

L1 ATTRITION: GERMAN IMMIGRANTS IN THE U.S.

by

Tina Badstübner

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DEDICATION

Für meine Eltern

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ABSTRACT

L1 attrition – which in the context of this study is defined as the decline of any native language skill (or portion thereof) in a healthy bilingual speaker (Ecke, 2004) – has been studied extensively for several decades. However, only few studies have examined the native speech of immigrants who use their L1 for professional purposes, such as language instructors (Isurin, 2007; Major, 1992; Porte, 1999, 2003). Furthermore, no research has been conducted comparing the L1 speech of such individuals with that of individuals who do not use their L1 for professional purposes. This study analyzed and compared L1 speech samples from two populations of German immigrants in the U.S., German Instructors and Other Professionals, and from a monolingual control group in Germany. It was hypothesized that German instructors may be less vulnerable to L1 attrition due to more frequent L1 use, a higher motivation to maintain the L1, and greater identification with the native language and culture. Data elicited through verbal fluency tasks, a film retelling task, a semi-structured interview, and a sociolinguistic questionnaire revealed significant differences between the control group and the two bilingual groups which point to L1 attrition (primarily as an access problem) in the bilingual speakers. The data also revealed significant differences between the German Instructors and the Other Professionals, suggesting that the severity of L1 attrition is not the same for all populations. In addition, a comparison of the two bilingual groups with regard to sociolinguistic variables, and correlations between linguistic measures and sociolinguistic variables also yielded interesting findings which have implications for L1 attrition research as well as L1 maintenance.

CHAPTER 1: INTRODUCTION

Rather than being a curse,
losing one's first language
is a clear manifestation of
how remarkably human
beings can adapt to
different situations.

(Major, 1993)

1.1 General Introduction

The phenomenon of first language loss or L1 attrition, which refers to the decline of any native language skill (or portion thereof) in a healthy bilingual speaker (cf. Ecke, 2004), has been under investigation for quite some time, but it was not until 1982 when “Loss of Language Skills,” a conference at the University of Pennsylvania (proceedings published in Lambert & Freed, 1982), marked the beginning of more extensive research in this field. Since then, a substantial amount of research has been carried out, investigating L1 attrition (for a comprehensive overview see Schmid, 2004c), and contributing extra- and intralinguistic factors. Apart from length of residence (e.g., De Bot, Gommans & Rossing, 1991), the amount of L1 attrition has been frequently attributed to factors such as the amount of L1 use and L1 contact (e.g., De Bot, Gommans & Rossing, 1991; De Leeuw, Schmid & Mennen, 2010; Hulsen, 2000; Schmid, 2007), motivation and effort to maintain the L1 (e.g., Ben-Rafael & Schmid, 2007, Major, 1993; Olshtain & Barzilay, 1991), and speaker identity (e.g., Hulsen, 2000; Major, 1993; Marx, 2002; Schmid, 2002, 2004b; Yağmur, 1997).

Based on the findings of previous quantitative as well as qualitative L1 attrition research, one may conclude that individuals who are motivated to maintain their native language, strongly identify with their native country and culture, and use their L1 with great frequency may be less likely to lose their native language. However, an alternative hypothesis could be that individuals with a great amount of L1 contact and L1 use – and especially those individuals who constantly alternate between their two languages which are simultaneously activated – may be prone to experience greater L1 attrition. In order to investigate which one of these two hypotheses is accurate, it is important to examine the native speech of individuals who fulfill these criteria. One group of immigrants to fit this profile, are language instructors who teach their native language at U.S. institutions of secondary and higher education.

1.2 L1 Attrition in Language Instructors

Unfortunately, only very few studies have investigated individuals who teach their native language at institutions of secondary and higher education. Being the first to examine the speech of language instructors, Major (1992) looked for phonetic deviations in the native speech of EFL teachers and administrators in an English language institute in Brazil and found that “despite strong personal and professional reasons for wanting to maintain English, all of the subjects suffered some loss of English” (p. 200).

EFL teachers were also the participants in two research studies conducted by Porte (1999, 2003). In an exploratory study, Porte (1999) surveyed 52 native-speaker EFL teachers residing in Spain in order to learn about their amount of L1/L2 contact and

the extent to which they perceived their L1 to be affected by attrition. The data revealed that the EFL teachers recognized that their native language was susceptible to change and attrition and that they experience doubts regarding correctness when evaluating student essays. The findings from this exploratory study prompted Porte (2003) to conduct an experimental study with three EFL teachers in Spain who participated in guided group discussions. The data from these discussions showed deviant forms mainly in the lexicon, i.e., L2 nouns and nominal groups were incorporated into the L1 speech.

In a recent study, Isurin (2007) examined the native speech of Russian graduate students teaching Russian at a U.S. university and the data – elicited via interviews and a grammaticality judgment task – revealed numerous instances of lexical and grammatical deviations. She concluded that the speakers' control over their L1 skills may diminish despite “an extensive exposure to the L1 in the second language (L2) environment and motivation to keep it intact due to a high professional demand” (p. 357).

1.3 Stating the Problem

The research outlined above has yielded interesting findings regarding the native speech of language instructors teaching their native language at institutions of secondary and higher education. However, no research has been conducted comparing the L1 speech and the amount of L1 attrition or crosslinguistic effects in individuals who use their native language for professional purposes – such as language instructors – with that of individuals who do not. Such a comparison is of great interest as one could hypothesize that native language instructors are less vulnerable to L1 attrition as they use their L1 on

a daily basis – or at least with great frequency – and are exposed to large amounts of L1 input, may strongly identify with and have positive attitudes towards their native language, country and culture, and may have a vested interest in maintaining their L1. But does this hypothesis hold true?

1.4 Purpose of this Study

In order to investigate this question, this study examined and compared the L1 speech of German immigrants who work as language instructors at U.S. institutions of secondary and higher education with the L1 speech of German immigrants who work in fields other than language teaching. In addition, the native speech of these two groups was compared to that of a monolingual (or minimally bilingual) control group in Germany.

The data were elicited through phonetic and semantic verbal fluency tasks, the Chaplin film retelling task, a semi-structured, face-to-face interview, and a sociolinguistic questionnaire. The data obtained were analyzed in order to shed light on potential differences between the three groups with regard to phonetic and semantic verbal fluency, lexical diversity, error rates and error types, as well as sociolinguistic variables such as L1 use, L1 interlocutor type, L1 input, motivation to maintain the L1, and identity and attitudes towards the native language, country and culture.

In addition to examining differences between the groups, this study also tested potential relations between the linguistic measures (phonetic and semantic verbal fluency scores, lexical diversity measures and error rates) and the sociolinguistic variables.

1.5 Research Questions

The data collection and analyses were guided by following research questions:

- (1) What are the participants' phonetic and semantic verbal fluency scores, and how do the data from the three groups under investigation (Control Group, German Instructors, and Other Professionals) compare?
- (2) What is the amount of lexical diversity in the participants' speech samples, and how do the data from the three groups compare?
- (3) What are the participants' error rates, and which error types occur in the spontaneous speech data? How do the data from the three groups compare?
- (4) Do the two bilingual groups (German Instructors and Other Professionals) differ with respect to sociolinguistic variables (amount of L1 use, contact and input, motivation to maintain the L1, and identity and attitudes towards the native language, country and culture)?
- (5) Do the bilingual participants' linguistic measures (phonetic and semantic verbal fluency scores; lexical diversity measures, and error rates from the film retelling and the interview) show correlations with the sociolinguistic variables (length of residence, amount of L1 use, L1 interlocutor type, L1 input; motivation to maintain the L1; and identity and attitudes towards the native language, country and culture)?

1.6 Outline of the Dissertation

This dissertation on L1 attrition in German immigrants in the U.S. is organized as follows: In Chapter 2, literature relevant to the topic and research questions is reviewed, theoretical considerations and definitions are discussed, and findings of previous research studies are presented. Chapter 3 provides a detailed description of the design and methodology of this study including information on the participants and the procedures for data collection, transcription, coding, and statistical analysis. Chapter 4 presents the quantitative and qualitative findings of the study, and Chapter 5 interprets these findings in light of previous research and answers the five research questions. In Chapter 6, the research questions are revisited, findings are summarized, and the implications of the study are discussed. The dissertation concludes with a critical look at the limitations of this study and suggestions for future research followed by some concluding remarks.

CHAPTER 2: REVIEW OF THE LITERATURE

After a brief definition of the concepts of language attrition and L1 attrition, findings of previous L1 attrition research relevant in the context of this dissertation are presented. This chapter is divided into two main parts: linguistic and sociolinguistic variables. The part on linguistic variables outlines research findings regarding verbal fluency, lexical diversity, transfer, interference and crosslinguistic influence as well as code-switching which can be considered to be linguistic manifestations of L1 attrition. In the part on sociolinguistic variables, theoretical considerations regarding L1 use, contact and input, motivation and attitudes, and issues of identity are discussed and research findings regarding the effect of these factors on L1 attrition, i.e., their potential to slow down the L1 attrition process, are presented.

2.1 Defining L1 Attrition

Language attrition is generally defined as the non-pathological decline of language proficiency of an individual or of a group of speakers. Depending on the language lost and the environment in which the loss occurs, four types of language attrition can be distinguished: 1) L1 loss in an L1 environment (e.g., L1 attrition in aging individuals), 2) L1 loss in an L2 environment (e.g., L1 attrition in immigrants), 3) L2 loss in an L1 environment (e.g., L2 attrition in repatriates, former L2 students), and 4) L2 in an L2 environment (e.g., L2 attrition in aging immigrants) (cf. De Bot & Hulsen, 2002; De Bot & Weltens, 1991). This dissertation investigated L1 loss in an L2 environment, which

according to Seliger (1991) is “an ubiquitous phenomenon found wherever there is bilingualism.”

L1 attrition refers to the situation in which a bilingual speaker’s first language deteriorates due to “a change in linguistic behavior and environment due to a severance of the contact with the community in which the language is spoken, in interaction with an increase in the use of a second language” (Schmid, 2009a, p. 171). L1 attrition can therefore be understood as a process in which a combination of crosslinguistic interference and lack of L1 input conspire to cause a change or erosion in the linguistic performance of the L1 which had been fully acquired and used before the onset of bilingualism (cf. Schmid, 2009a). Since L1 attrition is a form of language change caused by a break with the L1 community and the restricted use of L1, “the linguistic evolution of the immigrant [...] is no longer concurrent with the evolution in the ‘home’ community” (Jaspaert & Kroon, 1989, p. 81). Consequently, the occurring language change can potentially lead to potential communicative problems between immigrants and the speech community they belong to. According to Seliger (1996), L1 attrition can manifest itself as

(1) the ability to recall a meaning shared by both the L1 and the L2 but only being able to retrieve the L2 lexical item [...]; (2) rule reordering or simplification in the morphophonemics of the L1 [...], or the inability to inflect in accordance with previously acquired morphology, or not being aware that incorrectly inflected morphology is deviant where previously the speaker inflected in accordance with the L1 grammar [...]; (3) the acceptance of syntactically deviant sentences and the ‘correction’ of syntactically grammatical sentences. (p. 606)

2.2 Linguistic Effects of L1 Attrition

L1 attrition can manifest itself in a number of different ways. The L1 speech of an individual affected by L1 attrition may be characterized by linguistic phenomena such as reduced verbal fluency and decreased lexical diversity, transfer, interference and crosslinguistic influence as well as situationally inappropriate code-switching.

2.2.1 Verbal Fluency

2.2.1.1 Verbal Fluency in Bilingual Speakers

Verbal fluency and a potential reduction in verbal fluency have frequently been studied in bilingualism research. For example, Rosselli et al. (2000) examined the verbal fluency of 19 older Spanish-English bilinguals and compared it to that of 45 English and 18 Spanish monolinguals of roughly the same age. The data were elicited through verbal fluency tasks using the phonetic categories *F*, *A*, and *S* and the semantic categories animals and fruits. Statistical analyses demonstrated that while monolingual and bilingual participants' performed equally in the phonetic verbal fluency tasks, their performance on the semantic verbal fluency tasks was significantly different, i.e., the bilingual speakers produced significantly fewer words than the monolingual speakers. Rosselli et al. (2000) attributed this difference in semantic verbal fluency to crosslinguistic interference which is greater when concrete nouns have to be recalled as it is the case with semantic categories as opposed to phonetic categories which allow for non-concrete words to be named.

In order to test whether Rosselli et al.'s (2000) findings and their hypothesis regarding crosslinguistic interference can be generalized, Gollan, Montoya and Werner (2002) conducted a study which focused on the verbal fluency of younger participants and included a larger number of categories (ten phonetic, twelve semantic, and two proper name categories). A comparison of the verbal fluency data from thirty Spanish-English bilinguals and thirty English-speaking monolinguals revealed that bilingual participants produced significantly fewer responses than monolingual participants on both, phonetic and semantic, categories. In addition, statistical analyses showed that the magnitude of difference between monolinguals and bilinguals was more than twice as large on semantic categories, which seems to support Rosselli et al.'s (2000) hypothesis which assumes crosslinguistic interference.

However, since not all of Gollan, Montoya and Werner's (2002) findings are consistent with the account of crosslinguistic interference, they also consider the possibility of weaker S-to-P connections which suggests that each language system in a bilingual is supported by weaker links connecting the concept to the word, i.e., connecting the semantic to the phonological representation. Because only semantic fluency requires S-to-P connections, phonetic fluency should not be affected. This is supported by Rosselli et al.'s (2000) data but contradicted by Gollan, Montoya and Werner's (2002) findings. Therefore, Gollan, Montoya and Werner suggest that "even the letter fluency task requires the use of S-to-P connections to some extent" as "it may not be possible to produce words spontaneously without at least some activation (and use) of semantics" (p. 572) and support their claim with examples of strings of semantically

related clusters of words produced in the phonetic verbal fluency tasks. Examples for such semantically related clusters of words are *soccer*, *softball*, and *swimming* (different types of sports), or *Suppe*, *Salz*, *Soße*, and *Senf* (food items).

Portocarrero, Burright and Donovanick (2007) analyzed verbal fluency data from 39 monolingual and 39 bilingual undergraduate college students at an American university and found – similar to previous research – that the bilingual group performed significantly lower on the semantic verbal fluency tasks and the two groups achieved similar results on the phonetic verbal fluency tasks. These findings seem to support Rosselli et al.'s (2000) hypothesis that crosslinguistic interference is greater when a linguistic task requires the recall of concrete nouns as opposed to non-concrete nouns. Consequently, Portocarrero, Burright and Donovanick (2007) hypothesized that the difference between bilingual and monolingual speakers would be greater for the categories *animals* and *kitchen* than on the category *actions* which does not require the recall of concrete words. However, statistical analyses revealed that the differences for the categories *animals* and *actions* was significant, which suggests that the amount of crosslinguistic interference may not be related to the level of concreteness of the words required for the task.

2.2.1.2 Verbal Fluency in the Context of L1 Attrition Research

A number of L1 attrition studies have also included data elicited through semantic verbal fluency tasks in their research design. In a study on German speakers in Australia, Waas (1993) tested participants' verbal fluency in German and English with a 90-second

animal naming task. On the German task, immigrants produced circa 20 exemplars within the most productive 60 consecutive seconds and the monolingual control group produced circa 24 exemplars. This difference turned out to be statistically significant and was interpreted as quantitative evidence for language attrition. In addition to the significant quantitative difference, the researcher also observed that the bilingual participants had difficulties with the verbal fluency task that manifested themselves in “direct and literal translations from L2, pausing, halting speech, L2 pronunciations and intonation, code-switches to L2, slip-of-the-tongue mistakes, metatheses, abandoning attempts, lack of self-corrections and recognition markers” (p. 142).

In his dissertation, Yağmur (1997) analyzed the verbal fluency of forty Turkish immigrants in Australia and compared it to the verbal fluency of a reference group of forty monolingual speakers in Turkey. Both groups were divided into two subgroups based on their level of education. The data were elicited through two semantic verbal fluency tasks with the categories ‘animals’ and ‘fruit and vegetables’ and statistical analyses revealed that the two reference groups performed significantly better than the bilingual groups. On average, bilinguals produced 14-15 exemplars and monolinguals produced 23-25 exemplars for each of the two semantic categories. Yağmur (1997) concluded that these findings suggest attrition in the immigrants L1 lexicon.

Schmid (2009b) chose the same semantic categories as Yağmur (1997) for her research on German immigrants in Canada and in the Netherlands. An average verbal fluency measure was computed from the scores on the two individual tasks, and mean scores from the two immigrant groups and a monolingual control group were compared.

The differences between the two immigrant groups and the control group were statistically significant, however, the rather small effect sizes suggest that “the group differences were hardly dramatic” (p. 225).

2.2.1.3 Explanations for Reduced Verbal Fluency

Based on the research findings, researchers generally attribute the weaker performance of bilingual speakers on verbal fluency tasks to a) the effects of crosslinguistic interference, b) weaker connections between semantic and phonological representations (S-to-P connections) or c) a combination of the two.

When a task is language selective, the L1 and the L2 stand in direct competition which may delay the retrieval of a lexical item in the target language, e.g., when bilinguals attempt to retrieve a word in their L1 belonging to a specific category there is competition, i.e., crosslinguistic interference, from the translation equivalent in the L2. This competition has to be resolved before the lexical item can be produced which consequently slows down the retrieval process. Furthermore, researchers claim that for each lexical item that comes to mind, bilinguals have to first verify that the item belongs to the selected language before they can verbally produce that item. Therefore, bilingual speakers must adhere to a dual restriction (category and language membership) whereas monolingual speakers only have to adhere to one restriction (category) which places a greater cognitive demand on bilingual speakers compared to monolingual speakers (cf. Gollan, Montoya & Werner, 2002, Rosselli et al., 2000).

The other explanation for the reduced speed in lexical retrieval and, consequently, a weaker performance on verbal fluency tasks, may be that each language system in a bilingual is supported by weaker S-to-P connections, i.e., by weaker links between the concept and the word form, than in the single language of a monolingual speaker. The weakness of the links is due to less frequent, and possibly less recent, use of the lexical item. Naturally, bilinguals use words in both languages less and consequently strengthen the link between the semantic and the phonological representation less often (cf. Bialystok, Craik & Luk, 2008; Gollan, Montoya & Werner, 2002).

