computer logging program Inputlog</td>
</tr>
<tr>
<td>• L3 development?</td>
<td></td>
</tr>
<tr>
<td>RQ 3: What conditions favor L1, L2, L3 use and L-S in L2 and L3 writing?</td>
<td>• TAPs</td>
</tr>
<tr>
<td>• Computer logging program Inputlog</td>
<td>• Stimulated recalls</td>
</tr>
<tr>
<td>• Field notes</td>
<td>• Retrospective follow-up interviews</td>
</tr>
<tr>
<td>RQ 4: What types of L-S are used by multilinguals in L2 and L3 writing?</td>
<td>• TAPs</td>
</tr>
<tr>
<td>• Computer logging program Inputlog</td>
<td>• Stimulated recalls</td>
</tr>
<tr>
<td>RQ 5: What is the role of L1 and L2 in L3 writing?</td>
<td>• TAPs</td>
</tr>
<tr>
<td>• Retrospective follow-up interviews</td>
<td>• Stimulated recalls</td>
</tr>
<tr>
<td>• Final written text</td>
<td></td>
</tr>
</tbody>
</table>

### 3.6 Data Analysis

It is important to note that the present study blends quantitative and qualitative approaches within and across the stages of the research process and integrates both types of data in an equal status design.

All told, data gathered for the study consisted of six background questionnaires and eighteen TAPs (videotaped), final written texts, logfiles, stimulated recalls (audio taped), retrospective interviews (audio taped), and field notes. This section of the chapter describes how those sources of data were analyzed.

#### 3.6.1 Quantitative analysis

Quantitative analysis of TAPs was used to answer the first research question regarding amount of language use, frequency of L-S, and length of language segments.
and the second research question regarding relationships between L-S and (a) L2 proficiency; and (b) L3 development. Frequency of L-S occurrences was computed based on total number of switches in the TAPs. The length of L1, L2, and L3 segments in the verbal protocols was measured in number of words/lexemes, which differs from Woodall (2002), who investigated the temporal duration of L-S “based on the total number of seconds taken up by the switches in the protocol” (p. 14). The reason for focusing on length and not time duration resulted from the analysis of the TAPs, which revealed that the participants spoke faster in their L1, articulated more words, and expressed more ideas in their L1 than in their L2 and L3 within the same time period. In addition, since some switches were preceded by a pause, some as brief as a second, it could have been the case that the language of that thought remained uncertain. Furthermore, a difficulty in measuring the temporal duration of L-S arose in the case of a lexeme or one-two word segments uttered for less than a second. Instances like this were frequent in the TAPs. Therefore, it was considered that segment length measured in number of words/lexemes would provide a better understanding of the relationship among the three languages in L2/L3 composing. The average L-S frequency and length of monolingual utterances for each participant across tasks was calculated and further compared for intra-individual and inter-individual variations. In addition, the mean percentage of language use related to each coding category in L2 and L3 composing was calculated in order to make inter- and intra-individual comparisons, which provided important source of information about participants’ individual path of language use. Univariate analysis of variance ANOVA was used to answer the second research question
related to the significance of the difference in L-S frequency between FL and SL groups; and a relationship between L3 language development and L-S frequency in L3 writing.

Nevertheless, quantitative data offers only a fragmented picture of multilinguals’ writing. Qualitative analysis of the TAP and participants’ retrospective interviews were valuable to identifying specific conditions that create an environment for L-S and the role of L1 and L2 in L3 composing.

### 3.6.2 Qualitative analysis

The third, fourth, and fifth research questions were addressed mainly based on in-depth qualitative analysis of TAPs, logfiles, stimulated recalls, and retrospective interviews. All but the logfiles were transcribed. The retrospective interviews were coded according to themes that coincided with major areas of the research questions, and analyzed in order to reveal participants’ sociocultural and language background, language learning and writing experiences, perceptions of and attitudes toward languages, language use, writing, management of writing tasks, and triangulate with findings from the analysis of the quantitative data.

#### 3.6.2.1 Transcription of think-aloud protocols

All TAPs were transcribed. It is important to note that the transcription of the TAPs was produced in conjunction with the stimulated recalls, the field notes, and the logfiles. The analysis of the latter provided more accurate and complete transcription of the participants’ think-alouds. The transcription conventions were developed based on those employed by other researchers (e.g., Qi, 2003; Wang, 2003; Wang & Wen, 2002) and the current conversation analysis transcription conventions. Table 3.6 below illustrates the present study’s transcription conventions.
Additionally, the researcher and a native English speaker, fluent in at least one of the participants’ FL, reviewed the TAPs in order to verify language use and switches. Segments that were not authenticated were not included in the protocols.

### 3.6.2.2 Coding of think-aloud protocols

The second step consisted of coding the TAPs, a process that varies significantly across research on L-S and language use. For instance, Wang (2003) proceeded by
segmenting utterances into idea-units and subsequently identified and categorized L-S. Similarly, Woodall (2002) identified language-switches as L1 and L2 utterances which were consequently coded in accordance with the general writing activity at the time of the switch. Contrary to Wang (2003) and Woodall (2002), van Weijen et al. (2009) and Wang & Wen (2002) first segmented the protocols into categories corresponding to, respectively, cognitive and writing activities displayed by the writers and subsequently identified L1 and L2 occurrences. On the other hand, Qi (1998) divided the TAPs into L1 and L2 sequences, but did not provide details about coding the thinking processes. Furthermore, Jessner (2005, 2008) identified only instances of metalanguage (ML) in the form of questions and comments. One of the reasons for the use of different approaches to coding might have been the way L-S has been conceptualized by the researchers, as already discussed in chapter 1. With regard to unit of analysis of L-S, Qi (1998) employed a ‘sequence’ defining it as a think-aloud utterance with different length (a single word or several consecutive sentences) pronounced in one language. Following Chafe’s concept of idea-unit, Wang (2003) analyzed her data based on defining an L-S as “mental operations that went from L2 to L1” (p. 356) and a switch as an idea unit in L1 triggered by an idea unit in L2 called a prompter. Hence, Wang (2003) identified an L-S as consisting of an L1 idea unit(s), with a length from a single word to full sentences, followed by an L2 idea unit(s). Wang described the advantages of this operational definition of L-S sequences as being more precise, easily traceable and easy to explore. In fact, she acknowledged that contradictory findings between hers and Woodall’s study (2002) might have been attributable to differences in defining L-S. In contrast to Wang (2003) but similarly to Qi (1998), Woodall (2002) identified a switch as “any non-
instructed use of the first language during the L2 writing process” (p. 8), a definition further embraced by van Weijen et al. (2009). Therefore, in their studies a switch was considered as starting with an utterance in L1 and ending with the next utterance in L2. Consequently, any segment containing one or more words in the L1 was considered an occurrence of L1.

Taking into consideration the research goals of the present study, Wang’s (2003) use of idea-units was considered inadequate to capture details in multilinguals’ language use since it might blur the distinction among L1, L2, and L3 or impose additional unnatural boundaries among them. This is especially important to be taken into account, especially in think-aloud method studies in L2/L3 composing, since the method is unable to capture every single word or linguistic/non-linguistic thought that crosses writers’ minds. Additionally, in contrast to bilinguals (Wang, 2003), who are able to produce lengthier sequences in both languages, duration of L2 utterances for some intermediate and advance FL learners could differ significantly (Woodall, 2002). Thus, it is considered that L-S frequency, L1, L2, and L3 use, their roles, and the conditions that favor L-S would be depicted in more detail if the unit of analysis is a monolingual utterance with a length from a lexeme to a sequence of words articulated in one language.

Furthermore, an important difference with previous research concerns coding of the TAPs. Most of the studies discussed earlier were informed by cognitive or sociocognitive view of writing. Therefore, TAPs and L-S have been coded in terms of individual or general composing activities (Wang & Wen, 2002; Woodall, 2002) or cognitive/conceptual activities (van Weijen, 2009). For instance, Wang (2003) distinguished six categories of classifying L-S sequences (i.e., idea generation, language
use, lexical searching, translation, and metacomments). On the other hand, Woodall (2002) identified eight “general writing behaviors” (p. 14) including silent writing, simultaneous writing and talking, talking without writing, reading the prompt, reading the already produced text, pausing, editing, and dictionary searches. While van Weijen et al. (2009) drew on Flower & Hays’ (1981) writing model to analyze eleven categories (i.e., re-reading the assignment, planning, generating ideas, metacommments, pausing, formulating, rereading, evaluating, and revising the text), Wang & Wen (2002) noted the limitation of that model and based their categories on a variety of concerns expressed by the writers during the composing process. Thus, they distinguished five categories of composing activities, namely, task-examining, idea-generating, idea-organizing, text-generating, and process-controlling.

Unlike previous research, in this study think-aloud protocol coding was informed by the complexity theory approach to writing presented in Chapter Two. It entails examining writing at the level of the specific writing context and of the specific writing event timescale. In addition, L2/L3 writing activity is seen as a complex dynamic system, composed of components that are themselves complex dynamic systems. Hence, the participants’ think-aloud discourses were coded into writing components determined as parts of the L2/L3 writing activity system. Subsequently, the TAPs were coded into language systems (L1, L2, and L3). Hence, each TAP was divided into utterances based on four main dynamic components that focus on (1) engagement with L2/L3 writing, (2) managing the writing activity, (3) emerging text, and (4) language resources. They are explained below:
1. **Engagement** (E) with L2/L3 writing contains three components: (a) writing prompt (WP); (b) writing goals and planning (WG); and (c) reader (R). WP comprises utterances articulated when rereading the writing prompt (WT1) and analyzing, paraphrasing, or back-translating the writing prompt (WT2). The WG component includes segments that focus on setting and achieving writing goals and planning at global/text level and local/sentence level. The category of the reader (R) consists of segments that express the writer’s concerns with readers’ discourse community.

2. **Management** of the writing activity (Mgt) is composed of four elements. Utterances that express searching for, generating, and considering ideas/content or lack of ideas are coded as Mgt1. Noticing and making meaning (Mgt2) is reflected in the writer’s reflections, comments on, and evaluations of the writing process, emerging text, or problems related to the task. TAP segments that express the writer’s attempt to manage word processing and control the writing process, including word limit, are coded as Mgt3. For instance, commands and self-instructions such as “Let me see what I wrote here” and “Let me add now” signal an intended change in the writing process. Another example is expressions referring to word processing commands (i.e., “Delete this”, “Insert symbol”) that indicate an attempt to handle word processing. The forth element (Mgt4) includes utterances that involve controlling the mechanical aspects of the written text, such as spelling, accents, punctuation, capitalization, and paragraphing.

3. **Emerging text** (Txt) contains two elements. The first refers to utterances that focus on generating and writing/typing the actual text (Txt1). The second element (Txt2) includes rereading or back-translating the text produced so far.
4. **Language resources** (LgR) includes TAP segments that express searching for and evaluating a target item without the aid of online resources (LgR1), looking up and evaluating a target item using online resources (LgR2), and revising the text produced so far at word (spelling, morphosyntax/semantic), clause, sentence, and discourse levels (LgR3).

Coded TAPs components are presented, defined, and illustrated with examples in table 3.6 below.
<table>
<thead>
<tr>
<th>Writing subsystems</th>
<th>Writing conditions</th>
<th>TAP utterances description</th>
<th>TAP example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement with writing activity</td>
<td>Writing prompt (WP)</td>
<td>• rereading the WP (WP1)</td>
<td>• here we go. uhm, (. ) student, you have decided to create a blog for UD international students, OK, (B, 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• analyzing, paraphrasing &amp; back- translating the WP (WP2)</td>
<td>• d’accord, donc, introduire, les raisons de le créer, (introduce, the reasons for creating it) (A, 1)</td>
</tr>
<tr>
<td></td>
<td>Writing goals &amp; planning (WG)</td>
<td>• setting &amp; achieving writing goals; planning ;</td>
<td>“so, just start with freshman year” (M, 1)</td>
</tr>
<tr>
<td></td>
<td>Reader (R)</td>
<td>• referring to readers’ discourse community</td>
<td>“gracias por tu (. ) it’s more than one person so I should say tus (your)” (H, 2)</td>
</tr>
<tr>
<td>Management of writing activity</td>
<td>Managing content and ideas (Mgt1)</td>
<td>• searching for, considering, content and ideas or expressing lack of ideas</td>
<td>• “if you’d like to learn, (?) I don’t know, ( ) I can’t really say how to end, that does not really make any sense” (M, 1)</td>
</tr>
<tr>
<td></td>
<td>Noticing and making meaning (Mgt2)</td>
<td>• reflecting, commenting on, and evaluating writing process, task, and text</td>
<td>• “I’m very excited to have you reading about my passion for foreign languages, ( ) I don’t like this” (B, 1)</td>
</tr>
<tr>
<td></td>
<td>Managing the physical activity of writing (Mgt3)</td>
<td>• managing the writing process, word processing, online resource</td>
<td>• “I’ll just type that in and find the accents” (M, 1)</td>
</tr>
<tr>
<td></td>
<td>Managing the written text (Mgt4)</td>
<td>• managing mechanical aspects: capitalization, accents paragraphing, spelling, punctuation</td>
<td>• “les pays, en via de desarrollo en vie de développement, esto es un acento” (this is an accent) (S, 2)</td>
</tr>
<tr>
<td>Emerging text</td>
<td>Movements between already written and emerging text</td>
<td>• generating the actual text (Txt1) • rereading and back-translating the already produced text (Txt2)</td>
<td>• “I am creating my blog, estoy creando” [I’m creating] (H, 3) • “io cercherò di scrivere tutti i giorni (. ) e se no, (and if not) and if not” (B, 3)</td>
</tr>
<tr>
<td>Language resources</td>
<td>Approach and ability to using L1, L2, L3</td>
<td>• searching, evaluating a target item without consulting online references (LgR1) • analyzing, revising, editing the emerging text at word, clause, sentence, and discourse level (LgR3).</td>
<td>• “mundo (world) o mondo (world)? mondo is italiano, mondo” (H, 3) • “to tell you about my diferents, il faut un ef” (I need an f) (A, 1)</td>
</tr>
<tr>
<td></td>
<td>Experience with and approach to using online resources</td>
<td>• searching, evaluating a target item with the aid of online resources (LgR2)</td>
<td>• “multilingue, bon, on va le voir, (OK, I’ll look it up) quadrilingue, quadrilingue [F-S quadrilingue] [F-S carlingue] non, [F-S trilingue] polyglotte [F-S polyglotte] poliglota, hm, bizarre, ” (A, 2)</td>
</tr>
</tbody>
</table>

Note: Underlined segments exemplify the corresponding code; English translation is provided in italic in parentheses.
The dynamic subsystems and components identified above provide an alternative way to explore how writing unfolds and how the final text emerges. However, in order to understand the roles different language systems play in L2 and L3 writing process, there is a need to explore language use. Larsen-Freeman & Cameron’s (2008a) view language use as a property of a complex system. Drawing on research, they conclude that a person has “a latent potential” to use language in a discourse environment, which they called “language resources” (p. 174). As they emphasize:

These resources are virtual and do not exist separately of their manifestation in use. All we have is language-using behavior in particular contexts or discourse environments. Each occasion of language-using behavior is dependent on the specific discourse environment, and conversely each discourse event is unique” (p. 174-175).

Therefore, the TAP coded utterances were subsequently categorized according to the language they have been voiced in. Each coded segment that contains a lexeme, a word, or a sequence of words voiced in one language was considered an occurrence of the corresponding writer’s individual language system (e.g., L1, L2, L3). A coded utterance articulated in two or more languages were categorized as L1-L2 (a segment articulated in L1 and L2), L1-L3 (a TAP segment articulated in L1 and L3), L2-L3 (a TAP segment articulated in L2 and L3), and L1-L2-L3 (a TAP segment articulated in the three languages).

Coding the language systems was carried out by me and native English, Spanish, and Italian speakers until an agreement for all occurrences was reached. Coding into writing categories was carried out by me and two other multilingual speakers. In order to confirm that the rating data is reliable the other raters were asked to analyze 30% randomly selected data from each TAP. In addition, a week after my initial coding, I
randomly selected and coded 30% of the TAPs. This step was needed to assess intra-coder reliability (Wang, 2003). The results of the interrater and intrarater reliabilities of the TAPs for writing categories calculated using Cohen’s kappa were high (.9 and 0.95 respectively).

The following chapter presents the results from the analysis in relation to the research questions that guided the present dissertation.
Endnotes:

1 Prof. Stephen Hawkins, theoretical physicist is currently the director of research at the Centre for theoretical cosmology, at DAMTP in Cambridge. Interview in San Jose Mercury News (23 Jan. 2000) “I think the next [21st] century will be the century of complexity. We have already discovered the basic laws that govern matter and understand all the normal situations. We don’t know how the laws fit together, and what happens under extreme conditions. But I expect we will find a complete unified theory sometime this century. There is no limit to the complexity that we can build using those basic laws.” [Answer to question: Some say that while the twentieth century was the century of physics, we are now entering the century of biology. What do you think of this?]

2 Qi (1998) makes use of three sets of two writing tasks each at a different level of cognitive demands: two essays (a narrative and an argumentative), two written translations of the essays from L2 to L1, and two problem-solving questions in L2.

3 There is some inconsistency and ambiguity in Woodall’s (2002) description of the genre of the essay writing task as persuasive (p. 13), expository (p. 14), and argument/persuasive (p. 25).

4 Larsen-Freeman & Cameron (2008a) define the state of a system as “the (dynamic) behavior of elements or agents at a particular point in time” (p. 44).
Chapter 4 : Data Analysis and Results

“Oui, je n’ai qu’une langue, or ce n’est pas la mienne”
(Derrida, 1996)

The present study explores the nature of multilinguals’ language use and switching while performing L2 and L3 writing tasks. Hence, it sought to investigate how the three languages interact during L2 and L3 writing processes. Another goal was to explore the relationship between language-switching frequency and L2 proficiency as well as L3 language development in L3 writing. The third objective aimed to identify conditions under which the writing process changes its patterns of language use entailing language-switching. Hence, types of L-S have been identified. Finally, an inquiry into the role of L1 and L2 in L3 composing was conducted. The purpose of the present chapter is to report the results from the analyses of data obtained from TAPs, Inputlog files, final written compositions, background questionnaires, and interviews with the participants. The next two chapters analyze the findings from a complexity theory perspective and discuss them in relation to previous studies investigating language use and L-S in L2/L3 writing.

First, general data about the completion of the writing tasks with respect to time and number of words in the written texts and TAPs will be presented. Subsequently, findings related to each research question will be reported. The chapter concludes with a summary of the study’s results.
4.1 General Description of Participants’ Writing Tasks Fulfillment

Six multilingual participants volunteered to take part in this study. All completed the three writing tasks, one in their L2 and two in their L3, following the provided instructions. However, the writing process as regards the time spent on the tasks and the compositions’ and TAPs’ length varied widely not only across writers but also across writing tasks. Table 4.1 below gives information about the number of words in their compositions, TAPs, and time taken for completing the tasks.

Table 4.1. Composing time and word number in compositions and TAPs

<table>
<thead>
<tr>
<th>Participants</th>
<th>Task 1 (L2)</th>
<th>Task 2 (L3)</th>
<th>Task 3 (L3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Words in comp.</td>
<td>Words in TAP</td>
<td>Time (min)</td>
</tr>
<tr>
<td>M</td>
<td>251</td>
<td>1869</td>
<td>44'</td>
</tr>
<tr>
<td>A</td>
<td>385</td>
<td>3008</td>
<td>35'</td>
</tr>
<tr>
<td>H</td>
<td>306</td>
<td>2694</td>
<td>38'</td>
</tr>
<tr>
<td>B</td>
<td>693</td>
<td>4453</td>
<td>42'</td>
</tr>
<tr>
<td>D</td>
<td>317</td>
<td>1362</td>
<td>26'</td>
</tr>
<tr>
<td>S</td>
<td>487</td>
<td>1462</td>
<td>23'</td>
</tr>
<tr>
<td>Mean</td>
<td>406</td>
<td>2476</td>
<td>35'</td>
</tr>
</tbody>
</table>

Note: Time is measured in minutes. 1After finishing the composition the participant A reread the text five times in order to revise and type the accents. The total number of words in her TAPs includes only the first rereading of the written text when revisions have been made.

The instructions for all writing tasks specified word (250-300) and time limits (30’- 40’) but indicated that the participants were free to finish the composition as they wished. With the exception of M, who tended to spend more time writing the compositions, all other participants finished the writing tasks within the time limit. On average, the students’ compositions written in their L2 were longer than the ones written in their L3, respectively 402 and 293 words. The total number of words in their TAPs varied between 648 and 4453. These data suggest that the participants’ composing patterns differed across writers and writing. Data with respect to words in the TAPs were
the basis for the statistical analysis related to the dynamics of languages and relationships between L-S frequency and L2 proficiency and L3 development, which is discussed in the following subsections. Data regarding the length of the compositions and the time spent on the writing tasks provided important information about the participants’ L2 and L3 writing processes, which is discussed in the next chapter.

The chapter now moves to a presentation of the study’s results relative to each of the research questions addressed.

4.2 What Are the Dynamics of Languages in L2 and L3 Writing?

The goal of the first research question is to shed light on the interplay of languages during L2 and L3 writing processes. Computing the proportions of L1, L2, and L3 in the TAPs as well as L-S frequency, direction, and length provided detailed information about the dynamics of language use in multilinguals’ L2 and L3 composing. Here it must be remembered, as explained in Chapter 3, that the TAPs are considered part of composing, and that the participants were free to use whichever language they chose during the think-aloud writing process. Thus, the TAPs data are a key indicator of language use while writing. The total number of L1, L2, and L3 words in each TAP was calculated. Table 4.2 displays the proportion of participants’ L1, L2, and L3 use as reflected in their TAPs. Raw data is provided in Appendix D.
Table 4.2. Multilinguals’ L1, L2, and L3 use in L2 and L3 writing

<table>
<thead>
<tr>
<th>Group</th>
<th>Participant</th>
<th>Task 1 (L2)</th>
<th>Task 2 (L3)</th>
<th>Task 3 (L3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L1 %</td>
<td>L2 %</td>
<td>L3 %</td>
<td>Total %</td>
</tr>
<tr>
<td>FL</td>
<td>M</td>
<td>58.6</td>
<td>41.4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>54.7</td>
<td>44.9</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>51.0</td>
<td>48.1</td>
<td>0.9</td>
</tr>
<tr>
<td>SL</td>
<td>B</td>
<td>1.0</td>
<td>98.7</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>6.9</td>
<td>91.9</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>6.8</td>
<td>93.2</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: L1, L2, and L3 use is calculated as percentage of L1, L2, and L3 words to total number of TAP words. ¹ Total number of words (N) includes two L4 words; ² Total number of words in the TAP includes only the first final rereading of the written text when revisions have been made; ³ One word has been identified as a mixture of the three languages and therefore not counted.

Overwhelmingly the results indicate that all three languages, and four in the case of A, were used during both L2 and L3 composing processes: 83% of all eighteen TAPs collected in this study contained all three languages. However, it is notable that two participants (M and S) did not resort to their L3 while composing in L2. In addition, M did not use her L2 during the first L3 writing task.

The following tables 4.3 and 4.4 present both groups’ means of L1, L2, and L3 use, respectively in L2 and L3 writing:

Table 4.3. Groups’ mean percentages of L1, L2, and L3 in L2 writing

<table>
<thead>
<tr>
<th>Writing task</th>
<th>Language (L)</th>
<th>Group</th>
<th>Mean % (M)</th>
<th>St. Dev. (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing task 1</td>
<td>L1</td>
<td>FL</td>
<td>54.8</td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SL</td>
<td>4.9</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>FL</td>
<td>44.8</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SL</td>
<td>94.6</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>L3</td>
<td>FL</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SL</td>
<td>0.5</td>
<td>0.6</td>
</tr>
</tbody>
</table>
While the difference between FL and SL groups in L1 and L2 use in L2 writing is large, (M=54.8% vs. M=4.9% and M=44.8% vs. M=94.6%, respectively, for L1 and L2 use), both groups do not differ much with respect to L3 use.

Similarly, differences between groups remain large for L1 and L2 use in both L3 writing task, as seen in the table below:

**Table 4.4. Groups’ mean percentages of L1, L2, and L3 in L3 writing**

<table>
<thead>
<tr>
<th>Writing task</th>
<th>Language (L)</th>
<th>Group</th>
<th>Mean % (M)</th>
<th>St. Dev. (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing task 2</td>
<td>L1</td>
<td>FL</td>
<td>42.0</td>
<td>16.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SL</td>
<td>8.7</td>
<td>9.2</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>FL</td>
<td>0.6</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SL</td>
<td>14.2</td>
<td>10.2</td>
</tr>
<tr>
<td></td>
<td>L3</td>
<td>FL</td>
<td>57.4</td>
<td>16.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SL</td>
<td>77.1</td>
<td>3.5</td>
</tr>
<tr>
<td>Writing task 3</td>
<td>L1</td>
<td>FL</td>
<td>38.6</td>
<td>25.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SL</td>
<td>5.0</td>
<td>5.9</td>
</tr>
<tr>
<td></td>
<td>L2</td>
<td>FL</td>
<td>0.8</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SL</td>
<td>10.5</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>L3</td>
<td>FL</td>
<td>60.6</td>
<td>25.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SL</td>
<td>84.5</td>
<td>5.2</td>
</tr>
</tbody>
</table>

The results demonstrate that FL group’s use of L1 is almost 5 and 7.5 times higher than that of the SL group, respectively, for the second and third writing task. On the other hand, the data show that the SL group’s L2 use is higher than that of the FL group, correspondingly M=14.2% versus M=0.6% for the second and M=10.5% versus M=0.8% for the third writing task.

4.2.1 What is the amount of L1, L2, and L3 use in multilinguals’ L2 and L3 writing?

4.2.1.1 What is the amount of L1, L2, and L3 use in L2 writing?

Data reported in Table 4.3 show that on average the FL group (M, A, and H) relied primarily on their L1 (M=54.8%) while composing in L2. On the contrary, SL
writers’ (B, D, and S) amount of L1 use varied between 1% and 7% for the L2 writing task. Furthermore, differences between both groups persisted regarding L2 use in L2 composing. Results displayed in table 4.3 above indicate that whereas SL students articulated their thoughts almost exclusively in L2 (average 95%) while composing in L2, the amount of L2 use for FL students was almost less than half.

Concerning L3 use in the L2 writing process, the findings revealed that two of the six participants (M and S) did not use their L3 while composing in their second language. Table 4.3 shows that the average amount of L3 use in L2 writing accounts for 0.4% and 0.5%, respectively, of the FL and SL groups’ total number of words in the TAPs.

4.2.1.2 What is the amount of L1, L2, and L3 use in L3 writing?

Regarding language use in L3 composing, it is noteworthy that all but one of the twelve L3 writing task verbal protocols contain L1, L2, and L3 words, as reflected in table 4.4 above.

1. L1 use in L3 writing:

   Similar to L2 composing, L1 was found to be intensively involved in L3 writing, but mainly for the FL group. As shown in table 4.4 above, the average percentage of L1 use in L3 writing for FL writers represents 42% of their TAPs. However, this proportion is not uniform for FL students. While L1 accounts for an average 17% of A’s total thoughts as reflected in her TAPs for both L3 tasks, for M and H it represents respectively, 56% and 48%.

   Contrary to the FL group, the SL students resorted considerably less to their L1 while composing in L3. Their L1 accounts for an average 6.8% of the total words in the TAPs of both L3 tasks (M=8.7% and M=5%, respectively, for the second and third
tasks). Nonetheless, similar to the FL students, L1 use was not uniform across the SL writers. While B’s L1 use (1.3%) was consistent for both tasks, D resorted to L1 almost twice as much during her third writing task. On the other hand, however, S’s use of L1 dropped significantly during her third task, from 19% to 2%.

2. **L2 use in L3 writing:**

Second language use in L3 composing remained limited for the FL writers in both L3 tasks. Table 4.4 shows an average L2 use of 0.6% and 0.8%, respectively, in the second and third compositions, which is considerably lower than their L1 use. Conversely, the SL group indicated a tendency for relying significantly more on L2 in L3 composing. Their amount of L2 use was approximately 24 and 13 times higher than that of the FL group, respectively, in the second and third writing tasks (i.e., M=14% and M=10.5%). Moreover, the SL students used L2 almost twice as much as their L1 in both L3 tasks. Hence, the findings imply that SL writers seem to rely on L2 more than on L1 not only during L2 but also during the L3 composing process, while FL writers tend to resort mainly to L1 in both contexts.