2.2.2 Lexical Diversity

2.2.2.1 Definition

Lexical diversity – which is also referred to as ‘lexical variation’ – is “indicated by the number of different words in a sample of speech or writing of a set length” (Malvern et al., 2004, p. 3). It is most commonly measured by computing the percentage of different words in the total number of words, traditionally by using the type-token ratio (TTR). An alternative to the traditionally used type-token ratio is the lexical diversity measure *D* which eliminates some of the problems associated with quantifying vocabulary diversity (cf. McKee, Malvern & Richards, 2000). It can be computed with the *vocd* software included in the CLAN suite (available at <http://childes.psy.cmu.edu/>; MacWhinney, 2000).

In addition to lexical diversity or lexical variation, some researchers also calculate the percentage of infrequent vocabulary, i.e., words that do not belong to the first 2000

most frequent words, or the proportion of content and function words in a text sample. The former is commonly referred to as ‘lexical sophistication,’ the latter is termed ‘lexical density’ (cf. Laufer, 2003; Malvern et al., 2004). Often, these three constructs, i.e., lexical diversity, lexical sophistication, and lexical density are subsumed under the more general term ‘lexical richness’ (cf. Daller, Milton & Treffers-Daller, 2007; Daller, van Hout & Treffers-Daller, 2003). This study, however, focused exclusively on lexical diversity and analyzed and compared participants’ lexical diversity measure *D*.

In linguistic research, lexical diversity has been examined in a wide range of areas, e.g., in the study of literary and non-literary texts, genres, discourse patterns, communicative effectiveness as well as psychological and linguistic disorders (cf. Malvern et al., 2004). Furthermore, lexical diversity has also been investigated in second language acquisition, bilingualism, and L1 attrition research.

2.2.2.2 Lexical Diversity in Language Learning and L1 Attrition

Empirical research has shown that lexical diversity variables are valid in measuring language development as well as profiling language disabilities (cf. Malvern et al., 2004). According to Laufer (2003), transitional competence in a language – regardless of whether it is the developing L2 competence of a second language learner or L1 competence of a bilingual suffering from L1 attrition – is often characterized by risk avoidance in the use of vocabulary and by temporarily reduced accessibility of lexical items under time constraints which leads to a decrease in lexical diversity.

In second language acquisition research focusing on the characteristics of learner language, lexical diversity, richness and variation have been examined rather frequently (e.g., Kuiken & Vedder, 2007; Laufer & Nation, 1995; Lemmough, 2008; Ovtcharov, Cobb & Halter, 2006; Tidball & Treffers-Daller, 2008). In L1 attrition and bilingualism research, however, lexical diversity has received relatively little attention as only a small number of studies have examined lexical diversity measures (e.g., Dewaele & Pavlenko, 2003; Kim & Starks, 2008; Laufer, 2003; Schmid, 2009b). This may be due to the fact that changes in lexical richness and lexical variation are not immediately noticeable as they do not manifest themselves in errors. They are changes that can only be detected through complex mathematical formulae and/or sophisticated software.

2.2.2.3 Previous Research

In a study on productivity and lexical diversity in native and non-native speech, Dewaele and Pavlenko (2003) compared Russian narratives from thirty one English-Russian bilinguals with those from seventy-five monolingual speakers of Russian. Lexical diversity was measured with Dugast's (1980) *Uber* formula, an algebraic transformation of the traditional type-token ratio, which is well-suited for shorter text samples. A comparison of the lexical values revealed no significant difference between the two groups, a finding based on which Dewaele and Pavlenko (2003) concluded that lexical diversity may not be subject to change and not be affected by the L2 and by second language socialization.

Metaphorically one could compare the languages in contact in the individual's mind to two liquid colours that blend unevenly, [...] as far as productivity and lexical diversity are concerned, original colours may survive in their new environment. (Dewaele & Pavlenko, 2003, p. 137)

Whereas Dewaele and Pavlenko (2003) analyzed speech data, Laufer (2003) examined the influence of the second language on L1 lexical diversity in free written expression. She elicited compositions from three groups of Russian-Hebrew bilinguals ($n = 26$) and analyzed the text samples with regard to lexical diversity which she defines as a combination of lexical sophistication or lexical richness and lexical variation. The former refers to the percentage of infrequent vocabulary in a text, i.e., those words that do not belong to the first 2,000 most frequent words, and the latter is the percentage of different words in the total number of words. The analyses were conducted with a SAS software especially designed for this purpose and revealed a significant difference in lexical richness, i.e., the percentage of non-frequent words declined with increasing length of residence. Furthermore, the data showed a decrease in lexical variation, though the difference between the groups was not statistically significant.

Research studies on L1 attrition that include analyses of lexical diversity were conducted by Kim and Starks (2008) and Schmid (2009b). In both research studies, the lexical diversity measure D was established with the *vocd* software (available at <http://chldes.psy.cmu.edu/>; MacWhinney, 2000) for bilingual groups and a monolingual (or largely monolingual) control group.

Kim and Starks (2008) compared narratives from thirty Korean-English late bilinguals in New Zealand and ten monolingual Koreans and found significantly lower

lexical diversity in the linguistic performance of the bilingual group. Based on this difference in lexical diversity, Kim and Starks suggest that “the late bilinguals have a narrower range of L1 lexical items available during on-line production [...], perhaps due to their difficulty in accessing some lexical items promptly” and conclude that they “have undergone some degree of L1 attrition since their arrival in New Zealand” (p. 308). These findings, however, have to be treated with caution as the bilingual subjects for this study had immigrated from Korea to New Zealand at the age of 12-13 years and can therefore not be considered true late bilinguals. Therefore, Kim and Starks’ (2008) findings regarding the lexical diversity of late bilinguals cannot be compared to studies that investigate the L1 of immigrants who left their home countries as adults – such as, e.g., the participants in this study.

In a larger study on German migrants in Canada, German migrants in the Netherlands, and a monolingual control group by Schmid (2009b), the lexical diversity measure *D* was established for speech data from a semi-structured autobiographical interview and the Chaplin film-retelling task (cf. Perdue, 1993). A statistically significant difference was found only for one group in only one task, i.e., the German migrants in the Netherlands received significantly lower scores on the film retelling task. Therefore, Schmid (2009b) concluded that “lexical richness appears to have remained largely unaffected over the emigration span” (p. 226).

2.2.3 Transfer, Interference, and Crosslinguistic Influence

2.2.3.1 Theoretical Considerations

For a long time, transfer was simply viewed as a “fact of life” (Singleton, 1987, p. 27) which could potentially create problems for language learners and translators. This perception of transfer was common until Weinreich and Lado entered center stage in the 1950s. In their works *Languages in contact* (Weinreich, 1953) and *Linguistics across cultures* (Lado, 1957), transfer was first examined more closely than in any previous investigation. Especially Weinreich’s monograph serves “as a useful benchmark for assessing change and continuity in research on transfer” (Odlin, 2003, p. 438).

During the two decades following World War II, a structuralist-behaviorist perspective on language acquisition became influential, gave rise to contrastive analysis and sparked an interest in language transfer. Within the structuralist-behaviorist framework, learning difficulties were predicted based on a comparison of L1 and L2 habits and transfer was almost exclusively perceived in a negative light. However, in the early 1970s, contrastive analysis as a predictor of errors in the target language came under scrutiny and researchers began to question the role of cross-linguistic influence in the language learning process. This reassessment of transfer was further propelled by the new concept of interlanguage which quickly became the dominant paradigm in second language acquisition research. For many scholars, transfer was now “situated within a broader context, as one factor among others” (Singleton, 1987, p. 33) and some even suggested that transfer only played a marginal role. At the beginning of the 1980s, however, transfer moved back into the limelight and new research reflected the new

cognitivist perspective. Finally, in more recent years, “work on [...] Universal Grammar has given considerable attention to certain areas where cross-linguistic influence may operate” (Odlin, 2003, p. 458). In addition, the connection between relativism and transfer has received greater attention (Odlin, 2002).

In his seminal work *Languages in Contact*, Weinreich (1953), defined interference phenomena as “those instances of deviation from the norms of either language which occur in the speech of bilinguals as a result of their familiarity with more than one language, i.e., as a result of language contact” (Weinreich, 1963, second printing, p. 1). Clyne (1972), however, rejected the term ‘interference’ as it “points at least partly to the cause of the phenomenon” (p. 8) and adopted the term ‘transference’ in order to “merely [...] describe the phenomenon, i.e., the adoption of any elements or features from the other language” (p. 8).

In more recent scholarship, however, Mackey (2000) employs the term interference to refer to “the use of features belonging to one language while speaking or writing another” (p. 40). In contrast, Pavlenko (2003), uses “the term transfer to refer to processes that lead to the incorporation of elements from one language into another [...], and the more inclusive term crosslinguistic influence to refer to transfer and any other kind of effect that one language may have on the other” (p. 32f). Her understanding of transfer is based on the definition of ‘crosslinguistic influence’ proposed by Sharwood Smith and Kellerman (1986):

It is a psycholinguistic term referring to the influence on the learner which one language system he or she possesses may have on another language system. [...] The term is meant to cover more than the word ‘transfer’ and includes

borrowings, influence on L1 from L2, avoidance of transfer, etc. In other words, it covers a fairly wide range of phenomena. (Sharwood Smith & Kellerman, 1986; cited in Sharwood Smith, 1989, p. 185)

In Pavlenko's (2003) and Sharwood Smith and Kellerman's (1986) definitions, transfer is interpreted to be just one aspect of cross-linguistic influence. Similarly, Weinreich (1963) considered language transfer to be "one manifestation of linguistic interference" (p. 7). He emphasized that "there is also a type of interference [...] which does not involve an outright transfer of elements at all" (Weinreich, 1963, p. 7).

In contrast to the conceptualizations outlined above, Singleton (1987) uses the term 'transfer' as an umbrella term to "cover the whole range of phenomena which involve the learning of or performance in a given language being influenced by the knowledge of other languages at the learner/performer's disposal" (p. 27). Yet, other researchers, such as Pavlenko and Jarvis (2002) "use the terms 'language transfer' and 'crosslinguistic influence' interchangeably to refer to such diverse phenomena as 'transfer', 'interference', 'borrowing,' and L2-related aspects of language attrition" (p. 190). According to Ecke (2004), researchers adopt one of these different terms depending on how they perceive the scope and positive or negative effects of the concept.

However, despite this obvious lack of consensus among these scholars regarding a comprehensive conceptualization of transfer, interference and cross-linguistic influence, they do agree on one important aspect, namely the bidirectional nature of these phenomena. Pavlenko and Jarvis (2002) even explicitly state that they "expand the understanding of transfer in second language acquisition to include bidirectionality, that is the notion that in the oral and written production of the same adult L2 user,

crosslinguistic influence can simultaneously work both ways, from L1 to L2 and from L2 to L1” (p. 190). In contrast, a number of researchers in the field of second language acquisition, such as Lado (1957), exclusively deal with transfer and cross-linguistic influence from the L1 to the L2.

Individuals tend to transfer the forms and meanings, and the distribution of forms and meanings of their native language and culture to the foreign language and culture – both productively when attempting to speak the language and to act in the culture, and receptively when attempting to grasp and understand the language and the culture as practiced by natives. (Lado, 1957, p. 2)

In the field of second language acquisition, scholars generally distinguish between positive and negative transfer. Positive transfer facilitates L2 learning and is therefore sometimes called “L1-L2 facilitation” (Gass & Selinker, 1983, cited in Dechert & Raupach, 1989, p. ix), whereas negative transfer can inhibit L2 production.

According to Pavlenko and Jarvis (2002), “it is only recently that SLA scholars started paying attention to ways in which the L2 could affect the L1 in adult users” (p. 191). In order to distinguish between the influence of the L2 on a previously acquired language and the influence of a source language on the target language, Odlin (1989) uses the term “borrowing transfer” (p. 12) to refer to the former and the term “substratum transfer” (p. 12) to refer to the latter. In his opinion, such a distinction is necessary as the two concepts cannot be perceived to be monolithic. Since the focus of this paper is borrowing transfer, further definitions of substratum transfer and L1 to L2 influence will not be included here. For an in-depth discussion of L1 influence in language learning, see Faerch and Kasper (1986, 1987, 1989) and Odlin (1989, 2002, 2003).

According to Weinreich (1963), interference affects “the more highly structured domains of language, such as the bulk of the phonemic system, a large part of the morphology and syntax and some areas of the vocabulary” (p. 1) into which foreign elements are introduced. However, based on a more recent review of literature, Pavlenko (2003) suggests that “a second or additional language may influence the first in *all* [my emphasis] areas of language, whether phonology, morphosyntax, lexis, semantics, pragmatics, rhetoric or conceptual representations” (p. 33). Yet, many scholars maintain that L2 influence on the L1 most prominently manifests itself in the lexicon in the form of lexical borrowings, loan translation, semantic extension and lexical retrieval difficulties (Pavlenko, 2003, p. 40).

Considering the argument that transfer may affect all areas of speech production, a comparison of research findings may be rather difficult, especially in light of the fact that most studies do not investigate the whole spectrum but rather focus on selected areas. Dealing with this issue, Pavlenko (2000, 2003) advocates that “seemingly disparate instances of L2 influence in such diverse areas such as phonology, morphosyntax, or semantics can be brought together within a unitary framework” (p. 175). In this classificatory framework, instances of L2 influence on the L1 are theorized as evidence of one (or more) of the following phenomena: 1) borrowing transfer, or the addition of L2 elements to the L1; 2) convergence, or the creation of a unitary system, distinct from both L1 and L2; 3) shift, or a move away from L1 structures or values to approximate L2 structures or values; 4) restructuring transfer, or the incorporation of L2 elements into L1

resulting in some changes, substitutions or simplifications; and 5) L1 attrition, i.e., the loss of (or inability to produce) some L1 elements due to L2 influence (Pavlenko, 2003).

With respect to factors that potentially affect the strength of second language transfer, Pavlenko (2000) suggests “that L2 influence operates under ten – and possibly more – specific constraints” (p. 196), which can be divided into individual, socio-linguistic, linguistic and psycholinguistic factors. These factors are: 1) learners’ age and onset of L2 learning; 2) learners’ goals and language attitudes; 3) language proficiency; 4) individual differences; 5) learning context; 6) length and amount of language exposure; 7) language prestige; 8) language level; 9) typological similarity between the first and second language; and 10) developmental factors (for an alternative set of categories and factors that affect crosslinguistic influence, see Hall & Ecke, 2003).

Similarly, Mackey (2000) acknowledges certain constraints when he highlights that pattern and amount of interference in the speech of bilinguals can vary according to medium, style, register, context, style of discourse, and the role of the speaker in any communicative occurrence. Also recognizing the influence of contextual factors, Seliger (1996) claims that code-mixing can be cued by social or cultural context or result from the bilingual’s sensitivity to the interlocutor and/or the topic of conversation.

2.2.3.2 Previous Research

With the goal to provide evidence for the bidirectional nature of transfer (outlined in the previous chapter), Pavlenko and Jarvis (2002) analyzed Russian and English narratives collected from 22 Russian-English bilinguals in the United States and found “that

crosslinguistic influence works both ways in the oral production of these L2 users: While Russian continues to influence their English, their English has begun to influence their Russian as well” (p. 190). Eighty-two percent of their subjects showed L1 to L2 influence and seventy-seven percent were affected by L2 to L1 influence. This unusual research study has yielded interesting findings but, unfortunately, the bulk of research has investigated transfer as a unidirectional phenomenon.

In one of the earlier studies, Clyne (1972) examined the speech of German immigrants in Australia and encountered instances of morpho-semantic, semantic, morphemic, morphological, phonemic, allophonic, prosodic, syntactic, and lexicosyntactic transference. In narratives collected from Russian-English bilinguals, Pavlenko (2003) also found an influence of the L2 on the L1 in lexicon, semantics and morphosyntax and, additionally, in linguistic framing. She interprets these findings as evidence for the following phenomena: borrowing transfer, shift, restructuring transfer, and L1 attrition. In her data, the borrowing or internalization of new concepts via lexical borrowing or loan translations was the first and most important process.

The same year, Jarvis (2003) conducted a case-study with one Finnish-English bilingual and discovered “L2 effects in certain limited areas of grammar, and more broadly in areas of lexico semantics and general idiom” (p. 99). He emphasizes that the deviant grammatical structures which can be attributed to L2 influence appear to be item-specific and do not seem to influence whole systems of grammar. Another important finding of Jarvis’ (2003) study is that there was quite a bit of variability across data types, i.e., more deviant structures were found in natural data than in metalinguistic judgments

and self-report data. Interestingly, none turned up in more controlled data. Clearly, this observation has methodological implications for research on crosslinguistic influence as it highlights “the importance of looking at multiple sources of data whenever investigating L2 effects” (Jarvis, 2003, p. 100).

Köpke and Nespoulous (2001) analyzed the speech and L1 attrition of German-English and German-French bilinguals and concluded that the role of L2 influence is difficult to determine” (p. 232) in the language production task they used. They were only able to attribute a small number of deviant forms to L2 influence. However, their data revealed that the substitution of prepositions by German-English bilinguals is largely due to L2 interference. A similar observation was made by Clyne (1972), who examined data from German immigrants in Australia. He concluded that “prepositions are one of the main sources of transference among German-English bilinguals and are usually subject to semantic transference” (p. 22).

In self-report data from EFL teachers in Spain, Porte (1999) also found that “one of the most frequently mentioned interferences concerned the perceived leveling of prepositions” (p. 30). However, a great degree of interference was reported not only for the prepositions but for the entire lexicon, a finding which is supported by empirical data from other studies. In addition, Porte’s informants reported L2 influences in spelling, punctuation, and capitalization. Though Porte’s data are certainly interesting for the study of cross-linguistic influence, it has to be treated with caution as it was elicited via self-assessments only. Nevertheless, these findings prompted Porte (2003) to conduct an experimental study with three EFL teachers in Spain who participated in guided group

discussions. The data from these discussions showed that deviant forms mainly occurred in the lexicon, i.e., L2 nouns and nominal groups were incorporated by participants into their L1 speech. Porte explained that “these subjects tend mostly to code-mix what they are sure is familiar to their interlocutors” (p. 110) – an explanation which may point to the importance of language mode (Grosjean, 1998, 2001) – and concludes that despite frequent code-mixing, there is no evidence for L1 attrition.

Whereas most researchers concentrated on L2 influence on the lexicon, semantics and morpho-syntax, Major (1992) focused on deviations in phonology. He investigated voice onset time in the native speech of American immigrants to Brazil, and found evidence “that one’s native language is not a fixed and stable system but rather a fluid and changeable one that is highly subject to the influence of a well-developed second system” (p. 204). His data revealed that this “influence of the L2 is most prevalent in casual styles of L1 and may not be present in formal varieties” (ibid). The latter finding seems to support claims by Mackey (2000) and Seliger (1996) who acknowledged the influence of contextual variables on the amount of interference.

2.2.4 Code-Switching

2.2.4.1 Definition

Code-switching is defined as “the alternation of languages within a single discourse, sentence or constituent” (Poplack, 1980, p. 583). It can also be understood as the incorporation of material from one language into the discourse of another language in a way in which the material is not phonologically, morphologically, or syntactically

integrated (cf. Boyd, 1993). Generally, we distinguish between two types of code-switching: intrasentential and intersentential code-switching (cf. Myers-Scotton, 1993). The former refers to code-switching at the word level, and the latter refers to code-switching at the discourse level, i.e., either single words or longer stretches of speech from one language are incorporated into the other.

From a sociolinguistic perspective, code-switching can be understood as “a means to index the nuances of social relationships by exploiting the socio-psychological associations of the languages employed” (Myers-Scotton, 1993, p. 1). Additionally, code-switching is sometimes used to indicate solidarity between speakers or to highlight the hybrid, bilingual identity of speakers (cf. Dolitsky & Bensimon-Choukroun, 2000). From a psycholinguistic point of view, code-switching points to flexibility in language production, i.e., a bilingual speaker is able to utilize resources from both languages in order to overcome linguistic difficulties (cf. Myers-Scotton, 1993).

Consequently, code-switching “offers an extra tool in communication that is at the disposition of bilinguals and allows for greater nuances of expression including marking pragmatic functions, meaning (connotative and denotative), identity (psychological and social) and affect” (Dolitsky & Bensimon-Choukroun, 2000, p. 1255). However, a distinction needs to be made between code-switching as a discourse strategy and a means to make communication more efficient and code-switching that is caused by gaps in the linguistic knowledge of a bilingual speaker (cf. De Bot, 2002) – a distinction which is crucial especially in the context of first language attrition research.

Code-switching as a discourse strategy is governed by very clear sociolinguistic rules of appropriateness. If these rules are violated and bilinguals code-switch in situations where mixed forms are not appropriate, e.g., when a bilingual communicates with a monolingual speaker of the L1 and incorporates L2 words, we can assume that we are dealing with a sign of beginning L1 attrition. Therefore, it is important to distinguish between true code-switching which frequently occurs in normal bilingualism and between code-switching as a phenomenon of L1 attrition. In cases of true code-switching, the switches are situationally appropriate and the bilingual speaker has full control of the two languages. Moreover, the elements which are incorporated observe the language-specific constraints of the borrowing language (cf. De Bot, 2002).

In cases of beginning L1 attrition, instances of code-switching are sociolinguistically inappropriate and involve changes in syntax, morphological neologisms, and calquing of language material from various levels from L2 into L1, and grammatical constraints are no longer observed (cf. Seliger, 1996). Therefore, it is crucial that researchers proceed with caution when analyzing and interpreting examples of code-switching.

2.2.4.2 Previous Research

In their analysis of the speech of long-term German immigrants in the U.S., Stolberg and Tracy (2008) found not only numerous linguistic deviations that can be attributed to language transfer and crosslinguistic interference but also instances of code-switching. However, a close analysis revealed that the instances of code-switching found in the

speech data cannot be considered evidence of L1 attrition, as the code-switching was fluent, i.e., there were no pauses or self-corrections. Consequently, Stolberg and Tracy agreed with previous researchers (Dolitsky & Bensimon-Choukroun, 2000; Myers-Scotton, 1993; Seliger, 1996) that code-switching is not necessarily evidence for a linguistic deficit and L1 attrition but may be utilized to communicate more efficiently. In addition, they highlight that code-switching can serve as a marker of a bilingual speaker's hybrid and multicultural identity and as an indicator of group solidarity.

Whereas Stolberg and Tracy (2008) interpreted the instances of code-switching found in their data as discourse strategies, Boyd (1993) found code-switching patterns that are indicative of L1 attrition. She analyzed the data from twelve American and fourteen Finnish immigrants who had been living in Sweden for at least 10 years at the time of data collection. She found instances of code-switching in both data sets, i.e., both groups incorporated Swedish origin lexemes into their native languages. In most cases, single words were incorporated into the L1 speech. In both groups, Boyd found participants whose code-switching patterns deviated from the patterns regarding phonological and morphological integration found in the rest of the data. Boyd (1993) concluded that it seems "quite plausible that the 'deviant' informants represent the beginnings of possible long-term changes in the lexicon" (p. 408). Similar conclusions were drawn by Waas (1997). She examined the L1 speech of native German speakers in Australia and found instances of code-switching in all of her participants. In fact, she noted that "not one of the subjects was able to complete the interviews without

employing L2” and that “code-switching into L2 was the only viable option for the subjects” (Waas, 1997, p. 129).

Porte (2003) investigated code-mixing and blending in the native English speech of three senior EFL lecturers in Spain, and observed that mostly L2 nouns and nominal groups were incorporated into the L1 speech. He explained that most instances of code-switching occurred when participants knew that their interlocutors were familiar with the lexical items from the L2, and concluded that this type of code-switching should not be interpreted as a sign of incipient L1 attrition. However, Porte (2003) did point to the possibility that the type of code-switching found in his data along with the implicit attitude towards bilinguality may contribute to L1 attrition due to diminished control and monitoring of the L1 output.

Whereas Porte (2003) suggested that code-switching may be a contributing factor to L1 attrition, Seliger and Vago (1991) hypothesized that “it may become a precursor stage for gradual language attrition or loss as the bilingual increasingly loses control of the conditions that constrain mixing” (p. 6). However, Seliger and Vago (1991) also acknowledged that code-switching may be an additional communication technique or strategy.

2.3 Sociolinguistic Variables

In an attempt to define the sociolinguistic variables that affect the severity of L1 attrition, research on the amount of L1 use, L1 interlocutor type, L1 input, motivation and attitudes

as well as issues of identity along with their potential to slow down the attrition process have received increasing attention in recent L1 attrition research.

2.3.1 L1 Use

2.3.1.1 Theoretical Considerations

L1 attrition researchers generally agree that L1 attrition is caused, at least partially, by a restricted use of L1 and an intensive contact with the L2 (e.g., Köpke, 2007; Waas, 1996). Therefore, it can be assumed that immigrants who use their native language extensively are less vulnerable to L1 attrition than those who use their native language less frequently or hardly ever (cf. Schmid, 2007). However, “it is unclear exactly how much use or contact is necessary for a language to be maintained and other factors [...] are likely to be confounded with use and contact” (Hulsen, 2000, p. 22).

The assumption that individuals who hardly use their L1 gradually lose their L1 can be explained with the *Activation Threshold Hypothesis* proposed by Paradis (1993). This hypothesis claims that the more a lexical item is activated, the lower its activation threshold is; if the item is inactive and disused, the threshold of activation is raised. In the context of bilingualism, it is assumed that the activation threshold of the first language is raised and that “depending on the frequency of use, different linguistic items within the same language might require various degrees of stimulation in order to become activated” (Gürel, 2004, p. 56).

When investigating L1 use in the context of L1 attrition research, it is crucial to consider that – depending on the speaker’s language mode (Grosjean, 1998, 2001) – L1

use can occur in a variety of different forms. Language mode is a continuum with a monolingual mode (in which one language is activated while the other one remains deactivated) on one end and the bilingual mode (in which both languages are active but one more so than the other) on the other end. Bilinguals are in monolingual mode when they communicate with a monolingual of either their L1 or their L2; and they are in bilingual mode when they are interacting with other bilinguals who have knowledge of the same languages. In the bilingual mode, language mixing, code-switching and transfer may take place and would not be considered inappropriate (cf. Grosjean, 1998, 2001). Based on this language mode continuum, a distinction of five types of L1 use can be made. Schmid (2007, p. 140f) summarizes these modes and provides examples of situations in which they may be present:

- Type I: monolingual mode L1 use
 - distance communication with country of origin (telephone, email, letters)
 - visits to and from country of origin
- Type II: intermediate mode L1 use
 - professional L1 use
 - L1 use in clubs and societies with an (explicit or tacit) non-mixing policy
- Type III: bilingual mode L1 or L2 use
 - L1 use within the family
 - L1 use with friends, acquaintances, colleagues
- Type IV: intermediate mode L2 use
 - L2 use with recent emigrants wishing to acquire L2
 - L2 use with native speakers who have a rudimentary knowledge of L1
- Type V: monolingual mode L2 use
 - L2 use with monolingual speakers
 - L2 use with bilingual native speakers of other languages

According to Schmid (2007), for most well-integrated bilingual immigrants the most frequent type of language use is Type V, followed by Types III and II which will also be

relatively frequent for some but not all immigrants. In order to select a language mode, processes of activation and inhibition are involved, which also determine the activation threshold.

The level of activation corresponds to the frequency and recency with which any particular item [...] has been called upon, so the prediction is that those speakers who make more use of their L1 (and particularly those who have done so recently) will experience less accessing difficulties and other attrition phenomena.

Inhibition [...] refers to the fact that in order to be able to successfully access any item of linguistic knowledge, a speaker has to inhibit all competitors. Inhibition of L1 is therefore a process that speakers operating in an L2 environment routinely have to perform, and by doing so, the activation threshold of L1 items and of the overall L1 system are raised. (Schmid, 2007, p. 141)

The activation levels of a bilingual's two languages are influenced by the language mode, e.g., in Types I and V, inhibition of the L2 and L1, respectively, is very strong, while in Type III, the level of inhibition is rather low as code-switching is not only acceptable in the social context but also considered appropriate (cf. Schmid, 2007). Therefore, these different types of language use should not be lumped together in L1 attrition research.

2.3.1.2 Previous Research

Despite the importance that is generally ascribed to the impact of native language contact on L1 maintenance, surprisingly little empirical research has been conducted in order to validate or refute this claim. One of these few studies were carried out by de Bot, Gommans and Rossing (1991) who tried to find within-group characteristics that might influence L1 attrition and maintenance in Dutch immigrants in France. They focused on two factors most frequently mentioned in L1 attrition literature, i.e., length of residence

and amount of L1 contact. With regard to the factor ‘amount of contact with the L1’ participants were divided into two groups: numerous contacts versus few contacts. Participants in the first group had a Dutch partner and contact with other Dutch people at least once a week, and participants in the second group had a French partner (or no partner) and contact with other Dutch people less than once a week. Statistical analyses of the data showed a significant main effect, i.e., participants with numerous L1 contacts deviated less from the monolingual control group than those with few L1 contacts. Similarly, Hulsen (2000) – in her dissertation on language loss and language processing in three generations of Dutch immigrants in New Zealand – examined the role of L1 use and found a positive correlation between participants’ amount of L1 contact and their speed/accuracy on a picture naming task.

De Leeuw, Schmid and Mennen (2010) analyzed the L1 pronunciation of German immigrants in Canada and the Netherlands and examined which of the factors of age of arrival, length of residence and L1 contact can predict changes in the participants’ L1 pronunciation. Based on Grosjean’s (1982) concept of language mode, de Leeuw and her colleagues differentiated between two types of L1 contact: C+M (L1 contact in the bilingual mode in which code-switching is expected and appropriate), and C-M (L1 contact in the monolingual mode in which code-switching is less likely to occur). C+M included the variables family, friends, and church and C-M included work, visits to Germany, and correspondence with German speakers in Germany.

In order to determine the influence and effect of age of arrival, length of residence and the two types of L1 contact, multiple regression analyses were conducted and results

revealed that the only significant variable was C–M. Therefore, the researchers concluded that “contact with the L1 through communicative settings in which code-mixing is inhibited is especially conducive to maintaining the stability of native language pronunciation in consecutive bilinguals living in a migrant context” (p. 33). Furthermore, analyses of the individual variables subsumed under C–M revealed that only the variable correspondence with Germans in Germany was significant whereas L1 contact at work and visits to Germany were statistically not significant.

While de Leeuw and her colleagues (2010) distinguished between two types of native language contact, Schmid (2007) had, in an earlier study, established three independent variables pertaining to the frequency of language use, i.e., a bilingual mode (L1 use with family and friends), an intermediate mode (L1 use in clubs, churches, and at work), and a monolingual mode (L1 use with speakers in Germany). In order to see whether there was an interaction between three linguistic measures and L1 use in the three language mode, a linear regression was carried out but, surprisingly, yielded no significant result. Post-hoc analyses were conducted to investigate whether the individual variables grouped into the three language modes had a significant effect. The analyses revealed that only one variable, i.e., L1 use for professional purposes (which belongs to the intermediate mode), had an impact on the linguistic measures. From these meager findings, Schmid (2007) concluded that L1 use does not seem to have any power to predict the attrition effect. Similarly, Jaspaert and Kroon (1989) also found little to no impact of L1 contact when they examined the speech of Italian immigrants in the Netherlands.

2.3.2 Motivation and Attitude

2.3.2.1 Theoretical Considerations

Over the last decades, the role of motivation and attitudes has received a great deal of attention in second language acquisition research (e.g., Csizér & Dörnyei, 2005; Csizér & Lukács, 2010; Dörnyei, 2001, 2003; Dörnyei & Ushioda, 2009; Gardner, 1982; Gardner et al., 1987; Gardner & Lambert, 1972). In their seminal work on the role of motivational and attitudinal factors in second language learning, Gardner and Lambert (1972) suggested that language learners' attitudes and motivational orientation towards the target language, its speakers, and its culture play an important role in learning outcomes. Supporting Gardner and Lambert's (1972) claim, a number of research studies have provided empirical evidence that motivation is a strong predictor for language learning success (cf. Gass & Selinker, 2001).

Motivation for L2 learning can be divided into two types of motivation: Instrumental and integrative motivation (cf. Gardner, 2001; Gardner & Lambert, 1972). Instrumental motivation comes from the potential pragmatic gains and rewards of being proficient in an L2, such as getting a better job or a promotion. Integrative motivation refers to the language learner's positive disposition towards the members of the L2 group and the interest and desire to socially interact with them and even become a member of the L2 group. While Gardner and Lambert (1972) suggested that instrumental motivation plays a more important role in L2 learning than integrative motivation, the most developed and researched aspect has been integrative motivation (Dörnyei, 2003; Gardner, 2001).

In addition to studying the role of motivation in second language learning, Gardner and his colleagues (1987) also investigated the role attitudes and motivation play in second language maintenance and attrition. Though their data from 12-grade students did not reveal a correlation between the attitude and motivation measures and loss of language skill, “a causal modelling analysis indicated nonetheless that attitudes and motivation were implicated in second language [...] retention, [...] because motivational variables determine the extent to which individuals will make use of the second language” (Gardner et al., 1987, p. 29).

Applying these assumptions regarding L2 learning and L2 attrition to the field of L1 attrition and L1 maintenance, it is reasonable to assume that a positive attitude towards one’s native language, country, and culture and motivation to maintain the native language may also have a beneficial effect on L1 maintenance. Furthermore, if instrumental motivation plays a more important role than integrative motivation, as Gardner and Lambert (1972) suggested, it can be hypothesized that individuals who use their L1 for professional purposes, such as language instructors, may be more successful at maintaining their native language and less susceptible to L1 attrition. However, it is important to keep in mind that a positive attitude towards language maintenance has to go hand in hand with the appropriate actions, i.e., a conscious effort to use and maintain the L1 (cf. Hulsen, 2000).

2.3.2.2 Previous Research

Researchers have tried to establish a link between motivation and attitudinal factors and L1 attrition – with different and sometimes inconclusive findings. In two earlier studies from nearly two decades ago, researchers were not able to prove that motivation plays a major role in L1 maintenance or in counteracting L1 attrition. Olshtain and Barzilay (1991) analyzed the L1 speech of fifteen Americans in Israel, an environment in which “English, the primary language of the attriters, happens to be considered a language of high prestige and utilitarian value” and “the knowledge of English is regarded as an asset worth keeping” (p. 139). Thus, Olshtain and Barzilay (1991) looked at L1 attrition in a setting where L1 attrition may be less likely to occur due to the immigrants’ high motivation. Nevertheless, despite the fact that the participants highly valued language maintenance and put forth active efforts to not lose their L1, they displayed linguistic difficulties and a reduction in vocabulary retrieval.

In a smaller study examining the pronunciation of American immigrants in Brazil, Major (1993) examined the role of sociolinguistic factors such as cultural identity, attitude, and motivation in the loss and acquisition of phonology. Five English-language institute teachers and/or administrators with Brazilian families were chosen for this study because they were expected to have a very high motivation to learn Portuguese as well as to maintain their L1. The data showed a great deal of variation in the participants’ pronunciation, in their L1 as well as their L2, and therefore Major (1993) did not draw any conclusions with regard to motivation other than the fact that success at learning

Portuguese may have motivated participants to further their language ability and their integration with the Brazilian culture.

In a more recent study, however, Ben-Rafael and Schmid (2007) did find a link between language attitudes and L1 attrition. They compared two groups of immigrants in Israel, based on the assumption that in particular immigrant groups, linguistic attitudes are generally quite consistent. One of the two groups under investigation was comprised of immigrants from France who were ideologically motivated and eager to adopt the Hebrew language for public as well as private use, the other group consisted of Russians who immigrated for economic reasons and considered it important to maintain their native language and culture. The analysis of interview data revealed that the ideologically motivated French immigrants switched to Hebrew more frequently than the Russian immigrants who were motivated by lifestyle choices and economic reasons, and a *t*-test showed that the difference between the two groups was statistically significant. These findings seem to confirm Ben-Rafael and Schmid's (2007) prediction that a more ideological and integrative attitude towards the L2 would lead to more code-switching and possibly also a higher degree of L1 attrition than a more pragmatic and instrumental attitude towards the L2. However, the results from this study have to be treated with caution as they provide only sparse evidence for a relation between motivation and L1 attrition.