3. **L3 use in L3 writing:**

Table 4.4 indicates that the average amount of FL and SL groups’ L3 use accounts, respectively, for around 59% and 80% of the total number of words in their TAPs in both tasks. Nevertheless, whereas all SL participants used primarily L3 while composing in L3, the results are mixed for the FL group. As already pointed out, A tended to think almost exclusively in her L3 (83%), while M thought more in her L1 than in her L3 (56% and 44% of her thoughts were correspondingly in L1 and L3). With respect to H, she resorted less to her L1 in the second task than in the third task (43% vs.
56% and 53% vs. 46%, respectively, for L1 and L3 in the second and third tasks), as seen in table 4.2.

4.2.1.3 Tendencies in language use in L2 and L3 writing

Figures 1 and 2 below summarize the tendencies exhibited by the FL and SL groups regarding L1, L2, and L3 use, respectively, in L2 and L3 composing processes.

Figure 1. Multilinguals’ L1, L2, and L3 use in L2 writing

To summarize, on average both groups made use of all three languages while composing in L2 and L3, although L3 use in L2 writing accounts for only around 0.5% of the think-aloud data. Furthermore, the FL writers voiced their thoughts in L1 around 11 times more than the SL writers. Whereas the SL writers relied almost exclusively on their L2, the FL students tended to voice their thoughts in L1 while composing in L2.
In sum, in all but one instance of L3 writing, the participants used all their three languages. As evident from Figure 2 above, although L3 played a larger role in L3 composing process for both groups, the FL students tended to rely on their L1 around six times more than the SL participants. On the contrary, the latter group used their L2 around 18 times more than the former during the L3 composing process.

4.2.2 What are the L-S frequency and direction in L2 and L3 writing?

In addition to L1, L2, and L3 use, frequency and direction of L-S provide more detailed information about the interaction among the three languages in the L2 and L3 writing processes. Frequency was calculated as total number of L-S occurrences. The direction of L-S is specified as bidirectional, that is, between participants’ L1 and L2 language systems, which contains switches from L1 to L2, and vice-versa, between their L2 and L3 systems (L2→L3; L3→L2), and between their L1 and L3 systems (L1→L3;
L3→L1). Tables 4.5 and 4.6 below report the percentages of occurrences of each variety of language-switching as regards L-S direction in L2 and both L3 writing tasks, respectively, for FL and SL participants. Raw data is presented in Appendix D.

Table 4.5. FL group’s L-S frequency and direction in L2 and L3 writing

<table>
<thead>
<tr>
<th>Group</th>
<th>Participant</th>
<th>L1-L2 (%)</th>
<th>L2-L3 (%)</th>
<th>L1-L3 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Task1</td>
<td>Task 2</td>
<td>Task 3</td>
<td>Task 1</td>
</tr>
<tr>
<td>FL</td>
<td>M.</td>
<td>100</td>
<td>0</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>A.</td>
<td>94.7</td>
<td>1.4</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>H.</td>
<td>90.6</td>
<td>7.7</td>
<td>6.9</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>95.1</td>
<td>3.0</td>
<td>3.7</td>
</tr>
<tr>
<td>SD</td>
<td></td>
<td>4.7</td>
<td>4.1</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Note: Number of L1-L2, L2-L3, and L1-L3 switches as percentage of total number of L-S in TAPs; The language of composition is L2 for task 1 and L3 for tasks 2 & 3. \(^1\) The participant switched twice between L1-L4, which represents 0.7% of total L-S instances.

With respect to L2 writing, the results show that one TAP (for participant M) does not contain switches involving L3. In addition, one participant (A) switched between her L1 and L4 during the L2 composing process. Regarding L3 composing, the data indicate that one TAP (M’s task 2) does not contain L-S between L1-L2 and L2-L3. On the whole, the findings point to a tendency of FL writers to switch predominantly between their L1 and the language they were writing in (i.e., L2 in L2 composing and L3 in L3 composing). The results also show that in L2 composing switches to and from L3 include both their L1 and L2. It is noteworthy that the frequency of these switches is lower than the frequency of switches that involve L2 in L3 composing.

The table below demonstrates the direction and frequency of the SL groups’ language-switching in L2 and L3 composing.
As regards L2 writing, the results show that one TAP (for participant S) does not contain switches involving L3. The SL writers exhibited a tendency to switch mainly between their L1 and L2 in L2 composing, although considerably less frequently than the FL group. On the other hand, apparently the SL students tended to switch more to their L3 than the other group. Concerning L3 writing, unlike the FL participants, the SL group switched mainly between their L2 and the TL, although the frequency was considerably lower when compared to the former group’s L1-L3 switching. In addition, the results demonstrate that the SL participants displayed more intensive switching between their L1 and L2 than the other group.

Data presented in tables 4.5 and 4.6 suggest that the participants’ three language systems engaged in dynamic interactions in both L2 and L3 writing processes. Fifteen TAPs demonstrate that they switched among the three languages while composing in their L2 and L3. Nonetheless, results regarding L-S frequency and direction point to differences across groups and across writers’ L2 and L3 composing.
4.2.2.1 What are the L-S frequency and direction in L2 writing?

With respect to L2 composing, the findings indicate that the FL and SL students switched more frequently between L1-L2, respectively M=91% and M=85% of all switches. Nevertheless, differences between both groups emerged as regards L-S direction. For instance, the SL students switched almost eight times more often between L2-L3 than the FL participants, correspondingly M=13.3% and M=1.7%. In addition, the latter group’s L1-L3 switching was twice as much as that of the former, respectively M=3% and M=1.4%.

4.2.2.2 What are the L-S frequency and direction in L3 writing?

Regarding L3 writing, most switching occurred between L1-L3 for the FL students, (i.e., M=92% for both L3 writing tasks). However, the SL group showed a tendency for more balanced switching between L1-L3 and L2-L3, respectively M=33% and M=56% for both L3 tasks. Furthermore, the FL writers switched eleven times less frequently than the SL students between L2-L3 (M=5% for both tasks). In addition, other differences between both groups remained with respect to switching between L1-L2. The results indicate that 11% of all L-S instances involved L1-L2 switches for the SL students, which is about three times more frequent than for the FL group (i.e., 3.3% for both L3 tasks).

4.2.2.3 L-S tendencies in L2 and L3 writing

Figures 3 and 4 below display both groups’ main tendencies in switching between languages, respectively in the L2 and L3 composing processes.
To summarize regarding L-S in L2 writing, all participants switched considerably more frequently between L1-L2 than between L2-L3 and L1-L3, as illustrated in Figure 3. However, the SL students switched more frequently than the FL group between L2-L3, while the latter switched more often than the former between L1-L2 and L1-L3.
Figure 4 highlights the trends exhibited by both groups regarding L-S frequency and direction in L3 composing. In brief, while the FL students switched almost exclusively between L1-L3, the SL group switches were distributed in a more balanced manner between L1-L3 and L2-L3. Additionally, the FL participants switched less than the SL writers between L1-L2 and L2-L3.

To conclude, with regard to L-S across L2 and L3 writing, both figures 3 and 4 point to a tendency that the FL students switched considerably more frequently between their L1 and the language they were writing in, while L-S involving their L3 in L2 composing and their L2 in L3 composing occurred significantly less frequently. Conversely, a tendency displayed by the SL participants indicates that L-S direction involved mainly L2 in both L2 and L3 writing. That is, they tended to switch primarily between L1-L2 in L2 composing, but when writing in their L3, instances of language-
switching between L2 and L3 took place more often than those involving L1. An interesting finding is that in L2 composing, the FL group switched more frequently than the SL group between the languages they were not writing in (i.e., L1-L3), whereas in L3 composing the latter group switched more often than the former between L1 and L2 (i.e., the languages they were not writing in).

**4.2.3 What is the average length of L1, L2, and L3 utterances in L2 and L3 writing?**

Table 4.7 below presents the average length of participants’ monolingual L1, L2, and L3 segments measured in number of words. The length was computed by dividing the total number of L1, L2, and L3 words in the TAPs by the total number of, respectively, L1, L2, and L3 segments in both L2 and L3 tasks.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Task 1 (L2)</th>
<th>Task 2 (L3)</th>
<th>Task 3 (L3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L1</td>
<td>L3</td>
<td>L1</td>
</tr>
<tr>
<td>FL</td>
<td>10</td>
<td>1^1</td>
<td>8</td>
</tr>
<tr>
<td>SL</td>
<td>3</td>
<td>1^2</td>
<td>3</td>
</tr>
</tbody>
</table>

Note: Mean length is measured in number of words. ^1 One participant did not use L3 in writing task 1; ^2 One participant did not use L2 in writing task 2.

A comparison of mean L1, L2, and L3 segment length reveals certain differences across tasks and groups. Regarding L2 composing, while all writers tended to use mostly single word L3 segments (M=1), the FL group produced more than three times longer L1 utterances than the SL group, respectively 10 and 3 average number of L1 words per segment. This tendency of FL learners to articulate longer than the SL group’s L1 utterances appeared stable across L2 and L3 writing. With respect to L3 composing, the FL writers were more likely to produce approximately three times longer L1 segments.
than the SL participants, respectively M=8 versus M=3 for the first L3 task and M=7 versus M=2 for the second L3 task. These results might indicate a trend for more consistent L1 use by both groups in L2 and L3 composing. That is, FL writers produced 7-10 word L1 segments in the three writing tasks, while the SL writers articulated shorter L1 segments containing only 2-3 words.

Furthermore, regarding the use of L2 in L3 composing, results indicated that the SL writers tended to articulate their thoughts in longer L2 segments consisting of an average of 3-4 words. On the contrary, FL writers produced shorter, mostly single word L2 segments in their spoken discourse as reflected in the TAPs. Hence, whereas both groups did not differ in their use of L3 in L2 writing with respect to L3 segment length, significant differences remained in the use of L1 in L2 composing and L1 and L2 in L3 writing.

It should be emphasized that, for the present study, language segment length was not used as a measure of syntactic accuracy and complexity, nor as a measure of speaking/writing fluency. From the perspective of language use, in addition to L-S frequency and direction, monolingual segment length provides more detailed information about how multilinguals make use of their languages (i.e., at a single word or more than word-level utterances) and about their role in L2 and L3 writing.

4.3 Is there a Relationship between L-S Frequency and L2 Proficiency in L3 Writing and between L-S Frequency and L3 Development?

To answer the second research question, I investigated (a) whether there was a relationship between L-S and L2 proficiency in L3 writing; and (b) whether there was a relationship between L-S and L3 development in L3 writing.
4.3.1 Is there a relationship between L-S frequency and L2 proficiency?

Regarding the first sub-question within research question two, in order to correct for differences in TAP length, L-S frequency scores were standardized by calculating mean L-S frequency per 100 TAP words. The table below presents the mean L-S frequency and standard deviation (SD) in both L3 writing tasks (WT) combined and in each L3 writing task.

Table 4.8. Groups’ mean L-S frequency per 100 TAP words in L3 writing

<table>
<thead>
<tr>
<th>Group</th>
<th>L-S in WT 2&amp;3</th>
<th>L-S in WT2</th>
<th>L-S in WT3</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL</td>
<td>10.80</td>
<td>10.85</td>
<td>10.77</td>
</tr>
<tr>
<td></td>
<td>5.26</td>
<td>5.04</td>
<td>6.6</td>
</tr>
<tr>
<td>SL</td>
<td>10.39</td>
<td>10.34</td>
<td>10.45</td>
</tr>
<tr>
<td></td>
<td>3.68</td>
<td>1.85</td>
<td>5.5</td>
</tr>
</tbody>
</table>

Note: Mean L-S frequency is calculated per 100 TAP words.

The statistical procedure univariate analysis of variance ANOVA was used to assess the significance of the difference in L-S frequency between the FL and SL groups for both L3 writing tasks. The test did not reveal a significant main effect of group on L-S frequency in L3 writing (F = .02; p = .891; α = .05). This result suggests that there is no significant evidence to differentiate between the groups. Namely, level of L2 proficiency might not have had an effect on L-S frequency in L3 writing. Nevertheless, the findings should be interpreted with caution, since the small sample size (N=6) of the present study may not have enough statistical power to detect significant differences between groups.

4.3.2 Is there a relationship between L-S frequency and L3 development?

For this second sub-question within research question two, the statistical analysis conducted was based on a sample size of 5 of the participants (not 6), since participant B
was not taking FL (L3) classes during the semester when the study was carried out. The table below presents the mean L-S frequency in the first and the second L3 writing tasks of the five participants.

Table 4.9. L3 learners’ L-S frequency per 100 TAP words in L3 writing

<table>
<thead>
<tr>
<th>L3 Writing Task</th>
<th>L-S</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 2</td>
<td>11.07</td>
<td>3.58</td>
</tr>
<tr>
<td>WT 3</td>
<td>11.56</td>
<td>5.51</td>
</tr>
</tbody>
</table>

Note: Mean L-S frequency is calculated per 100 TAP words.

As seen in table 4.9, on average the five participants who were taking L3 language courses switched slightly more frequently during the third writing task than during the second writing task. A univariate analysis of variance test was run in order to determine whether these differences in means were statistically different. The results revealed no significant differences in L-S frequency (F = .28, p = .871, α = .05). This finding suggests that a 10-week period of L3 language development might not have an effect on L-S frequency in L3 writing.

4.4 What Conditions Favor L1, L2, L3 Use, and L-S and What Types of L-S are Used by Multilinguals in L2 and L3 Writing?

Findings regarding the third and fourth questions will be presented together in this subsection in order to avoid redundancy in the use of examples. Hence, the selected examples from the TAPs illustrate tendencies related to both questions.

The third and fourth research questions aimed to provide insights into the conditions that create a favorable environment for L-S to occur in L2 and L3 composing and types of L-S used by multilinguals. Therefore, TAP utterances were coded using the
coding scheme presented in table 3.6. To briefly summarize, multilinguals’ writing process is viewed in this study as a dynamic complex system. Accordingly, based on data from the TAPs, and Inputlog files, and drawing upon the premises of complexity theory, four dynamic subsystems were identified as components of the L2 and L3 writing systems. Analyses of data show that they create specific conditions for language use and L-S to occur. Hence, these conditions were identified for TAP coding as specified below:

1. **Engagement with writing in L2/L3** includes three components. Writing prompt (WP) refers to utterances produced when rereading the prompt (WP1) and back-translating or analyzing the prompt (WP2). Evidently, WP1 segments were voiced in L2 in L2 composing and in L3 in L3 composing. The writing goals (WG) component denotes segments focusing on setting and achieving writing goals and planning at global and local levels. Reader (R) indicates utterances that reflect on readers’ discourse community.

2. **Management of the writing activity.** This refers to utterances that express generating ideas/content (Mgt1), noticing and making meaning reflected in the writers’ comments (Mgt2), managing the writing process and word processing (Mgt3), and managing mechanical aspects of the written text (Mgt4).

3. **Emerging text.** This consists of segments that refer to generating the actual text (Txt1) and rereading or back-translating the text already produced (Txt2).

4. **Language resources.** These include segments that express searching for and evaluating a target item without the aid of online resources (LgR1), with the aid of online resources (LgR2), as well as revising the produced text at word, clause, sentence, and discourse level (LgR3).
Subsequently, the coded TAP segments were categorized based on the language(s) they were voiced in (i.e., monolingual, bilingual, and multilingual).

4.4.1 What conditions favor L1, L2, L3 use, and L-S in L2 writing?

Analyses of TAP data presented in the tables below indicate that certain conditions are more likely to create an environment that favored the use of L1 and L2 more in monolingual utterances than in bi- or multilingual ones.

4.4.1.1 What conditions favor monolingual utterances in L2 writing?

Table 4.10 below shows the average proportion of mono-, bi-, and multilingual segments in each TAP category for the FL participants in L2 writing.

Table 4.10. FL group’s mean percentage of mono-, bi-, and multilingual utterances for each writing condition in L2 composing

<table>
<thead>
<tr>
<th>Writing System Components</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L1-L2</th>
<th>L2-L3</th>
<th>L1-L3</th>
<th>L1-L2-L3</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement with writing activity</td>
<td>WP1</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>WP2</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>WG</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Management of writing activity</td>
<td>Mgt1</td>
<td>98</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Mgt2</td>
<td>97</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Mgt3</td>
<td>98</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Mgt4</td>
<td>94</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Emerging text</td>
<td>Txt1</td>
<td>1</td>
<td>70</td>
<td>27</td>
<td>2</td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Txt2</td>
<td>39</td>
<td>60</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Language resources</td>
<td>LgR1</td>
<td>5</td>
<td>73</td>
<td>11</td>
<td>11</td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>LgR2</td>
<td></td>
<td>97</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>LgR3</td>
<td>34.5</td>
<td>4.5</td>
<td>57</td>
<td></td>
<td>4</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Note: The mean percentage is calculated excluding all zero values.

The results show what the FL students exclusively used their L1 for: (a) back- translating or analyzing the writing prompt (WP2); (b) setting writing goals (WG); and (c) reflecting on the reader (R). Additionally, the FL participants made use of L1 almost entirely for (a) generating ideas (M=98%); (b) reflecting on the writing process or text
(M=97%); (c) managing the writing process (M=98%); and (d) managing the mechanical aspects of the written text (M=94%). On the other hand, the most frequent conditions for expressing their thoughts in L2 were when generating the actual text (Txt1: M=70%) and rereading the text already produced (Txt2: M=60%). Furthermore, monolingual utterances were least likely to occur in L1 (M=5%) and not at all in L2 when searching for a target item without the aid of online resources. Additionally, when revising their written texts, the FL students relied significantly more on their L1 than on their L2 (M=34% and M=5%, respectively).

Table 4.11 below indicates the average proportion of mono-, bi-, and multilingual segments in each TAP category for the SL participants in L2 composing.

<table>
<thead>
<tr>
<th>Writing System Components</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L1-L2</th>
<th>L2-L3</th>
<th>L1-L3</th>
<th>L1-L2-L3</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement with writing activity</td>
<td>WP1</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>WP2</td>
<td>25</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>WG</td>
<td>17</td>
<td>66</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Management of writing activity</td>
<td>Mgt1</td>
<td>33</td>
<td>67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Mgt2</td>
<td>42</td>
<td>58</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Mgt3</td>
<td>48</td>
<td>52</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Mgt4</td>
<td>53</td>
<td>36</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Emerging text</td>
<td>Txt1</td>
<td>94</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Txt2</td>
<td>97</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Language resources</td>
<td>LgR1</td>
<td>21</td>
<td>65</td>
<td>5</td>
<td>9</td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>LgR2</td>
<td></td>
<td>82</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>LgR3</td>
<td>3</td>
<td>72</td>
<td>11</td>
<td>5</td>
<td>16</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Note: The mean percentage is calculated excluding all zero values.

Unlike the FL writers, the SL group displayed a more balanced distribution of monolingual L1 and L2 utterances. They tended to use L2 exclusively only when commenting on the reader and mostly when generating the text and rereading it, which
represented, respectively, 94% and 97% of all Txt1 and Txt2 segments. Additionally, conditions that were more likely to elicit L2 use were: (a) analyzing the writing prompt (M=75%); (b) setting writing goals and planning (M=66%); (c) generating content (M=67%); and (d) commenting on the writing process (M=58%). It should be stressed, however, that the SL writers relied more on their L1 than on L2 for controlling the mechanical aspects of the compositions (respectively, M=53% and M=36%) and equally on both languages for managing the writing process (M=48% for L1 and M=52% for L2).

4.4.1.2. What conditions favor L-S in L2 writing?

The findings presented in tables 4.10 and 4.11 above identify conditions that might have created favorable environment for bi- and multilingual utterances for both groups in L2 writing. Analysis of data revealed differences between the two groups. For instance, while setting goals and planning incited the SL students to articulate their thoughts in L1-L2 (M=17%) it was not a factor for the FL students. Conversely, on a small number of occasions, only the FL writers reflected on and managed the writing process in, respectively, L1-L2-L3 (M=3%) and in L1-L2 (M=2%).

On the other hand, six conditions that seemed to favor mixed language segments in L2 writing were identified as common for both groups: controlling the mechanics of the text (Mgt4), generating (Txt1) and rereading/back- translating (Txt2) the actual text, searching for lexical items without (LgR1) or with (LgR2) the aid of online resources, and revising the text (LgR3).

While controlling the mechanics of the text elicited L1-L2 utterances (M= 3% and M=11% for, respectively, the FL and SL students) the other five conditions seemed to have a major effect on producing segments involving L3. For instance, L2-L3 utterances
(M=2% for the FL group and M=3% for the SL group) and L1-L2-L3 utterances (M=1% only for the SL students) occurred when the participants were generating the actual text. Analysis of the verbal protocols revealed that these types of L-S appeared to be for the most part the result of a slip of the tongue or lexical borrowing, as seen respectively in the following two examples. The transcription conventions are presented in table 3.5.

Example 1:

1 vogliamo che ogni persona faccia, una (.) in English, what’s the word in English? vogliamo che ogni persona faccia, una background? no, una: I don’t know, vogliamo che ogni persona faccia una descrizione de se stesso↑ profile↑ profile, faccia una profilo, un profilo, de se stesso,  

2 we would like everyone to make one (.) in English, what’s the word in English? we would like everyone to make one background? no, one: I don’t know, we would like everyone to make a description of himself↑ profile↑ profile, to make a profile, a profile of himself;  

(D., L2 task)

Note: L1 = En.; L2 = It. [italic]; L3 = Sp. [bold]. 1 Transcription of TAP; 2 Translation of transcription;

In the above example, the SL participant was searching for the lexical item ‘profile’ first in her L2, indicated by the use of the indefinite article (‘una’), followed by a 1-3 second pause and then in her L1. After rereading the L2 segment she had previously typed (i.e., ‘vogliamo che ogni persona faccia’), she tried to find the appropriate L1 equivalent. She settled for ‘una descrizione’ (L2) and continued her thought, inserting an L3 functional element ‘de’ instead of the L2 preposition ‘di’. However, later on when revising the composition, the participant corrected the L3 preposition, which suggests that ‘de’ was not part of her L2 language system. Most likely it appeared as a slip of the tongue in this instance. In addition to such mixing of languages that involved slips of the tongue of functional words, such as de-di, como-come, porque-perché, and pero-ma, (in Spanish and Italian respectively), some participants borrowed L3 lexical items when writing in their L2:
Example 2:

1 I guess I hope you’ll continue to visit it (.)
2 I guess I hope you’ll continue to visit it (.)

I don’t need to look that up either, espero
I don’t need to look that up either, I hope.
I guess, that’s Italian or Spanish? I hope.
I guess, that’s Italian or Spanish? I hope.

Note: L1 = En.; L2 = It.; L3 = Sp. [bold]. ¹Transcription of TAP; ²Translation of transcription.

In this excerpt, H generated her idea first in her L1, but when she attempted to transfer it in L2, the Spanish (L3) verb ‘espero’ came first to her mind. While initially she was sure this was the L2 item that matched the meaning of the corresponding L1 idea, after typing it H had doubts about her lexical choice and decided to look it up in the online dictionary. Instances of slips of the tongue and insertions like those presented above were common when the participants were generating the actual text or rereading it.

In addition, multilingual utterances in L2 composing occurred while searching for a target item without or with the aid of online resources (coded respectively as LgR1 and LgR2) or revising the written text (LgR3). A similar pattern for both groups emerged with respect to the former condition. As seen from results presented in tables 4.10 and 4.11 earlier, both groups’ LgR1 utterances were more likely to involve L1 and L2 in lieu of only one language. Additionally, both groups showed a similar tendency to engage in interplay among the three languages. However, only the SL writers attempted to articulate their thoughts in bilingual L2-L3 utterances. In these instances of lexical searches without the aid of online resources, switches between L3 and the other languages assisted writers to retrieve the L2 lexical item or to check it against an equivalent L3 item to avoid confusion. The following examples (3 and 4) demonstrate the interplay of the languages in these two kinds of instances:
Example 3:

1. I study international business with subjects like, commercial Spanish or English, and, **gestión** non pas **gestión**, c’est en espagnol, non pas **counting** je peux le chercher, ah↑ économique, **economy**

2. I study international business with subjects like, commercial Spanish or English, and, **management** no, not **management**, this is in Spanish, no, not **counting**, I could look it up, ah↑ **economy**, **economy** (A., L2 task)

Note: L1= Fr.; L2=En. [italic]; L3=Sp. [bold]. ¹Translation of TAP; ²Translation of transcription; ³L2 item is pronounced in L1 but simultaneously typed in L2.

In this excerpt, A (FL writer) was generating the actual text in L2. When she faced the need to search for an L2 lexical item, she resorted first to her L3 (i.e., gestión), evaluated it in her L1, retrieved an L2 synonym (i.e., counting) but rejected it after assessing it again in her L1, expressed readiness to consult the dictionary, again in L1 (i.e., “je peux le chercher”), and finally retrieved the item first in her L1 (i.e., “ah↑ économie”), which prompted the cognate L2 item (i.e., economy) that matched the meaning of the corresponding L1 word.

Example 4:

1. **questo e’, il mio, primera? primo, primo**, in Spanish it’s cousin so it’s first, in Italian, e’ il mio primo, blog.

2. this is, my **first? first, primo** in Spanish it’s cousin so it’s first, in Italian, is **my first blog.** (H. L2 task)

Note: L1=En.; L2=It. [italic]; L3=Sp. [bold]; e’ = é. ¹Transcription of TAP; ²Translation of transcription.

In the excerpt above, the interplay of the three languages helped the FL student to highlight differences between syntactically close L2 and L3 lexical items. First H retrieved the L3 lexical item (i.e., primera), which triggered another syntactically close but semantically different L3 lexical item (i.e., primo). The participant made her lexical choice only after highlighting in her L1 the semantic difference between the latter L3 item and its L2 homograph.
With respect to searching for lexical items with the aid of online resources, it is important to note that both the SL and FL learners’ switching involved almost exclusively L1 and L2 (respectively, M=97% and M=82%) as well as multilingual L1-L2-L3 utterances. However, the proportion of the latter was higher for the SL group (M=18% vs. M=3%). Interestingly, in these instances, the participants retrieved the desired lexical item first in their L3 and either engaged in a search for synonyms in their other languages or decided to resort directly to the online dictionary to look it up. These two approaches are evident in the following two examples:

Example 5:

1 per mostrare i nostri interessi, con (.) juntos
con (.) con: juntos, how do you say that in
English? (.) con ciascuno, ciascuno [I-E
ciascuno] con ‘i’, no, con, (.) [E-I each other]
con, all right, forget about that, OK

2 to show our interests, with (.) together
with (.) with: together, how do you say that in
English? (.) with everyone, everyone [I-E
ciascuno] with ‘i’, no, with, (.) [E-I each other]
with, all right, forget about that, OK

(D., L2 task)

Note: L1 = En.; L2 = It. [italic]; L3 = Sp. [bold]; [I-E ciascuno] = looking up in It.-En. dictionary; [E-I each other] = looking up in En-It. dictionary. ¹ Transcription of TAP; ² Translation of transcription.

In the follow-up interview, the participant reported that she was looking for the lexical items “each other, together” and thought that the Spanish (L3) equivalent would prompt the L2 item. When she could not retrieve it in her L2, she attempted to find an L1 equivalent (i.e., ‘how do you say that in English?’) but identified an L2 item that conformed to her intended meaning (i.e., ciascuno) and decided to look it up in the online Italian-English dictionary. Dissatisfied with the results, the participant looked up the lexical item, but this time in the English-Italian dictionary, which left her again unconvinced, and finally she decided to find a different way to convey her thought in L2.
Example 6:

1 and, what else do I like to do? spend time with my friends, to spend time it’s, all I’m getting is *pasar lo tiempo* which is not right [E-I spend time] *passare il tempo*,

2 and, what else do I like to do? spend time with my friends, to spend time it’s, all I’m getting is *to spend time* which is not right [E-I spend time] *to spend time*,

(H. L2 task)

Note: L1 = En.; L2 = It. [italic]; L3 = Sp. [bold]; [E-I spend time] = looking up in En-It. dictionary.