2.3.3 Identity and L1 Attrition

2.3.3.1 Theoretical Considerations

In early scholarship – based on sociopsychological and variationist approaches – identity was understood “as being derived from an individual’s membership in a social group (or groups)” (Ricento, 2005, p. 896). It was conceptualized as “static and one-dimensional” (Norton & Toohey, 2002, p. 116), as a “stable, fixed entity within a person which controls his or her actions and understanding of the world around him or her, but which remains [...] for the most part unaffected by the changing outer context” (Marx, 2002, p. 265). Moreover, it was considered to be “independent of language” (Pavlenko & Blackledge, 2004, p. 13).

In recent years, however, a new conceptualization rooted in social constructionist and poststructuralist approaches has gained prominence and identity is now defined as a variable and dynamic entity (Coulmas, 2005, Norton & Toohey, 2002), as “multiple and contradictory” (Norton, 2000, p. 127), and as a process of continuous change and permutation. Moreover, it is no longer viewed as “an inescapable fate imposed upon us but, to some extent at least, [as] a social construct, a matter of choice” (Coulmas, 2005, p. 173). In addition, identity has come to be considered an “interactional accomplishment, produced and negotiated in discourse” (Pavlenko & Blackledge, 2004, p. 13). According to Tabouret-Keller (1997), language and identity are inextricably connected and linguistic identity is “endlessly created anew, according to very various social constraints [...], social interactions, encounters, and wishes that may happen to be very subjective and

unique” (p. 316). Therefore, language acts can be considered acts of identity (Le Page, 1986; Le Page & Tabouret-Keller, 1985).

Due to these changes in the understanding of identity and the connection between identity and language, the role of identity is receiving increasing attention in second language acquisition research (e.g., Norton, 2000; Pavlenko & Blackledge, 2004; Pavlenko & Lantolf, 2000), and it has been shown that a strong desire to belong to the L2 community as well as the identification with the L2 culture and values can be considered an important predictor of success in L2 acquisition.

When investigating issues of identity in the context of L2 acquisition, the *Theory of Ethnolinguistic Identity* (Giles & Byrne, 1982) is of particular interest. It was developed to specify “social psychological conditions which facilitate or inhibit members of a subordinate ethnic group achieving near native-like proficiency in the language of a dominant ethnic collectivity” (p. 17). In this theory, Giles and Byrne (1982) propose five conditions under which native-like proficiency in the dominant language will most likely be acquired as they “promote a strong motivation to learn the L2” (p. 35).

- (1a) ingroup identification is weak and/or L1 is not a salient dimension of ethnic group membership;
- (2a) quiescent inter-ethnic comparisons exist (i.e., no awareness of cognitive alternatives to inferiority);
- (3a) perceived ingroup vitality is low;
- (4a) perceived ingroup boundaries are soft and open;
- (5a) strong identification exists with many other social categories, each of which provides adequate group identities and a satisfactory intragroup status. (p. 34f)

Considering the tenets of the *Theory of Ethnolinguistic Identity* (Giles & Byrne, 1982) as well as research findings demonstrating that a wish to belong to a linguistic community can lead to greater success in L2 acquisition, it is reasonable to assume that identity also plays an important role in L1 attrition. It can be expected that when immigrants strongly identify with their native language and culture and consider the L1 to be an important aspect of their identity they may be less vulnerable to L1 attrition than an immigrant who is highly motivated to integrate into the L2 society. A number of studies have examined the relation between L1 attrition and identity phenomena (Major, 1993; Marx, 2002; Prescher, 2007; Schmid, 2002, 2004b; Waas, 1996; Yağmur, 1997) and their findings will be outlined in the following section.

2.3.3.2 Previous Research

With her dissertation on L1 attrition of German immigrants in Australia, Waas (1996) was one of the first researchers to examine the effects of identity and attitude on L1 attrition by analyzing data from four quasi-experimental groups and a control group of native German speakers in Germany. To guide the composition of the quasi-experimental groups, immigration status and ethnic affiliation were selected as criteria. Participants were divided into a group of permanent residents and a group of naturalized citizens, and each of these two groups was then divided into individuals who show an affiliation with the native language and culture and those who do not. Individuals were considered to have an ethnic affiliation if they were involved in German-speaking organizations, married to a native speaker or if they used their native German for professional purposes.

A large part of the data were elicited through self-reports (can-do scales and a sociolinguistic questionnaire including questions regarding language use, choice, and attitudes) and statistics showed that permanent residents with an ethnic affiliation were closest to the control group, and naturalized citizens without ethnic affiliation were furthest from the control group (cf. Waas, 1996, p. 101). However, ethnic affiliation proved only significant for the self-report data and not for the actual linguistic performance, which was tested through a FiCA (Fluency in Controlled Association) test.

Another study in which issues of identity and their effect on L1 attrition were taken into account was conducted by Yağmur (1997). He examined data from a FiCA test, a syntactic test, and a story retelling task as well as self-report data elicited through the *Subjective Ethnolinguistic Vitality Questionnaire* (Bourhis, Giles & Rosenthal, 1981) which is based on the *Ethnolinguistic Vitality Theory* (Giles, Bourhis & Taylor, 1977). This theory, a socio-psychological approach to the relationship between language and identity, predicts that groups with high ethnolinguistic vitality are more likely to maintain their native language than groups with low ethnolinguistic vitality. However, Yağmur (1997) did not find a significant correlation between the participants' level of L1 attrition and their reported ethnolinguistic vitality.

Ethnolinguistic vitality was also one of the sociolinguistic factors Hulsen (2000) examined in her dissertation research in which she compared data from three generations of Dutch immigrants in New Zealand. One of her research interests was a possible relationship between the sociolinguistic factors L1 use, ethnolinguistic vitality, and social networks and L1 attrition as measured through language processing tasks (picture naming

and picture word matching). Her findings showed that L1 use and ethnolinguistic vitality did indeed emerge as “determining variables for the success and speed with which items from the L1 and L2 were retrieved from the mental lexicon” (p. 187).

In her, to this day, most influential study on L1 attrition and identity, Schmid (2002, 2004b) examined the native language of German-Jewish immigrants after sixty years of residence in the United States. Her speech data came from a corpus of 35 narrative autobiographical interviews collected by the *Mahn- und Gedenkstätte Düsseldorf*, a Holocaust Memorial Center in Germany. Schmid compared three groups: the first group was comprised of individuals who left Germany within the first 2.5 years after the Nazi rise to power, before September 1935, when the Nuremberg race laws were passed; informants in the second group migrated before the pogrom in November 1938; and the third group left after the pogrom and before the outbreak of World War II in September 1939. Members of the third group were expected to show a greater amount of L1 attrition than the other two groups, as their horrific, first-hand experiences with persecution may lead to less or no identification with the L1 and the L1 culture, up to the point of dissociation. This hypothesis was supported by quantitative findings: The third group made consistently more morphosyntactical errors than the control group and appeared to no longer sound native, while the participants in the first group managed to preserve their L1. Therefore, Schmid (2002, 2004b) concluded that extralinguistic factors such as attitude towards the L1 country, speaker identity, and self-perception provide a good prediction of the process and severity of L1 attrition.

Two research studies focusing on changes in L1 and L2 pronunciation also considered identity as a possible determining variable. Major (1993) examined the English and Portuguese pronunciation of five adult native speakers of American English who had immigrated to Brazil. His data revealed that those participants who showed the greatest loss in their L1 pronunciation “were those who approached native Portuguese accent more closely and closely identified with Brazilian culture” (p. 475), suggesting that speaker identity does play a role in L1 attrition. The data from this study were also examined in light of Giles’ (1973) Speech Accommodation Theory, and Major (1993) hypothesized that “the subjects accommodated, consciously or unconsciously, to [...] a second dialect – Brazilian English” (p. 474). The basic hypothesis of *Speech Accommodation Theory* is that people adjust their speech in order to express values, attitudes and intentions towards L2 speakers, i.e., they shift toward (convergence) or away from (divergence) the L2 speakers. The former reflects social integration whereas the latter can be considered a tactic of social dissociation (Tabouret-Keller, 1997).

Almost a decade later, Marx (2002) examined changes in her own L2 accent while residing in Germany as well as changes to her L1 accent upon return to her native Canada. Focusing on identity phenomena, Marx applied the *Metaphor of Self-Translation*, a basic framework developed by Pavlenko and Lantolf (2000), in order to describe the reconstruction and unification of her multiple identities. Self-translation consists of two main phases: a phase of continuous loss followed by a phase of recovery and (re)construction. During the first phase, individuals lose their linguistic identity, the connection to their inner world and meanings. Moreover, subjectivities are lost because

individuals can no longer make sense of the world based on their 'old' frame of reference, and ultimately, loss of the L1 inner voice and L1 attrition may occur. Subsequently – or sometimes concurrently – recovery and self-translation take place. In this second phase, individuals first appropriate the voices of others and finally, an own L2 voice begins to emerge. Only then are learners able to construct meaning in this language and to reconstruct their past in “translation therapy”. Finally, a “continuous growth into new positions and subjectivities” occurs (Pavlenko & Lantolf, 2000, p. 162).

Whereas the research studies outlined above have investigated the effects of identity and attitudes on L1 attrition, Prescher (2007) focused on the consequences the notion of L1 attrition has for the individual's identity and sense of self and effect of L1 attrition on identity. First person accounts of twenty German long-term immigrants in the Netherlands were analyzed and – based on Meader's (1997) theory on identity formation by migrants – participants were divided into two subgroups. One group of participants wanted to quickly adjust to the new environment and culture and rejected their linguistic and cultural origin. Members of the second group tried to maintain their native culture and identity but were open to the new culture. Through qualitative analysis of the narratives, Prescher (2007) was able to show that all participants, regardless of the group, were aware of a decline in their L1 skills and that a majority does not want to lose the L1 and puts a conscious effort into L1 maintenance. Furthermore, the data revealed that “the longer the duration of immigration, the more subjects try to reflect on or return to their original identity and language” and that most participants “try to preserve their L1 skills as an essential part of their identity” (p. 201). These findings are consistent with the

longitudinal study of immigrants in Australia reported by de Bot and Clyne (1994). Their data revealed that with advanced age, participants used the L1 more frequently and spoke the L2 with a stronger L1 accent. Based on these results, it is reasonable to conclude that language and identity are indeed closely interconnected.

CHAPTER 3: DESIGN AND PROCEDURE OF THIS STUDY

The previous chapter has shown the breadth and depth of research into L1 attrition and crosslinguistic influence and provided a multifaceted picture of the nature of L1 attrition and the factors that influence it. Unfortunately, to this date, only very few studies have examined the L1 of language instructors who teach their native language at high schools, colleges, and universities (Isurin, 2007; Major, 1992; Porte, 1999, 2003) and no research has been conducted examining the difference of L1 attrition between individuals who use their native language for professional purposes and those who do not.

Therefore, the goal of this study is to add to the existing research by examining and comparing the native German speech of two quasi-experimental groups in the US, German language instructors and German immigrants who work in fields other than language teaching, and a monolingual (or minimally bilingual) control group in Germany. Data from these three groups were elicited through phonetic and semantic verbal fluency tasks, the Chaplin film retelling task, a semi-structured, face-to-face interview, and a sociolinguistic questionnaire and were analyzed in order to answer the following research questions:

3.1 Research Questions

- (1) What are the participants' phonetic and semantic verbal fluency scores, and how do the data from the three groups under investigation (Control Group, German Instructors, and Other Professionals) compare?

- (2) What is the amount of lexical diversity in the participants' speech samples, and how do the data from the three groups compare?
- (3) What are the participants' error rates, and which error types occur in the spontaneous speech data? How do the data from the three groups compare?
- (4) Do the two bilingual groups (German Instructors and Other Professionals) differ with respect to sociolinguistic variables (amount of L1 use, contact and input, motivation to maintain the L1, and identity and attitudes towards the native language, country and culture)?
- (5) Do the bilingual participants' linguistic measures (phonetic and semantic verbal fluency scores; lexical diversity measures, and error rates from the film retelling and the interview) show correlations with the sociolinguistic variables (length of residence, amount of L1 use, L1 input; motivation to maintain the L1; and identity and attitudes towards the native language, country and culture)?

3.2 Participants

This study examined data from three groups of participants, who were recruited through the researcher's personal and professional contacts and by way of referral: two quasi-experimental groups of balanced German-English bilinguals, and a control group of monolingual (or minimally bilingual) speakers of German.

According to Cook (2003), a comparison of a group of monolingual native speakers with a quasi-experimental group of fully competent bilingual speakers with the same L1 is the basic methodological paradigm in L1 attrition research, which has been used in numerous research studies (e.g., Olshtain & Barzilay, 1991; Skaaden, 2005; Yağmur, de Bot & Korzilius, 1999). A monolingual control group is assumed to “provide a valid and accurate representation of the state of the bilingual’s grammar before the onset of bilingualism” (Seliger, 1996, p. 607) and therefore serves as a “baseline-comparison” (Andersen, 1982, p. 85) or a “point of reference” (Jaspaert, Kroon & van Hout, 1986, p. 38) against which linguistic features of the bilinguals’ speech can be measured. The need for such a baseline comparison has repeatedly been emphasized (e.g., Seliger, 1996), but researchers do acknowledge the difficulty in defining a control group and in equating the two groups for socio-economical, geographical and historical factors (Altenberg & Vago, 2004; Cook, 2003; Jaspaert, Kroon & van Hout, 1986). One of the most problematic aspects regarding monolingual control groups is that – given the importance of foreign language education in primary, secondary, and higher education – monolingual speakers are increasingly hard to find. Therefore, Cook (2003) proposes “to abandon the attempt to contrast ‘pure’ monolinguals with L2 users” (p. 14) and suggests a comparison of minimal and maximal, i.e., balanced, bilinguals instead.

In the context of this study, the term ‘balanced bilinguals’ is used to refer to individuals who possess approximately equal, i.e., native and near-native, proficiency in two languages across various contexts; individuals who are only minimally proficient in a second language are termed ‘minimal bilinguals’ (cf. Baker, 2001). In order to ensure that

participants in the quasi-experimental groups are true balanced bilinguals and participants in the control group are monolinguals or minimal bilinguals, participants were asked to self-assess their English proficiency by choosing one of six descriptions on the global scale of the *Common European Framework of Reference for Languages* (Council of Europe, 2001; Trim et al., 2001). For the quasi-experimental groups, only participants who rated their English proficiency at C2 were included in the study. For the control group, only participants whose proficiency in English did not exceed B1 were included.

3.2.1 Control Group

The Control Group (CG) consists of 17 monolingual – or minimally bilingual – native speakers of German (6 women and 11 men) who are residing in Germany and have not lived, worked and/or studied abroad for any significant amount of time, i.e., not longer than three months. Due to the nature of language education in secondary education in Germany, most of the participants in the Control Group reported to possess a basic knowledge of one or several foreign languages but all described themselves as monolingual or minimally bilingual speakers.

At the time of data collection, all participants were between the ages of 26 and 65, with an average age of 38.4 years. The members of the Control Group were selected based on similarities with the participants in the two quasi-experimental groups in order to match the groups with respect to age and educational level, i.e., they were at least 20 years of age and completed the *Abitur* (i.e., eight/nine years of secondary education).

Table 1. Participant Characteristics – Control Group

Name	Age	Gender	Profession
CG [1]	35	F	Actress, <i>now</i> : Graduate Student (Elementary Education)
CG [2]	46	M	Public Relations
CG [3]	37	M	Diagnostician (Children & Adolescent Psychiatry)
CG [4]	33	F	Pharmaceutical Technical Assistant
CG [5]	38	M	Economist
CG [6]	41	M	Architect
CG [7]	26	M	Graduate Student (Geography, Philosophy)
CG [8]	29	M	Computer Scientist
CG [9]	32	M	Master Brewer
CG [10]	34	M	Engineer
CG [11]	32	M	Software Developer
CG [12]	60	F	Teacher (Elementary and Middle School)
CG [13]	38	F	Ph.D. Student (Art History)
CG [14]	37	M	Special Education Teacher
CG [15]	34	F	Special Education Teacher
CG [16]	35	F	Teacher (K-4)
CG [17]	65	M	Civil Servant (Higher Administration, Postal Service)

3.2.2 Quasi-Experimental Groups

At the time of data collection, all participants in the two quasi-experimental groups had lived in the U.S. for at least 1.5 years. An analysis of variance was conducted in order to make sure that the group means for length of residence were similar and the result was statistically not significant.

In order to reduce heterogeneity and to eliminate confounding factors, only bilingual speakers who were born and raised in Germany, grew up speaking only German in their homes, and who had completed the *Abitur* (i.e., eight/nine years of secondary education) were allowed to participate in this study. Matching the participants for educational level was especially important as research has shown that higher-educated

bilinguals are better at L1 maintenance than individuals with fewer years of schooling (cf. Keijzer, 2009).

Furthermore, only participants who had lived in Germany for at least 19 years were included in the two quasi-experimental groups. Therefore, their command of the L1 at the time of immigration can be assumed to have been of native fluency, i.e., their speech habits presumably were fixed upon arrival in the U.S. (cf. Waas, 1993).

3.2.2.1 German Instructors

The quasi-experimental group of German Instructors (GI) is comprised of 19 native speakers of German (16 women and 3 men) who teach their native language at institutions of secondary or higher education. At the time of data collection, all participants were between the ages of 24 and 53, with an average age of 35.2 years. They arrived in the U.S. between the ages of 19 and 42, with an average age of arrival (AOA) of 25.2 years, and have resided in the U.S. between 1.5 and 25 years, with an average length of residence (LOR) of 9.7 years.

Table 2. Participant Characteristics – German Instructors

Name	Age	Gender	AOA	LOR	Profession
GI [1]	43	F	25	19	University Professor
GI [2]	53	M	27	25	University Professor
GI [3]	26	M	24	2.5	Teaching Associate/Fellow
GI [4]	37	F	19	18	Adjunct Faculty (Community College)
GI [5]	41	F	32	9	German Instructor (University)
GI [6]	51	F	42	9	Teaching Associate, Research Assistant
GI [7]	31	F	23	9	Academic Specialist
GI [8]	27	F	26	1.5	Teaching Associate
GI [9]	29	F	28	1.5	Teaching Associate
GI [10]	34	F	22	12	University Professor
GI [11]	45	F	22	20	University Professor
GI [12]	34	F	21	13	German Instructor (K-12)
GI [13]	31	F	23	8	Teaching Associate
GI [14]	24	F	23	1.5	Teaching Assistant
GI [15]	29	F	23	6.5	Teaching Associate
GI [16]	30	F	26	3.5	Teaching Associate
GI [17]	29	F	22	7	Teaching Associate
GI [18]	28	F	24	3	Teaching Associate
GI [19]	46	M	26	16	University Professor

Note. The participants' age reported in the table is the age at the time of data collection. The abbreviations AOA and LOR stand for "Age of Arrival" and "Length of Residence," respectively.