1 Transcription of TAP; 2 Translation of transcription.

On the contrary, in the above case, although the FL writer retrieved the lexical item first in L3, she did not attempt to find a connection with the corresponding L2 item but directly resorted to the online dictionary. It could be that the participant had learned the L3 lexical item as an idiomatic expression or just, as she reported in the follow-up interview, preferred to consult online resources when “the word does not come up within a second” (H, Interview 3).

Data analysis of L2 composition TAPs points to an important role of L3 during the lexical search process, as evident in the above examples. The findings reveal that literacy in L3 may result in a wider variety of approaches to language use for lexical searches as opposed to bilingual writers, who have only two languages in their repertoire.

The sixth condition that created favorable conditions for multilingual utterances in L2 composing was revising the emergent text (LgR3). Regarding L3, the results presented in tables 4.10 and 4.11 indicate a tendency exhibited by the SL writers to produce bilingual L2-L3 utterances (M=5%) and multilingual ones (M=9%). On the other hand, the FL group used L3 only in multilingual utterances, although less frequently (M=4%). The following example demonstrates an instance of concurrent use of the three languages when revising the already written text.
Example 7:

1 vogliamo che ogni persona faccia un profilo di se stesso. *de* is Spanish *di*, *di se stesso*, of, of himself. (D., L2 task)

This revision was made during the final rereading and revising of the written composition. As the SL writer was rereading the sentence, she noticed the previously written preposition ‘*de*’ (L3) and first corrected it orally by saying ‘*di*’ (L2) followed by a justification of the linguistic choice (i.e., ‘*de* is Spanish *di*’). In this specific instance, both L2 and L3 items were embedded into L1, which provided the syntactic frame of the utterance. The student finished by editing and rereading the corrected sequence.

Nevertheless, analysis of the data points to a distinctive trend displayed by the SL and FL participants with respect to language coded under LgR3. That is, whereas the former group tended to resort primarily to their L2 to voice their thoughts in monolingual form (M=72%), the latter produced for the most part bilingual L1-L2 segments (M=57%) while revising and editing the already written text in L2 writing.

4.4.2 What conditions favor L1, L2, L3, and L-S in L3 writing?

Analyses of the data revealed that the identified conditions which might create favorable environment for L-S to occur in L2 writing were the same as in L3 writing. However, the findings seem to point to a difference between L2 and L3 composing in terms of a larger variety of language combinations in the latter.
4.4.2.1 What conditions favor monolingual utterances in L3 writing?

Table 4.12 below presents the average percentage of mono-, bi-, and multilingual utterances coded under the corresponded writing conditions in the verbal protocols of the FL participants’ L3 tasks.

Table 4.12. FL group’s mean percentage of mono-, bi-, and multilingual utterances for each writing condition in L3 composing

<table>
<thead>
<tr>
<th>Writing System Components</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L1-L2</th>
<th>L2-L3</th>
<th>L1-L3</th>
<th>L1-L2-L3</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement with writing activity</td>
<td>WP1</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>WP2</td>
<td>67</td>
<td>33</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>WG</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Management of writing activity</td>
<td>Mgt1</td>
<td>85</td>
<td>14</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Mgt2</td>
<td>88</td>
<td>9</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Mgt3</td>
<td>97</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Mgt4</td>
<td>69</td>
<td>5</td>
<td>6</td>
<td>20</td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Emerging text</td>
<td>Txt1</td>
<td>77</td>
<td>0</td>
<td>1.5</td>
<td>20</td>
<td>1.5</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Txt2</td>
<td>12</td>
<td>88</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Language resources</td>
<td>LgR1</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>62</td>
<td>18</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>LgR2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LgR3</td>
<td>18</td>
<td>20</td>
<td>0.5</td>
<td>54</td>
<td>7</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Note: The mean percentage is calculated excluding all zero values. ¹ Mean percentage = 0.2%.

A comparison of the results presented in tables 4.10 and 4.12 indicates that the FL group showed a consistent tendency in both L2 and L3 composing to rely primarily (between 69% and 100%) on their L1 for back-translating/analyzing prompt (Txt2), setting writing goals and planning (WG), searching for ideas (Mgt1), noticing and making meaning (Mgt2), managing the writing process (Mgt3), mechanical aspects of the text (Mgt4), and considering the reader’s discourse community (R). Additionally, L1 segments were articulated when back-translating or paraphrasing the already written text, searching for target items without consulting online references, and revising. However, the L1 segments represent, respectively, 12%, 6%, and 18% of all the utterances.
articulated in these conditions, which are relatively smaller than in L2 composing. Furthermore, results indicate that, in L3 composing, the FL students voiced their thoughts entirely in L2 only when attempting to control the mechanics of the text, although the average percentage of these L2 segments was rather small (M=5%) when compared with that for L1 segments (M=69%).

Table 4.13 below shows the average percentage of mono-, bi-, and multilingual utterances coded under the corresponded writing conditions in the verbal protocols of the SL participants’ L3 tasks.

<table>
<thead>
<tr>
<th>Writing System Components</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L1-L2</th>
<th>L2-L3</th>
<th>L1-L3</th>
<th>L1-L2-L3</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement with writing activity</td>
<td>WP1</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>WP2</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>WG</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Management of writing activity</td>
<td>Mgt1</td>
<td>25</td>
<td>58</td>
<td>17</td>
<td>100</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Mgt2</td>
<td>21</td>
<td>56</td>
<td>23</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mgt3</td>
<td>38</td>
<td>62</td>
<td></td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mgt4</td>
<td>50</td>
<td>36</td>
<td>1</td>
<td>13</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Emerging text</td>
<td>Txt1</td>
<td>95</td>
<td>3</td>
<td>2</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Txt2</td>
<td>2</td>
<td>97</td>
<td>1</td>
<td>0</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language resources</td>
<td>LgR1</td>
<td>2</td>
<td>14</td>
<td>42</td>
<td>18.5</td>
<td>23.5</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LgR2</td>
<td></td>
<td>40</td>
<td>12</td>
<td>48</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LgR3</td>
<td>6</td>
<td>34</td>
<td>26</td>
<td>29</td>
<td>5</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Note: The mean percentage is calculated excluding all zero values. *Mean percentage = 0.3%.

Contrary to the FL participants’ tendency to rely mostly on their L1, the SL group’s monolingual utterances were not only distributed among the three languages, but it appears that L2 was more intensively involved in the L3 composing process than L1. For instance, the L2 sequences coded under WG, Mgt1, Mgt2, and Mgt3 averaged between 56% and 100%, a tendency similar to the one displayed in their L2 writing.
With regard to managing the mechanical aspects of the text, similar to the tendency exhibited in L2 writing, the SL students resorted more to L1 (50%) than to L2 (36%) while composing in L3. This trend manifested in Mgt4 condition is similar to that of the FL students, who relied as well mostly on their L1. Furthermore, a small proportion of the SL groups’ L2 utterances were coded as back-translating the written text and revising, respectively, M=2% and M=6%. More specifically, regarding these two conditions for L-S in L2 and L3 composing, it could be said that they relied more on the language they were writing in (L3). However, the SL participants did not reflect explicitly on the audience when writing in their L3. Additionally, in contrast to L2 writing, the SL participants tended to produce more frequently multilingual utterances instead of monolingual ones when searching for target items while writing in L3 (i.e., M=98% and M=100%, respectively, for LgR1 and LgR2). In addition, contrary to a tendency exhibited in L2 composing, the SL writers showed a preference for uttering their thoughts in multilingual segments instead of in monolingual ones when revising the already produced text (M=60% vs. M=25% in L2 writing).

4.4.2.2. What conditions favor L-S in L3 writing?

Regarding L3 use in L3 composing, when the participants were generating the actual text, they voiced their thoughts mainly in the language of the composition (M=77% and M=95%, respectively, for the FL and SL groups), which corresponds to the trend exhibited in L2 writing. Nonetheless, a comparison of the results demonstrates that the participants exhibited a wider spectrum of language combinations when articulating their thoughts while writing in L3 than while composing in L2.
Additionally, the findings presented in tables 4.12 and 4.13 point to some differences between FL and SL writers regarding conditions that favor mixed language segments in L3 writing. For instance, contrary to the SL group, which employed exclusively monolingual utterances when generating ideas, commenting on the writing process, and managing the writing process, the FL participants articulated a small percentage of their thoughts (1%-2%) in L1-L3 and/or L1-L2-L3 language segments. In these instances, L2 and/or L3 lexical items were inserted in the midst of L1 discourse, which provided the syntactic frame for the utterances. This type of L-S is demonstrated in the example below:

Example 8:

1 Ok we had to, (.) learn a language, we had to study a language, **nous avons**, (.) what was it called? I have to **devoir** let me find that [F-F **conj. devoir**] dû, it’s weird, I don’t remember using that word, ( ) I have not used any **imparfait**, that’s weird, I don’t know, anyways, **nous avons dû** ( ) étudier,

2 Ok we had to, (.) learn a language, we had to study a language, **we have**, (.) what was it called? I have to **have to** let me find that [F-F **conj. devoir**] had to, it’s weird, I don’t remember using that word, ( ) I have not used any imperfect tense, that’s weird, I don’t know, anyways, **we had to** ( ) **study,**

(M. L3 task)

Note: L1 = En.; L2 = It.; L3 = Fr. [bold]; [F-F conj. devoir] = looking up the conjugation of the verb in Fr.-Fr. Dictionary. 1 Transcription of TAP; 2 Translation of transcription.

In the above excerpt, the FL writer attempted to express in her L3 the idea that she had to study an FL at school. She recalled immediately the corresponding L3 lexical item (the verb ‘devoir’), but not its past participle. After she found it in the online dictionary, M commented that she had never seen this verb form. She continued on by reflecting on the use of the past/present perfect (passé composé) versus imperfect (imparfait) in her composition, but instead of using the L1 corresponding item for ‘imparfait,’ she directly borrowed it from L3 and inserted it into her thought voiced in L1.
Alternatively, only SL participants used L1-L3 and L2-L3 utterances for back-translating or paraphrasing the written composition, although in very small proportions (between 0% - 1%). In these cases, either L1 emerged as a slip of the tongue or L2 found its way into the L3 thought via lexical borrowing. The latter type of L-S is seen in the following excerpt:

Example 9:

\[1\] J'ai commencé à étudier le français dans l'école élémentaire au quinzième année. Dans mon école nous avons eu le choix de avoir une autre classe de “creative writing” en anglais ou une classe de français.

\[2\] I started to study French in elementary school in the fifteenth year. in my school we had the choice of having another class in “creative writing” in English or a French class.

(S. L3 task)

Note: L1 = Sp.; L2 = En. [bold]; L3 = Fr. \[1\] Transcription of TAP; \[2\] Translation of transcription.

Initially, when the SL writer generated her text, she used the term “creative writing,” directly borrowing it from her L2 without making any attempt to find its corresponding L3 item. Similarly, at the end of her composing process, when S was revising the written composition she reread the sentence but again did not attempt to replace the L2 borrowing.

Furthermore, the results point to five conditions that played a role in producing multilingual utterances for both groups. However, they differ in the way the writers made use of the three languages when writing in L3. For instance, with respect to managing the mechanical aspects of the text (Mgt4), both groups made use of bilingual utterances, but whereas the FL students switched only between L1-L3 (M=20%), the SL group preferred an L2-L3 language combination (M=13%). While in some of these Mgt4 instances the type of switching between languages involved insertions of L3 lexical items into a frame constituted by the linguistic rules of L1 or L2, there were also a few cases
that involved language alternation (i.e., juxtaposition within an utterance of passages of discourse belonging to L1, L2, or L3 linguistic systems), as demonstrated below:

Example 10:

1. espérer, espérer. [F-F conj. espérer] this is what I need, I’ll just look up the accent, j’espère, que vous, trou---- trouviez? que vous, le trouviez, amusant, et, intéressant, I need now that accent, nous avons besoin de l’accent,

2. to hope, to hope. [F-F conj. espérer] this is what I need, I’ll just look up the accent, I hope that you, fi---- find? that you find it, fun, and, interesting, I need now that accent, we need the accent, 

(M. L3 task)

Note: L1 = En.; L2 = It.; L3 = Fr. [bold]; [F-F conj. espérer] = looking up the conjugation of the verb in Fr.-Fr. Dictionary. 1 Transcription of TAP; 2 Translation of the transcription; 3 The correct target form should be in indicative mood.

In this passage, the FL writer made two attempts to manage the orthographic aspects of the text. Initially, after finding the conjugation of the target item “espérer” in the online dictionary, the participant evaluated positively her choice and expressed in her L1 the need to move to the next step to find and type the specific accent mark (“I’ll just look up the accent”). However, after finishing typing her thought, she realized that she needed a different accent mark for the target item ‘intéressant,’ but this time she expressed her attempt to manage the mechanical aspect in both her L1 and L3 (“I need now that accent, nous avons besoin de l’accent”). Analysis of the retrospective interviews with the participant revealed that this language alternation might have been prompted by the writer’s approach to using L3 as a means for practicing that language.

I think whenever I thi---- I think in French, it’s kind of, more for me to practice it, I guess in my mind like, it doesn’t like come naturally to me so; (.) I feel like if I think in French then I can write in French and I can speak in French, (M, Interview 3)

As the participant acknowledged in the same interview, although she would think mostly in English when composing in L2 and L3, she would think in her L3 “probably
something simple that [she] knew in French” motivated by her wish to learn to think in her L3 by practicing it more.

With respect to the second condition that favored L-S for both groups, results indicate that while the FL writers made use of L1-L2, L2-L3, L1-L2-L3, and mostly L1-L3 (M=20%) language combinations when generating the actual text, the SL participants’ switches involved small proportions of L2-L3 (M=3%) and L1-L3 (M=2%) utterances. These instances of L-S were characterized by slips of the tongue, insertions of L1 or L2 functional elements, particularly conjunctions, into a base L3 structure, use of L1 or L2 tag items (i.e., the Spanish “este”, “I guess”, “so”, etc.) introduced into L3 discourse, as well as language alternations. The latter type of L-S involved expressing an idea first in L1 or L2 and translating it into L3, or when the idea was initially expressed in L3, then the participants translated it back into L1. The following example illustrates the dynamic interplay of the three languages when the participant was generating her ideas:

Example 11:

1 escribir’e again soon, escribir’e, un, otro, no, otro, sí?
otra, otro is italiano, un otro, (. ) escribir’e un otro, blog.

2 I’ll write again soon, I’ll write, one, another, no, another, yes?
other, another is Italian, another, (. ) I’ll write another, blog.

Note: L1= En.; L2= It. [italic]; L3= Sp. [bold]; ’e = é. ¹ Transcription of TAP; ² Translation of transcription.

In this excerpt, the FL student was trying to convey in L3 her idea that she will write more soon. After looking up the future form of the target verb ‘escribir’ in the online dictionary, she typed it but continued her thought in L1 (i.e., ‘again soon’). She attempted to keep on in L3 by repeating the L3 target verb, but her thought continued in L2 and she typed the L2 item ‘altro’. In the retrospective interview, the participant
explained that she typed the L2 word automatically. However, right after seeing its visual representation on the monitor, she associated it with her L2 system, which prompted the L2 question ‘no altro, si?’, followed by the corresponding L3 item and a comment on the distinctness of both elements expressed in a multilingual utterance. Subsequently, the participant typed the intended L3 item and reread the L3 utterance.

Furthermore, overwhelming use of all types of multilingual segments by the participants emerged when they were searching for lexical items without consulting online resources (LgR1). There is a distinction, however, between SL students who employed the whole spectrum of mixed segments with preferred L2-L3 combination (M=42% as shown in table 4.13), unlike FL writers who predominantly used L1-L3 type of utterances (M=62%). On the other hand, the average percentage of LgR1 multilingual utterances was 23% and 18%, respectively, for the SL and FL writers. Likewise, all participants used exclusively mixed language segments when searching for lexical items online (LgR2). The latter condition seems to have prompted the FL writers to switch primarily between L1-L3 (M=94%), while the SL participants voiced their thoughts mainly in L2-L3 or the three languages (M=40%), and significantly less in L1-L3 (M=12%). A more detailed analysis of LgR1 and LgR2 bi- and multilingual utterances revealed that when searching for lexical items while composing in their L3, these multilingual writers tended to engage in multifaceted search processes employing a wide range of language forms and functions. For instance, only around 13% of utterances coded as LgR1 and LgR2 contained two (in the bilingual ones) or three (in the multilingual ones) lexical items as illustrated in the excerpt below:
Example 12:

1 (. ) raccontare to tell [opens dictionary] **contar**↑ 2 (. ) to tell [opens dictionary] **to tell**↑ (. )

Note: L1 = En.; L2 = It. [italic]; L3 = Sp. [bold]. 1 Transcription of TAP; 2 Translation of transcription.

In the retrospective interview, D explained that she uttered the target item first in Italian (L2) in order to trigger the corresponding L3 item and then immediately translated it into L1 (English) to make sure it was the right linguistic choice. Concurrently, she opened the dictionary web page but succeeded in retrieving the L3 target item without looking it up online.

Analysis of the verbal protocols showed that in these two- and three-word bilingual and multilingual utterances, the target items included functional words such as prepositions and conjunctions (e.g., since, also) and lexical words such as adverbs, and specific terms (i.e., anthropology, Greek).

Nevertheless, significantly more frequently, the writers tended to experience an intense and complex lexical search process, wherein a wide variety of language forms and functions were employed while searching for alternative lexical choices, expressing comments and feelings, managing the searching process and online resources, evaluating the target item, and referring to lexico-grammatical features of the lexical choice. Instances of this kind of multifaceted lexical searches represent around 87% of all lexical searches. The example below demonstrates the intricate interplay of all languages involved in the search of an L3 lexical element:

Example 13:

1 l obiettivi principale di questo blog è per ( ) **compartire**↑? I don’t think that’s right, **compartire**↑ (. ) let’s see, English to Italian, [see, English to Italian, com]— what’s that word? share, [E-I translate google.com share] **condividere**↑, um. I think that’s share a sandwich, I just wanna (. ) **partecipare dividere spartire, spartire**↑? (. ) I: no, I think it is
*spartire dividere* is to like, divide, let’s go from the Spanish to English instead. Spanish, here we go. *compartir* [S-I translate.google.com compartir] OK, same thing apparently, so *condividi, condividi, per condividere* con tutti

(B. L3 task)

Note: L1 = Sp. [bold]; L2 = En.; L3 = It. [italic]. 1 Transcription of TAP; 2 L3 lexical invention based on the L1 verb compartir [share]; 3 Correct L3 verb is condividere.

In this passage, the SL participant (B) made extensive use of all three languages while searching for the target item. B resorted to her L1 not only to search for L3 alternatives, but also to build a bridge between L1 and L3 in order to find the target item. As a result, S proposed an L3 lexical invention (compartire) that bears the stem of the corresponded L1 item (compartir) but is morphologically adapted to the TL (L3). Furthermore, L3 served to propose corresponding lexical items and, as well, to express insecurity about lexical choices (i.e., ‘spartire?’) or the existence of a lexical item (i.e., ‘compartire?’). Additionally, L2 in the form of a question was used to recall an L2 lexical item, and in the form of comments (e.g., to express doubts, to manage the searching process and online resources, to reflect on the semantic differences of the proposed L3 synonyms, and to comment on lexical choices). Hence, as already pointed out, for multilingual writers, the process of lexical searching in L3 composing might involve a large variety of language forms and functions, and language combinations.

Similar to the LgR1 and LgR2 conditions, the FL writers used predominantly L1, L2, and L3 in mixed segments for revising and editing their compositions (LgR3). They switched intensively between L1-L3 (M=54%), and in a small number of instances between L1-L2, L2-L3 (M=1%), and the three languages (M=7%). On the other hand, the SL writers displayed a more balanced distribution of monolingual and mixed utterances, M=40% and M=60%, respectively. With respect to the latter, they tended to
switch between their L1 and L2 and the language they were writing in (respectively, M=29% and M=26%), but not at all between L1 and L2.

In sum, while analyses of the data revealed significant differences in conditions for L-S across writing and groups as presented in this portion of the chapter, it is imperative to point out that all the participants tended to use their three languages and a great variety of language combinations, forms and functions when articulating their thoughts during the L3 writing process.

4.5 What is the Role of L1 and L2 in L3 Writing of FL and SL Multilinguals?

This subsection addresses the fifth research question. Results stemming from the analysis of language use and L-S in L3 writing displayed in tables 4.12 and 4.13 point to distinctive roles of L1 and L2 in L3 composing. Moreover, analysis of writers’ retrospective interviews provided additional evidence to differentiate both languages with regard to their role in L3 writing process.

4.5.1 What is the role of L1 and L2 in L3 writing of FL multilinguals?

Data presented in table 4.12 indicate a large role of L1 for FL multilingual writers. According to the results, the FL students used L1 almost exclusively in monolingual utterances for analyzing and back-translating the writing prompt, setting and achieving writing goals, generating ideas, commenting on the writing process and task, managing writing process, word processing, and online resources, managing the mechanical aspects of the text, and reflecting on the reader. Furthermore, apparently the FL writers resorted mostly to L1 for generating ideas, since 20% of their thoughts were voiced in L1-L3 bilingual utterances and for back-translating the written text. Hence, these findings suggest that L1 played a primary support role in L3 composing.
However, the FL participants articulated their thoughts mainly in bi- and multilingual sequences while searching for a target item with and without the aid of online resources and while revising the compositions. Hence, additional analysis of the verbal protocols with respect to the position of activation of L1, L2, and L3 was necessary in order to learn more about the role of the languages in these specific instances (Jessner, 2008).

The data show that the most common pattern displayed by the FL writers while searching for a lexical item with or without the aid of online resources was L1-L3, wherein L1 was activated in initial position in the form of a lexical item proposal, question or comment, followed by the final lexical choice articulated in L3. The example below illustrates this pattern:

Example 14:

*lea:lo, again, it's supposed to be the same as in Italian but it could not be working, again [E-S again] otra vez* (H. L3 task)

Note: L1 = En.; L2 = It.; L3 = Sp. [italic]; [E-S again] = looking up the item in En.-Sp. dictionary.

In this particular instance, the participant switched abruptly from L3 to L1 most likely in order to initiate the search for the needed L3 lexical item (i.e., ‘again’), then commented in L1 on the possibility of finding a connection between her L2 (Italian) and L3 (Spanish) regarding the lexical item, but then decided to look it up in the English-Spanish dictionary, and finished by articulating it in L3.

Overall, when searching for a target item, the FL participants used initially their L1 in 71% of all bi- and multilingual lexical search instances, their L3 in 24%, and their L2 in only 5%, which points to a primary support role of L1 in L3 writing. Furthermore,
it is notable that lexical and syntactic searches initiated in L3 were followed immediately by a switch to L1 in 92% of these instances. In these cases L1, activated in the form of a comment, question, or equivalent target item, played a major role in rejecting, confirming, accepting, evaluating, or commenting on the proposed lexical choice.

In addition, L1 was found to play a large role while revising and editing the already written text. The results for FL writers presented in table 4.12 show around 20% of these occurrences were voiced only in L1. However, the mean percentage of LgR3 bilingual utterances involving L1 and L3 represented 54%. A more detailed analysis of these utterances showed that L1, in the form of a one-word segment or clause, was used to question, analyze, confirm, reject, and comment on the proposed revisions, as showed in the following two excerpts:

Example 15:

1 esta blog, este blog, masculine, este blog 2 this blog, this blog, masculine, this blog

(H. L3 task)

Note: L1 = En.; L2 = It.; L3 = Sp. [italic]. 1 Transcription of TAP; 2 Translation of transcription.

In this specific instance, the participant repeated the target item ‘blog’ preceded by the feminine and the masculine forms of the Spanish demonstrative adjective, thus showing doubts about which form to use. Subsequently, she switched to her L1 to analyze it, which prompted a one-word L1 utterance, followed by the revised item in L3.

The following example shows a more complex analysis of the target item under revision, articulated mainly in L1:
Example 16:

1 enterarse de, del mundo pueden se enter--- (.) can learn, so pueden so I don’t have to use the
pronoun, so it’ll just be enterarse because it’s after pueden and because it’s infinitive, pueden
enterarse, de

2 to learn about of the world can to lea--- (.) can learn, so can so I don’t have to use the pronoun,
so it’ll just be to learn because it’s after can and because it’s infinitive, can
learn about

(H. L3 task)

Note: L1 = En.; L2 = It.; L3 = Sp. [italic]. ¹ Transcription of TAP; ² Translation of transcription.

After looking up the target item, a synonym of ‘learn’, in the E-S dictionary and finding the lexical choice that best translated her idea, the FL writer reread the last written segment, “del mundo pueden,” and started to write the conjugated form of the verb “enterarse”. Most likely, the aural and visual form of the target item prompted certain doubts, because the participant stopped writing abruptly and switched to her L1 to revise the L3 element. The extensive analysis that followed was uttered in a bilingual L1-L3 utterance for which L1 provided the syntactic and semantic matrix, wherein L3 elements were inserted.

The results presented in table 4.12 point to a small but vital role of L2 in the FL writers’ L3 composing. The data show that L2 was involved in bilingual and multilingual utterances when searching for a target item without the aid of online resources and revising the written text, and only in multilingual segments when searching for an L3 item with the support of online resources. A more detailed look at utterances involving L2 revealed that the latter played a secondary support role in lexical and syntactic searches. As already mentioned, L2 was activated in initial position in 5% of all bi- and multilingual search instances, which represents 50% of all searches that involved L2. Another common tendency displayed by the FL learners was to resort to
their L2, expecting it to trigger the corresponding L3 item. These instances were followed by an L1 comment, question or proposed lexical item, as illustrated below:

Example 17:

1. el verano **prima**? no, before, [E-S before]
   antes de, **prima di** is Italian, waw↑ oh,
2. the summer **before**? no, before, [E-S before]
   **before, before** is Italian, waw↑ oh, (H. L3 task)

Note: L1 = En.; L2 = It. [bold]; L3 = Sp. [italic]; [E-S before] = looking up the item in En-Sp dictionary.
1. Transcription of TAP; 2. Translation of transcription.

However, in a few cases a writer attempted to evoke the needed L3 item by repeating the L3 item that immediately preceded the searched one, followed by a comment or questioning uttered in their L1. This approach is shown below:

Example 18:

1. mi comment je peux? mi: mi mi mi prochain
   comment dire prochain? mi: mi next, (. ) mi(. ) ah,
   je sais plus, [F-S prochain] próximo↑
2. my how can I? my: my my my
   next how to say next? my: (. )
   next, (. ) my (. ) ah, I don’t know anymore, [F-S next] next↑

Note: L1 = Fr.; L2 = En.[bold]; L3 = Sp. [italic]; [F-S prochain] = looking up the item in Fr-Sp dictionary.
1. Transcription of TAP; 2. Translation of transcription.

As seen in the last two excerpts, the writers resorted to their L2 expecting that the L2 item could prompt the corresponding L3 lexical item.

Additionally, analysis of lexical searches and revising instances revealed another significant function of L2 in L3 composing. The findings point to a tendency to use L2 in order to highlight or contrast specific L2 and L3 phonetic, orthographic, morphosyntactic, and semantic features, as the following two excerpts illustrate:
Example 19:

1 and Frances? France, [E-S France] Fran--

francese Francia Francia Francia

2 and Frances? France, [E-S France] Fran--

French France France France, France

Note: L1 = En.; L2 = It. [bold]; L3 = Sp. [italic]; [E-S France] = looking up the item in En-Sp dictionary;
1 Transcription of TAP; 2 Translation of transcription.

In this particular instance, the FL writer needed the L3 equivalent of France and initially she proposed an L3 item ‘Frances’ in the form of a question. Since H had doubts about that item, she proceeded to look it up in the dictionary. However, after finding the L3 item, she attempted to pronounce it (Fran--), but uncertain about the L3 pronunciation, she switched to L2 most likely to evoke the particular L2 pronunciation [francese], which then prompted the correct L3 one. The participant continued on typing the L3 item, simultaneously pronouncing the lexical item first in L2 and then in L3, probably in order to explicitly contrast their different phonological features.

Example 20:

1 y las personas, del, of the world del mondo, or un mondo? mondo it’s italiano↑ ho-ho↑ [E-S world] mondo mondo is Italian, mondo, is Spanish,

2 and the people, of, of the world of the world, or a world? world it’s Italian↑ ho-ho↑ [E-S world] world, world is Italian, world, is Spanish

Note: L1: En.; L2: It. [bold]; L3: Sp. [italic]; [E-S world] = looking up the item in En-Sp dictionary.
1 Transcription of TAP; 2 Translation of transcription.

In this excerpt, H evoked concurrently both L2 and L3 lexical items but expressed doubts about which language system they belonged to. Hence, she made the decision to look it up in the online dictionary. After ensuring that the target item corresponded to the intended language system, she went back to the text but once again switched back and forth among the three languages in order to contrast the specific L2 and L3 morphological features (i.e., mondo/mondo).
Data from H’s retrospective interviews elucidate further the role of L2 in her L3 writing. When asked to elaborate on her writing strategies, H explained:

it is not really happen that, I go back and forth but, if I’m thinking in English, I’ll be trying to think of, think of the word I need, and may be it will pop up in the language I need or may be it won’t so may be I’ll have to translate it twice, uh [i.e., in Italian and Spanish] which is kind of depends on .... the word ... especially when they are close, and there are a lot of words that have, like the same roots and then the ending is ---ción or ---zione which is, I mean they are very similar, (H, Retrospective interview 2)

Additionally, in the last interview H gave her perspective on the role of the three languages in her L3 writing. She perceived her L3 as the foreground where she “was trying to keep [her]self centered”, her L1 as the helper, “to get to the next part in Spanish,” whereas her L2 “was something that, [she] tried to use, ..., almost as a learning experience in that, when it came in [she] made that translation and ... an extra connection [between L2 and L3]” (H, Interview 3).

Hence, the selected data provide evidence that the FL writers resorted to their L2 not only as a secondary support language for lexical and syntactic searches and revising, but also as an enhancer to distinguish both language systems, with the aim to use it as a medium for language learning and development that would help establish a closer connection between L2 and L3, or, in H’s words, “to build a bridge” (Interview 3).

4.5.2 What is the role of L1 and L2 in L3 writing of SL multilinguals?

Contrary to the trend exhibited by the FL writers with respect to L1 and L2 use, data presented in table 4.13 point to a larger role of L2 in the SL learners’ L3 composing. The results show that the SL participants reflected on setting and achieving the writing goals exclusively in their L2. Furthermore, the data indicate a strong inclination for using L2 instead of L1 when searching for and considering ideas, commenting on the writing
process and text, and managing the writing process. Interestingly, regarding instances of managing the mechanical aspects of the text, the SL writers equally distributed their preferences between L1 and L2, although in the latter case they also tended to use L2 in mixed L2-L3 utterances. In addition, the results revealed that L2 was the only language used for back-translating the already written text. Hence, the findings indicate a primary support role for L2 in L3 writing.

However, similar to a tendency displayed by the FL writers, both L1 and L2 were used exclusively in mixed utterances when the SL writers were searching for target items with or without the aid of online resources. Therefore, additional analysis of LgR1 and LgR2 utterances regarding the position of activation of L1 and L2 was carried out in order to distinguish the specific role of both languages in these instances.

The findings revealed that L2 was activated in initial position in 51% of all instances of L3 target item searches. L1 and L3 were activated in initial position, respectively, in 29% and 20% of these occurrences. Moreover, in the latter case when the target item was first proposed in L3, the SL writers resorted immediately to L2 in 67% of these instances in order to confirm, accept, reject, suggest an alternative choice, express doubts about the proposed L3 item, comment on, and highlight morphosyntactic differences between function and content L2 and L3 words. The findings further indicate that the most common pattern followed by the SL writers when searching for a target item with or without the aid of online resources was L2-L3, which represented 25% of all searches. Namely, they initiated the search in L2 in the form of a lexical or syntactic item, comment or question, and subsequently switched to L3 to suggest the alternative target item. This approach is illustrated in the following excerpt:
Example 21:

1 *in qui sto* (.) **wait, how do you say my major is?** *in questo momento stò nell quarto anno della università [...], qui sto studiando*  
2 *in here I am* (.) **wait, how do you say my major is?** *at this time I am in the fourth year at the university [...], here I am studying* (B., L3 task)

Note: L1 = Sp.; L2 = En. [bold]; L3 = It. [italic].  
1 Transcription of TAP; 2 Translation of transcription.

In the above example, the SL participant interrupted her L3 thought and switched to L2, most likely in order to initiate a lexical search. First she attempted to manage the writing process (the command ‘wait’ was accompanied by the act of stopping typing), followed by articulating the needed target item in the form of a question. Subsequently, the participant switched back to L3 to reread the already typed text, which might have triggered her thought to continue in L3. Subsequently, she came up with the solution (i.e., ‘sto studiando’) without switching back to other languages.

These findings point to a tendency displayed by the SL writers to resort primarily to their L2 during lexical and syntactic searches, which further suggests that L2 plays a primary role as a support language in this process. It is notable that this trend runs counter to the trend distinctive for the FL writers, who preferred to rely mostly on their L1 when searching for a target item.

With respect to the role of L1 during the search process, the findings provide evidence for considering L1 as a second support language. Besides being activated in initial position in only 29% of all instances coded under LgR1 and LgR2, analysis of bi- and multilingual segments produced while searching for an L3 target item revealed that switching between L2 and L1 before the final L3 choice was the second most common pattern in lexical searches (i.e., 21%). In these occurrences, the SL writers initiated the search process in their L2 in the form of a comment, question or lexical item and
subsequently switched to L1 before deciding on the L3 lexical choice. This approach is demonstrated by the following example:

Example 22:

1. *son (.)* el mejor *scelta* what does that mean?  
2. *are (.)* the best *choice* what does that mean?  

*scelta* choice [E-S choice] *mi mejor ( .) eleccion?*  

*choice* choice [E-S choice] *my best ( .) cho--- ( .)*  

*mi mejor eleccion*  

*choice* choice [E-S choice] *my best ( .) choice*  

(D., L3 Task)

Note: L1 = En.; L2 = It. [bold]; L3 = It. [italic]; [E-S choice] = looking up the item in En-Sp dictionary.

1. Transcription of TAP;  
2. Translation of transcription.

As observed in the excerpt above, the SL writer switched from L3 to L2, thus initiating the lexical search process by suggesting a lexical item (i.e., “scelta”). Subsequently, she resorted to her L1 to make sense of the proposed L2 lexical item before proceeding to look it up in the online dictionary. While at first glance it might look like the participant switched to her L1 with the aim of finding the corresponding L1 lexical item (i.e., “choice”) to look up in the L1-L3 dictionary, analysis of her retrospective interviews revealed a new function of L1. The following statement captures D’s insights on the role of L1 while writing in L3:

I will think in Italian [L2] and then I’d translate that in English [L1] and then I’ll look it up or I’ll, it’s almost like a double-check for me like if I if I think of a word that I wanna say in Spanish [L3] and I don’t know it, I’ll think of it in Italian and then I’ll figure out what that word means to me in English to see if it’s, accurate and if it fits in the sentence, so it’s like a, like a double-check for me... for me I feel like it’s easier to, understand what I’m trying to say if I can translate it into more than one language, (D, Retrospective Interview 3)

D emphasized a few times during the interviews the important role L1 played in her L3 writing to double-check the intended meaning initially articulated in L2.

Furthermore, similar to the FL writers, analysis of the data points to another important role of L1 used to highlight phonetic and morphosyntactic similarities between
L1 and L3, perceived as typologically close languages by two of the SL writers (i.e., B and S):

if I can’t find the word, a word that I can’t translate, ... , I’ll try to translate from Spanish [L1] to Italian [L3], first I will try from English [L2] to Italian, it seems like, and then if I can’t find it then I’ll go from Spanish to Italian because Spanish it’s more similar to Italian (B, Interview 3)

Unlike B, who would first resort to her L2 instead of to L1, which she considered morphologically closer to her L3, analysis of S’s TAPs suggests that L1 plays a larger role in L3 lexical searches and revising during her L3 writing process. S reported:

if I don’t know, how to say it in French [L3] I’ll say it in Spanish [L1], and see if I can, that way relate it to French easier, and if not, I’ll say it in English [L2] ... when I say that I think in Spanish it’s mostly like the grammatical composition of things, the sentences ... words, (S, Interview 3)

It is worth noting here that while B and S tended to find their L1 (Spanish) and L3 (respectively Italian and French) typologically close, for D there was an established typological relationship between L2 (Italian) and L3 (Spanish). As she stated in the retrospective interviews, she would resort to her L2 with the intention that the latter would trigger the corresponding L3 item. Thus, the role of L1 and L2 seems largely influenced by the way the SL learners perceived structural and lexical similarities and/or differences among their languages.

Regarding the role of L1 and L2 while revising and editing the already written text, the findings presented in table 4.13 do not show a definitive prevalence of either L1 or L2. The results show that the SL writers tended to articulate their thoughts primarily in bi- and multilingual utterances involving both L1 and L2. Further analysis of TAPs revealed that while editing, the SL writers resorted to both L1 and L2 to comment on the element considered for revising, to evaluate, to back-translate in order to find the correct
verb tense and preposition, and to contrast specific orthographic and morphosyntaxic characteristics between L1, L2 and L3 elements. However, only L2 was found to be used to question, analyze, and reject revisions, in which instances it provided the matrix of the utterance wherein L3 items had been inserted, as seen in the following example:

Example 23:

*qui*, is it with ‘q’ and ‘u’? let’s see what’s up here [searching for the word in the prompt] *in cui* (...) but *in cui* is like of where you’re in, yah, that’s with ‘q’,

(B., L3 task)

Note: L1 = Sp.; L2 = En.; L3 = It. [italic]. ¹ Transcription of TAP; ² Translation of transcription.

In the above excerpt, the first switch from L3 to L2 might have been prompted by the visual representation of the L3 item “qui,” which triggered a question uttered in L2 about its correct orthography. Subsequently, the participant expressed in L2 her approach to solving the problem (i.e., first to look for the word in the prompt). After finding and rereading aloud the L3 item under consideration, B proceeded to analyze the distinction between both L3 elements (i.e., qui/cui) by resorting to both L2 and L3. In cases like this L2 constituted the syntactic frame of this utterance wherein the L3 item was embedded.

These findings with regard to the role of L1 and L2 in the SL writers’ L3 composing process point to a trend to use L2 as a primary support language, which is further confirmed by participants’ emic insights. For instance, on a few occasions in her retrospective interviews, B reported that while she perceived both her L1 and L2 as a backup, she tended “to think more in English [L2] than in Spanish [L1]” not only for lexical searches but also in the planning process:

I think before I started writing, maybe like more like, what should I write, or: wondering what was it that I wrote last time, like in that case I was thinking in English, (B, Interview 3)
In addition, D stated that during the L3 writing process, both L1 and L2 are “always like an aid or tool that I can use to help me” (Retrospective Interview 3). However, she distinguished between the roles of both languages in the process. The role of L2 was perceived to “check” and that of L1 to “double-check” the L3 intended meaning. Additionally, D commented on the role of L2 to approach grammatical aspects of the L3 text: “I usually think grammatically in Italian [L2] ... when I’m questioning a [L3] grammatical, thing, aspect, I always, it’s always in Italian” (D, Interview 3). This trend is similar to that of S’s, who reported using her L1, which she perceived typologically closed to her L3, for approaching L3 grammatical aspects.

In sum, these findings suggest that unlike the FL writers, the SL writers displayed a more complex approach toward the roles of their L1 and L2 in L3 writing. While groups results indicate that they tended to use L2 as a prime source of support and L1 as a secondary, they also reveal intra-group differences, which points to an equally important role of both languages for some writers. For instance, L1 played a prominent role for making sense of thoughts voiced in L2 and L3 and for controlling the accuracy of the intended meaning for D, while both languages were equally important in S’s composing process. Furthermore, it was found that both L1 and L2 were used as a prompt for searching for an L3 target item. These findings suggest that this role of L1 or L2 might be related to SL writers’ perceptions of structural and lexical similarities between their languages.

4.6 Summary of Findings

This chapter presented the results of quantitative and qualitative data analyses as they relate to each aspect of the research questions. Overall, the findings suggest that
these multilingual writers resorted to all three languages in their repertoire during their L2 and L3 composing processes.

Concerning the first research question, the summary of findings is illustrated in Figures 1 and 2, respectively, for L2 and L3 composing. The amount of L1, L2, and L3 use points to significant differences across the two groups. Regarding L2 writing, the proportion of L1 was considerably higher for the FL participants, contrary to the pattern exhibited by the SL group, which relied almost exclusively on their L2. Similarly, with respect to L3 writing, the results show a more intensive use of L1 by the FL students and, conversely, the amount of L2 was found to be higher than L1 for the SL group. However, the use of L3 in L2 writing, although limited, was around the same for both groups. With respect to L-S, the results are illustrated in Figures 3 and 4, respectively, for L2 and L3 composing. The findings regarding L-S frequency and direction point to a dynamic interaction among all three languages during the L2 and L3 composing processes. While both groups tended to switch mostly between L1 and L2 in L2 composing, they showed different preferred patterns in L3 composing, that is, between L2-L3 and between L1-L3, respectively, for the SL and the FL participants. Regarding the length of the monolingual utterances, while the FL students displayed a trend toward producing longer L1 utterances than those of the other group during L2 and L3 composing process, the SL participants tended to articulate their thoughts in longer L2 utterances in L3 writing.

With respect to the second research question, results from univariate analysis of variance test indicate that there were no significant differences between both groups in L-S frequency means in L3 writing, which implies that level of L2 proficiency does not
have an effect on L-S frequency in L3 writing. In addition, no sufficient evidence was found to suggest an effect of a 10-week period of L3 language development on L-S frequency.

Regarding the third research question, analysis of TAPs, final texts, and Inputlog files revealed specific conditions that favored L1, L2, L3 use, and L-S in L2 and L3 writing. The findings showed evidence that certain conditions, such as analyzing writing prompt, setting writing goals, generating ideas, reflecting on the writing process or text, and managing the writing process, were more likely to elicit monolingual utterances for both groups of writers. Other conditions, such as managing the mechanical aspects of the written text, lexical searches, and revising, tended to play a prominent role in producing bi- and multilingual utterances. In addition, although the findings point to specific differences between the FL and the SL writers in L2 and L3 composing with respect to the distribution of monolingual and mixed utterances, it seems that L3 writing involved the whole spectrum of language combinations in contrast to in L2 writing.

With respect to how these multilinguals switched among languages, three types of L-S were discerned: insertion (including slip of the tongue, insertion of function and content elements), alternation, and congruent lexicalization (i.e., lexical inventions).

Concerning the fourth research question about the role of L1 and L2 in L3 writing, the findings revealed a trend exhibited by the FL writers to rely on L1 as a prime source of support and on L2 as a secondary support language. This trend, however, ran contrary to the tendency displayed by the SL writers. The results show that conditions related to writing goals, management of ideas, writing process, and text, emerging text, and searching for target items were linked to a primary and secondary support role of,
respectively, L1 and L2. However, this distinction between both languages is not as clearly delineated as in the case of the multilingual FL writers. As the findings point out, it appears that both L1 and L2 could have played a significant role in managing the mechanical aspect of the text and revising, and both played a role as a prompt for searching for a target item. Analysis of the interviews with the participants revealed that in the latter case, their roles might have been influenced by writers’ perception of typological closeness between languages. Furthermore, L2 was found to be used by both FL and SL writers as a medium for L3 learning and development by highlighting distinctive linguistic features of the three language systems. Moreover, analysis of TAPs points to a distinctive role of L1 for comprehending thoughts uttered in L2 and L3 and controlling and/or negotiating the intended meaning.
Endnotes:

“Oui, je n’ai qu’une langue, or ce n’est pas la mienne” [Yes, I only have one language and yet, it is not my own.] (My translation). Derrida, J. (1996, p. 13).
Chapter 5: Data Analysis from a Complexity Theory Perspective

“WHERE CHAOS BEGINS, classical science stops.... The irregular side of nature, the discontinuous and erratic side - these have been puzzles to science, or worse, monstrosities” (Gleick, 2008, p.3).

The previous chapter presented the research findings related to the dynamics of language use and switching in multilinguals’ L2 and L3 writing, relationships between language-switching and (a) L2 proficiency; and (b) L3 development, conditions that have created a favorable environment for L1, L2, and L3 use, types of L-S, and the role of L1 and L2 in L3 writing. Quantitative and qualitative data analyses presented in the previous chapter point to certain tendencies that distinguish greatly not only L2 and L3 writing but also FL and SL writers. Nevertheless, although these tendencies suggest a distinctive nature of L3 writing with regard to L2, group averages may conceal some salient intra-groups and intra-individual differences that could not be ignored.

Indeed, L2 writing researchers have explained differences in language use and L-S in L2 writing with the effect of L2 proficiency level, writing task difficulty, language group, cognitive overloading, writing expertise, the language the topic-area has been acquired in, and modes of writing (see Chapter 2). Nonetheless, in an effort to make sense of the present study’s findings, it seems that these factors fail to account for the irregularities that emerge when comparing individual writers’ L2 and L3 writing processes regarding language use and L-S. For instance, one SL (S) and one FL (M)
writer did not make use of their L3 in L2 composing, but did use their L2 in L3 writing, although in the case of the latter it was only during the third writing task. In addition, although statistical analysis indicated that a 10-week period of L3 development did not seem to have had an effect on L-S frequency in L3 composing, some FL and SL writers resorted more to L1 and/or L2 and switched more frequently between their languages during their second L3 writing task. Moreover, while one FL writer (A) seemed eager to resort to all her four languages during L2 composing, her language use (mostly L3) and L-S patterns changed significantly in L3 writing. In brief, it was found that the amount of L1, L2, and L3 and L-S frequency and direction were far from uniform across writers and writing tasks. Additionally, analysis of conditions that favored L-S revealed writers’ patterns of language use and L-S: some stayed stable, while others changed across writers and writing incited by processes of self-adaptation to context of use within a specific timescale. Undoubtedly, these findings demonstrate the nonlinearity of L2/L3 writing development and the limitations of the “classical/mainstream cognitive science” (Atkinson, 2011, p. 144) to make sense of the data and results. First, these findings entail a need for rethinking the factors that account for multilinguuals’ patterns of language use and L-S. Second, they question the view that there is linear cause-effect relationship between factors and we are able to distinguish clearly between cause and effect.

Hence, there is a need to move beyond the binary of cause-effect relationship to consider the complexity of elements that are intricately interconnected parts of a dynamic, open, adaptive system that change synchronically and diachronically. Thus, the focus needs to be shifted from single factors to interrelationships.
In order to explain the present study’s findings, I explored and embraced the complexity theory approach and in the process developed a dynamic model of multilingual writing. The study’s results are seen in this chapter through the lens of this proposed model.

First, the model is presented within the context of complexity theory. Next, it is applied to data from the study in order to identify and explain multilinguals’ language use and L-S patterns in their L3 writing.

5.1 Dynamic Model of Multilingual Writing

Seeing L2/L3 composing processes from a complexity theory perspective offers useful insights into our understanding of how this process unfolds through interactions among multifaceted components, especially through the interplay of the three languages, which is the focus of the present study. Hence, the following section presents a model of multilingual writing as a complex dynamic system, which should be seen as an attempt to depict and map the dynamics and interconnectedness of its elements and to capture the process as a whole instead of separating it into fixed categories. It is important to note that the theoretical foundation of this dynamic model is grounded in complexity theory as conceptualized and presented by Larsen-Freeman & Cameron (2008a) and is influenced by the theoretical concepts behind Jessner’s (2008) DMM. Undoubtedly, L2 writing theory and research, in particular concerning language use and L-S, had as well its impact on developing the multilingual writing model which is discussed and presented below.

In this study, multilingual writing is seen as a complex dynamic system. Its wholeness is created by the interconnections among its parts. From this perspective, a writing activity may be viewed as emerging from the interactions of an array of
components that moves across levels and timescales. Based on complexity theory’s conceptual framework, a model of multilingual writing has been developed in an attempt to map the dynamic complexity of multilingual composing and to account for variation in multilinguals’ language use and L-S at a specific level (i.e., L3 writing activity) and timescale. First, the main features of the complexity theory are reviewed, followed by a presentation of the dynamic model of multilingual writing. Taking into consideration that the main focus of the present study is on language interplay in multilinguals’ L3 writing, findings relevant to the latter are discussed in the following section from the perspective of the complexity theory.

The main facets of complex dynamic systems as thoroughly explained by Larsen-Freeman & Cameron (2008a) are presented below in the context of language use in multilinguals’ L3 writing.

5.1.1 Complexity

A complex system is composed of heterogeneous elements, agents, and processes that “connect and interact in different changing ways” (Larsen-Freeman & Cameron, 2008a, p. 26). These components may be complex systems of their own, intricately interconnected and interdependent parts of a whole. This whole, however, cannot be reduced to its parts. Hence, based on the present study’s results, multilinguals’ L3 writing could be represented as a complex system comprised of the following components:

1. Engagement with writing in L2/L3. This comprises the writer’s perceptions of and attitudes towards intended readers, writing goals, and writing genre (including elements such as attitudes towards writing prompt, writing task, and experiences with
writing genres), his/her L1, L2, L3 writing experiences (including writing mode preferences), and his/her sociocultural and language background (including elements such as language learning experience, sociocultural practices experienced through a particular language, attitudes to FLs, and community of practice).

2. **Management of the writing activity.** This includes four components. One is topic knowledge as seen in the writer’s approach to generating and organizing ideas, deciding what to include, and where in the text. It should be understood not as “static representation stored in particular locations”, but as “processing involving the dynamic mutual influence of interrelated types of information as they activate and inhibit each other over time” (Larsen-Freeman & Cameron, 2008b, p. 210, drawing upon Ellis’ 2006 concept). The other components are management of the attention resources as reflected in writers’ metacommments (e.g., willingness and ability to make and/or negotiate meaning), of the physical activity of the writing process including computer and word processing skills, and of mechanical aspects of writing.

3. **Emerging text.** This entails movements between already written and emerging text, including pre-text, and the writer’s ability to notice semiotic cues (i.e., visual, aural, oral, and textual).

4. **Language resources.** This consist of a learner’s language systems (e.g., their L1, L2, L3, etc., language development, proficiency level at a particular timescale), learner’s memory characteristics, language environment, approach to and experience with using print or online resources, and perception of language distance.

Thus, through the lens of complex theory, L2/L3 writing is seen as an intricate system. Consequently, multilinguals’ languages are conceived of individual language
subsystems (L1, L2, and L3) which are a component of a larger language resources subsystem. Each language (e.g., English, French, etc.) can be seen as a complex system of its own comprising its phonetics, syntax, lexicon, and so forth at a specific moment of time in a learner’s language development. L2/L3 writing could be conceived of as a subsystem of another complex system, such as individual FL/SL learning, oral or written discourse, language classroom, literacy, education, and so forth. From a complexity theory perspective, these language systems are coupled “with the use of one affecting the use of the other” (Larsen-Freeman & Cameron, 2008a, p. 134). Hence, as discussed above, complex systems operate at different levels and timescales that influence each other in a non-hierarchical way. Thus, the written text could be seen as emerging out of interrelationships among individual language systems, emerging text, and the writer’s history, perceptions, motivation, attitudes towards L2/L3 learning, writing, and so forth.

5.1.2. Dynamics

Larsen-Freeman & Cameron (2008a) argue that “in a complex dynamic system everything changes, all the time” (p. 29). This perspective provides the conceptual tools to view multilinguals’ language systems not as fixed and static entities, but rather as dynamic, continually changing synchronically and diachronically. Namely, L1, L2, and L3 language system components such as phonetics, morphology, and syntax change with each use of language. As a result, changes in one of the components might bring about changes in the others as well as to the multilingual’s language system and, consequently, to his/her writing process as a whole. For instance, one participant attempted to apply a newly acquired L2 grammar structure while composing in L3. Consequently, it
influenced her pattern of using L3 syntax, thus changing her L3 writing process with regard to language use and L-S.

In brief, complex dynamic systems are in constant flux, which in turn shapes their path across time and space. They can be examined at different timescales and levels, that is, on the scale of milliseconds to millennia and at the level of neuron, cell, individual, community, to international. From this perspective, multilingual writing could be seen as a process that unfolds continuously in real time. The writer disposes of an array of options of ideas, concepts, signs, images, and so on, that flows in the form of a specific linguistic or semiotic form to choose from in the course of the writing activity. Furthermore, these linguistic, visual, and aural/oral signs interact with the writer’s language systems, language learning experiences, perceptions, attitudes at a specific moment of his/her L2/L3 development. Hence, a writing activity could be interpreted at different timescales (i.e., a specific writing assignment, a series of different types of writing activities over time) and different levels (i.e., L2/L3 learner, L2/L3 class, school, etc.). For instance, one of the research foci of the present study is multilinguals’ L3 composing process with regard to language use and L-S examined at a particular moment of their L3 development.

However, in contrast with the cognitive models in L1/L2 writing, complex dynamic systems are far from being organized into hierarchical structures. Rather, their components remain interrelated and continue to influence each other and the systems as a whole at different timescales and levels (Larsen-Freeman & Cameron, 2008a). Thus, the unfolding of each writing activity, namely, the movement of the writing complex system across its state space (i.e., the combination of all possible states of a system or its
landscape) could be considered unpredictable and unique. Nevertheless, as found by the present study, in this process different patterns of language-use emerge. They could be unique at a particular point in time and for a particular learner and change into other patterns over time.

5.1.3. Non-linearity

The prevailing view of the physical universe that has permeated Western thought has been profoundly influenced by the Cartesian rational objectivity and Newtonian determinism. This paradigm assumes linearity, reductionism, and predictability. In a linear system, the value of the whole is equal to the value of the sum of its parts, and the effect is proportional to the cause. A linear system can be reduced to its elements and is predictable in the short and long term. In contrast, a nonlinear system could be more than the value of the sum of its parts, cannot be reduced to its parts without altering the relationships between them, produces output which is not proportional to the input, and is subject to unpredictable qualitative changes. A nonlinear system exhibits sensitive dependence on initial conditions, known as the butterfly effect (see Chapter 2). The relations among the components of a nonlinear system are not fixed and predetermined, and the interactions among them change continuously or abruptly over time.

Hence, a complexity theory perspective of writing implies seeing the activity from a holistic view rather than as a sum of its components. It is well known that writers do not approach every writing task and prompt in the same manner, do not perceive them in the same way, and do not put the same amount of time, effort, attention, and motivation into each writing activity. Therefore, the initial conditions of writing activities and for each writer are unique because of his/her background, language learning and writing
experiences, and so forth change synchronically and diachronically and influence the relationships with other components of the system and the system as a whole. Furthermore, a slight shift in ideas or attitude, for instance, might lead to significantly different effects on the final written text. The components of the writing activity system (i.e., engagement, management, emerging text, and language resources) are not independent and the interrelations among them are not fixed or predetermined. Instead, they are unique for each writer and for each writing process. Thus, the complexity of the writing system arises out of this nonlinear and dynamic interconnectedness among its parts.

5.1.4 Openness and interconnectedness

Open dynamic systems operate in an environment or context and “allow energy or matter to enter from outside the system” (Larsen-Freeman & Cameron, 2008a, p. 32). Consequently, they argue that a dynamic system and its physical, social, and cognitive contexts are not only inseparable but also interconnected in such a way that “systems may be coupled, with one acting as dynamic context for the other” (p. 73). For instance, FL teaching as seen as a complex system might take place in the context of a school which, as a complex system of its own, comprises syllabi, policies, classrooms, teachers, students, parents, community, and so forth. A change in the environment (i.e., migration or changes in population), could affect L2 teaching at a particular school, which, in turn, might bring about changes in the school’s syllabi, policies, individual student's L2 development, and so on. Hence, open systems not only are subject to influences from contexts and other systems, but they influence them in return.
5.1.5 Adaptation

A complex open dynamic system is sensitive to influences from its context or other systems. Therefore, when changes affect its behavior or path of development, the system exhibits flexibility to adjust in response to these changes. Consequently, changes in one subsystem alter the structure of interrelations of its parts, which leads to changes in the system as a whole. As emphasized by Larsen-Freeman & Cameron (2008a), complex systems adapt dynamically to changes in context or in response to other systems “in a process of soft-assembly” (p. 239). Each use of language, they argue throughout their book, could be seen as “the soft-assembly of language resources for particular instances” (p. 64).