3.2.2.2 Other Professionals

The quasi-experimental group of Other Professionals (OP) consists of 21 native speakers of German (9 women and 12 men) who are living in the U.S. and work in professions other than German language teaching. At the time of data collection, all participants were between the ages of 26 and 60, with an average age of 40.3 years. They arrived in the U.S. between the ages of 23 and 42, with an average age of arrival (AOA) of 29.6 years, and have resided in the U.S. between 1.5 and 24 years, with an average length of residence (LOR) of 11 years.

Table 3. Participant Characteristics – Other Professionals

Name	Age	Gender	AOA	LOR	Profession
OP [1]	47	F	35	12	Visual Merchandiser, Graduate Student
OP [2]	30	M	25	5	Ph.D. Candidate (Aerospace Engineering)
OP [3]	43	F	32	11	Physical Therapist, <i>now</i> : Teacher (K-4)
OP [4]	45	M	42	3	Set Designer, <i>now</i> : Aviation Technology
OP [5]	30	M	24	6	Ph.D. Candidate (Aerospace Engineering)
OP [6]	38	M	29	10	Research Faculty (Aerospace Engineering)
OP [7]	29	M	27	1.5	Research Assistant (Hydrology)
OP [8]	50	M	38	12	University Professor (Math)
OP [9]	38	M	30	8	University Professor (Psychology)
OP [10]	52	F	30	32	Adjunct Faculty (Science)
OP [11]	50	F	25	22	Assistant Director, Office of Study Abroad
OP [12]	58	F	34	24	Realtor
OP [13]	28	M	24	4	Ph.D. Candidate (Aerospace Engineering)
OP [14]	26	M	23	3	Ph.D. Student (Aerospace Engineering)
OP [15]	34	F	30	4	General Education Instructor
OP [16]	60	M	39	20	Researcher (Radiation Oncology)
OP [17]	46	F	24	22	Associate Professor (History)
OP [18]	53	M	34	18	Publisher, Scoring Director (Pearson/SAT)
OP [19]	33	M	25	8	Visiting Instructor (Linguistics)
OP [20]	28	F	25	2.5	ESL Instructor, Graduate Student
OP [21]	29	F	27	3	Graduate Student, Teaching Associate

Note. The participants' age reported in the table is the age at the time of data collection. The abbreviations AOA and LOR stand for "Age of Arrival" and "Length of Residence," respectively.

3.2.3 Equating the Groups for Gender

Unfortunately, the three groups could not be equated for gender and the group of German Instructors (GI) included significantly more women than the Other Professionals (OP) and the Control Group (CG). A plausible explanation for this imbalance and the difficulty to find more male participants for the group of German Instructors (GI) is that a significantly larger number of women pursue careers in foreign languages than men. This claim can be supported by statistical information and data from, e.g., the German *Bundesministerium für Bildung und Forschung (BMBF)* and the *American Association of*

Teachers of German (AATG). According to data from a longitudinal study conducted by the *BMBF* investigating the role of women in German higher education, women clearly dominate the Humanities, and especially in Foreign Language Studies, they account for more than 70% (cf. Ramm & Bargel, 2005, p. ii). Furthermore, membership data from the *AATG* show that 67.2% of all *AATG* members are female (M. Williams from the *American Association of Teachers of German*, personal communication, November 15, 2010) which supports the claim that the majority of German language instructors in the U.S. are indeed female.

3.3 Data Collection

3.3.1 Blueprint for L1 Attrition Research

Examining previous L1 attrition research, Schmid (2004a) criticizes that “the variety of research designs and data analyses, compounded by the fact that it is rare for any one study to employ more than one method of data elicitation” are an obvious “impediment to progress in language attrition research” (p. 353f) and therefore calls for a “blueprint for research” (p. 354) – an idea which had already been suggested by Andersen (1982) over two decades ago. Consequently, Schmid (2004a) proposes a common research design which is to include the following data elicitation techniques: 1) introspection and self-assessments (sociolinguistic questionnaires, can-do scales, and matched guise experiments), 2) formal elicitation tasks (C-tests, verbal fluency tasks, and grammaticality judgments), and 3) spontaneous speech (film retelling tasks and semi-structured interviews). Employing such a combination of different methods and

triangulation of the resulting data makes it possible to arrive at a clearer and more comprehensive picture of L1 attrition, especially since “investigators have suggested that if multiple tasks converge on a core of knowledge, we can have some confidence that we have identified knowledge rather than task effects” (Altenberg & Vago, 2004, p. 115).

Following Schmid’s (2004a) blueprint for research, this study analyzed data elicited through phonetic and semantic verbal fluency tasks, the Chaplin film retelling task, a semi-structured, face-to-face interview, and a sociolinguistic questionnaire. All instruments used for data elicitation were piloted with a small number of native speakers of German before they were administered to the monolingual and bilingual German speakers who participated in this study. Below, each of the data elicitation techniques is explained in detail, in the order the tasks were administered.

3.3.2 Formal Elicitation: Verbal Fluency Tasks

The first data set was collected through verbal fluency tasks which are “aimed at tapping specifically into lexical retrieval, which has been recognized to be one of the most important and earliest consequences of first language loss” (Schmid, 2004a, p. 360). And while “it has not been demonstrated whether the results [...] correlate with difficulties the attriter encounters in the production of unguided discourse” (Köpke & Schmid, 2004, p. 26) it can be a useful tool especially when being triangulated with data from spontaneous speech samples and correlated with data from a sociolinguistic questionnaire.

All participants completed two tasks: a phonetic verbal fluency task and a semantic verbal fluency task. The letters selected for the phonetic verbal fluency task

were *F*, *A*, and *S*, which are most commonly used for this task (e.g., Bialystok, Craik & Luk, 2008; Obler et al., 1986; Portocarrero, Burright & Donovanick, 2007; Rosselli et al., 2000). In the *FAS* set in English, *F* has the lowest and *S* has the highest dictionary frequency (cf. Spreen & Strauss, 1998); the same applies for the *FAS* set in German (cf. *Duden*, 2000). For the semantic verbal fluency task, the following categories were selected: *animals*, *fruits and vegetables*, and *things in the kitchen*. These categories have also been used in previous research (e.g., Bialystok, Craik & Luk, 2008; Gollan, Montoya & Werner, 2002; Obler et al., 1986; Portocarrero, Burright & Donovanick, 2007; Roberts & Le Dorze, 1997; Rosselli et al., 2000; Schmid, 2009b; Snodgrass & Tsivkin, 1995; Waas, 1996).

For each of the six tasks, participants were asked to produce as many lexical items as possible within 60 seconds starting with a particular letter of the alphabet (phonetic) or belonging to a specific semantic category (semantic) without using proper names and without using inflected forms of a lexical item which had already been mentioned (e.g., singular and plural of the same nouns, or conjugated forms of the same verb). For the exact instructions, please see Appendix A. Immediately after the participants were given the letter or the category, the researcher began timing with a stopwatch. If participants stopped naming words before the 60 seconds were up, the researcher encouraged them to think of more words or, if there was a longer silence, repeated the instructions. If the instructions had to be repeated or participants asked clarification questions, extra time was given (cf. Spreen & Strauss, 1998, p. 448). However, this was the case only with a very small number of participants.

3.3.3 Spontaneous Speech

Discourse data for L1 attrition research can be collected via interviews (e.g., Boyd, 1993; Isurin, 2007; Skaaden, 2005), group discussions (e.g., Porte, 2003), or narratives based on pictures, picture stories or film retellings (e.g., Olshtain & Barzilay, 1991; Pavlenko, 2003; Schmid, 2007, 2009; Skaaden, 2005). One advantage of such ‘natural’ data elicitation techniques is that they attempt to “measure attrition at the level at which it actually occurs, as against the largely abstract skills that formal tests aim at tapping into” (Köpke & Schmid, 2004, p. 27). For this study, spontaneous speech data were collected through the Chaplin film retelling task and a semi-open, face-to-face interview conducted by the researcher.

3.3.3.1 Chaplin Film Retelling Task

This instrument, which was adapted from the Chaplin film retelling task used in a number of other research studies (De Leeuw, Schmid & Mennen, 2010; Perdue, 1993; Schmid, 2007, 2009), represents a compromise between authentic free speech and a controlled oral task. It employs a montage of Charlie Chaplin’s silent comedy film *Modern Times* (1936) which lasts about seventeen minutes and is divided into two episodes (for a detailed description of the two episodes, please refer to Appendix B). The researcher and each participant watched the first episode together in order to create a common knowledge base for the retelling. Then, the researcher left the room while the participant watched the second episode of the movie. At the end of the second episode, the researcher returned and the participant was asked to retell the second episode (cf. Perdue,

1993). The film retelling was conducted in a quiet room, digitally recorded, and later transcribed verbatim by the researcher.

According to Perdue (1993), this method of data elicitation provides rich spontaneous speech data because:

- a) This is a complex verbal task: the speaker retells part of a relatively complex story, consisting of events whose relationship to each other must be specified (for example, event *a* caused event *b* to happen). Within each event, the speaker has to tell who did what to whom, introducing new characters and maintaining reference to characters who are already on stage. The main characters are male (Charlie) and female (a young girl) and they act and are acted upon. Their stories, which run in parallel during the first half of the film, intertwine during the second half, necessitating a choice on the part of the [...] [participant] as to which of them is central in which event.
- b) We have partial, although not total, control over what is mutually known to [...] [participant] and [...] [researcher] at the beginning, and over the retelling of the story by the [...] [participant] in that the film is available to compare with his production. This gives us a partial idea of what the [...] [participant] would maximally want to retell, on the assumption that he wants to get his listener [i.e., the researcher] to understand what he has seen. (p. 105)

An additional advantage of film retelling tasks is that speech samples can be obtained without any unnecessary interference from the researcher (Porte, 2003). Furthermore, they represent samples of language use in context, the output they produce is more complex, and the data are rather homogeneous across subjects due to constant semantic referents. Especially narratives based on film, as opposed to pictures or picture stories, seem to be less artificial (Pavlenko, 2003).

3.3.3.2 Semi-Structured Interview

The second part of the spontaneous speech data was collected through a semi-structured, face-to-face interview conducted by the researcher (for the interview questions, please refer to Appendix C). The interview consisted of ten questions and was devised based on theoretical assumptions underlying sociolinguistic interviews (cf. Tagliamonte, 2006). It is assumed that interviewees produce more natural speech when speaking about happy, terrible or embarrassing moments in their lives or issues that make them happy or angry as they get more engaged in the topic of conversation which then lowers their affective filter and the potential anxiety caused by the recording (cf. Labov, 1966, 1972, 1984; Starks & McRobbie-Utasi, 2001; Tagliamonte, 2006). The interviews were conducted in a quiet room, digitally recorded, and later transcribed verbatim by the researcher. Apart from a few exceptions, most interviews took between ten and twenty minutes.

3.3.4 Introspection and Self-Assessment: Sociolinguistic Questionnaire

Immediately after participants completed the phonetic and semantic verbal fluency tasks, the Chaplin film retelling task, and the semi-structured interview, they were asked to complete a sociolinguistic questionnaire. According to Schmid (2004a), a questionnaire is “an indispensable part of any study involving multilinguals, considering the large variation encountered in this type of subjects” (p. 358), and a number of studies on L1 attrition have included such questionnaires in order to elicit information on participants’ language use, preference and attitudes, metalinguistic awareness, or ratings of L1 and L2

performance (e.g., Ammerlaan, 1997; Hulsen, 2000; Isurin, 2007; Jarvis, 2003; Porte, 1999; Yağmur, de Bot & Korzilius, 1999; Waas, 1996).

3.3.4.1 Questionnaire for the Quasi-Experimental Groups

The questionnaire, which had to be completed by the two quasi-experimental groups (i.e., German Instructors (GI) and Other Professionals (OP); see Appendix D), represents an amalgamation of instruments of this type used by Waas (1996) and Hulsen (2000).

The first two sections of the questionnaire elicited information about the participants' personal, educational, linguistic, and professional background which enabled the researcher to provide more precise descriptions of the participants and to define potential confounding variables. The other sections included a number of questions and statements designed to elicit information on the following sociolinguistic variables: overall language use (of German, English and other languages), language preference and dominance, L1 use and input, visits to Germany and/or German-speaking countries, motivation to maintain the L1, attitudes towards the native language, country and culture, linguistic awareness, and L2 use and input. Participants answered the questions or rated the statements by checking the appropriate box on a Likert-scale. An even number of responses was especially important for the questions regarding attitudinal and motivational factors in order to eliminate the possibility of a neutral response (cf. Busch, 1993).

The questionnaire ends with an open-ended question about the participants' thoughts, feelings, worries, etc. regarding their language use and linguistic performance

during the phonetic and semantic verbal fluency tasks, the Chaplin film retelling task, and the semi-structured, face-to-face interview.

3.3.4.2 Questionnaire for the Control Group

The questionnaire for the participants of the monolingual (or minimally bilingual) Control Group (CG) was translated into German (see Appendix E) and only elicited information about the participants' personal, educational, linguistic, and professional background to allow for a more precise description of participant characteristics. In addition, participants were also given the opportunity to comment on their language use and their performance on the linguistic tasks. Due to the fact that the Control Group exclusively consisted of monolingual or minimally bilingual speakers, German is the only language used in daily life. Therefore, there was no need to measure the amount of exposure to and use of the native language.

3.4 Data Analysis

3.4.1 Verbal Fluency Data

Phonetic and semantic verbal fluency tasks were scored by two raters to ensure the accuracy of the results. In order to obtain the verbal fluency scores, the number of correct words each participant produced for each of the three phonetic and the three semantic categories were counted. Incorrect words, repetitions, English intrusions, and words belonging to another category were not counted. In the semantic categories, a superordinate label of a subcategory (e.g., *Fische, Vögel*) was only counted as a correct

word when no other subcategory members were named (e.g., *Goldfisch* or *Karpfen* in the category *Fische*; or *Amsel* or *Drossel* in the category *Vögel*).

After a phonetic and semantic verbal fluency score, i.e., a word count, had been established for each participant, group means for the Control Group (CG), German Instructors (GI), and Other Professionals (OP) were calculated. In addition, for each participant, overall verbal fluency scores were calculated by averaging the total number of correct responses across the three phonetic categories (*F*, *A*, and *S*) and across the three semantic categories (*animals, fruits and vegetables, things in the kitchen*), and group means were established. Last but not least, incorrect words, English intrusions, and metalinguistic comments pointing to lexical retrieval problems were counted and group means were established.

The group means for each of the categories, the overall group means (phonetic and semantic) as well as the incorrect words, English intrusions, and metalinguistic comments were analyzed in a one-way, between-subjects analysis of variance (ANOVA) (cf. chapter 3.4.4.1 for an explanation) with participant type (Control Group, German Instructors, and Other Professionals) as the factor. Additional pairwise comparisons (cf. chapter 3.4.4.2 for an explanation) were conducted to provide more detailed information regarding the differences between the three groups.

3.4.2 Spontaneous Speech Data

3.4.2.1 Transcription and Coding Procedure

All speech samples elicited through the Charlie Chaplin film retelling and the semi-structured interview were digitally recorded and transcribed verbatim by the researcher in regular *.doc* format and coded for linguistic deviations. The coding procedure was performed simultaneously by the researcher as well as a second independent rater, a monolingual German-speaker, in order to ensure the accuracy of coding. Only errors coded by both raters were considered for further analysis.

The error types listed in the table below – which has been adapted from Schmid (2002, p. 80) – were used by both raters as a guideline to identify deviant forms in the speech samples. Errors which did not belong to one of these categories were coded as errors of unknown origin. Furthermore, metalinguistic comments and self-repairs were coded and quantified.

Table 4. Error Types

DOMAIN	ERROR TYPE
Lexicon	<ul style="list-style-type: none"> • Code-switching • Borrowing of a single lexical item • Lexical retrieval problems (as indicated by pauses and filler words) • Partial recall of an L1 word
Semantics	<ul style="list-style-type: none"> • Transfer of an English word to a phonologically similar word or a part-synonym in German • Calque (morpheme-by-morpheme translation)
Function words	<ul style="list-style-type: none"> • Deviant use of prepositions • Dropping of articles (e.g., in front of streets, months or countries)
Morphology	<ul style="list-style-type: none"> • Case • Gender • Plural • Verb phrase morphology
Morphosyntax	<ul style="list-style-type: none"> • ‘Structural borrowing’ (a German verb is used with the argument structure of its English equivalent) • Analytic vs. synthetic negation
Syntax	<ul style="list-style-type: none"> • Order of adverbials (place before time) • Order of indirect object and direct object • Subject-verb structures in main clauses (German as a V2 language) • Subject verb agreement • Discontinuous word order (V_{FIN}-X-V_{INF}) • Verb-final placement in subordinate clauses

3.4.2.2 Computing the Lexical Diversity Measure *D*

In a second step, each transcript was converted to the CHAT (Codes for Human Analysis of Transcripts) format, and analyzed with the *vocd* software included in the CLAN suite (available at <http://childes.psy.cmu.edu/>; MacWhinney, 2000). The *vocd* software “implements a solution to problems encountered in quantifying vocabulary diversity” (McKee, Malvern & Richards, 2000, p. 323) and offers an alternative to the traditionally used type-token ratio (TTR).

The type-token ratio is flawed because the value obtained is related to the size of the speech sample. Speech samples with a greater number of tokens yield lower values

for TTR because, due to repetition of previously introduced types, the number of types increases at a slower rate than the number of tokens. In order to overcome this problem, which can significantly skew research results, the *vocd* software was developed which computes the lexical diversity measure D (cf. McKee, Malvern & Richards, 2000).