Hence, from a complexity theory perspective, each instance of language use produced in the course of L2/L3 writing activity could be regarded as a process of soft-assembly of a writer’s language resources in response to particular instances and exigencies of the writing task and/or emerging text. In the process of engagement with writing, the writer brings to the activity his/her idiosyncratic context, such as language learning experiences, motivations, attitudes and perceptions towards writing, writing prompt, task. This context of L2/L3 writing activity might also be perceived as a complex dynamic system which is not only inseparable but also a component of the whole system in such a way that, as Kramsch (2002) puts it, you cannot tell the dancer from the dance. A complex dynamic system of L2/L3 writing is seen in a perpetual state of flux moving smoothly or abruptly through sequences of states and, in the process, adapting, and self-organizing, which may lead to the emergence of new patterns of language use.
The figure below represents multilingual writing as a complex system and depicts the dynamics of an L3 writing activity. As Larsen-Freeman & Cameron (2008a) argue, the dynamic processes of composing “are like the trajectory of a complex system, in which the ‘final’ text emerges as a fixed point attractor. The compositional system contains multiple interacting subsystems. Composing in the moment arises through the meshing together of systems and subsystems at various levels and timescales” (p. 187).
Figure 5. Dynamic model of multilingual writing
In light of the above-discussed main facets of complex systems, the model attempts to capture the dynamics of the relationships among complex, dynamic, non-linear, open, and adaptive writing system parts. In this model, writing, at a specific level and timescale, is seen as a emerging from interactions among interdependent elements in constant flux. Drawing upon previous L2 writing research and the findings of present study, four main components of the L3 dynamic writing system were identified: engagement with L2/L3 writing, management of the writing activity, emerging text, and language resources. Each component is seen as a complex dynamic subsystem that embraces an array of elements. They are inseparable and interconnected, that is, a change in one brings about changes in others and the system as a whole. They have the potential to interact in a particular way “to produce some overall state or form at a particular point of time” (Larsen-Freeman & Cameron, 2008a, p. 26). Language use in multilinguals’ writing emerges from the interactions among system’s components. They change continually and dynamically and in this process affect the other components and alter the L3 writing system.

The following section of the chapter discusses the study’s findings with respect to multilinguals’ L3 writing in light of complexity theory.

5.2 Dynamics of Language Use and L-S in Multilinguals’ Writing

Changes are inherent to complex dynamic systems and language resources and are, as a dynamic part of L3 writing, interconnected with the other parts of the system. Examining the interrelationships among its components helps us further understand the interactions among multilinguals’ languages and how new patterns of language use emerge.
5.2.1 Multilingual FL writers

The previous chapter’s findings with regard to L3 writing reveal that the learners of two FLs resorted to all their languages (L1, L2, L3) while writing in L3, an outcome which supports findings from previous research on L3 writing (Jessner, 2005, 2008). Furthermore, findings regarding L-S frequency point to dynamic interaction among all three languages. The results also suggest intensive use of L1, which was found to play a primary support role, especially when analyzing the writing prompt and reader, setting goals, generating ideas, commenting on and managing the writing process and mechanical aspect of the text. With respect to the roles of languages in L3 writing, the finding that L1 was used as a main source of support is in line with Jessner (2005, 2008). However, it is essential to point out that results from the present study reveal a different role of L2 in L3 writing. More specifically, the FL writers tended to use L2 not only as a secondary source of support (in line with Jessner, 2008), but also for highlighting linguistic differences between L2 and L3, and, consequently, as a means for L2 and L3 learning. However, although group averages pointed to these trends in writers’ language use, this finding could conceal some patterns exhibited by an individual, which might diverge from the group pattern. Thus, in order to understand individual writer’s L1 and L2 use, it is important to identify his/her preferred path of language use and how it changes over the period of 10 weeks. This is where a complexity theory perspective has value for this study. Given this objective, the chapter now turns to examining individual cases among the six participants.
5.2.1.1 The case of M

M was an American-born student, who, at the time of the study, was a senior majoring in Italian and French. In her sophomore year she changed her major from music to languages and took intensive beginning French and beginning Italian language courses. She had extensive study abroad experience in Italy, where she studied both her L2 and L3. The student liked writing in all the three languages and shared with me that she wanted to become a translator. She approached and carried out the study’s writing tasks thoroughly and meticulously. This is especially evident during her L3 composing process as she took her time looking up words and checking spelling, verb forms, gender, and accents. On one occasion she even spent around two minutes to find an item online and copy the needed accented letter. She resorted to online resources more than 50 times on average during her first and second writing tasks. As she reflected in an interview, she would check any word if she was not “100% sure” (M, Interview 3) about its meaning or spelling.

Regarding language use, a few stable patterns were discerned in M’s L2 and L3 writing, a finding which distinguished her greatly from the other participants in the study. The numbers in table 4.2 show that she relied primarily, more than any other writer, on her L1 (English) during both L2 and L3 composing processes. If the linearity of the cause-effect approach is followed, it could be concluded that M’s exhibited pattern interfered with some findings in L2 writing research that point to the effect of language proficiency on L1 use and L-S. For instance, conclusions put forth by Jones & Tetroe (1987), Wang & Wen (2002), and Woodall (2002) suggest that more proficient L2 writers use less L1 and switch less frequently between languages. However, this
conclusion runs counter to M’s patterns of language use and switching vis-à-vis the other writers who had the same level of L3 proficiency.

Hence, M’s patterns, distinctive in comparison to the other writers, might best be explained by exploring the relationships among her writing system’s components and how they changed throughout the semester. It is important to note M’s perceptions of the role of her L1 in L2 and L3 composing processes. As already quoted above, she was consciously aware that she “mostly” thinks in English (Interview 3). It could be that this perception of the role of L1 was related to her FL writing experience. For instance, a few studies have reported on SL/FL learners’ use of direct and translation modes in relation to the amount of L1 use (Cohen & Brooks-Carson, 2001; Gosden, 1996; Kobayashi & Rinnert, 1992). M shared in the interviews that at the beginning of her language studies, she would write her L2 and L3 compositions first in her L1 and then translate them into the TL. After experiencing difficulties with this mode of writing, a new pattern emerged and she started to plan in L1 and write directly in the TL. This preferred pattern was especially seen in M’s L3 composing process when she voiced her thoughts almost exclusively in monolingual L1 utterances while reflecting on the prompt, planning and managing the writing process, text, and ideas. In addition, L1 use could be also related to M’s perception of the audience. As mentioned above, she paid close attention to the linguistic accuracy of the text, which might have been influenced by her concern about the reader, as shown in her reflections:

I just, I mean I did not wanna like, make any mistakes, you know I wanna it to be, like grammatically correct and stuff, so that, the reader would understand but also, thinks that I: (.) knew what I was talking about (M, Interview 3)
While it could be assumed that this particular attitude toward producing grammatically correct narratives might have influenced her approach to using online resources and, consequently, the amount of L1 use, it is essential to note here that M’s TAPs revealed some degree of uncertainty regarding her own language resources. As she stated, she would always use online resources, even though:

most of the time I knew what word I needed or at least I had a good idea and so I just had to make sure or just to double check. (M, Interview 3)

Hence, apparently M’s attitude toward and perceptions of writing, reader, text, role of L1, her own L3 resources, and using online language resources are intricately interrelated. These dynamically interconnected elements of the L3 writing system seem to have influenced the choice of L1 as an attractor or a “preferred path within individual performances” (Larsen-Freeman, 2006, p. 601) in the course of the L3 composing process.

Since a complex system is in constant flux, when it changes from one state to another its patterns of behavior might also change. The L3 writing system experiences such changes when the writer articulates thoughts in a language other than L1 or in a combination of languages. For instance, the findings revealed that M voiced her thoughts in bilingual L1-L3 utterances mainly when searching for target items and revising the text. However, the unexpected finding, that she did not resort either to her L3 during L2 writing or to her L2 during the first L3 writing task is interesting for two reasons. First, this pattern distinguished her from the other FL writers. Second, since this student had been through an intensive immersion study abroad program in Italy, where in addition to L2 she had taken L3 language courses, it was expected, in line with previous research
(Cohen & Brooks-Carson, 2001; Friedlander, 1990) that L2 learning, sociocultural environment, and interactional context would have shaped a particular interconnection between her L2 and L3 language systems. Although both languages are cognate, it appears that M had not developed an awareness of proximity between them and did not perceive them as interrelated, as evident from her reflections.

Sometimes I compare, like, I don’t know different verbs and stuff but, I don’t think [L2] really helped [L3 composing] it’s just kind of, something that I do. (M, Interview 3)

However, although the writer shared in the retrospective interviews that “sometimes [she]’ll mix up the two languages like in [her] head ... mostly when [she is] writing” (Interview 3), she asserted that she had not switched between L2 and L3 during her first and second writing tasks in the beginning of the semester. Nonetheless, a change in her language using pattern is reflected in the TAP of the second L3 writing task. It involves a decrease of L1 use and an increase of L3 and L-S frequency. In the course of this activity, similar to the other FL writers, M switched to L2. A possible explanation for using L2 in her L3 writing at the end of the semester might have been related to her L2 and L3 development, since M was taking five L2 and L3 upper-level FL courses. Additionally, she revealed that the second L3 writing task involved writing goals that differed from those of the first L3 composition. This change in writing goals evidently was related to her language development:

I think like I’ve learned like grammatical things since then [the first L3 task] and I wanted to use it and stuff ... like instead of just saying j’étudie [I study] ... I said je me spécialise en [my major is] it just sounds a little better it sounds more intelligent... in some ways it was harder, I’ve kind of had to push myself to use words, and like phrases that I wouldn’t normally use, (M, Interview 3)
With respect to language learning, Larsen-Freeman & Cameron (2008a) argue that “every use of language changes the language of learners; over time successive usages of language lead to the emergence of language-using patterns across groups and in the language resources of the individual” (p. 220). Applying a complexity theory perspective to M’s L3 composing makes it possible to see changes in the L3 writing engagement subsystem. Namely, changes in the writing goals, a higher motivation to push herself to find the needed language resources along with her continually developing language systems might have influenced changes in other components (e.g., language resources) and in the whole writing system, prompting the latter to adjust to the new conditions by reorganizing its language resources and stretching them in the process.

5.2.1.2 The case of A

A. was an exchange student from a French University where she was a sophomore in International Business. At the time of the study she was taking courses in marketing, communication, Spanish, and German as an international student at the research site. As a native speaker of French, she had been studying English, Spanish, and German as FLs, although all in different contexts (table 3.2).

Analyses of her TAPs and interviews revealed stable patterns regarding language use and switching that had been transferred from her L1 to L2 and L3 composing. For example, A’s awareness of the writer’s audience revealed a concept of reader and writing goals, that had been influenced by her L1 writing experiences. She shared that she had always written for “the teacher” who would “correct [her] text.” Hence, her writing goals included to “avoid mistakes ... to try to find a beautiful way to say sentences .... because it’s for the teacher” (A, Interview 3). This is particularly evident in her TAPs, which
revealed constant concerns, voiced in L1, for finding more sophisticated ways of expressing ideas as well as searching for the appropriate target item that best communicated the intended meaning. Thus, A’s L1 writing experience, clear sense of audience, and writing goals might have affected the way she used her languages in order to produce a narrative that conformed to reader’s expectations of linguistic accuracy and style. In addition, her use of online resources, which remained stable across L2 and L3 writing but differed greatly from the other participants’ pattern, was characterized by first attempting to solve the problem by talking through it in her L1 or making use of her other languages before resorting to the dictionary. Hence, A’s approach to rely mostly on her language resources for negotiating meaning or facilitating the writing process instead of on online resources, seems to have influenced quantitatively and qualitatively her L1 use. This is reflected in the TAPs data respectively in terms of the amount of L1, L2, and L3 use and their roles in the composing process.

However, the first L3 writing task marks a shift in A’s preferred path of language use during the writing process. This can best be seen in the choice of L3 as the language for planning and carrying out the L3 writing activity. It seems unlikely that this pattern of less planning and more intensive use of L3 for planning, generating ideas, and revising could be explained by a single cause-effect factor or by her level of L3 proficiency and writing experience. Moreover, when compared to her L2 writing pattern, the shift to L3 in L3 writing conflicts with findings reported in previous research showing that lower language proficiency is related to more L1 use (Jones & Tetroe, 1987; Knutson, 2006; Wang & Wen, 2002), more frequent language-switching (Woodall, 2002), and that more skilled writers use less L1 (van Weijen, 2009).
A more detailed look into A’s L3 writing system reveals how its initial conditions were different from those of her L2 writing system and how its components adapted to the new conditions and self-organized to enter an attractor state that she had not experienced before. These differences are in relation to A’s L2 and L3 learning background, writing experience (including writing mode and attitude towards L2 and L3 writing), attitudes towards L2 and L3, and perception of typological relationships among her language systems.

In her retrospective interviews, A compared her L2, L3, and L4 language learning experiences and how they had affected her attitudes toward the languages. She reported that, contrary to her positive attitude towards her Spanish tutor and teacher and learning Spanish, she did not like her English teachers and even had “given up” on German (L4) when she had a teacher she considered “bad” (A, Interview 3). Interestingly, she associated her negative L2 learning experience with FL instruction at her French university, which had emphasized translating literary texts:

I spend very, I spend a lot of time translating texts ... we don’t have play role, we don’t have writing paper, (A, Interview 3)

The influence of her limited writing experience in L2 and L3 and writing mode was particularly manifested in her approach not only to L2 composing for the present study, as discussed earlier, but also to her preferred mode of approaching writing papers for her English courses at the research site. She reported using a translation mode of writing, namely, writing the draft in her L1 and translating it into L2. A few studies (e.g., Gosden, 1996; Kobayashi & Rinnert, 1992) have shown the influence of FL instruction on L2 writing strategies (i.e., direct versus translation mode). Nevertheless, since A
reported having similar limited L3 writing experiences, apparently FL instruction alone could not have influenced the change of pattern in her L3 writing with respect to language use. In fact, A’s more positive attitude towards L3 could probably have affected her attitude towards L3 composing, since she reported enjoying writing in L3 more than in L2. She was even surprised to find out that, at the end of the semester, writing in L3 was easier for her than writing in L2, which had been the primary language of her academic and social environment during the semester. This difference in A’s attitudes towards L2 and L3 writing probably stems further from her awareness of language distance (Kellerman, 1979, 1983) between her first and second, and first and third languages. When asked how she could compare her experiences in writing in English (L2) and Spanish (L3), she reported:

I don’t know how to explain that ... Spanish is so much easier, ... I can think in Spanish but I don’t think that I can think in English. I have to, first think in French, then in English when I’m writing. When I’m talking it’s OK, I speak in, I uhm, I’m thinking in English. When I’m writing I have to put, all my words and, and all the sentences in French and then and then translate them, but in Spanish, it’s ... like if I would be Spanish actually.... may be because Spanish and French are very close, I mean the sounds, the, the words too ... I think because it’s a romance language too so it’s easier. (A, Interview 3)

Indeed, this perception of proximity between her L1 and L3 systems can be seen in her invention of an L3 lexical item, “regreto” (third writing task), which bears the stem of the corresponding L1 and L2 items (regretter/to regret) but is morphologically adapted to the TL (L3). This creation of a novel lexical item presents further evidence for the intricate relationships between A’s language systems.

Hence, a complexity theory perspective provides a framework for looking at how A’s L3 writing system self-organized to respond to changes in its components, involving language learning history, attitudes towards her FLs, writing and writing mode
experiences, as well as her awareness of linguistic distance between her language systems. In the process, new patterns of L1, L2, and L3 use that distinguish her from the other FL participants emerged. More specifically, this included a drastic decrease of L1 use at the expense of L3 in L3 composing and a larger role for L3 in planning, searching for ideas, generating the text, and revising.

In addition, at the end of the semester, another shift in A’s L3 writing system regarding language use was observed during her second L3 writing task. It was characterized by fewer L-S instances and an even larger decrease in L1 use. Moreover, a noticeable shift in the conditions that favor L1, L2, and L3 use was observed. Namely, in comparison to the first L3 writing task, the TAP of the second one reveals significantly less planning, less management (i.e., of ideas and the writing task, fewer comments), fewer instances of searching for lexical items, but, on the other hand, more intensive use of L3 for revisions. On the other hand, L2 was solely used for managing the mechanical aspect of the text. In fact, A’s minimal use of L2 in her L3 writing seemingly runs counter to what Cohen & Brooks-Carson (2001) suggested as an explanation for their bilingual participants’ L2 use as influenced by an English-speaking (L2) academic environment. Moreover, it does not seem to concur with the present study’s finding suggesting that L3 language development does not have an effect on L-S frequency in L3 composing.

The interviews with A reveal that what changed during the 10 weeks between writing tasks was her writing experiences in L2 and L3, her approach to and perception of the writing task and writing goals, and the immediate linguistic environment of the second L3 writing task. With respect to A’s writing experience, it should be noted that
after her initial attempt to write her L2 papers first in L1, she then switched to a direct mode of writing in the TL. This new pattern positively changed her approach to FL writing, since she found it “easier when you think in that same language that you are writing” (A, Interview 3). Moreover, it seems that A approached the second L3 writing task from a different perspective, that is, with more confidence in her L3 writing skills, as confirmed in the interview: “actually, I was surprised because I didn’t trust me, about my Spanish skills and knowledge, and I just think I can write in Spanish easily and I was not sure about that [in the beginning of the semester]” (A, Interview 3). In addition, the third retrospective interview revealed that A felt more comfortable when writing the second L3 composition, since she knew that it was the same writing task and “same expectations” and, therefore, she “didn’t spent a lot of time thinking what ... to write.” Moreover, A reported that she felt this third task “was easy because [she] did not use very sophisticated vocabulary” and she did not consider different ideas but instead “just took [her] ideas when they were coming” (A, Interview 3). Furthermore, A acknowledged that the immediate linguistic context, that is, preparing for and taking a Spanish (L3) oral exam a few hours before carrying out the writing task, “had an effect” on the language in which she thought. She reported that she felt the third writing task was “really easy to do” because she was “used to speak and think in Spanish” (A, Interview 3).

Hence, a complexity theory perspective seems to put forward the view that not the individual elements of the writing system per se, but rather the interrelationships among them and how they change from one writing activity to another engender the trajectory of language use during L2 and L3 composing processes. Thus, the change of A’s L3 writing system emerged as a result of coadaptation of mutually interacting components.
(e.g., language learning history, writing experience, attitudes towards FL languages and writing, managing of the writing task, emerging text, typology) in an effort to construct meaning and create meaningful written discourse. As seen from the above discussion, A’s L3 writing system self-organized for the particular task, and in the process elements of her writing system co-adapted and transformed her language resources and linguistic systems.

5.2.1.3 The case of H

At the time of the study, H was a junior majoring in Italian and Spanish. An American-born English speaker, she started studying Italian at the research site, and although she had studied Spanish for three years in high school, she was placed in an intensive beginning course. Despite her negative FL learning experience in high school, she seemed enthusiastic about her language studies and excited about her upcoming study-abroad trip to Spain and Italy. Although she had more extensive writing experience in her L2, she enjoyed writing more than speaking in both her L2 and L3. Taking into consideration H’s L2 and L3 language proficiency and writing expertise, it should be noted that results relevant to her language use and switching are in line with Wang’s (2003) and van Weijen et al.’s (2009) findings but run counter to other studies, suggesting that higher language proficiency and writing expertise are related to less L1 use and L-S (e.g., Jones & Tetroe, 1987; Kobayashi & Rinnert, 1992; Wang & Wen, 2002; Woodall, 2002). For instance, findings from the present study presented in tables 4.2 and 4.5 show that H relied more on her L1 while carrying out her first and third writing task than while carrying out her second one. Moreover, the findings showed that the writer switched more between her L1 and L2 during L2 composing than between L1
and L3 during L3 composing. Furthermore, H exhibited a pattern to switch between her FLs, but these instances were more frequent during her third writing task. In addition, it is noteworthy that relatively more L2 slips of the tongue appeared while carrying out the third writing task than during the second one.

Actually, these patterns of language use could hardly be explained by a linear relationship with writing expertise and language proficiency, as L2 writing literature suggests with regard to language use and L-S. In fact, data from the TAPs and retrospective interviews reveal that interrelationships among some of H’s writing system’s components might have played a vital role in her L2 and L3 composing processes and in the emergence of new patterns in L3 writing at the end of the semester. For instance, it is important to note that H approached FL speaking and writing as an opportunity to practice the TL. In addition, this stance seems to have been connected as well to her attitude towards using her FLs and L-S while composing as a means for L2 and L3 learning. For instance, she stated that for more challenging assignments she would push herself to think in the TL so she “can learn it better” (H, Interview 3). Moreover, being consciously aware that she mixed both her FLs while composing, H explained that she was eager to use instances of L-S not only to improve her vocabulary and grammatical knowledge, but also to make a connection between her L2 and L3 (e.g., examples 4, 14, and 20 in Chapter 4). When talking about her perceptions of language use in L2 and L3 writing, she explained that when the non-target language “did creep in it was something that, I tried to use ... as almost as a learning experience in that, when it came in I made that translation and I made an extra connection and then I put it back in
that little area again,” (H, Interview 3). Indeed, the writer expressed a unique perception of interconnection among her three languages:

it’s also kind of like a, building a bridge between, the Spanish and the Italian, because, I know, my, like English to Spanish I know my English to Italian, but, my: Spanish to Italian I never really like I’ve never been to Italy studying Spanish for example so, I don’t have that bridge built ... so I think I’m kind of trying to make myself learn, how to be able to go between the three of them and not just, between, them and English. (H, Interview 3)

On the other hand, the writer reflected on her conscious effort in “learning to separate [her] two romance languages” (H, Interview 3) which further reveals that she had developed awareness of L2 and L3 distance and proximity. Hence, it appears that two opposite forces aiming to connect and concurrently separate her L2 and L3 systems define H’s perceptions of language learning, language use, and FL writing. This is further related to her use of language resources. Unlike A, for example, H was eager to use an online dictionary “if the word does not come up within a second” (H, Interview 3) instead of talking it through. This approach is evident in the intensive use of the online dictionary during both her L2 and L3 composing, which could have influenced the amount of H’s language use and L-S frequency. For instance, on a number of occasions during L3 lexical searches, a switch to L2 could be interpreted as a slip of the tongue. However, it should be noted that the writer exhibited the pattern of reflecting on these slips of the tongue or choice of language by contrasting or making a connection between both items. These types of reflections were also prompted by H’s approach to using aural/oral (as a consequence of thinking aloud while composing) and visual word-recognition cues, as she explained in an interview:

I am much better in compositions than I am at (...) than in just conversations ... being able to see on the page it’s just (...) you know it’s like a brand new sense, just having that language on the page
whether it’s only Spanish on the page or only Italian whatever it’s kind of that visual that’s that kind of propels me to stay in that language, whereas when I am just thinking in a conversation, especially if there is not a lot of feedback, ... my mind is everywhere, (H, Interview 3)

In these instances of reflecting on the connection between L2 and L3 items, L1 provided the matrix wherein the L2 and L3 elements were inserted following the internal L1 grammatical structures. H’s attitude toward languages, language use and learning, switching, language resources, and perceptions of language proximity revealed an approach to generating/organizing ideas and managing the writing task that involved higher L-S frequency between her three languages. This might have reorganized the interrelationships among the components of her writing system in a way that brought about more intensive L1 use and switches between L1 and the TL during her second L3 writing task.

Hence, changes in H’s L3 writing system’s components throughout the semester appear to have altered the dynamics of the writing activity system. For instance, the writer shared that at the end of the semester, especially “after pretty intensive studies in the last few weeks,” she felt more “confident” in her L3 “writing skills, in [her] Spanish skills in general” and expressed the view that her third composition “was very much better” (H, Interview 3) than the second one. Furthermore, during the semester her L2 and L3 systems were also developing, thus creating conditions for functional and basic content L2 and L3 words to become “fully integrated” (H, Interview 3) correspondingly in her L2 and L3 lexicons. This is evident in her frequent slips of the tongue, especially involving more L2 content words during the last L3 composing task. Additionally, unlike in the beginning of the semester, when H had perceived the coexistence of her three languages as a frustrating experience, ten weeks later that perception had evolved
into a positive attitude, but only after she had found a way to interconnect her languages as a medium to learn and construct meaning:

I’m kind of used to it now, it was definitely frustrating when I was still trying to figure out how I can make them all work together but I kind of like it, it’s kind of fun (H, Interview 3).

The above discussion implies inconsistencies between H’s patterns of language use and L-S in L3 composing and conclusions put forth in current L2 writing literature suggesting that more proficient and experienced L2 writers would use less L1 and switch less during L2 composing. Hence, the above discussion suggest that factors such as language proficiency and writing expertise were not sufficient to explain H’s patterns of language use and L-S. It appears that changes in H’s L3 writing activity system’s elements as analyzed above (e.g., writing goals, writing experience and attitude towards writing, L3 development, perceptions of language typology) and in their interrelationships prompted the emergence of new dynamics of the system evident in patterns of more L1 use and more frequent L-S.

5.2.2 Multilingual SL writers

Overall, an important finding is that all of the multilingual SL participants made use of their three languages in L3 composing, a finding which is in line with Jessner’s (2005, 2008) findings. One of the main characteristics that distinguished the multilingual SL writers from the multilingual FL writers in the present study is that the latter group studied their second and third languages as FL, while the former group had the experience of developing their L2 language literacy in an SL context. It should be noted here that results from previous research in L2 writing have generated some controversy about the relationship between level of language proficiency and writing expertise, on the
one hand, and language use and L-S on the other, albeit in the context of L2 writers (see Chapter 2). Since the present study explored the interplay of writers’ three languages in their L3 composing, one of the guiding research questions sought to find out whether there is a relationship between L2 proficiency and L-S in L3 composing. The statistical analyses did not provide evidence of a relationship between L2 proficiency and L-S frequency in L3 writing. Namely, writers with higher L2 proficiency did not seem to switch more frequently among languages while composing in L3 than writers who were less proficient in their L2. In addition, the results show that the SL writers exhibited a pattern of relying significantly more on their L2 than on their L1 in L3 composing, but also resorting more frequently to their L1 in L3 writing than in L2 writing. Moreover, it was found that the L2 was more intensively involved for setting writing goals, generating content and ideas, and commenting on and managing the writing process, unlike the FL writers who preferred L1 in these conditions. Unlike the FL writers, however, the distinction between L2 and L1 as playing primary and secondary support role in L3 composing was not so clearly marked for the SL participants. More specifically, the findings point to an important role for L1, not only for managing the writing activity, searching for the target item, and revising, but also for controlling and negotiating meaning.

However, while group averages provide some insight into the above-mentioned patterns of language use and L-S exhibited by the SL group, they might conceal important differences not only among the SL writers as a group, but also within individual writers. For instance, findings presented in tables 4.2 and 4.6 show that L1, L2, and L3 use and L-S were far from being uniform across the SL writers and L3 tasks.
Therefore, a complex dynamic theory perspective which focuses on development and change is expected to provide a useful framework for exploring an individual writer’s preferred paths of language use and interplay among his/her language systems over time and how they change from one writing activity to another. A more comprehensive examination of changes and differences across writing tasks and writers reveals some disparity in their routes to using languages when composing in L3.

5.2.2.1 The case of B

A native of Puerto Rico, B was a senior at the research site majoring in marketing and international business. Her formal studies of English began when she entered preschool at the age of three and continued through a bilingual elementary, middle, and high school. B had developed a deep love and appreciation towards her L2, as evident in these comments:

I tend to think more in English, since I was little... I really like the English language so I’d sometimes even... talk to my dolls or play in English. (Interview 3)

In high school she studied Italian (L3) for three years because she “like[d] languages and thought Italian was a beautiful one to learn” (B, Questionnaire). Although her L3 learning experience in high school was not entirely positive, she continued studying Italian at the research site, where she was placed in a beginning level course. Even though B had decided to pursue a major and a minor in a different field, she wanted to become “fluent” in her L3 (B, Interview 1) and spent the semester prior to the present study in Italy, where she took intermediate level language courses. At the time of the study, B was not taking L3 classes and reported that she had not used her L3 during the summer before the semester.
B expressed a positive attitude towards her SL and FL, and writing in all of her languages. However, she shared that although she tried L1 blogging in Italy in order to stay in touch with her parents and friends and wrote a journal for her L3 classes, she did not like these writing experiences and found the writing prompt “a little hard” (B, Interview 1). She explained her attitude towards this kind of creative writing relative to her personality, seeing herself as “more like bullet points kind of a person” who would prefer “small things like Facebook” (B, Interview 1). In addition, she reported that from a readers’ point of view, she wanted to write “straight to the point” and was concerned that “too much” would bore them (B, Interview 3). For instance, it is interesting to note that during her L3 composing, B went back to reread the prompt rather frequently, “trying to follow, what it says and do it in a way, the shortest possible” (B, Interview 3). Indeed, she followed it strictly and concisely. For both L3 writing tasks, she wrote a first draft of about 140-150 words, followed by an editing/review process in the course of which she added new ideas in order to increase the text length to the suggested limit.

Taking a complex theory approach helps to investigate B’s writing process. Namely, it allows us to see interrelationships among B’s writing system’s components, such as how her engagement with the activity (including personal characteristics, attitude towards L2 and L3, writing experiences, perceptions of the writing prompt, engagement with and approach to the writing task) was connected to her mode of management of the writing activity, emergent text, and use of language resources. Once again it should be stressed that the goal of this kind of analysis is not to determine the direction of interactions between components (i.e., which component influenced which), but rather
the nature of their interrelatedness and the patterns of language use and L-S that characterize the trajectory of B’s writing system.

With respect to language use in L3 writing, the finding that B made use of her L2 as a primary source of support does not seem surprising in line with the above-discussed system dynamics. The participant resorted to L2 when planning, generating ideas, expressing comments, managing the writing process, task, text, online resources, and word processing. Moreover, L2 was activated in the initial position in most lexical searches instances. Regarding revising, L2 had also a major role, since it provided the semantic and syntactic framework of the utterance wherein L1 and L3 items were inserted. This pattern of resorting first to L2 and then to L1 and online resources could be interpreted in line with Jessner’s (2008) conclusions about the primary role of the dominant language. However, B’s perceptions of the relationships between her languages seem to bring some controversy to the issue of her dominant language. It appears that the writer herself perceived this pattern (i.e., resorting first to L2 instead of L1 in L3 composing) as “weird” and “funny” because she considered English to be her “second language” (B, Interview 3), and, even more, as the findings demonstrate, she had developed awareness of typological similarities between her L1 and L3.

Complexity theory could provide a possible explanation for B’s decision to resort mainly to her L2 instead of the typologically closer L1 during L3 composing. Indeed, the data reveal the dynamics of the interrelationships between her language learning background, attitude towards writing prompts and languages, and perceptions of their role, including her view about her dominant language. More specifically, she considered L2 to be her dominant language in the U.S. discourse environment. Hence, the finding
that she relied mostly on her L2 further supports Cohen & Brooks-Carson’s (2001) and Jessner’s (2005) conclusions. As B pointed out, “the fact that [she] speak[s] English everyday ... has made it more, common to, think and do everything in English” (B, Interview 3), whereas she used Spanish merely to converse with her family and friends from Puerto Rico. It might be also that her involvement with and investment in L2 had reached a level at which her English could be considered her dominant language. As she shared in the third interview: “sometimes I just avoid I don’t know why, it’s just like I forget that I know Spanish.”

Furthermore, B’s attitude toward and approach to the writing task seem to be interrelated with her approach to using online resources. The latter is characterized by a preference for searching for the L3 target item by making use of her L2 and L1, by L3 circumlocution, and finally by resorting to online resources with a focus on finding the “easiest way” (B, Interview 3) to convey her ideas in L3. In fact, she was the only participant who resorted to an online dictionary that provided direct translations, which she found more straightforward, simpler, and easier to navigate than wordreference.com. Hence, this choice of language resources seems to be connected to B’s overall attitude toward and approach to writing, language use, and writing task.

While B considered the role of L2 in her L3 writing as a “backup,” she was aware that in addition to language searches and revising, she used her L1 mostly to manage the mechanical aspects of the written text. However, her L1 slips of the tongue and an L3 lexical invention embedded in L1 (Example 13, Chapter 4) seem to point to a dynamic interrelationship between her L1 and L3.
Hence, from a complexity theory perspective, B’s patterns of language use and switching in L3 writing seemed stable. They were stabilized in particular interrelationships among languages and system components, albeit with some variation, as seen in B’s amount of L1, L2, and L3 use and L-S during her L2 and first L3 writing tasks (tables 4.2 and 4.6). However, the results show that she used less L2 and more L1 and L3 and switched less between L2-L3 and more between L1-L3 while writing the second L3 composition at the end of the semester. Considering that B was not taking L3 classes during that semester and used her L3 only occasionally in informal contexts, this finding seems to contradict conclusions from previous studies on relationships between TL proficiency and writing expertise, on the one hand, and language use and switching on the other (e.g., Jones & Tetroe, 1987; Kobayashi & Rinnert, 1992; van Weijen, 2009; Wang & Wen, 2002; Woodall, 2002).

A complexity theory approach offers a possible explanation for this shift in B’s L3 writing at the end of the semester. In the follow-up retrospective interview, she stated that she approached the second L3 task with doubts about her L3 proficiency and ability to accomplish it and tried to recall, although unsuccessfully, what she had written in the previous composition with the intention to make this task “easier” (B, Interview 3). However, she soon realized that she had not forgotten her L3, which she felt it was “coming easy” (B, Interview 3). This shift in perception of L3 is related to a shift in her L3 writing activity system. B saw the writing task as an “easy” one and did not set clear writing goals, as evident from her statement in this regard: “I didn’t put as much, into it, I think” (B, Interview 3). Regarding her attention resources, she indicated that “the words were coming to me, but a little slower .... I could think like ... OK that sounds familiar”
(B, Interview 3). Interestingly, her attitude towards the emerging text seemed to have adjusted to that pattern: “it’s sounds good, let’s keep going” (B, Interview 3). Changes were identified as well in her approach to managing ideas, writing process, and task which resembled “brainstorming” and in her approach using languages:

it was still easy to remember the words in Italian and because of that I wasn’t using English neither Spanish to kind of help it. (B, Interview 3).

Changes in the dynamics of interconnectedness among the three language systems are evident in her more frequent L-S between L1-L3 in comparison with the first L3 task, probably due to more instances of L1 slips of the tongue and instances of an L1 lexical borrowing and lexical inventions, which might have been related as well to the writer’s memory characteristics as seen in the above quote.

What could be concluded from the above discussion is that changes in the L3 writing system’ elements, such as in writing goals, managing ideas and writing process, attention resources, memory characteristics, and attitude towards emerging text, could alter the interrelationships among its components and the dynamics of the whole system. B’s L3 writing system seems to have changed “smoothly” from her first L3 writing activity to her second one. However, this “change from one state to another” (Larsen-Freeman & Cameron, 2008a, p. 44) brought about changes in its patterns of language use and switching among them.

5.3.2.2 The case of D

D was a junior majoring in international studies and languages. She was born in the USA but raised in an Italian family and spoke only Italian until she entered elementary school. Even though she considered English as her native language, she
seemed actively involved in her L2 culture by listening to music, reading news, and conversing in L2 with her parents, family, and friends. She began studying Italian formally in high school and was placed in a third year Italian course at the research site. As a sophomore she studied one semester in Italy, where she took university upper level courses in Italian. In addition, D took two years of Spanish in high school. She continued studying her L3 at the research site, where she was placed into an intermediate level Spanish course, the class she was taking at the time of the study.

Complexity theory perspective helps discern stable language use patterns that were transferred from D’s L2 into her L3 writing system. For instance, during both her L2 and L3 composing processes the student preferred the patterns of using both L1 and L2 for managing the writing task, process, ideas, and text, and all three languages while searching for a lexical item and revising. The same held for rather more frequent switching among the three languages in comparison with the other SL participants. With respect to L3 writing, it is important to note her extremely developed awareness of the typological relationship among her three language systems and perceptions of the distinct roles of her L1 and L2 in L3 composing. For instance, the former is evident in D’s use of L2 not only to trigger the needed L3 item but also, interestingly, to transfer morphosyntactic knowledge from L2 to L3 (i.e., verb moods, tenses, conjugations, determiners, pronouns, and prepositions). In addition, similar to M and H, D showed a tendency to use all her three languages as a tool for further developing her L2 and L3 knowledge. With respect to their roles in L3 composing, it is noteworthy that she had developed an approach to L-S and translation characterized by using L2 for
“reassurance,” “clarification,” and “checking” the intended L3 meaning and L1 for “double-checking” the intended meaning and helping the writing process (Chapter 4).

Nevertheless, the findings reveal some changes in amount, intensity, and nature of language use and L-S that D’s L3 writing system underwent in the course of the semester. A complex systems view makes it possible to discern some new patterns that emerged during D’s L3 writing process. For instance, contrary to some expectations supported by previous L2 writing research concerning the effect of TL development on the amount of L1 and L-S, D’s L3 composing at the end of the semester was distinctive in terms of higher L-S frequency and more extensive L1 use at the expense of L2 and L3. The above-mentioned causality seems rather contradictory for two reasons. First, D acknowledged the effect of her L3 development and writing experience on L3 composing, explaining that “after the course [she] took it’s, [L3 writing] got a lot easier” and she felt “more confident this time” (D, Interview 3). Second, D stressed a change in L2 role during her second L3 task which seemed to be related to her L3 development. As pointed out earlier, she approached the first L3 writing task through L2 morphosyntax:

I was relying only on the grammatical knowledge that I knew in Italian, to guide me through, trying to figure out how to do it in Spanish. (D, Interview 3)

In fact, it is important to note that during the second L3 writing activity, there were significantly fewer instances of L2 usage for checking morphosyntactic accuracy of L3 items, which is further evidence for her L3 development. Hence, the relationship between L3 development and language use (including switching) appears to be neither a simple nor a linear one. Indeed, a very important change during the second L3 writing
activity occurred in her approach to the task in terms of content and ideas. What changed was her perception of the latter as a continuation of the first L3 composition:

I tried to do it a little differently ... as if I already knew, that I designed [the blog], I already knew what I said about it so this time it’s just kind of ... kept going with it instead of, starting over. (D, Interview 3)

It appears that D’s different approach to the writing task was interconnected with the content and ideas of the emerging narrative. Analysis indicates a change from low-level L3 knowledge about personal information and preferences (i.e., studies, parents, activities), communicated in the first L3 composition, to more complex ideas in her second one, conveying the writer’s attitudes toward and perceptions of her linguistic and cultural heritage, study abroad experience, courses taken, and what she had learned during the semester. Hence, in order to articulate her ideas in L3 during the second L3 writing task, D needed to resort considerably more frequently to online resources than during the first one, which seems to have altered the dynamics of her three language systems. On the one hand, it appears that during her second L3 composing activity, D resorted to the same preferred L3 searching pattern, more specifically, articulating the intended target item in L2, translating it into L1, and then retrieving the L3 equivalent or looking it up in the L1-L3 dictionary. On the other hand, D’s data show that what had changed during the semester was the movement from attention to L3 items’ morphosyntactic properties to the process of constructing and negotiating meaning through the use of all her languages and shifting among them. As D acknowledged, the pattern of translating from L2 to L1 and then to L3 was not “simple but very procedural thing” for her:
I feel like it’s easier to understand what I’m trying to say if I can translate it into more than one language. (D, Interview 3).

What could be said from a complexity perspective is that when a change occurs, it prompts the system to self-organize in response to the demands of the task and, in the process, to explore new paths in order to maintain its stability, such as the change in nature and direction of L-S in D’s pattern of language use (i.e., more L1-L3 switches). Thus, exploring L3 writing as a complex dynamic system allows us to discern changes in the interrelationships among D’s L3 writing system’s components. Changes in her attitude toward L3 writing, approach to the writing task, emerging text, attention resources, L1, L2, L3 development and systems, and use of online resources enabled “the system to leave the attractor basin and continue on a trajectory across the landscape to the next attractor” (Larsen-Freeman & Cameron, 2008a, p. 50).

5.3.2.3 The case of S

A native of Puerto Rico, S came to the USA to study international relations. The participant considered Spanish to be her first and native language despite the fact that, similar to B, she had studied English since kindergarten in a bilingual context where both Spanish and English were used as languages of instruction. She continued using her L1 on a daily basis to read news articles and connect with family and friends. At the time of the study, she was taking a French language course towards her minor in French, a language she had studied as an FL for six years prior to college. At first glance, S’s cultural and language background and language learning experiences could seem similar to those of B’s. Consequently, this similarity could presuppose that they would display
similar patterns of language use in their L2 and L3 composing. Nonetheless, the following discussion reveals significant differences in their language use.

For example, unlike B, the amount of L1 use and L-S was higher in S’s L2 composing. Moreover, the array of conditions that created a favorable environment for L1 use during S’s composing (i.e., verifying meaning, searching for ideas and lexical items, managing the writing process and emerging text, revising, and exclamations) was more diverse than those during B’s composing. It is important to emphasize that these patterns of L1 use were largely exhibited in S’s composing during the first L3 writing task, whereas L2 was resorted to mainly for managing word processing and online resources. Another pattern of language use in her L2 and L3 writing is the distinction between L1 and L2 use based on the relationships between the topic area and the language it had been acquired in (Friedlander, 1990), or sociocultural practices and the language they had been experienced in. It was especially evident in S’s tendency to say numbers in her L1, which does not align with Qi’s (1998) conclusion about L1 use when a writer faces an overload of working memory. This trend to associate topics, places, people, and cultural practices with her L1 or L2, and conceptual knowledge acquired along each language (S, Interview 3) is similar to a pattern exhibited in D’s L3 composing. Additionally, similar to D, S made use of her L1 for contrasting L1 and L3 morphosyntactic and semantic features, a pattern that could be related to her clear perception of typological proximity between her L1 and L3. This is a characteristic that distinguishes the nature of S’s language subsystems interrelationships from B’s. Also to be noted is S’s highly developed awareness of the specific role of L1 as a primary and L2 as a secondary source of support in L3 writing, which can be seen below:
whenever I write in French I think in French and then if I’m not thinking in French I’ll think in Spanish and then in English ... when I write in French that’s my sequence, (S, Interview 3).

Nonetheless, a number of changes in S’s patterns of language use and switching emerged when comparing the composing processes of her first and second L3 writing task. For instance, S’s second L3 writing task carried out at the end of the semester is characterized by significantly more L3 use, lower amount of L1 use and L-S instances as well as a small variety of conditions that favored L1 use (i.e., lexical searches). These patterns could be related to S’s L3 language development and as well to her growing enthusiasm about and interest in the French language and culture, and motivation to learn the language since she was preparing for a study abroad in France the following semester. Also to be noted is the nature and direction of the preferred pattern of language use, from L2→L1→L3 exhibited during her first L3 writing task to L2→L3 during the second one, which could be seen as influenced by her L2 academic environment.

Indeed, these findings could be perceived as adding further support to previous L2 writing research that points to a relationship between higher language proficiency and L2 academic environment and less L1 use and L-S. They could be perceived as well to run counter to the conclusion with regard to the second research question that suggests no relationship between L3 development and L-S. However, examining S’s L3 composing process from a complexity theory perspective offers a possible explanation that goes beyond taking into consideration isolated factors, since it provides a framework for seeing how its components interact dynamically with each other and in the process change their interrelationships and the writing system as a whole. An interview segment
reveals that S approached her second L3 writing task through her memories about the first one, which might have influenced a change in her writing goals:

I was trying to remember what I wrote on my last one, to either write the same thing or write something a little bit more different, then I started remembering how I talked about (.) like, our culture and, like so many complicated things and I was kind of oh I’m just gonna keep it simple. (S, Interview 3).

It appears as well that writing goals were dynamically interconnected with S’s awareness of the reader, as revealed in the following interview segment:

I think I did not give it that much emphasis in this one, I made it more about myself ... I think the first one, I was more: (.) ... about, inspiring the reader that was more in my mind, (S, Interview 3).

This change in L3 writing system dynamics undoubtedly altered the interrelationships among other components of the system, that is, the emerging text and ideas, and the language in which they were voiced. For instance, ideas generated in the course of the first L3 composition were related to the influence of the French language in the world, international relations, European colonization, developing countries, writer’s interests in politics and international conflicts, the UN, languages and cultures. However, the second composition was more personal, about her studies, classes, and activities. As mentioned earlier, S tended to associate language with topics and sociocultural experiences, and indeed this is evident in more extensive use of L1 during the first L3 composing. Nevertheless, most likely, in order to manage the writing process and task easier, or, as she stated on several occasions “to keep it simple,” S tended to stay within her preferred attractor state (i.e., L3) during her second L3 composing process:

My mind is thinking in French because my thoughts have to be simpler because I’m gonna have to write it in French, they can’t be to elaborate ... being in that French mindset, makes me think in
French but then, my thoughts become simpler, because I know that I can’t be too ... complicated. (S, Interview 3)

Furthermore, it appears that S’s engagement with and management of the writing activity was interrelated with her attitude towards using online resources. Whereas during her first L3 writing task she seemed eager to resort to online resources, she tended to avoid them while composing the second one:

I think I kept it pretty simple, (.) I think just because, (.) there were things that I would have wanted to say but either I did not know how to say it in French and, I did not wanna be looking up every single word. (S, Interview 3)

It is interesting to note here that S was aware of her different approach to using the online dictionary during the second writing task. She reported that she was “more focused” during the first L3 composing and that she used the online dictionary more frequently, since she thought more in L1. Hence, a change in her attention resources regarding spelling was also noticeable. For instance, while composing her first L3 narrative, S resorted rather frequently to the online Windows Alt codes table in order to type the appropriate French accented characters. Whereas these instances represented almost half of the amount of L1 use, since she would always say the numeric codes in her L1, none was recorded during her second L3 composing process. Two reasons probably account for this change. On the one hand, it seems like S had visualized or developed the habit of typing some of the accented characters without looking at the numeric keypad and saying the code. On the other hand, it appears that in order to “make it simple,” she decided not to look up accents she did not know the code for (e.g., ‘à’, ‘ê’), which further points to the changing dynamics of S’s L3 writing system.
What is evident from this depiction of S’s L3 composing process is how what could be considered a small change in one of the elements of her L3 writing system at the end of the semester (i.e., recollection of the first L3 writing task) altered the interrelationships among its elements. Hence, changes in her writing goals, emerging text, audience awareness, attention resources, language subsystems, language resources, and managing the writing process consequently altered the interrelationships among the system parts in such a way that new patterns of L1, L2, and L3 use emerged in the process.

5.4 Chapter Summary

The literature on language use and L-S in L2 writing point to factors that might influence the amount of L1, L2, and L3 and L-S frequency. These include L2 proficiency, task difficulty, degree of cognateness between L1 and L2, cognitive overloading, modes of writing, and the language in which topic knowledge has been acquired. The present chapter emphasized the insufficiency of these factors to account for irregularities that emerge when intra-group and intra-individual differences in multilinguals’ composing are taken into consideration. Hence, it presented the need to look at L3 writing from a complexity theory perspective. This perspective made it possible to bring to the fore other factors that have the potential to influence L1, L2, and L3 use and change the L-S frequency and direction. The findings revealed that writers’ perceptions about the readers, their writing goals, language learning background, attitude to and experiences with using technology and online resources, the emergent text, the semiotic cues, and the immediate language environment might as well bring about changes in their patterns of language use. Hence, what a complexity theory approach
might contribute to the discussion of L2 and L3 writing is (a) that these factors could account for variation in language use and L-S in L2/L3 composing; and (b) that they should not be considered in isolation nor along the lines of a simple linear relationship between cause and effect, but rather as intricately interrelated, dynamically changing components of the L2/L3 writing system.

In the present chapter I introduced a dynamic model of multilingual writing which paved the way for analyzing multilinguals’ writing from a complexity perspective. Concurrently, this chapter opened a way to see L2 and L3 writing not as a combination of isolated factors influencing multilinguals’ language use and L-S, but rather as a complex, dynamic, nonlinear, open, adaptive system comprised of intricately interconnected components. The next chapter discusses the findings related to the research questions and in the process puts forth the main conclusions arising from the present study.
Endnotes:
1 Atkinson (2011) distinguishes six alternative approaches to SLA that “depart from the field’s dominant cognitivist orientation” (p. 16): sociocultural, complexity theory, identity, language socialization, conversation-analytic, and sociocognitive approaches. As he emphasizes, even “sociocognitive perspectives are well outside the SLA mainstream” (p. 144).
2 It should be stressed that Jessner’s (2008) conclusions are with regard to the use of metalanguage.
3 After reading the L2 prompt A prepared a written plan using pen and paper. The language of planning was almost exclusively L1 unlike during the second writing task when the language of planning was mostly L3 with occasional switches to L1. For her second L3 writing task A proceeded directly to writing the composition without planning.
4 Jones & Tetroe (1987) conclude that level of language proficiency affects the language of planning while composing in L2, that is, more proficient writers use less L1.
Chapter 6 : Discussion and Conclusions

This study aimed to explore the dynamics of language use and L-S in multilinguals’ L2 and L3 composing processes. It sought to inquire into language dynamics in L2 and L3 writing. In addition, the study attempted to examine the relationship between L2 proficiency, L3 development, and L-S in L3 writing. Furthermore, it investigated conditions that might create a favorable environment for L1, L2, and L3 use and switching between languages and identified different types of L-S used by multilinguals while composing in L2 and L3. Another goal was to explore the roles of L1 and L2 in L3 multilinguals’ writing.

The main purpose of this chapter is to discuss the results presented in chapters 4 and 5 in light of related research and, in the process, put forward the primary conclusions and implications arising from the findings. The chapter is organized into eight sections. Sections one to five address, correspondingly, each research question. The sixth section puts forth the main conclusions with respect to the dynamic model of multilingual writing. The chapter concludes with two sections discussing the contributions of the study as well as its limitations and suggestions for future research.
Collectively, the results of the study demonstrate that the multilingual writers who participated in the research used at least two languages while composing in L2, thus confirming findings from previous SLW research (Cohen & Brooks-Carson, 2001; Cumming, 1989; Knutson, 2006; Kobayashi & Rinnert, 1992; Lei, 2008; Manchón et al. 2000; Uzawa & Cumming, 1989; van Weijen et al., 2009; Wang, 2003; Wang & Wen, 2002). With respect to L3 writing, the data imply that multilinguals tend to use all their languages while composing, a finding which is in line with Cohen & Brooks-Carson (2001) and Jessner (2005, 2008). Drawing from this summary of the study’s main findings, the chapter now moves to addressing each of the research questions which motivated the research.

6.1 What are the Dynamics of Languages in Multilinguals’ L2 and L3 Writing?

Regarding the first research question, it is important to note that a crucial difference between the present study and existing literature on language use and switching in L2 writing concerns the linguistic context of the writing process. Namely, these six participants had not two but three languages (four in the case of A) in their repertoire while composing in L2 and L3. This essential distinction should be taken into account when the findings are interpreted and discussed in relation to SLW literature.

6.1.1 What is the amount of L1, L2, and L3 use in multilinguals’ L2 writing?

A key finding of the present study is that while some multilinguals tended to resort to all of their languages during the L2 composing process, others stayed within their two language systems. Hence, the results imply that L2 writing could be a bilingual (as opposed to a multilingual) event for some writers, a finding which is in line with previous L2 writing research and specifically with Wang and Wen (2002), who
concluded that the L2 writing process is a bilingual event for L2 writers (p. 239). At the same time, though, the findings suggest that L2 composing could be a multilingual event for multilingual writers, which opens up interesting avenues within and beyond the boundaries of L2 writing for further investigation of the complex interplay of languages in multilinguals’ writing.

With respect to the amount of L1 and L2 use in L2 composing, the results from the present study concur with findings reported in the SLW literature. However, differences in methodological procedures should be taken into consideration. For instance, whereas Kobayashi & Rinnert (1992) relied on participants’ self-estimation of L1 and L2 percentage of use, Manchón et al. (2000) calculated the proportion by deducting the number of words in the composition from the total number of words used while composing. On the other hand, similar to Wang & Wen (2002), the amount of L1, L2, and L3 in the present study was computed as a percentage of the total number of words in the TAPs. Despite differences in methodological procedures, the amount of the multilingual FL writers’ use of L1 is concurrent with findings reported by Kobayashi & Rinnert (1992), Manchón et al. (2000), and with Wang & Wen’s (2002) students with the lowest level of L2 proficiency. In addition, this study’s results indicate that multilingual SL writers’ amount of L1 use is significantly lower than (a) multilingual FL writers’ L1 use; and (b) bilingual writers’ amount of L1 use in the studies of Kobayashi & Rinnert (1992), Manchón et al., (2000), and Wang & Wen’s (2002) most proficient FL students.

To my knowledge, the issue of L3 use in L2 composing has not been investigated in SLW research. Thus, the conclusions put forward are based solely on the results of the present study. One of the most important finding is that these multilingual FL and SL
students resorted not only to L1 also to L3 while composing in L2, although to a different extent, in different conditions, and for different purposes. For instance, whereas one SL writer resorted to her L3 most likely with the intention to create a discursive space shared by writer and reader, other writers made use of their L3 as a tool for L2 and L3 learning, enhancing morphological and semantic differences between languages, and making meaning. Based on the analysis of data and the finding that the amount of L3 use in L2 writing does not differ across groups, it could be concluded that the use of L3 does not seem to be related to level of L2/L3 proficiency nor to L2 writing expertise, factors that L2 writing researchers have found to affect language use. However, although L3 represented a small percentage of the participants’ total verbalized thoughts, and it was articulated in single word segments, the findings imply that literacy in an L3 might alter significantly the dynamics of languages used during the L2 writing process. Consequently, the use of L3 appears to have accounted for certain quantitative (i.e., amount of language use and L-S frequency) and qualitative differences (i.e., conditions for language use and L-S as discussed in section 6.3) between the composing processes of the learners of two and three languages, a finding which points to the distinct nature of multilinguals’ writing.

### 6.1.2 What is the amount of L1, L2, and L3 use in multilinguals’ L3 writing?

Results presented in the fourth chapter demonstrate that all the multilinguals made use of their three languages during the L3 composing process. However, different tendencies emerged across groups and languages. Regarding L1 use, the present study found that, in contrast to the SL third language learners, the FL group tended to voice their thoughts more in L1 than in L2. This tendency seems to be in accordance with the
FL writers’ preferences for L1 and the SL writers’ preferences for L2 use in lieu of L1 during L2 composing. It is further confirmed by the findings regarding language systems’ segment lengths in L3 writing. For instance, unlike the FL students, who produced considerably longer L1 than L2 segments, the SL writers articulated their thoughts in longer L2 than L1 utterances. Although in the latter case the difference remained rather narrow, when this finding is considered with those concerning the amount of language use in L2/L3 composing, it points to a distinctive trend. Namely, in L2 and L3 composing, the learners of two FLs showed preferences for relying on L1, unlike the SL third language learners, whose use of L1 and L2 seemed to be more balanced.

Furthermore, findings emerged with respect to L3 use in the L3 composing process. Analysis of data suggests that while both groups voiced more than half of their thoughts in L3, the SL group relied on L3 much more than the FL group. Additionally, the results indicate that the latter group relied more on their L3 in L3 composing than on their L2 in L2 composing, in contrast to the former group. Taking into consideration the writers’ level of L2 and L3 proficiency, this finding appears rather surprising, since it does not suggest that TL proficiency might influence L1 and L2, as concluded in previous studies (e.g., Knutson, 2006; Wang & Wen, 2002). However, as previously mentioned, groups’ results might conceal individual patterns in language use and L-S. For instance, whereas one FL writer seemed to be consistent in her language use in L3 writing at the beginning and at the end of the 10 week period, an SL and an FL writer showed a tendency to use more L3 and less L1 during the second L3 writing task. This is contrary to the pattern of more L1 use during the second L3 writing task exhibited by two
other writers. In addition, with respect to L2 use, while for the FL writers the amount seemed to be consistent across tasks, it differed greatly for the SL group. Hence, it appears that if we consider individual patterns of language use, the findings of the present study seem to challenge conclusions put forth in previous SLW research, especially regarding the factors that might influence L1, L2, and L3 use during the composing process.