The approach is based on an analysis of the probability of new vocabulary being introduced into longer and longer samples of speech [...]. This yields a mathematical model of how TTR varies with token size. By comparing the mathematical model with empirical data in a transcript, it provides a new measure of vocabulary diversity that we refer to as D . The measure has three advantages: (1) it's not a function of the number of words in the sample; (2) it uses all the data available; (3) it is more informative because, as opposed to a single value of TTR, it represents how the TTR varies over a range of token size for each speaker [...] (i.e., it is based on the TTR versus token curve calculated from data for the transcript as a whole rather than a particular TTR value on it). (McKee, Malvern & Richards, 2000, p. 324)

According to Jarvis' (2002) comparison and evaluation of lexical diversity measures, the lexical diversity measure D (Malvern & Richards, 1997) is the most accurate – along with Dugast's (1980) *Uber* formula, which is an algebraic transformation of the traditional type-token ratio. However, the *Uber* formula is better suited for small text samples consisting of a couple of hundred words while the D measure is especially useful for longer and very large text samples (cf. McKee et al., 2000). Since the speech data from this study's participants also included several long narratives, the lexical diversity measure D was chosen for the analysis and established for each of the speech samples from the Chaplin film retelling task and the semi-structured interview.

The D measures were then analyzed in a one-way between-subjects analysis of variance (ANOVA) (cf. chapter 3.4.4.1 for an explanation) in order to test whether the

differences between the three groups were statistically significant. Additional pairwise comparisons (cf. chapter 3.4.4.2 for an explanation) were conducted to provide more detailed information regarding the differences between the three groups.

3.4.2.3 Computing the Error Rate

For the quantitative analysis, the total number of errors was counted in each speech sample and a percentage of errors in relation to total number of word types was computed by multiplying the number of errors by 100 and dividing the resulting number by the number of word types (number of errors x 100/number of types). The number of types was computed with the *vocd* software included in the CLAN suite (available at <http://childes.psy.cmu.edu/>; MacWhinney, 2000).

The error rates were compared in a one-way between-subjects analysis of variance (ANOVA) in order to test whether the differences between the three groups were statistically significant. Additional pairwise comparisons were conducted to provide more detailed information regarding the differences between the three groups.

3.4.3 Questionnaire Data

From the questionnaire, mean scores were computed for each participant, averaging the answers to the questions for the sociolinguistic variables under investigation (L1 use, contact and input, motivation for L1 maintenance, and identity and attitudes towards the L1 and C1) (see Appendix E). The mean scores and the scores for each individual question or statement for the two quasi-experimental groups were then analyzed with a

one-way, between-subjects analysis of variance (ANOVA) in order to determine whether the difference between the groups were statistically significant. Additional pairwise comparisons were conducted to provide more detailed information regarding the differences between the three groups.

In addition, Pearson's correlation coefficients (cf. chapter 3.4.4.3 for an explanation) were calculated for the participants' scores for the sociolinguistic variables (length of residence, L1 use, L1 interlocutor type, L1 input, motivation for L1 maintenance, and identity and attitudes towards the L1 and C1) and the linguistic measures (phonetic and semantic verbal fluency scores, lexical diversity measures from the film retelling and the interview, and error rates from the film retelling and the interview) in order to determine whether there was any relationship between these measures.

3.4.4 Statistical Analyses

For the analysis of the linguistic and sociolinguistic data collected for this study, the following statistical procedures were employed: analysis of variance, pairwise comparisons, and Pearson's correlation coefficients. All three statistical analyses will be explained in the following sections.

3.4.4.1 Analysis of Variance

Analysis of variance is a collection of statistical procedures used to analyze designed experiments, such as the quasi-experimental research conducted for this study. The

analysis of variance is based on “the idea of dividing the total variability of the scores in an experiment into systematic sources of variability that reflect the experimental manipulations and unsystematic sources that are not influenced by these manipulations” (Keppel & Wickens, 2004, p. 1). In order to determine whether there is a statistically significant difference between the mean scores of three groups under investigation – Control Group (CG), German Instructors (GI), and Other Professionals (OP) – one-way, between-subjects analyses of variance (ANOVA) were conducted with ‘group’ as the factor, i.e., the independent variable.

3.4.4.2 Pairwise Comparisons

In order to arrive at a better understanding of the differences between the three groups, all pairwise comparisons were examined, i.e., each of the three groups – Control Group (CG), German Instructors (GI), and Other Professionals (OP) – were compared with every other group. Therefore, the family of tests contained a total of three comparisons (cf. Keppel & Wickens, 2004), namely comparisons between CG and GI, CG and OP, and GI and OP.

Since the number of pairwise comparisons conducted is greater than the number of groups minus 1, the p -level for all post-hoc analyses had to be adjusted with the Bonferroni correction. The Bonferroni correction can be applied to a wide range of statistical tests, including the analysis of variance, and is a very general procedure for controlling the Type I error rate. A Type I error occurs when the null hypothesis is true, i.e., there is no difference between the groups, but we nonetheless reject the null

hypothesis and assume a statistically significant difference. (cf. Keppel & Wickens, 2004). By dividing the p -level of .05 by the number of pairwise comparisons, the p -level at which statistical results are significant was reduced to $p = .017$.

3.4.4.3 Pearson's Correlation Coefficients

In order to investigate whether the values of the sociolinguistic variables (length of residence, L1 use, L1 input, motivation for L1 maintenance, and identity and attitudes towards the L1/C1) can be used to predict the value of the linguistic measures (phonetic verbal fluency, semantic verbal fluency scores, lexical diversity measures and error rates from the film retelling and the interview), Pearson's correlation coefficients were calculated.

The Pearson's correlation coefficient is the most familiar method to measure the dependence between two variables. The correlation coefficient is sensitive to a particular form of relationship between the two variables. This relationship can be represented by a straight line, and ranges between -1 and +1. A value of +1 is a perfect positive linear relationship, a value of -1 is a perfect negative linear relationship. The closer the value approaches +1 or -1, the stronger is the correlation, i.e., the closer the relationship between the two variables (cf. Keppel & Wickens, 2004).

A positive correlation means that the two variables that are correlated behave the same way, i.e., when the value of variable A increases, so does the value of variable B and when the value of variable A decreases, so does the value of variable B. In contrast, a negative correlation means that the two variables behave directly opposite, i.e., when the

value of variable A increases, the value of variable B decreases, and when the value of variable A decreases, the value of variable B increases.

When interpreting the results of such calculations, it is important to keep in mind that correlation does not equal causation. However, correlations can still be understood as an indication of a potential causal relationship.

CHAPTER 4: FINDINGS

For this study, fifty-seven native speakers of German were asked to complete three phonetic and three semantic verbal fluency tasks, the Chaplin film retelling task, a semi-structured, face-to-face interview, and a sociolinguistic questionnaire. The participants were divided into three groups: a monolingual or minimally bilingual Control Group (CG) living in Germany ($n=17$), German Instructors (GI) who teach their native language at U.S. institutions of secondary or higher education ($n=19$), and Other Professionals (OP), i.e., individuals who work in professions other than language teaching ($n=21$). The data from these three groups were analyzed and compared in order to answer five research questions.

4.1 Restating the Research Questions

- (1) What are the participants' phonetic and semantic verbal fluency scores, and how do the data from the three groups under investigation (Control Group, German Instructors, and Other Professionals) compare?
- (2) What is the amount of lexical diversity in the participants' speech samples, and how do the data from the three groups compare?
- (3) What are the participants' error rates, and which error types occur in the spontaneous speech data? How do the data from the three groups compare?

- (4) Do the two bilingual groups (German Instructors and Other Professionals) differ with respect to sociolinguistic variables (amount of L1 use, L1 interlocutor type, L1 input, motivation to maintain the L1, and identity and attitudes towards the native language, country and culture)?
- (5) Do the bilingual participants' linguistic measures (phonetic and semantic verbal fluency scores; lexical diversity measures, and error rates from the film retelling and the interview) show correlations with the sociolinguistic variables (length of residence, amount of L1 use, L1 interlocutor type, L1 input, motivation to maintain the L1, and identity and attitudes towards the native language, country and culture)?

4.2 Verbal Fluency Data

Verbal fluency data were elicited through three phonetic verbal fluency tasks with the letter cues *F*, *A*, and *S*, and three semantic verbal fluency tasks with the stimulus categories *animals*, *fruits and vegetables*, and *things in the kitchen*. For each of the six tasks, participants were asked to produce as many lexical items as possible within sixty seconds starting with a particular letter of the alphabet (phonetic verbal fluency tasks) or belonging to a specific semantic category (semantic verbal fluency tasks).

4.2.1 Phonetic Verbal Fluency

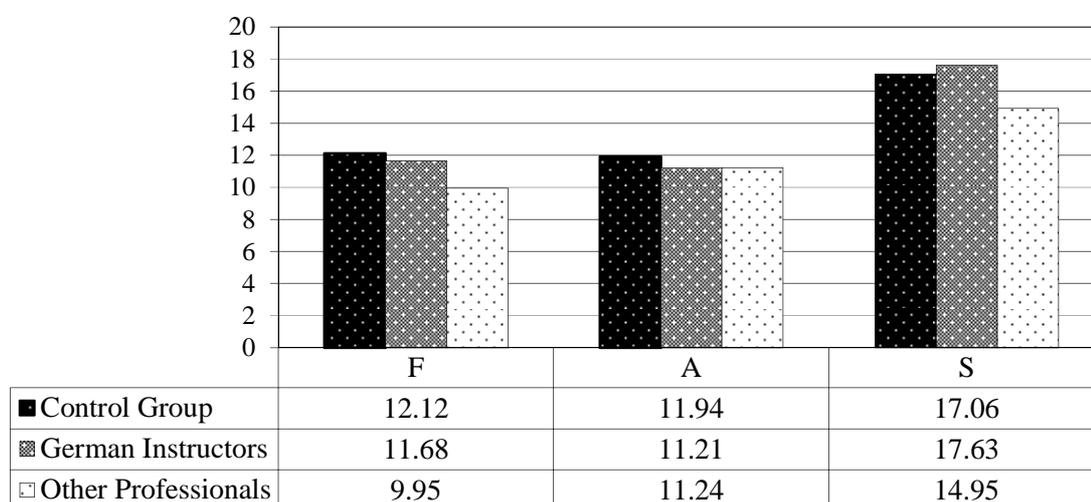
For each of the three phonetic verbal fluency tasks, each participant's correct lexical items were counted and group means were established (see figure 1). On average, the

Control Group (CG) named between 11.94 and 17.06 correct lexical items, the German Instructors (GI) produced between 11.21 and 17.63, and the Other Professionals (OP) between 9.95 and 14.95 exemplars.

All three groups produced the largest number of lexical items for the letter *S*. CG and GI produced the second highest number of lexical items for the letter *F* and the lowest for the letter *A*. However, the results for the OP group were opposite, i.e., they produced more lexical exemplars for the letter *A* than for the letter *F*.

A comparison of the group means showed that for the letter *F*, CG named the most words, followed by GI and OP who produced the smallest number of words, i.e., two words less than CG. For the letter *A*, CG obtained the best result and the two other groups performed slightly lower, though the differences between the group means were minimal. For the letter *S*, GI slightly outperformed CG (with a difference of 0.57), and OP named approximately two words less than the other two groups.

Figure 1. Mean Number of Words Produced for Each Phonetic Verbal Fluency Task.



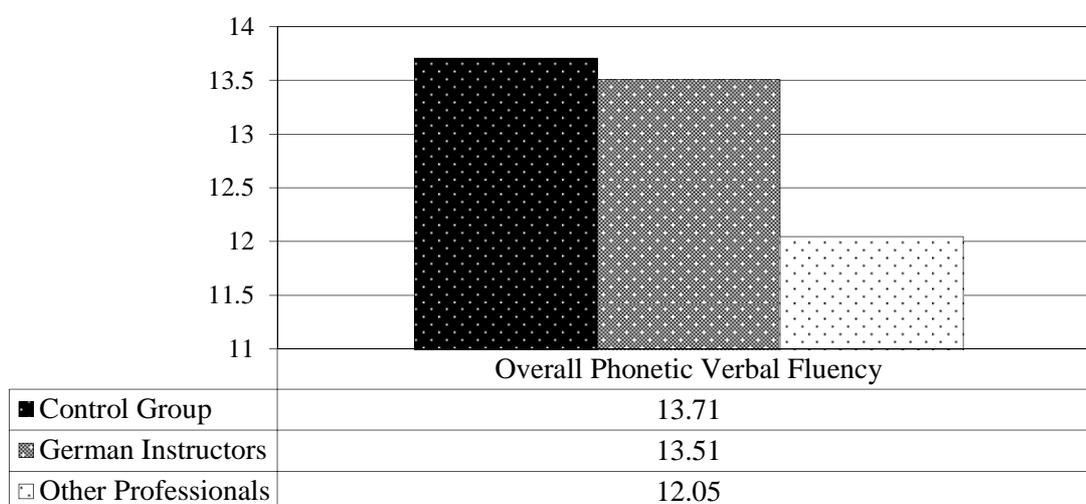
Note. Standard deviations for the group means are provided in Appendix F.

In order to establish whether the differences between the three groups are statistically significant, group means for each of the three phonetic verbal fluency tasks were compared with a one-way, between-subjects analysis of variance with group (CG, GI, and OP) as the factor. No overall statistically significant difference was found for any of the three tasks. Additional pairwise comparisons did not reveal any statistically significant difference between CG and GI, between GI and OP, and between CG and OP on any of the three phonetic verbal fluency tasks either.

In a second analysis, average scores over the three phonetic verbal fluency tasks with the letters *F*, *A*, and *S* were computed for each participant and group means were established for the three groups: Control Group (CG), German Instructors (GI), and Other Professionals (OP) (see figure 2). In the combined scores, CG performed best, followed

by GI and OP. The difference between CG and GI was extremely small (0.20 words), while the differences between CG and OP, and between GI and OP were somewhat larger, although still less than two words.

Figure 2. Mean Number of Words Produced Across All Phonetic Verbal Fluency Tasks.



In order to establish whether the differences in overall phonetic verbal fluency between the three groups are statistically significant, group means were compared with a one-way, between-subjects analysis of variance with the factor group (CG, GI, and OP). The overall difference was not statistically significant and pairwise comparisons did not reveal any statistically significant differences among the three groups.

4.2.2 Semantic Verbal Fluency

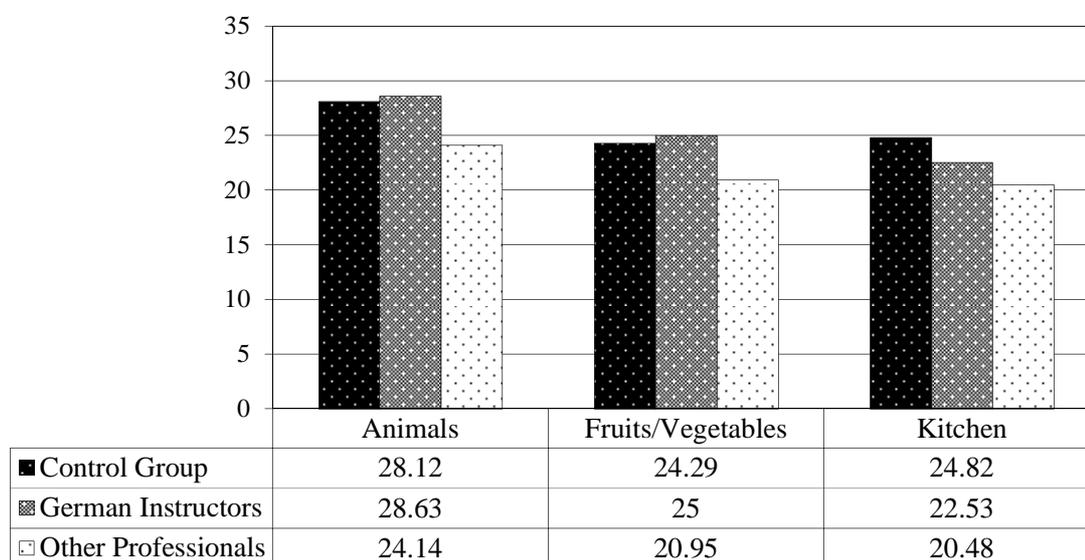
For each of the three semantic verbal fluency tasks *animals*, *fruits and vegetables*, and *things in the kitchen*, each participant's correct lexical exemplars were counted and group

means established (see figure 3). On average, the Control Group (CG) named between 24.29 and 28.12 correct lexical items, the German Instructors (GI) produced between 22.53 and 28.63, and the Other Professionals (OP) between 20.48 and 24.14 exemplars.

All three groups named the largest numbers of words when prompted with the category *animals*. Furthermore, CG and GI produced more exemplars than OP in all three semantic verbal fluency tasks.

For the categories *animals* and *fruits and vegetables*, GI named the most lexical items, followed by CG and OP. In each of the two categories, the differences between GI and CG were less than one word. However, the differences between GI and CG and OP were larger as OP produced approximately four words less than the other two groups. For the category *things in the kitchen*, CG produced the largest number of correct lexical items, followed by GI and OP. The difference between CG and GI was approximately two words, the difference between CG and OP was approximately four words.

Figure 3. Mean Number of Words Produced for Each Semantic Verbal Fluency Task.

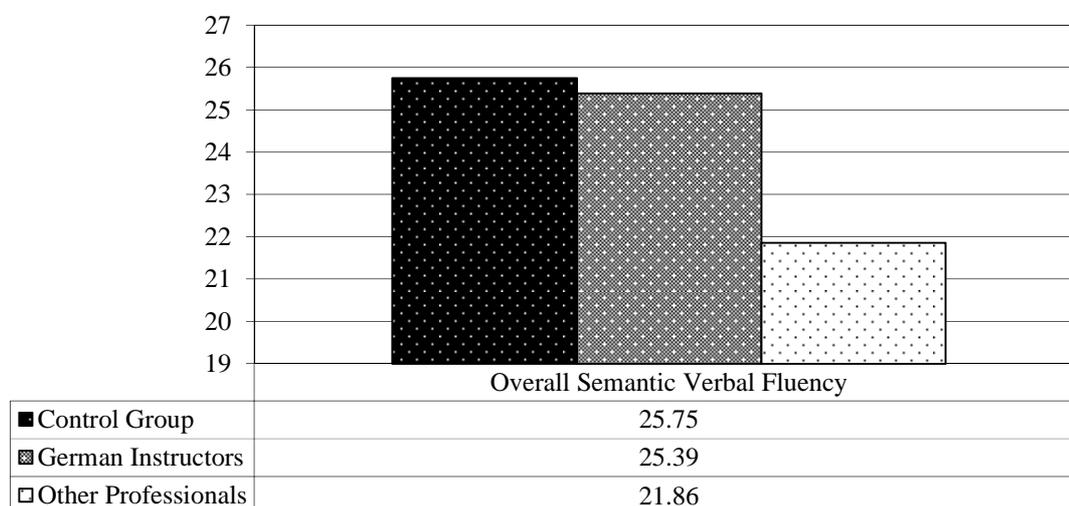


For each of the three semantic categories, the differences between the group means were analyzed with a one-way, between-subjects analysis of variance with group (CG, GI, and OP) as the factor. While no significant difference was found for the category *animals*, the differences for the categories *fruits and vegetables* ($F(2,54)=3.52, p<.05$) and *things in the kitchen* ($F(2,54)=3.74, p<.05$) were statistically significant.