6.1.3 Factors that influence language use in L2 and L3 writing

Although the relationship between language proficiency and language use has already been documented in a handful of studies, conclusions are far from conclusive as was discussed in the second chapter. To be precise, Haneda (2007), Jones & Tetroe (1987), Knutson (2006), and Wang & Wen (2002) reported that L1 use declines with increasing L2 proficiency. This conclusion seems consistent with the findings of the present study, but only regarding L2 writing (i.e., writers more proficient in the L2 would rely less on their L1). This is further supported by the finding that the FL writers produced considerably longer L1 utterances than the SL writers. Moreover, participants’ emic perceptions of the relationship between L2 proficiency and the language of composing provide further evidence for the claim that L2 proficiency influenced the language they were thinking in while composing in L2. Hence, it seems that L2 proficiency might have accounted for the finding that the SL learners who studied a third, foreign language, relied significantly more on their L2 than on their L1 while composing in L2, whereas learners of two FLs resorted mainly to their L1.

However, the findings related to L3 writing do not seem to point to such a relationship, which further supports van Weijen et al.’s (2009) conclusions. This is
evident if intra-group and intra-individual differences in the amount of language use in L3 writing are examined. Various reasons could account for this disparity with previous research. The first is that the multilinguals’ L2 and L3 writing differed not only quantitatively (i.e., L-S frequency, amount of language use), but also qualitatively (i.e., factors impact in different ways L2 and L3 writing). This conclusion suggests a distinct nature of multilinguals’ writing as opposed to bilinguals’ writing. The second implies that a cause-effect relationship (i.e., between level of TL proficiency and amount of language use) is not linear but one that involves interrelations among an array of factors.

The SLW research offers some insights on the influence of writing expertise and writing topic on the amount of language use. With respect to the former, it should be emphasized that the SL participants were more experienced L2 writers than the FL learners due to the larger number and variety of papers they had to write for their college courses. Regarding the latter factor, it seems important to evoke Friedlander’s (1990) conclusion that the language the topic area has been acquired in could influence the choice of language. The findings of the present study provide further evidence that multilinguals’ conceptual knowledge might be dynamically interrelated with their sociocultural practices experienced through a particular language. This is further supported by participants’ emic perspective. They expressed conscious awareness about certain cultural practices and “portable cultural memories” (Kramsch & Whiteside, 2008, p. 667) might entail switches to a specific language. For instance, S asserted that she would think “faster for some topics in Spanish [L1] and for others in English [L2]” (S., Interview 3). She associated with her L1 topics related to her native country, her life and family there, articles and jokes read or heard in Spanish, while school work and her
experience in the U.S. were associated with her L2. Similarly, D also perceived a connection between cultural practices and the languages they were embedded in (i.e., school and cooking terms associated, respectively, with L1 and L2). Additionally, when discussing bilinguals’ L3 writing strategies, Cohen & Brooks-Carson (2001) noted that the English-language university context might have influenced their participants’ preferences for more L2 (English) use. Therefore, the effect of the academic language discourse on L-S in L2 composing cannot be ignored.

Hence, based on statistical data and participants’ emic perspectives, the present study provides evidence that (a) there is no relation between L3 writing expertise and L1/L2 use in the context of L3 writing; (b) the language of the sociocultural and/or academic environment might lead to more use of that language in multilinguals’ L2 and L3 writing; (c) level of TL proficiency might be related in L2/L3 writing of learners of two FLs; and (d) SL learners of an L3 as an FL might use in a more balanced way their first and second languages in L3 writing than learners of two FLs.

However, these factors, language proficiency, writing expertise, and language environment, fail to explain certain individual patterns and intra-group differences. For instance, language proficiency alone cannot account for the significant difference between A’s L1, L2, and L3 use in L2 and L3 composing, nor for SL intra-group differences in L2 use in L3 writing. Additionally, it appears that the academic and sociocultural environment did not affect A’s L2 use in L3 writing, nor M’s perception of L2-L3 typological proximity. Moreover, writing expertise alone cannot explain the differences between A’s and H’s L1 use in L2 and L3 writing. What could be concluded is that the relationships between these factors and the multilinguals’ languages were more
complex and multifaceted than they appeared at first glance. Taking a complexity theory approach to multilingsuals’ writing, that is, seeing it as a complex dynamic system, reveals that there were other factors (subsystems) that influenced the writing activity, and, second, that all these subsystems were interconnected and interdependent.

Therefore, writing goals and prompt, writers’ language learning background, their experiences with and attitudes toward modes of writing and using digital resources, their perceptions of audience and language proximity, are seen as elements of the dynamic writing system. Their characteristics are idiosyncratic, constantly changing (synchronically and diachronically), and adapting to each other and the whole writing system. Most importantly, this novel approach to multilingual writing puts an emphasis not on single variables and linear results but on interrelationships and “mutual causality, in which change in one system leads to change in another system connected to it, and this mutual influencing continues over time” (Larsen-Freeman, 2008b, p. 202). While language proficiency, writing expertise, and language environment might have influenced the interplay of languages during the L2/L3 composing process, this study presents evidence that they were enmeshed with the other elements of the writing activity system characterized by dynamic intricate interrelationships and coadaptation.

6.1.4 What are the L-S frequency and direction in L2 and L3 writing?

6.1.4.1 What are the L-S frequency and direction in multiliguals’ L2 writing?

Although only a handful of studies have investigated switching between languages in L2 composing, this study’s findings concerning L-S frequency and direction do imply that multilingual writers switch more often than bilingual writers while composing in L2. For instance, the six participants switched more frequently than
Woodall’s (2002) intermediate and advance-level learners (cognate and non-cognate groups) in both easy and difficult writing tasks. In addition, the three SL writers switched more frequently than Qi’s (1998) bilingual participant composing a letter in a non-cognate language but less frequently in the case of his argumentative task (i.e., high-level knowledge demand writing task). This disparity in results of the previous research and the present one could be attributed to the effect of writing task (a more cognitively demanding task increases L-S frequency, as claimed by Qi, 1998), or the combined effect of L2 proficiency, task difficulty, and language group (Woodall, 2002), or as well to methodological differences concerning definitions of L-S and coding L-S data, as already discussed in the third chapter. Taking into consideration the dynamic and complex nature of L2/L3 writing, it could be concluded that learners of L2 and L3 cognate languages might experience more intensive switching among languages than do learners of only one FL/SL. Consequently, this finding implies a distinct nature of multilinguals’ L2 writing as opposed to bilinguals’ L2 writing. However, this postulation should be considered as a springboard for further investigating multilinguals’ writing.

With respect to L-S direction, it should be pointed out that although both the SL and FL writers switched primarily between L1 and L2 in L2 composing, the former group switched less frequently than the latter. An interesting finding regarding these multilingual writers was that both groups’ participants switched to their L3 during the L2 composing process. Overall, analysis of data point to a distinction between both groups with respect to (a) L-S direction of switches to L3 (i.e., contrary to the FL writers, the SL writers switched more between L2 and L3 than between L1 and L3); and (b) L-S frequency (i.e., the SL writers switched less frequently than the FL writers). The latter
finding runs contrary to Wang’s (2003) conclusions, but is concurrent with Woodall (2002). The discrepancy could be due to (a) methodological differences and/or bilingual versus multilingual contexts of composing; and (b) the present study’s finding that this relationship is in fact a part of a more complex configuration of relationships and interconnectedness among a host of other variables seen as dynamic elements of the writing activity system.

6.1.4.2 What are the L-S frequency and direction in multilinguals’ L3 writing?

Two interesting findings emerged when comparing the multilinguals’ L-S in L2 and L3 writing. Regarding L-S frequency, it appears that the multilinguals switched more frequently during their L3 than during their L2 composing process. With respect to L-S direction, the FL participants showed a tendency to switch predominantly between their L1 and the TL in both L2 and L3 composing. On the other hand, the analyses point to a preference for a more balanced allocation between L1-L3 and L2-L3 switches in the SL participants’ L3 writing. Although these findings could not be corroborated to previous research due to a lack of studies on multilinguals’ L-S in L3 writing, they do suggest that multilinguals’ L2 and L3 composing differ regarding both L-S frequency and L-S direction. This conclusion implies that the language dynamics in multilinguals’ writing are more varied than in bilinguals’ writing. Additionally, the findings point to certain factors that may affect L-S frequency and direction.

6.1.4.3 Factors that influence L-S in multilinguals’ writing

Although the SLW research provides insights on factors that might influence L-S in L2 writing, such as language of topic-knowledge and L2 proficiency, conclusions are far from conclusive regarding the latter (Woodall, 2002; Wang, 2003). In the case of the
present study, at first glance, level of L2 proficiency seems to be one of the explanations for differences between both groups with respect to L-S frequency and direction in L2 and L3 composing. Findings aligned with this were that the FL participants switched (a) considerably more frequently than the SL writers in L2 composing; and (b) significantly less frequently than the SL group between L2 and L3 in L3 writing. However, as previously emphasized, group results might conceal certain individual trends. The discussion of participants’ cases revealed that different writers displayed different paths of L-S, as explained through the lens of complexity theory. Moreover, changes in their patterns between L2 and L3 writing, as well as between the first and the second L3 writing tasks, were observed. For instance, although all participants were more proficient in their L2 than in their L3, A and H (in her second task) switched less frequently in L3 writing. In addition, although all writers expressed conscious awareness of the effect of L3 proficiency on their L-S behavior, even with 10 weeks of L3 learning, some participants (M, H, and D) switched more frequently during their second L3 writing task than during their first one. This trend was contrary to the one exhibited by A and S, and especially by B, who had used her L3 only on a few occasions during the semester.

This individual variability could not be explained by a simple cause-effect relationship involving language proficiency. Previous SLW research has looked at the effects of writing expertise, although only in relation to L1/L2 use and not to L-S frequency. This study results show that L3 writing expertise and development (during a 10-week period) could not account for intra-group (M and H vs. D and B and S vs. D) and intra-individual differences (between M’s, H’s, and D’s first and second L3 tasks). Furthermore, it could be that differences between both groups’ patterns of L-S in L2/L3
composing might have been related to the effects of which language the topic-area knowledge had been acquired in (Friedlander, 1990). This seems to be consistent with the tendency exhibited by the FL writers to switch exclusively to L1 as the language of topic-area knowledge for managing the mechanical aspect of the text and word processing. Similarly to the FL group, the SL writers switched on many occasions to L1 in the case of the former but did not switch at all to their L1 in the case of the latter condition. It should be noted that findings concerning L-S switching for managing the mechanical aspect of the text in L2 writing (i.e., regarding accents, paragraphing, etc.) have not been reported in previous research as a separate category.

Additionally, another factor that could account for differences in L-S direction between both groups could be the influence of the language of the academic and sociocultural environment. For instance, the FL writers tended to produce single word L2 or L3 segments embedded into their most proficient language (L1), which constituted the syntactic frame of the utterance, while the SL group tended to use their L2 as a matrix. Nevertheless, this factor does not seem to explain certain intra-individual differences, such as A’s lower frequency of L-S involving L2 after a semester of studying in US academic context.

Hence, on the one hand, drawing on findings from previous research and from the present one, it appears that there is a relationship between L-S and language proficiency, writing expertise, academic and sociocultural discourse context, and the language of topic knowledge acquisition. These relationships might have accounted for more intensive L-S in the multilinguals’ L2 writing as opposed to in the bilinguals’ L2 writing. However, on the other hand, while these factors could elucidate group differences
regarding L-S frequency in L2 composing, they do not necessarily show a cause-effect relationship or offer explanations for some intra-group and intra-individual differences. A complexity theory perspective on multilinguals’ writing provides specific insights into the complex interrelationships between these systems’ components and a range of others. For instance, the discussion in the previous chapter revealed how both emerging text and semiotic cues could bring about a sudden switch to another language. Moreover, L-S direction seems to be related as well to the writers’ perceptions of typological proximity between languages. Additionally, sociocultural background, world knowledge, and cultural memories related to writing topics and ideas might emerge in the form of L1, L2, or L3 and bring about L-S during the writing process. Hence, instead of isolating factors and looking for cause-effect relationship, complexity theory provides a framework to see writing as a dynamic system where linear axes are reordered into dynamic complex relationships and writing at the moment arises through the interactions of the writing system’s components.

6.2 Is there a Relationship between L-S Frequency and L2 Proficiency in L3 Writing and between L-S Frequency and L3 Development?

The finding that variations in L-S frequency means between both groups are not statistically different supports the argument that there is a need to move beyond the linear cause-effect relationship. Although the small sample size of the study may not have had enough statistical power to detect significant differences between groups, this finding implies that there is no evidence that level of L2 proficiency might have an effect on L-S frequency in L3 writing. However, since the effect of L2 proficiency on language use in L2 writing has been one of the main inquiries in basic SLW research (Leki et al., 2008),
further research is needed in order to explore this relationship in the context of L3 writing.

In addition, the present study examined differences in multilinguals’ L-S in L3 writing at two states of their L3 development (i.e., in the beginning and the end of a semester). From a complexity theory perspective, the finding that latter does not influence the former implies that participants’ dynamic writing systems have been in a stable mode. Nevertheless, “stability is not stasis” (Larsen-Freeman & Cameron, 2008b, p. 204). This is evident from changes in individuals’ patterns of language use and L-S discussed above, which could be seen as indicators of L3 development (Larsen-Freeman & Cameron, 2008b).

These findings appear to support the need to move beyond the conventional view of (a) reducing a complex phenomenon/system to its parts and isolating them from the whole in order to investigate them; and (b) seeing relationships between systems parts as linear. Hence, it points to a need to embrace the view that individual learners’ language development is influenced by a host of factors that interact dynamically with each other at any timescale and level and that interconnectedness and openness shape idiosyncratically their patterns of language use.

6.3 What Conditions Favor L1, L2, L3, and L-S in Multilinguals’ Writing?

As this research revealed, literacy in an L3 brings about more complex relationships among languages, manifested not only in the amount of language use and L-S frequency and direction, but also in the variety of conditions that create an environment for mono-, bi-, and multilingual utterances to emerge. This could explain the finding that both the FL and SL third language learners expressed concerns at syntactic, lexical, and
rhetorical levels while composing in L2. This is contrary to Wang (2003), who concludes that more proficient writers use L-S as a strategy for achieving rhetorical purposes and for construction of meaning, while identifying less proficient writers’ L-S behavior as “unidirectional, decontextualized” and limited to lexical level (p. 368).

6.3.1 What conditions favor monolingual utterances in L2 and L3 writing?

Although previous research on language use and L-S in L2 writing identifies purposes, reasons, and factors that prompt L1 use and L-S, certain methodological differences such as the studies’ coding categories make it difficult to draw comparisons with this study’s findings. Nevertheless, some tendencies do emerge. Results from this study shed light on conditions that create a favorable environment for monolingual utterances. For instance, in line with previous studies, it was found that L1 was used during L2 and L3 composing processes for: writing drafts and outlines, searching for, generating, and organizing ideas, controlling the process and contextual meaning, verifying lexical meaning, retrieving grammatical rules, consulting dictionaries, planning, considering intended readers, backtranslation, and metacommments (e.g., Cumming, 1989; 1990; Friedlander, 1990; Gosden, 1996; Jones & Tetroe, 1987; Lei, 2008; Knutson, 2006; Qi, 1998; Uzava & Cumming, 1989; van Weijen et al., 2009; Wang, 2003; Wang & Wen, 2002). In addition, results point to other conditions that might have triggered monolingual utterances, such as back-translating/analyzing the writing prompt and the emerging text, setting writing goals, and managing the mechanical aspect of the text.

When analyzing how these conditions favor the occurrences of monolingual utterances, major differences emerged not so much between the L2 and L3 writing of the participants, but between the FL and SL third language learners. For instance, these
findings concur with those from previous studies showing that generating and organizing ideas, process-controlling, metacomments, and self-instruction (Jessner, 2005, 2008; van Weijen, 2009; Wang, 2003; Wang & Wen, 2002) seem to create conditions for producing monolingual L1 utterances in both L2 and L3 composing, although, as this study demonstrated, mainly for learners of two FLs. With respect to the SL learners findings indicate that they tend to rely on both their L1 and L2 for (a) analyzing the writing prompt and setting writing goals in L2 writing; and (b) reflecting on the writing process, generating ideas, and managing the writing process and the mechanical aspects of the text in L2 and L3 writing. In that respect, van Weijen & al.’s (2009) conclusions that goal-setting, structuring, and generating ideas are more likely to occur in L2 in the context of L2 writing seem to support tendencies displayed by this study’s SL participants but run counter to those exhibited by the FL writers.

In line with Wang’s (2003) conclusions, the study’s findings present additional evidence that the condition of reflecting on the reader favors L1 utterances for FL writers and L2 utterances for SL writers. Similar to Wang & Wen (2002), the results present further evidence that more proficient L2 writers tend to produce text primarily in L2, but only in the context of L2 composing. As already emphasized, it would be an oversimplification to assume that the complex interconnectedness among a range of factors influencing language use in L2 writing could be reduced to the effect of a single factor, such as level of L2 proficiency. Moreover, as already noted, the level of L3 proficiency could not account for differences between both groups as regards the above conditions in L3 composing. Complexity approach enables taking into consideration a host of dynamically interrelated elements of the system, such as writers’ perceptions of
typological proximity of their languages, their language learning experiences, and the influence of numerous semiotic cues that could bring about L-S while generating a text.

Furthermore, viewing L2 language proficiency as a main factor that could account for differences between FL and SL third language learners seems inadequate to explain individual variations among SL participants with respect to using monolingual utterances in some of the above-discussed conditions. For instance, while in L2 writing B voiced her thoughts exclusively in L2 when analyzing the writing prompt, setting writing goals, reflecting on the writing process, generating ideas, and managing the writing process, S displayed a pattern of shifting between L1 and L2, and D articulated her thoughts in L1 only when generating ideas, and managing the writing process. Moreover, the three SL writers demonstrated different tendencies with regard to managing the mechanical aspects of the text, such as making use only of L1 (S), of both L1 and L2 (B), and of L2 and switching between L1 and L2 (D). The analysis of data from a complexity theory perspective presented in the previous chapter points to an interconnectedness among a variety of elements that have the potential to influence language use during the L2 composing process, such as writing topic, writers’ perceptions of modes of writing, language learning contexts, typological distance between languages, and their role in the writing process.

6.3.2 What conditions favor L-S in multilinguals’ L2 and L3 writing?

The present study sheds light on conditions that create a favorable environment not only for monolingual but also for bi- and multilingual utterances to occur. Related findings provide a more detailed picture of language interplay in the multilinguals’ L2/L3 writing. Taking a complexity theory perspective to examining these conditions allowed
for setting clearer distinctions between (a) generating the text and analyzing/back-translating it; (b) managing ideas, writing process, mechanical aspects of the text, and noticing and making meaning; and (c) searching/evaluating target items with/without the aid of online resources and revising. These distinctions facilitated detailed investigation of the interactions among language systems and other factors (i.e., system’s components) that might have influenced their interplay.

The data analysis shows that on a very small number of occasions, conditions that might elicit bilingual language segments in L2 and L3 writing included the following: managing ideas, writing process, and commenting on process and text for the FL learners, and generating the text for both groups. These conditions tended to create a favorable environment for L-S to arise, but its direction in L3 composing (L1-TL and L2-TL) distinguished between both groups. The findings suggest that while the multilingual SL writers tended to use monolingual utterances when commenting on the emerging text, the multilingual FL writers were more likely to switch among their languages. They produced multilingual utterances wherein L2 and L3 items were embedded into an L1 frame. This seems to have been an intended choice that indexed writers’ perceptions of the roles of L2 and L3 as a language learning tool. Interestingly, this finding supports Jessner’s (2005, 2008) conclusion that the language of writers’ metalanguage indicates their dominant language. However, it does not provide further evidence that level of TL proficiency influences language choice. Moreover, with respect to the FL writers the finding partially supports her conclusion that metacomments are expressed in bilingual and trilingual units. However, this difference in results might be of a methodological nature, since the present study did not distinguish between metacomments on writing
process and text from metacommments on choice of lexical items, which are included in one category in Jessner’s study.

With regard to the condition of generating the actual text, the findings point to patterns that denote complex interactions among the three languages. For instance, while generating the actual text, the FL participants, more frequently than the SL writers, tended to produce bilingual segments by alternating between L1 and the TL in both L2 and L3 composing. This finding is in line with Wang & Wen (2002), who concluded that text-generating is L2 dominant for EFL learners. Nonetheless, one pattern that comes to light in this study is that, while generating the L2 and L3 texts, both the FL and SL participants also produced bilingual utterances that involved non-target language items. It was found that in many of these occurrences, the participants were not initially aware of using the non-target language item in lieu of the corresponding TL one. However, later on in the composing process, a host of semiotic cues (i.e., visual, aural, textual, semantic denotation) prompted the writers to interact with and through the text in order to revise and correct it, as seen in examples 2 and 7 (chapter 4). Hence, these bilingual and the few multilingual instances which emerged while generating the actual text seem to indicate complex interactions among the multilinguals’ languages. Whereas the initial use of the non-target FL/SL item seemed to evoke unconscious use, later on in the writing process L-S appears to have been triggered by what Jessner (2008) refers to as “a dynamic interplay of crosslinguistic and metalinguistic awareness” (p. 279).

In addition, contrary to van Weijen et al.’s (2009) conclusion that L2 is used more for goal-setting, it was found that setting writing goals and planning brings about monolingual utterances for FL writers in L2 and L3 composing. However, this finding
seems to concur with that of van Weijen et al.’s (2009) in the case of SL learners of an L3, who tended also to voice their thoughts in bilingual utterances in L2 composing.

Moreover, the complexity theory approach enables seeing interconnectedness among language systems and the language the topic knowledge was acquired and experienced in, especially in the case of D and S. This finding expands on Friedlander’s (1990) conclusion about the influence of the topic-area knowledge on the choice of language.

In line with previous research on language use in SLW, the present study found that the conditions that mostly favor mixed utterances are searching for a TL item with and without the aid of online resources, and revising the emerging text. The finding that these conditions create an environment for multilingual writers to voice their thoughts primarily in bilingual L1-L2 utterances while composing in L2 seems congruent with findings from previous research that lexical meaning verification (Qi, 1998), lexical searches (Wang, 2003), and reviewing the text (Wang & Wen, 2002) are factors that prompt L-S. However investigating multilinguals’ language interplay in L3 composing brings about a more complex picture. The present study’s findings suggest that literacy in an L3 alters the interactions among all of the languages during the process of searching for lexical and syntactic items and revising. Namely, whereas bilingual writers tend to use two languages or switch between them, the multilinguals displayed a larger variety of language combinations as evident in their L2 and L3 composing (chapter 4.4).

Hence, bringing one more language into the writing system seems to change its configuration, which seems in turn to bring about a more intense and complex writing process for multilinguals. Conclusions from previous SLW research on language use
(e.g., Cohen & Brooks-Carson, 2001; Jones & Tetroes, 1987; Wang & Wen, 2002; Woodall, 2002) suggest that level of TL proficiency might elucidate the finding. However, the complexity theory approach makes it possible to explain these distinctions not as a result of level of TL proficiency, but rather as a result of changes in interrelationships among the elements of the writing system. It reveals that interconnectedness among writers’ memory characteristics, reader awareness, and experiences with, attitudes toward, and preferences for writing mode, using digital resources play a large role in defining their idiosyncratic patterns of language use and L-S while searching for a target item or revising.

Additionally, in the context of multilinguals’ writing, this study presents further evidence that aligns with Jessner’s (2008) DMM and claim that multilinguals’ language systems are not independent entities but rather inextricably intertwined. Moreover, these findings seem to confirm Qi’s (1998) claim that conceptual knowledge is shared across languages and might be accessed via all languages.

Hence, the dissertation’s findings concerning conditions that favor monolingual and mixed utterances present further evidence that we should go beyond a linear cause-effect continuum and see multilinguals’ languages as dynamic, open, adaptive, non-linear and, moreover, as parts of a complex dynamic system (i.e., L2/L3 writing activity) whose elements “interact to form a connected whole” (Larsen-Freeman & Cameron, 2008a, p. 26). Additionally, they point to a distinct nature of multilinguals’ L2 as opposed to their L13 writing and, as well, to a distinct nature of multilinguals’ L2 writing as opposed to bilinguals’ L2 writing.
6.4 What Types of L-S are Used by Multilinguals in L2 and L3 Writing?

The goal of this research question was to examine types of language-switching multilinguals use in order to better understand the interplay of languages and their roles in the writing process. Following Muysken’s (2000) typology developed for conversational C-S, the present study’s findings indicate that the three types of switching (i.e., insertion, alternation, and congruent lexicalization) are also produced by multilinguals during the composing process.

For instance, bilingual segments elicited while the writers were managing the writing activity were identified as insertion type of L-S. In these cases, it seems that L-S served a practical function to facilitate the writing process in order to move to the next phase. Hence, this L-S type provides evidence that multilingual writers are likely to conceptualize L-S as a tool for optimizing the writing process. In addition, the data contain multiple examples for lexical borrowing that involved two and three languages, especially while the participants were searching for target items and revising. These bilingual and multilingual occurrences, wherein an item from one language or items from two different languages are embedded into an L1 or L2 frame, denote the language that might play the main support role in L2/L3 writing. An interesting finding in this study is that while L-S frequency and direction pointed to language use patterns specific for each group of writers, L-S types did not seem to be indicative of such a distinction between both groups. Finally, the instances of slips of the tongue, seen usually as speech errors in first and second language production (Poulisse, 1999), might play a positive role for multilinguals. As seen in Chapter 4, when slips of the tongue did occur, the multilingual writers appeared to be eager to take the opportunity to reflect on orthographic, phonetic,
morphological, syntactic, and semantic differences between items belonging to different
language systems. Moreover, these instances of slips of the tongue provide further
evidence of the complex interaction and interconnectedness of multilinguals’ language
systems in L2/L3 composing.

6.5 What is the Role of L1 and L2 in Multilinguals’ L3 Writing?

The focus of this research question was to find out if L1 and L2 play different
roles during the L3 composing process of learners of two FLs and of SL learners of an
FL. The conclusions put forth are based on statistical analyses of data related to amount
of L1 and L2 use, L-S frequency and direction, conditions favoring monolingual and
mixed utterances in conjunction with findings as regards L-S types, participants’ emic
perspective, and the dynamic model of multilingual writing. Since the conditions of
searching for target items and revising were found to create the most favorable
environment for L-S to occur, additional statistical analyses were run in order to obtain
information about the position of L1 and L2 activation in these instances. The findings of
the present study suggest that the roles of L1 and L2 in L3 writing differ across groups.
The following conclusions could be drawn:

1. Regarding FL learners, the findings imply that L1 and L2 could be considered
   as, respectively, main and secondary support language in L3 composing. The latter is
   especially evident from the interviews, when the participants identified explicitly the
distinctive roles of both languages (chapter 4) and reported thinking mostly in their L1.
   As M, stated, “it’s always back to English [L1] for me, like I think in English most of the
time” (M, Interview 3).
2. With respect to SL learners of an FL, the findings indicate more complex relationships among the language systems. It appears that for some writers, both languages may play an equally important role (e.g., S) and for others, L1 could be the language for comprehending, negotiating, and controlling meaning in L3 composing (e.g., D), or L2 could be the primary support language as in the case of B.

The above findings support partially Jessner’s (2005, 2008) conclusions. It could be said that the roles of L1 and L2 for the FL participants concur with Jessner’s conclusion that level of language proficiency determines the dominant and less dominant languages and consequently their roles in L3 production. Similar to Jessner’s participants, L1 played a primary support role for the FL group in L3 writing. However, it should be stressed that the FL group’s characteristics differ greatly from Jessner’s participants, who had higher levels of L2 and L3 proficiency and lived in a bilingual environment. Another vital difference is that the latter study investigated only metalanguage used for lexical searches while the present one examined metalanguage articulated during the entire L3 composing process and L3 writing as a whole activity. In addition, the complexity theory approach contributes to the understanding that the interconnectedness among language systems and topic knowledge, language typology, writing experience, and writing goals determines the role of L1 and L2 in FL writers’ L3 composing.