Pairwise comparisons were conducted to obtain a clearer picture of between-group differences. There were no statistically significant differences between CG and GI. However, a statistically significant difference was found between GI and OP for the category *fruits and vegetables* ($F(1,38)=6.33, p<.017$). Furthermore, a marginally significant difference was found between CG and OP for the category *things in the kitchen* ($F(1, 36)=6.04, p=.019$).

In an additional analysis, an average score for the three semantic verbal fluency tasks with the categories *animals*, *fruits and vegetables*, and *things in the kitchen* was computed for each participant and mean scores were established for the three groups (see figure 4). A comparison of the group means shows that the Control Group (CG) performed best, followed by the German Instructors (GI) and the Other Professionals (OP). Similarly to the results in overall phonetic verbal fluency, the difference in overall semantic verbal fluency between CG and GI was rather small, the differences between these two groups and OP, however, were larger as the participants in the OP group produced on average circa four lexical items less than the participants in the other two groups.

Figure 4. Mean Number of Words Produced Across All Semantic Verbal Fluency Tasks.



A one-way, between-subjects analysis of variance with the factor group (CG, GI and OP) revealed that the difference between group means for overall semantic verbal fluency was

statistically significant ($F(2,53)=4.32, p<.05$). Pairwise comparisons showed that the differences between CG and OP, and between GI and OP were statistically significant (CG and OP: $F(1,36)=7.40, p<.017$; GI and OP: $F(1,38)=7.42, p<.017$) while the difference between CG and GI was statistically not significant.

4.2.3 Additional Observations

In addition to quantifying the number of correct lexical items each participant named for each of the three phonetic and three semantic categories and analyzing these scores quantitatively, the data were also analyzed for metalinguistic comments, lexical retrieval problems, and errors. Errors were defined as incorrect lexical items – i.e., non-words – and English intrusions.

In the following sections, metalinguistic comments, lexical retrieval problems, and errors discovered in the data of the two bilingual groups, GI and OP, are described and illustrated with examples. None of these linguistic phenomena were detected in the CG data.

4.2.3.1 Metalinguistic Comments

A number of participants commented on difficulties they experienced during the phonetic verbal fluency tasks and stated that only English words came to mind (examples 1-4), that they were unable to recall words in neither English nor German (example 5), and one participant in the OP group even admitted that she does not know which language the words belong to that come to mind (example 6).

- (1) Mir fällt immer nur Englisch ein. (GI11)
- (2) Oh Gott, jetzt fallen mir englische Wörter ein. Aargh! (GI18)
- (3) Hm, das ist ein englisches Wort. (OP12)
- (4) Jetzt fallen mir lauter englische Wörter ein. (OP17)
- (5) Mir fallen weder Sachen auf Englisch noch auf Deutsch ein. (GI10)
- (6) Mir fallen immer Wörter ein, wo ich nicht weiß, welche Sprache das ist. (OP17)

Metalinguistic comments from two GI participants also included code-switches between German and English (examples 7-11) and three participants from the OP group even inserted comments entirely in English (examples 12-15) while completing the phonetic and semantic verbal fluency tasks in German.

- (7) Äh, *no*, Vater geht nicht. (GI5)
- (8) Kann ich auch *past* machen? Also “fuhr?” (GI5)
- (9) Alterieren – Gibt’s so’n Wort? – alternieren? – *Whatever!* (GI15)
- (10) Wie heißen die? – Äh, *nevermind...* (GI15)
- (11) Art – Äh, *no*, “art” ist Englisch. (OP3)
- (12) *I can’t think. I can’t think.* (OP3)
- (13) *Oh my goodness!* (OP16)
- (14) *Uh, what else?* (OP16)
- (15) *I’m quite amused how I can’t think of anything.* (OP17)

4.2.3.2 Errors in the Verbal Fluency Data

4.2.3.2.1 Incorrect Lexical Items

While phonetic verbal fluency data from the two quasi-experimental groups GI and OP only included one incorrect German word, i.e., the non-word *Finsterheit* (GI10) instead of the correct *Finsternis*, participants in both groups made a lot more lexical errors when prompted with a semantic category, e.g., *Polarbär* (GI11) instead of *Eisbär*, and *Augenpfau* (OP8) for *Pfauenauge*. The former seems to be a transfer from the English *polar bear* whereas the latter can be considered an instance of partial recall, the incorrect

lexical item includes the correct morphemes but in the wrong order. Another transfer error is *Pommegranate* (GI2) which was produced instead of *Granatapfel*.

The largest number of incorrect lexical items, however, manifested itself in responses for the category *things in the kitchen*: *Wender* (GI2) instead of *Pfannenwender*; *Waschautomat* (GI5) for *Spülmaschine*; *Kerzenhalter* (GI16) for *Kerzenständer*; *Abtrocknerhandtuch* (OP1) for *Geschirrtuch*; *Spachtel* (OP5) for *Pfannenwender*; and *Küchenbehälter* (OP9) for *Tupperdose* or *Plastikbehälter*.

4.2.3.2.2 English Intrusions

With the exception of the English intrusion *forensic* (OP8) which was found in the phonetic verbal fluency data, all instances of lexical intrusions from the L2 appeared in the semantic verbal fluency data. For the category *animals*, the words *javelina* (GI2), *reindeer* (GI10), and *tortoise* (OP2) were named. In the category *fruits and vegetables*, participants listed *plantanes* (GI1), *squash* (GI1), *sour sob* (GI2), *lilikoi*, *passion fruit* (GI2), *tangerine* (GI10 and OP3), *eggplant* (GI15), and *chili peppers* (OP17). A number of English intrusions were also found in the category *things in the kitchen*, i.e., *chop sticks* (GI2), *blender* (OP8), *spatula* (OP13), *microwave* (OP16), and *ziploc bags* (OP18).

The data also revealed another form of L2 intrusion, i.e., intrusions of phonetic nature. A number of cognate nouns were pronounced in the L2 instead of the L1 as required for the verbal fluency task, e.g., *orang utan* (GI1), *zucchini* (OP17), and *grapefruit* (OP17). In two instances, cognate nouns were even pronounced as a mixture between the two languages, e.g., the first syllable was pronounced in German and the

second syllable in English (*tiger*, GI5) or vice versa (*broccoli*, OP16). In most cases, participants failed to notice their mispronunciation and continued naming other lexical items belonging to the category in question. In two instances, however, participants did notice their mistake and corrected (or attempted to correct) their errors, e.g., *mangos* (OP12) and *coyote* (OP3).

4.2.3.3 Lexical Retrieval Problems

In addition to metalinguistic comments, incorrect lexical items and intrusions from the L2 which suggest difficulties with lexical retrieval, the semantic verbal fluency data also included evidence that leaves no doubt that participants experienced difficulties accessing certain lexical items. In some instances, the correct lexical item was preceded by a metalinguistic comment, a question and/or circumlocution (examples 1-5).

- (1) Wie heißen denn die Dinger, mit denen man Pfannen anfasst? Topflappen. (GI1)
- (2) Die roten Dinger, rote Beete. (GI11)
- (3) Die ganzen grünen Blätterdinger, wie heißt das auf Deutsch? – Grünkohl – Die anderen weiß ich nicht, wie die auf Deutsch heißen. (GI11)
- (4) Löffel – So 'ne, wie heißen diese? – Salatbesteck. (GI11)
- (5) Wie heißt denn der Kocher, den man da noch so hat? – Teekessel. (GI18)

In other cases (examples 6-17), participants produced an incorrect and/or an English word first and were then able to self-repair and recall the correct lexical exemplar. Often this lexical retrieval process was also accompanied by metalinguistic comments indicating an awareness of problems with accessing vocabulary. In the examples, incorrect words are marked with an asterisk, and English words are italicized.

- (6) *sour sob*, ..., ..., saure Sobbe (GI2)
- (7) *Eis-, *Polarbär, Eisbär (GI11)
- (8) *alterieren, gibt's so'n Wort? – alternieren – *whatever!* (GI15)
- (9) Uhm, *eggplant*, Aubergine. (GI15)
- (10) Küchen-, *Küchengerät – Heißt das so? Nee, ..., ..., Küchenmaschine heißt das, nicht *Küchengerät! Entschuldigung! (GI18)
- (11) Wie heißt das Ding? – *Meerschwein – *Tortoise*, wie heißt'n das? – Schildkröte. (OP2)
- (12) *Wasch-, äh, *Kü-, *Waschmaschine, äh, wie heißt'n die? *Wäsche... hm... Geschirrspülmaschine, *Geschirrtrockner. (OP2)
- (13) *Cook*-,... Küchentuch, Küchenrolle. (OP4)
- (14) *Blender*, Mixer (OP8)
- (15) *Messgerät, Waage (OP10)
- (16) *Küchen-, äh, *Teigschaber, Pfannenheber (OP10)
- (17) *Microwave*, *Mikrowa-, äh, Mikrowelle (OP16)

In the examples listed above (examples 1-17), participants clearly had trouble accessing certain words but were ultimately able to successfully retrieve the correct lexical items. In other instances, however, they were unable to recall the correct word (examples 18-32). Again, participants produced an incorrect word (marked with an asterisk) and/or English word (italicized) or a circumlocution, commented on their lexical retrieval problems, and attempted to self-repair, although without success.

- (18) *Spätzlemaschinenteil. (GI1)
- (19) So'n Ablegeteil, wo man die schmutzigen Löffel drauflegen kann. (GI1)
- (20) *Waschautomat, *counter*, *dishw*- (GI5)
- (21) *Wender, *Kart-, *Pfannkuchenwender, weiß nicht, fällt mir das Wort nicht mehr ein. (GI6)
- (22) *Soßensch-, *Soßengießschüssel, wie auch immer man die nennen mag. (GI8)
- (23) Die – nee, das sagt man nicht auf Deutsch – die *Aspenbäume. (GI11)
- (24) *Plätzchendingsums, zum Ausstechen. (GI12)
- (25) *Sahne-, *Sahne-, so, *Schaumbesen nennt man das, glaub ich. (GI17)
- (26) Ach, jetzt weiß ich nicht, wie man das nennt. Dings, wo man das Geschirr zum Trocknen reinstellt. (GI17)
- (27) *Waschlappen – nee, *Putzschwämmchen. (OP6)
- (28) *Spatula*, ich weiß nicht, wie der auf Deutsch heißt. (OP13)
- (29) *Absaug-, wie heißt das auf Deutsch? Weiß ich nicht. (OP16)
- (30) Äh, wie heißen denn diese Dinger noch? Jetzt weiß ich nicht mehr, wie sie heißen. *Seepferde? Nee, aber das meinte ich nicht, Scheiße! – Die Dinger, die im

- Wasser sind. *SEALS!* Ich hab keine Ahnung mehr, wie die auf Deutsch heißen.
(OP17)
- (31) *Pizzabrett, oder wie immer das heißt. (OP17)
- (32) Jetzt wird's Englisch: *ziploc bags*. Das fällt mir jetzt auf Deutsch nicht ein.
(OP18)

The data also included instances (examples 33-37) where participants were not able to access a word, as indicated by a metalinguistic comment such as “What are these things called” but immediately moved on to the next lexical item – without spending any time on trying to retrieve the word.

- (33) Ähm, wie heißen die Dinger? (GI11)
- (34) So'n Ding da, weiß nicht, wie das heißt, äh. (GI18)
- (35) Äh, was ist das andere? Fällt mir jetzt nicht ein. (OP3)
- (36) Wie heißen diese Dinger da? – Vergessen. (OP6)
- (37) Wie heißt das Zeug noch? (OP18)

This observation may be attributed to the fact that participants were instructed to produce as many lexical items as possible within sixty seconds (for the instructions, see Appendix A). From the data, one could speculate that some participants were more focused on completing the task and did not let lexical retrieval problems slow them down, whereas other participants seemed to ‘get stuck’ on one particular item and spent an extended period of time on trying to access that lexical item without worrying about the sixty minute time limit and the time lost due to the prolonged retrieval process.

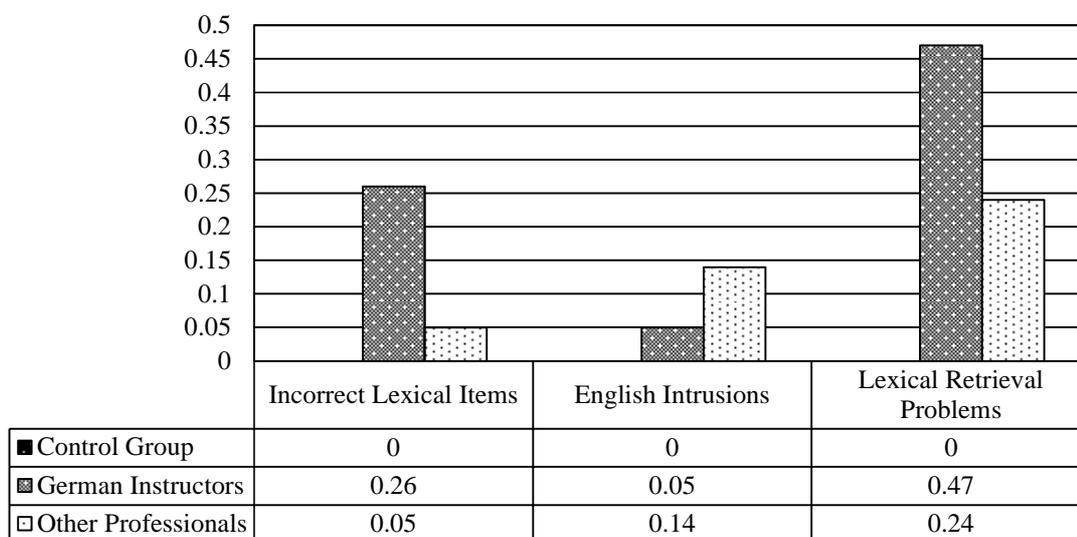
4.2.4 Distribution of Errors and Lexical Retrieval Problems

In order to determine whether there were differences between the three groups, i.e., the Control Group (CG), the German Instructors (GI) and the Other Professionals (OP), each

participant's errors, i.e., incorrect lexical items and English intrusions, as well as lexical retrieval problems were counted and group means were calculated (see figure 5).

A look at the group means in figure 5 shows that the participants in the GI group produced more incorrect lexical items, i.e., German non-words, and experienced more lexical retrieval problems than the participants in the OP group. However, the phonetic verbal fluency data from the OP group revealed more intrusions from the L2. No incorrect lexical items, English intrusions, or lexical retrieval problems were found in the CG data.

Figure 5. Distribution of Incorrect Lexical Items, English Intrusions, and Lexical Retrieval Problems in the Phonetic Verbal Fluency Data.

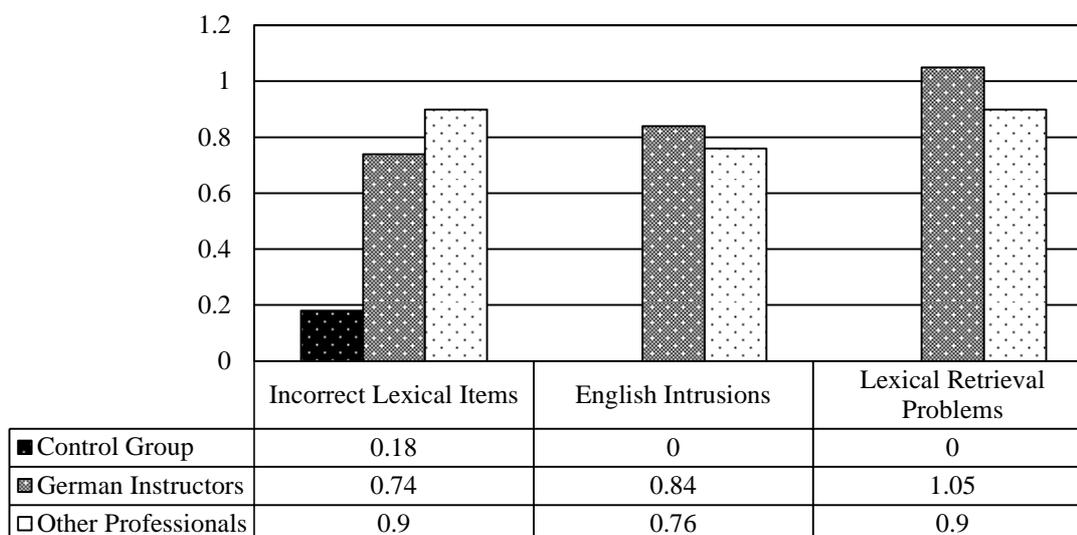


For each of the three categories, a one-way, between-subjects analysis of variance with the factor group (CG, GI, and OP) was conducted in order to find out whether the between-group differences were statistically significant. However, no statistically

significant differences between the three groups were found for any of the three categories.

Figure 6 illustrates the distribution of incorrect lexical items, English intrusions, and lexical retrieval problems found in the semantic verbal fluency data. It shows that the Other Professionals (OP) produced the largest number of incorrect items, followed by the German Instructors (GI) and the Control Group (CG). English intrusions and lexical retrieval problems occurred most frequently in the GI data, followed by the OP data, and were entirely absent from the CG data.

Figure 6. Distribution of Incorrect Lexical Items, English Intrusions, and Lexical Retrieval Problems in the Semantic Verbal Fluency Data.