The findings of the present study with respect to the SL group do not seem to concur with Jessner’s (2005, 2008) conclusions concerning the role of L1 as playing a primary support role in L3 production. In fact, Jessner (2005) had anticipated what the present study found, namely, that both L1 and L2 play a balanced role in L3 writing.
Differences in conclusions could be ascribed to the above-mentioned methodological differences and research foci. In addition, findings about the dynamic interrelationships among all the parts of the writing activity system reveal that, contrary to Jessner’s conclusion, level of language proficiency and recency of use could not be the only decisive factors for determining the roles of L1 and L2. Hence, from a complexity theory perspective, the findings imply that the roles of L1 and L2 could be the result of the dynamic configuration of a multilingual’s writing system at a particular level and timescale.

Another conclusion is that L1, L2, and L-S seem to play an important role as a semiotic tool for target item searches and revising the emerging text. As we saw, the FL and SL writers resorted to their languages in order to contrast or highlight orthographic, phonetic, morphosyntactic, and semantic differences between target items belonging to different language systems. Moreover, some writers further developed their perceptions of the roles of L1, L2, and L-S as a means for language learning. In addition, as already stressed, L1 played an important role for controlling and negotiating meaning expressed initially in L2 or L3. Seeing multilinguals’ writing through the lens of complexity theory reveals interconnectedness among the languages systems, the emerging and written text, and a number of semiotic cues. From this perspective, the present study presents further evidence, in line with Jessner (2005, 2008), that language systems are not autonomous entities. Although the findings do not present evidence as to whether multilinguals’ language systems are “jointly stored,” as claimed by Jessner (2005, p. 65), the complexity theory perspective sheds light on the nature of their interrelationships, which further supports the view that bilinguals are not two monolinguals in one person (Grosjean,
Based on the findings of the present study, it could be argued that literacy in an L3 brings about not only changes quantitative and qualitative in nature, but alters the map of L1, L2, and L3 interconnectedness in the L2/L3 writing processes. The earlier discussion in this chapter sheds light not only on the distinct nature of bilinguals’ L2 writing vis-à-vis multilinguals’ L2 writing, but also on multilinguals’ L2 vis-à-vis their L3 writing.

However, the attempt to explain and understand this complex nature of language interplay in multilinguals’ composing revealed the deficiency of the traditional method that isolates factors in order to look for causality. Variables such as language proficiency, linguistic academic environment, and writing expertise, found to affect language use and L-S in L2 writing (e.g., Qi, 1998; Wang, 2003; Wang & Wen, 2002; van Weijen et al., 2009) failed to explain the dynamic and heterogeneous nature of the interplay of languages in these multilinguals’ L2/L3 composing processes. When faced with intra-group differences and intra-individual variations in language use manifested in L3 writing, I found it useful to focus on interconnectedness and change and explore the phenomena through the lens of complexity theory. As Larsen-Freeman (2011) observes, “because everything is interconnected, it is problematic to sever one component from the whole and single it out for examination. By doing so, one is likely to get findings that do not hold up when the whole is considered” (p. 60). Hence, the focus of the study moved...
from investigating isolated variables to examining “interconnecting and self-organizing systems that co-adapt” (Larsen-Freeman, 2008b, p. 203).

Thus, the findings related to multilinguals’ L2 composing served as a springboard for identifying the elements of the dynamic model of multilingual writing put forth and explained in the previous chapter. It should be noted that complexity theory was not used in this study for exploring multilinguals’ L2 writing due to the foci of the research questions and insufficiency of data to detect changes in language use in L2 composing. However, it provided the framework for identifying and comparing L2/L3 writing patterns, which opened up “ways to access the relational nature” (Larsen-Freeman, 2008b, p. 206) of the phenomena under investigation. Thus, instead of presenting a taxonomy of single, fixed factors that might have influenced language use and L-S in the multilinguals’ L3 writing, the goal was to depict the dynamic interrelatedness among the components of the writing system in order to discover writers’ specific configurations that brought about patterns of change.

Furthermore, adopting the complexity theory approach helped to conceive of L2/L3 writing activity as a complex dynamic system sensitive to writer’s initial conditions and consisting of components which are complex dynamic subsystems themselves. Consequently, a dynamic model of multilingual writing activity was put forward. It identifies four subsystems and their elements (i.e., engagement and management of the writing activity, emerging text, and linguistic resources). Detailed analysis of the participants’ writing activity systems implies that each writer’s composing in the moment arises out of the interactions among the parts of writing system at different levels and timescales.
For instance, a synchronic analysis of the data shows how a small change in writing goals could incite a process of coadaptation leading to changes in interrelationships among the parts of the system (evident in changes in language use and L-S) and the writing process as a whole. In addition, although the complexity theory approach embraces unpredictability, it also focuses on understanding multilinguals’ writing process and the interplay of languages by identifying and tracing patterns of language use and L-S within a writing activity and how they develop over time. Nevertheless, the proposed writing model should not be considered as universal and rigid, but rather as what Larsen-Freeman & Cameron refer to as “particular generalization” (2008b, p. 203). Namely, it offers the possibility to depict and map each writer’ dynamic configurations at various levels and timescales, which would then capture the mechanisms related to how changes in interactions of the parts generate emergence of new writing patterns. It reveals the writing system of each learner as characterized by the idiosyncratic nature of interrelationships among its components. For instance, while language typology did not play an important role in the dynamics of M’s and B’s L3 writing system with regard to language use and L-S, this element contributed to a change in the constituent elements of the other participants’ systems at that particular timescale.

Thus, the study provides evidence that multilinguals’ writing is a complex, interconnected, interdependent, dynamic, open, and adaptive system (Jessner, 2008, Larsen-Freeman & Cameron, 2008a).

6.7 Contributions and Implications of the Study

The present study sought to contribute to the fields of SLW and TLA and to the discussions about language use and switching between languages during the composing
processes. Concurrently, it draws attention to the needs and characteristics of multilingual writers, which would, in turn, broaden the scope of L2 writing research. This dissertation represents an effort to fill in the gap that exists in L2 writing research with regard to multilinguals’ writing and the dynamics of language use in their L2 and L3 composing processes. Hence, the findings provide evidence for the significance of the study in relation to theory, research, and educational practices.

The complexity theory approach is a novel approach to SLA and L2 development put forward by Larsen-Freeman (1997, 2006, 2011) and further developed by Larsen-Freeman & Cameron (2008a, 2008b). The present study is probably the one of the first in L2 writing literature to examine multilinguals’ composing process, and in particular, language use and L-S, through the lens of the complexity theory approach. It should be emphasized here that complexity theory is to be seen as an alternative way to explore L2/L3 writing and the intricacy of language use, and not as an attempt to substitute for or replace other approaches and their methodologies.

To elaborate on the comment above, first, the complexity theory approach offers an alternative way of conceiving of writing, in particular multilingual writing and writers. Namely, writing is seen as a complex, dynamic, open, adaptive, nonlinear system that includes particular characteristics of the writer, writing process, text, and language resources as its core elements. Thus, writing emerges out of the interactions among and the interconnectedness of its parts in such a way that, to paraphrase Kramsch (2002), you cannot tell the writer from the writing. From this perspective, the dynamic approach to writing differs greatly from other approaches that view writing as hierarchically
organized cognitive processes and the writer as an agent who monitors and controls the writing activity.

Second, the proposed model of multilingual writing draws on complexity theory. Moreover, the findings of this study support the application of such a complex dynamic model to the investigation of L2/L3 writing. Applying the complexity theory approach was an attempt to overcome some of the limitations of the existing L2 writing models (see chapter 2) in order to provide a more detailed picture of multilingual writing. One of the major differences with these models is that present one identifies not single, isolated factors but components of a complex system, which are dynamically interconnected, in constant flux, each modifying and coadapting to the others, and influencing each other across levels and timescales. In addition, the model does not separate the writer from his/her background, thus, it does not postulate a monitor which constraints the writer as s/he selects and controls the use of languages. On the contrary, it includes the characteristics of the writer and the writing process as dynamically interconnected elements of a writing system that constitutes a whole. Therefore, the dynamic model of multilingual writing put forth in this study places emphasis not on the parts of the system, but rather on the continuously changing interrelationships among them. This in turn alters the conventional approach to explaining patterns of language use and L-S by reducing the whole into its parts. Furthermore, the proposed model makes it possible to go beyond the linearity of the cause-effect approach to investigate L2/L3 writing and, in particular, explain how writers make use of their languages and switch among them during the composing process.
Moreover, the proposed model takes into consideration writers’ development of language proficiency by including all languages in their repertoire as part of the writing system and seeing them as interconnected language subsystems in constant flux. As a complex dynamic system, the multilingual writing system operates at different levels and across different timescales, which could further shed light on how writing patterns change or new ones emerge because activity on one level and scale influences what happens on other levels and scales, with phenomena sometimes emerging at a particular level or scale as a result of activity at a lower level or in an earlier period, it is important when we are conducting research within a complex systems approach that we seek to find relationships within and across different levels and timescales (Larsen-Freeman, 2008b, p. 205).

Nevertheless, what could be seen as a limitation in the conventional sense of the term is that, contrary to the traditional view of theory of L2 writing as being able to predict outcomes, the complexity theory approach embraces unpredictability. That is, outcomes would be difficult to anticipate due to the nonlinearity of the system and its dependency on the initial conditions.

Briefly, the proposed dynamic model provides more pieces to the puzzle of multilingual writing, namely, how writing unfolds at a particular level and timescale and how patterns of interactions of the system parts emerge, develop and change. It helped to understand how new language use patterns emerged, and the mechanisms by which writers and writing adapted to new paths of language use and L-S during the composing process.

Furthermore, the present study has several implications for enriching L1 and L2 writing research. It broadens the scope of investigation by exploring the composing
processes of learners literate in three languages. Additionally, it develops further interest into language use and L-S during the composing process and expands it in the context of multilingual writing. Based on the findings of the present study, it could be argued that when another language becomes a part of the L2 writing system, it alters not only the other components of the system and their interconnectedness, but also the writing process as a whole. This in turn brings about qualitative and quantitative changes in the L2 writing process. Moreover, although the focus of the present study has been language use and L-S, findings suggest that bilinguals’ and multilinguals’ writing differs in a number of ways, which points to a distinct nature of multilinguals’ writing. In addition, the study contributes to research exploring language use and L-S by identifying conditions that create a favorable environment for L1, L2, and L3 use and L-S to emerge.

This study called attention to multilingual writers and the way they used all languages in their repertoire in L2 and L3 composing. Nowadays, more teachers and educators in the USA face learners with diverse linguistic and cultural background (Harklau, cited in Matsuda et al., 2003). Therefore, implications can be drawn as regards SL/FL methodology, pedagogy, and educational policy. The findings point to the distinct nature of multilingual writing as opposed to bilinguals’ writing with respect to the use of their languages in L2 and L3 composing. In addition, the participants’ reflections reveal their positive attitude towards L-S, and a clear sense about the role of their languages in the writing process. Hence, the study implies a need for teachers to take into consideration students’ multicultural and multilingual background and base pedagogical L2/L3 writing practices on a multilingual approach (Gorter & Cenoz, 2011) to writing and writers. Furthermore, understanding differences between L2 and L3 writing is
crucial for addressing L3 writers’ special needs. Consequently, FL/SL teachers and educators should consider various strategic, discourse, and linguistic practices aimed at developing relationships among language systems instead of isolating them. For instance, conceptualizing language choice and L-S as a resource for an effective L2/L3 composing process would incite teachers to encourage students to use all of their languages in the planning stage, for generating ideas, searching for lexical items, revising, and so forth. Additionally, the view of writing as a complex dynamic system implies dynamic interrelationships between languages which may call into question traditional pedagogical practical issues, such as advising L2/L3 learners to think only in the TL while composing.

Undoubtedly, more studies are needed in order to help scholars, teachers, and students to gain a better understanding of whether L-S should be encouraged and, if so, in what specific situations or contexts. Findings from recent research point to large beneficial effect of multilingual interaction “on the development of creativity, identities, and criticality.” (Gorter & Cenoz, 2011, p. 444)

6.8 Limitations and Suggestion for Future Research

The present study investigated the nature of language use and switching between languages in the L2 and L3 composing of six learners of a third FL. Thus, as an exploratory case study, it provides data with moderate statistical power and its results could not be generalized to a larger target multilingual population. In addition, although D’s L1 and L2 background and learning experiences differ slightly from that of S and B, a decision was taken to include her in the SL group because of her level of L1 and L2 proficiency and of her experiences of learning an L2 in a bilingual environment.
Nevertheless, it should be acknowledged these differences might have affected the results of the study.

Therefore, in terms of future research, one project could be to investigate the research questions with a larger number of participants in order to increase the power of the statistical tests. Furthermore, while the present work attempted to shed light on the dynamic interrelationships among languages in multilinguals’ writing, it was limited with respect to the specific level of participants’ L2 and L3 proficiency, writing expertise, language cognateness, writing genre, and writing tasks context. Concerning the latter, it should be acknowledged that the same writing prompt and the relatively short period (two weeks) between the completion of the first and the second writing task represent another limitation of the study. Undoubtedly, other options for exploring multilinguals’ L2 and L3 writing could include completing two or more writing task on different topics and across broader timescales. A future study of this kind would provide further information about multilinguals’ language use and enrich this study’s conclusions. Taking into consideration the lack of concern with the needs of FL and multilingual writers in educational settings, and in light of the current gap in the L2 writing literature with regard to the latter, it would be worthwhile to investigate as well the dynamics of languages at various levels (i.e., larger group/classroom level). Studies within this line of research would further illuminate our understanding of multilingual writing.

In addition, in order to go beyond the limitations of the present study, the same issues could be explored by taking into account various variables such as age, language groups, level of proficiency in L1, L2, and L3, writing genre and level of task difficulty, language typology, and discourse situations.
Furthermore, while the present study’s findings suggest that choice of languages, their role and use, and L-S patterns change in the course of a writing activity or from one writing activity to another, more research is needed to examine language use and L-S patterns and their context of emergence as well as the specific configuration of the writing activity subsystems that led to these changes.

Additionally, the findings did not imply specific relationships between writers’ language use and L-S and their voice and identities. Hence, future studies should address these issues since, as Hirvela & Belcher (2001) assert:

[W]e need to better understand the already existing voices and identities of the multilingual writers we research and teach as well as the process of voicing they may be undergoing. We need greater emphasis on trying to locate the writerly person, the identities and self-representations, “behind the written words” of our students if we are to assist them meaningfully in their voicing. (p. 105)

This mixed-method study calls attention to a need for multimodal inquiry and methodology (Silva, 2005) by employing a variety of sources, such as TAPs, stimulated recalls and retrospective interviews, background questionnaires, written texts, logfiles, and field notes. However, it is well known that any given technique might have its limitations. For instance, methodological flaws concerning the use of retrospective interviews and verbal protocols were discussed in Chapter 3. Although additional sources such as video-recordings, logfiles, field notes, and stimulated recalls were used with the aim to compensate for some of the limitations of the think-aloud method, without doubt the inability to register every single semiotic (including linguistic) sign that comes to a writer’s mind during composing have influenced the study’s results. Hence, future research should not shy away from exploring new research designs and various methodologies that would enrich our understanding of multilinguals’ writing. The
present study offered an alternative approach to investigating the dynamics of relationships among languages, viewing writing as a complex dynamic system, thus advocating the idea that future research in L2 and multilingual writing should be open to embracing multimodal inquiry paradigms (Silva, 2005).

To conclude, in light of the exploratory nature of the present research and its above-discussed limitations, the findings should be interpreted with caution. Therefore, further studies are needed to confirm or reject the conclusions put forth in this paper, to recognize the potential of complexity theory approach to writing, and to test the multilingual writing model in order to capture in more detail and map the kaleidoscopic nature of L2/L3 writing.
Endnotes:
1 Foucault, M. (1971, p. 162). *Dits et écrit*. “I don't write a book so that it will be the final word; I write a book so that other books are possible, not necessarily written by me.” Transl. by O'Farrell, (2005, p. 9).
2 As already discussed, Cohen & Brooks-Carson (2001) reported that L3 learners (with L2 as ESL) thought less in L1 than in L2 while writing in L3.
3 Jessner (2005, 2008) investigated multilinguals’ use of L1 and L2 during the L3 writing process but only for metalanguage.
4 One SL participant used L3 to greet the intended readers in the beginning and the end of her post (i.e., writing task in L2).
5 In the context of the present work bilinguals and multilinguals are viewed as individuals literate in, respectively, two and three or more languages (see Chapter 1).
6 Jones & Tetroe’s (1987) conclusions are limited to the planning stage of the writing process.
7 The three studies that have investigated specifically L-S in L2 writing are Qi’s (1998), Woodall’s (2002), and Wang’s (2003). However, the latter presents only the mean percentage of L-S sequences.
8 Five of the participants were U.S. college students and one participant was an exchange student from a French university.
References


Silva (Eds.), *Research on second language writing: Perspectives in the process of knowledge construction* (pp. 3-15). Mahwah, NJ: Lawrence Erlbaum Associates.


Appendix A: Instructions for the Writing Task

Instructions: Thank you for participating in my research designed to investigate how foreign language learners write compositions. In this experiment I am interested in what you think aloud when you write, that is, everything you would say to yourself silently and in any language while you think and write. Don’t try to explain your thoughts. Just speak to yourself as if you were alone.

Writing task: You have 30-40 minutes to write a 250-300 words. Please feel free to stop anytime when you think your assignment is completed.
Appendix B : Background Questionnaires

1. Background Questionnaire for ESL participants

Thank you for agreeing to participate in this study. For my research I would like to know more about you, your language learning and writing experiences. Please answer the following questions as completely as possible.

1. About yourself.
   i. Participant Research Number:
   ii. Your age:
   iii. Your gender: MF
   iv. Your native country:
   v. Length of time in the USA:
   vi. Number of semesters of university study (in the USA) completed.
   vii. Your major and minor:
   viii. Have you ever studied at a school/university outside the USA? Please explain.

2. About your language learning experience:
   i. Indicate the language that you consider to be your native (L1).
   ii. Have you had formal education in your native language? When? Where?
   iii. Currently how do you use your native language in your personal and academic life? Please give details.
   iv. What are your reasons for using/not using your native language?
   v. Indicate the language that you started to learn as a second/foreign (L2) and since when have you been studying it?
   vi. When and what L2 courses have you taken
      a/ at school?
      b/ at the university?
vii. Currently how do you use your second language in your personal and academic life? Please give details.
viii. What are your reasons for using/not using your second language?
ix. Indicate the language that you started to learn as a third/foreign (L3) and since when have you been studying it?
x. When and what L3 courses have you taken
   a/ at your school?
   b/ at your university?
xi. Currently how do you use your third language in your personal and academic life? Please give details.
xii. What are your reasons for studying a third language?
xiii. In the languages you know how would you evaluate your oral proficiency compared with other people around you?
   1. Novice level
   2. Intermediate level
   3. Advanced level
   4. Superior level
   5. Native-like
   L1 ____   L2 ____   L3 ____
xiv. In the languages you know how would you evaluate your writing proficiency compared with other people around you?
   1. Novice level
   2. Intermediate level
   3. Advanced level
   4. Superior level
   5. Native-like
   L1 ____   L2 ____   L3 ____
3. About your writing experience
   i. What kinds of writing in your native language (L1) do you do on an everyday basis and/or for your coursework? Check as many as apply.
      essays/papers
      journal writing
      creative writing
      emails
taking notes
other (please specify)

ii. How much do you enjoy writing in your L1?

Not at all
Very much
1  2  3  4  5

iii. Which of the following writing activities do you do in your second language (L2) on an everyday basis and/or for your coursework? Check as many as apply.

- essays/papers
- journal writing
- creative writing
- emails
- taking notes
other (please specify)

iv. How much do you enjoy writing in your L2?

Not at all
Very much
1  2  3  4  5

v. Which of the following writing activities do you do in your third language (L3) on an everyday basis and/or for your coursework? Check as many as apply.

- translating individual sentences from L1/L2 into L3 and/or vice-versa
- completing grammatical activities
- writing dialogues in L3
- writing essays/papers of more than one paragraph
- taking notes
other (please specify)

vi. How much do you enjoy writing in your L3?

Not at all
Very much
1  2  3  4  5
2. Background Questionnaire for FL Participants

Thank you for agreeing to participate in this study. For my research I would like to know more about you, your language learning and writing experiences. Please answer the following questions as completely as possible.

1. About yourself.
   i. Participant Research Number:
   ii. Your age:
   iii. Your gender: MF
   iv. Your native country:
   v. Number of semesters of university study (in the USA) completed:
   vi. Your major and minor:
   vii. Have you studied in another country? Please explain.

2. About your language learning experience:
   i. Indicate the language that you consider to be your native (L1).
   ii. Currently how do you use your native language in your personal and academic life? Please give details.
   iii. Indicate the language that you first started to learn as a foreign (L2)?
   iv. When and what L2 courses have you taken
      a/ at your school?
      b/ at your university?
   v. What are (were) your reasons for studying that foreign language (your L2)?
   vi. Currently how do you use your L2 in your personal and academic life? Please give details.
   vii. Indicate the language that you started to learn as a second foreign (your L3) and since when have you been studying it?
   viii. When and what L3 courses have you taken
        a/ at your school?
        b/ at your university?
   ix. What are your reasons for studying a third language?
x. Currently how do you use your third language in your personal and academic life? Please give details.

xi. In the languages you know how would you evaluate your oral proficiency compared with other people around you?
1. Novice level
2. Intermediate level
3. Advanced level

L1 ___ L2 ___ L3 ___

xii. In the languages you know how would you evaluate your writing proficiency compared with other people around you?
1. Novice level
2. Intermediate level
3. Advanced level

L1 ___ L2 ___ L3 ___

3. About your writing experience
   i. What kinds of writing in your native language (L1) do you do on an everyday basis and/or for your coursework? Check as many as apply.
      essays/papers
      journal writing
      creative writing
      emails
      taking notes
      other (please specify)
   ii. How much do you enjoy writing in your L1?
      Not at all                      Very much
      1   2   3   4   5
   iii. Which of the following writing activities do you do in your second language (L2) on an everyday basis and/or for your coursework? Check as many as apply.
      essays/papers
      translating individual sentences from L1/L2 into L3 and/or vice-versa
completing grammatical activities
taking notes
journal writing
creative writing
emails
other (please specify)
iv. How much do you enjoy writing in your L2?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

v. Which of the following writing activities do you do in your third language (L3) on an everyday basis and/or for your coursework? Check as many as apply.

- translating individual sentences from L1/L2 into L3 and/or vice-versa
- completing grammatical activities
- writing dialogues in L3
- writing essays/papers of more than one paragraph
- taking notes
- other (please specify)

vi. How much do you enjoy writing in your L3?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Appendix C : Writing Prompts

1. Writing Task 1
1.1 Writing prompt in L2 for FL group (translated into English).
Recently you decided to create a blog for Italian-speaking students at your university.
You have set up your new blog design and now you are writing in Italian your initial weblog post in which you:
1. you introduce your blog, the reasons for creating it, and its goals;
2. you introduce yourself, talk about your studies, interests, and passion for languages and cultures;
3. you recount the most important event in your life that has influenced your decision to study French/Spanish.
4. Finish your first post by inviting your readers to visit your blog.
You have 30-40 minutes to write your post limited to 250-300 words.

1.2 Writing prompt in L2 for SL group.
As an international student at the University you decided to create a blog for the international students. You have set up your new blog design and now you are writing in English your initial weblog post in which:
1. you introduce your blog, the reasons for creating it, and its goals;
2. introduce yourself, talk about your studies, interests, and passion for languages and cultures;
3. recount the most important event in your life that has influenced your decision to study English.
4. Finish your first post by inviting readers to visit your blog.
You have 30-40 minutes to write your post limited to 250-300 words.
2. Writing Task 2 and Task 3

2.1 Writing prompt in L2/L3 (in Italian).
Recemmente voi avete deciso di creare un blog dedicato agli studenti universitari italiani della vostra università. Voi avete realizzato il modello del vostro nuovo blog e adesso iniziate a scrivere in italiano il vostro primo post in cui:
1. vii presentate il vostro blog, il perchè della sua realizzazione e i suoi obiettivi;
2. vi presentate, parlate di vostri studi all’università, dei vostri interessi e la vostra passione per le lingue e culture straniere;
3. vi raccontate il più importante evento della vostra vita che ha influenzato la vostra decisione di studiare italiano.
4. concludete il vostro primo post invitando i vostri lettori a visitare il vostro blog.
Voi avete 30-40 minuti per scrivere il vostro post (250-300 parole).

2.2 Writing prompt in L3 for FL and SL groups (translated into English).
Recently you decided to create a blog for Italian-speaking students at your university.
You have set up your new blog design and now you are writing in Italian your initial weblog post in which:
1. you introduce your blog, the reasons for creating it, and its goals;
2. introduce yourself, talk about your studies, interests, and passion for languages and cultures;
3. recount the most important event in your life that has influenced your decision to study French
4. Finish your first post by inviting your readers to visit your blog.
You have 30-40 minutes to write your post limited to 250-300 words.
## Appendix D: Language Use in Participants’ TAPs: Raw Data

### Table D.1. Total number of words in the three writing tasks

<table>
<thead>
<tr>
<th>Gender</th>
<th>Participant</th>
<th>Task 1 (L2)</th>
<th>Task 2 (L3)</th>
<th>Task 3 (L3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L1</td>
<td>L2</td>
<td>L3</td>
</tr>
<tr>
<td>FL</td>
<td>M</td>
<td>1096</td>
<td>773</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>1646</td>
<td>1352</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>1374</td>
<td>1295</td>
<td>25</td>
</tr>
<tr>
<td>SL</td>
<td>B</td>
<td>47</td>
<td>4394</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>94</td>
<td>1252</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>100</td>
<td>1361</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: 1. The total number (N) of words includes two L4 words; 2. The total N of words in the TAP includes only the first final rereading of the written text when revisions have been made; 3. One word has been identified as a mixture of the three languages and therefore not counted as neither L1, L2, L3.

### Table D.2. Direction and total number of L-S in the three writing tasks

<table>
<thead>
<tr>
<th>Participant and task</th>
<th>L-S Frequency</th>
<th>Direction of L-S</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total N</td>
<td>L1→L2</td>
</tr>
<tr>
<td>1. M/Task 1</td>
<td>191</td>
<td>191</td>
</tr>
<tr>
<td>M/Task 2</td>
<td>239</td>
<td>0</td>
</tr>
<tr>
<td>M/Task 3</td>
<td>244</td>
<td>2</td>
</tr>
<tr>
<td>2. A/Task 1</td>
<td>262</td>
<td>248</td>
</tr>
<tr>
<td>A/Task 2</td>
<td>147</td>
<td>2</td>
</tr>
<tr>
<td>A/Task 3</td>
<td>58</td>
<td>2</td>
</tr>
<tr>
<td>3. H/Task 1</td>
<td>446</td>
<td>404</td>
</tr>
<tr>
<td>H/Task 2</td>
<td>387</td>
<td>30</td>
</tr>
<tr>
<td>H/Task 3</td>
<td>436</td>
<td>30</td>
</tr>
<tr>
<td>4. B/Task 1</td>
<td>70</td>
<td>58</td>
</tr>
<tr>
<td>B/Task 2</td>
<td>168</td>
<td>10</td>
</tr>
<tr>
<td>B/Task 3</td>
<td>136</td>
<td>11</td>
</tr>
<tr>
<td>5. D/Task 1</td>
<td>96</td>
<td>70</td>
</tr>
<tr>
<td>D/Task 2</td>
<td>110</td>
<td>18</td>
</tr>
<tr>
<td>D/Task 3</td>
<td>186</td>
<td>43</td>
</tr>
<tr>
<td>6. S/Task 1</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>S/Task 2</td>
<td>143</td>
<td>6</td>
</tr>
<tr>
<td>S/Task 3</td>
<td>58</td>
<td>5</td>
</tr>
</tbody>
</table>

Note: 1. L-S is measured in number of occurrences; 2. The participant switched once between L1→L4 and L4→L1.