The group means for the number of incorrect lexical items, English intrusions, and lexical retrieval problems in the data elicited through the semantic verbal fluency tasks were also compared in a one-way, between-subjects analysis of variance with the factor group (CG, GI and OP). The overall differences between the three groups were statistically

significant for all three categories (incorrect lexical items: $F(2,54)=3.98, p<.05$; English intrusions: $F(2,54)=3.56, p<.05$; lexical retrieval problems: $F(2,54)=4.68, p<.05$).

After the overall analyses of variance, pairwise comparisons were conducted in order to arrive at a clearer picture of between-group differences for the three categories. A significant difference between the Control Group (CG) and the German Instructors (GI) was only found in one of the categories, i.e., lexical retrieval problems ($F(1,34)=7.87, p<.01$). The differences between the Control Group (CG) and the Other Professionals (OP), however, were statistically significant for all three categories (incorrect lexical items: $F(1,36)=8.05, p<.01$; English intrusions: $F(1,36)=9.00, p<.01$; lexical retrieval problems: $F(1,36)=11.63, p<.005$). No significant difference was found between the two bilingual groups, GI and OP, for any of the three categories.

4.3 Spontaneous Speech Data

Spontaneous speech samples were elicited through the Chaplin film retelling task and a semi-open, face-to-face interview conducted by the researcher. The film retellings and the interviews were recorded electronically and transcribed verbatim. All 114 speech samples collected from the participants in the three groups were of adequate length and quality and were included in the analysis.

4.3.1 Sample Length

The speech samples from the Chaplin film retellings ranged from 411 to 1,929 tokens for the Control Group (CG) with an average of 733.29 tokens, from 135 to 1,348 for the

German Instructors (GI) with an average of 724.63 tokens, and from 243 to 971 for the Other Professionals (OP) with an average of 598.05 tokens. The interview transcripts were between 436 and 3,208 tokens for CG with an average of 1,133.94 tokens, between 453 and 1,741 for GI with an average of 1,152.89 tokens, and between 543 and 3,426 words for OP with an average of 1,209.05 tokens. For both tasks, the CG, GI and OP group means of tokens were compared and there were no statistically significant differences.

Table 5. Range and Mean Number of Tokens for the Spontaneous Speech Samples.

	Film Retelling		Interview	
	Range	Mean	Range	Mean
Control Group	411 – 1,929	733.29	436 – 3,208	1,133.94
German Instructors	135 – 1,348	724.63	453 – 1,741	1,152.89
Other Professionals	243 – 971	598.05	543 – 3,426	1,209.05

4.3.2 Lexical Diversity

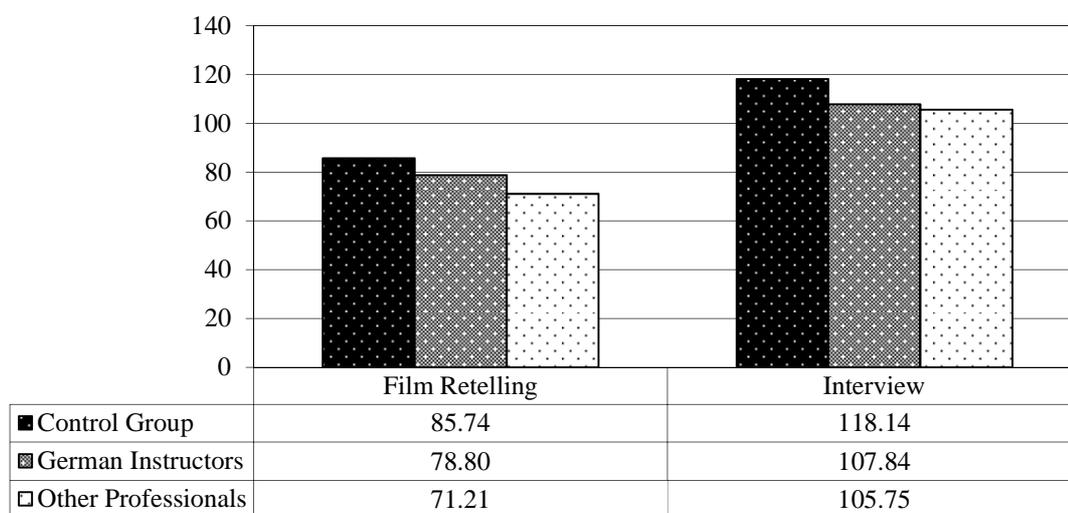
In order to measure the participants' lexical diversity, all transcripts were converted to the CHAT (Codes for Human Analysis of Transcripts) format, and analyzed with the *vocd* software included in the CLAN software suite (available at <http://childes.psy.cmu.edu/>; MacWhinney, 2000), which offers a valuable alternative to the traditionally used type-token ratio (TTR). For each participant, the lexical diversity measure D was computed for both tasks, and group means were established for the CG, GI and OP groups.

Figure 7 shows that all three groups had more lexical diversity in the interview than in the film retelling. However, this was to be expected as the Chaplin film retelling was a more controlled task that required specific vocabulary whereas the semi-structured

interview offered participants the possibility to discuss a wide variety of topics and use a more diverse vocabulary which increases the lexical diversity.

A comparison of the group means shows that, on both tasks, speech samples from the CG group were more lexically diverse than those from the two bilingual groups GI and OP, and GI performed better than OP. It is interesting to note, that the difference between these two groups was bigger in the speech samples elicited through the Chaplin film retelling task than in the speech samples elicited through the interview which seems to point to a task effect.

Figure 7. Mean Lexical Diversity Measures for the Film Retelling and the Interview



In order to compare the group means, a one-way, between-subjects analysis of variance with the factor group (CG, GI and OP) was conducted for the Chaplin film retelling data and for the interview data. Overall, no significant difference between the three groups

was found for the film retelling task. For the interview, however, there was an overall significant difference ($F(2,54)=3.27, p<.05$)

In addition to the overall ANOVA, pairwise comparisons were conducted in order to arrive at a clearer picture of between-group differences. Significant differences were found for only between the Control Group (CG) and the Other Professionals (OP) groups. Their lexical diversity measures from both speech samples were significantly different (film retelling: $F(1,36)=7.30, p=.01$; interview: $F(1,36)=6.29, p=.017$). The differences between the Control Group (CG) and the German Instructors (GI) as well as the differences between the German Instructors (GI) and the Other Professionals (OP) were not statistically significant.

4.3.3 Speech Errors

The two spontaneous speech samples elicited through the Chaplin film retelling task and the semi-structured, face-to-face interview were coded for linguistic deviations by the researcher as well as a second independent rater, a monolingual German-speaker, in order to ensure the accuracy of coding. Only those errors identified by both raters were included in the analyses.

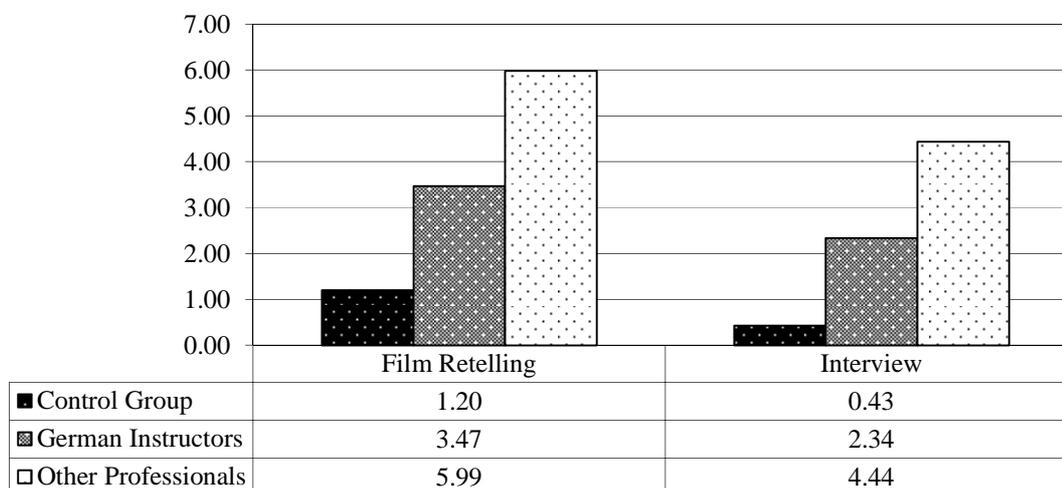
4.3.3.1 Error Rates

In order to compute the error rate for each individual speech sample, each participant's total number of errors was counted and a percentage of errors in relation to the total number of word types was computed by multiplying the number of errors by 100 and

dividing the resulting number by the number of word types (number of errors x 100/number of types). The number of types was computed with the *vocd* software included in the CLAN suite (available at <http://childes.psy.cmu.edu/>; MacWhinney, 2000). An error rate was computed for each participant for each task, and the group means were established for the Control Group (CG), the German Instructors (GI) and the Other Professionals (OP).

Figure 8 shows that all three groups had higher error rates in the film retelling than in the interview. The same observation was made for the lexical diversity measures (see section 4.3.2) and, again, this may be attributed to the controlled nature of the Chaplin film retelling task which required participants to tell exactly what happened in the episode, whereas the semi-structured interview allowed participants to select subjects of their choice and avoid difficult topics and linguistic structures they may not feel confident about. Furthermore, the data showed that, on both tasks, CG had a drastically lower error rate than the two quasi-experimental groups GI and OP, and that GI had a lower error rate than OP.

Figure 8. Mean Percentages of Errors for the Film Retelling and the Interview.



One-way, between-subjects analyses of variance with the factor group (CG, GI and OP) revealed that the differences between group means for error rate were statistically significant for the film retelling ($F(2,54)=28.59, p<.001$) as well as for the interview ($F(2,54)=32.23, p<.001$).

After the overall analysis of variance, pairwise comparisons were conducted in order to arrive at a clearer picture of between-group differences for both tasks. All three pairwise comparisons of the error rates from the film retelling showed statistically significant differences (CG and GI: $F(1,34)=25.75, p<.001$; CG and OP: $F(1,36)=50.90, p<.001$; GI and OP: $F(1,38)=12.21, p=.001$). Likewise, all three pairwise comparisons of the error rates from the interview showed statistically significant differences (CG and GI: $F(1,34)=46.47, p<.001$; CG and OP: $F(1,36)=51.08, p<.001$; GI and OP: $F(1,38)=13.43, p=.001$).

4.3.3.2 Error Types

In order to categorize the linguistic deviations found in the speech data, an adapted version of Schmid's (2002) error types (see chapter 3.4.2.1, table 4), was used. If the origin of a lexical error could not be determined, the error was labeled as a lexical error of unknown origin. In addition, participants' metalinguistic comments and self-repairs were coded and quantified.

The following sections provide an overview of the error types found in the spontaneous speech data from the monolingual (or minimally bilingual) Control Group (CG) and the two quasi-experimental, bilingual groups, German Instructors (GI) and Other Professionals (OP). Examples from the speech data are given in order to illustrate the different error types for each of the linguistic domains.

Furthermore, the mean percentages of error types as well as lexical retrieval problems, metalinguistic comments, and self-repairs in relation to the overall number of errors are presented.

4.3.3.2.1 Control Group

In the data collected from the Control Group (CG), the majority of errors occurred in the lexical domain, i.e., wrong lexical items were chosen to express a certain idea or describe a thing or an action. Due to the fact that the Control Group was composed of monolingual (or minimally bilingual) native speakers of German, transfer or crosslinguistic interference can be ruled out as the cause for these incorrect lexical choices. Most errors occurred when words were required that are rarely used in everyday communication or

when participants presumably did not know the correct word to describe a certain thing or action (examples 1-3).

- (1) Sie sind dann beide hinten zu diesem Ausstieg [= zur Tür] gegangen. (CG6)
- (2) Der hatte ja so'n, äh, Befürwortungsschreiben vom, äh, oder ein Lobschreiben [= Empfehlungsschreiben] vom, äh, vom Sheriff bekommen. (CG11)
- (3) Das Mädels wollte aus dem fahrenden Auto rausrennen [= springen]. (CG13)

In addition to incorrect lexical choices, a small number of single lexical items that were borrowed from the English language occurred in the CG data. However, only four of the seventeen participants used English words (examples 4-7).

- (4) Close-up [= Nahaufnahme] auf ihr Gesicht. (CG1)
- (5) Für mich ist München eine sehr cleane [= saubere], saubere Stadt. (CG2)
- (6) Zwischendurch gibt's noch einen zweiten plot [= Handlungsstrang] von einer Frau. (CG7)
- (7) Ist sie, in den, in den, in den truck [= Lieferwagen], äh, der die Lieferung gebracht hat, hineingesprungen. (CG11)

Loanwords, i.e., English words that have been integrated into the German language and are frequently used – even by otherwise monolingual German speakers and German-language media – were not counted as errors or L2 intrusions. Examples of loanwords that were found in the CG data, are *der Sheriff*, *der Gentleman*, *der Boom*, *das Highlight*, *das/die Email*, *das happy End*, *outdoor-*, *Small-Talk*, *sorry*, *das Login*, *die Young Professionals*, *der Bachelor(studiengang)*, and *die Kids*.

4.3.3.2.2 Quasi-Experimental Groups

In the spontaneous speech data from the two quasi-experimental, bilingual groups – German Instructors (GI) and Other Professionals (OP) – a much larger number of errors

was detected than in the data from the monolingual (or minimally bilingual) Control Group (CG). Errors were found in the following domains: lexicon, semantics, function words, morphology, morphosyntax, and syntax (cf. Schmid, 2002).

The individual error types that occurred in each of these domains will be described in the following sections. Since there was no qualitative difference regarding the types of errors in the spontaneous speech data from the two bilingual groups, the error types and examples are presented in the same chapter.

The quantitative differences between the German Instructors (GI) and the Other Professionals (OP) are discussed in section 4.3.3.2.3, following the descriptions of error types.

4.3.3.2.1 Lexicon

A majority of the errors made by German Instructors (GI) and Other Professionals (OP) belong to the lexical domain. On one hand, there were instances where linguistic material from the L2 was incorporated into the L1 sentence, i.e., either single lexical items were borrowed from English (examples 1-9) or somewhat longer stretches of L2 words were inserted in the L1 speech (examples 10-13).

- (1) Dass wir, ähm, mehr an, m-, m-, mehr an, m-, *charity*, ähm, äh, dass wir mehr spenden. (GI6)
- (2) Hauptsächlich koordiniere ich, ähm, *outreach*, ähm, *activities*. (GI7)
- (3) Dann kannst du vielleicht ein paar *blocks* laufen. (GI8)
- (4) Ja, *anyway*. Äh, was denn noch? (GI12)
- (5) Das war *the end*, das Ende. (OP3)
- (6) Nicht [...] dass wir, äh, *lobster* essen wollen, aber [...]. (OP11)
- (7) Albertsons hat ein ganz passables *bread*, Brot. (OP14)
- (8) Irgendwelche Klamotten oder sonstige *gadgets*. (OP18)

- (9) Dadurch ist die Gegend halt recht, recht wohlhabend, also nicht reich, aber schon, schon, äh, nicht, äh, nicht deprived. (OP19)
- (10) Und ich say „Yeah! Halloooo!“ (GI13)
- (11) Ich würde jetzt gern halt meine Forschung weiter vorantreiben und live happily ever after. (OP9)
- (12) Mein Mann hat, mein Mann war in charge. (OP12)
- (13) Was hat mich – Oh my God! – was hat mich letzte Woche gefreut? (OP15)

In addition, there were a number of instances where participants uttered the beginning of an English word, noticed their code-switching, and managed to switch back to German and correct themselves by saying the German word instead (examples 14-18).

- (14) Ich interessiere mich besonders für, ähm, für, ähm, lan-, Sprachtransfer. (GI15)
- (15) Negative Auswirkungen [...] auf job s-, äh, Jobsicherheit. (GI19)
- (16) Und basica-, äh, mehr oder minder sagt er [...]. (OP8)
- (17) Neuere, neuere, äh, an neueren thera-, Therapien. (OP16)
- (18) Dass [...] auch die Politiker [...] sich da mo-, mehr oder weniger drauf geeinigt haben. (OP16)
- (19) Zumindest was western-, äh, Westeuropa betrifft. (OP21)

Borrowing of single English words was observed more frequently than the incorporation of longer stretches of English words. Both ways of incorporating L2 vocabulary into the L1 speech are examples of intrasentential code-switching; instances of intersentential code-switching (cf. Myers-Scotton, 1993) were not found in the spontaneous speech data from the two bilingual groups, GI and OP.

Mostly, participants resorted to the use of L2 terminology when describing things and concepts that do not exist in Germany. The German Instructors (GI) and some of the Other Professionals (OP), who work in a university setting, used L2 vocabulary to refer to university-specific concepts, e.g., *department*, *tenure*, *credits*, *provost*, *funding*, *assistant/associate/full professor*, *prospectus/proposal*, *teaching/research assistant*,

gen(eral) ed(ucation), freshman/sophomore/junior/senior, grad(uate)/undergrad(uate) student, academia, faculty, adjunct, cubicle, tuition waiver, out-of-state tuition, or comprehensive exams. A number of participants also found it difficult to describe their field of study, their academic interests, and their work in the L1. In addition, both bilingual groups used English vocabulary to describe things typical for the U.S. American setting, such as e.g., *downtown, (strip) malls, suburbia, college town, interstate/highway, rec center, or independent movie theater.* These types of L2 intrusions have to be distinguished from the type of lexical borrowing which has been illustrated with the examples above.

Aside from obvious patterns of code-switching, the speech data from German Instructors (GI) and Other Professionals (OP) also included numerous instances of lexical retrieval problems, as indicated by pauses, filler words such as *äh/ähm*, false starts, and sometimes even metalinguistic comments which clearly point to problems participants were experiencing when trying to access a lexical item in the L1.

In some instances (examples 20 and 21), participants were able to successfully complete the lexical retrieval process. The examples below illustrate the retrieval process with a number of false starts and filled pauses as well as the successful retrieval of the lexical item in question.

- (20) Ich werd mich wirklich hier und dort bewerben müssen [...] so wie der Job-, äh, äh, -markt, der Ste-, der Arbeitsmarkt im Moment aussieht. (GI13)
- (21) Er kommt in ein, verw-, in ein, er wird, er meldet sich bei einer, ähm, Schiffs-
werft. (OP6)

In other cases (examples 22-24), participants were not able to access the word in question – as indicated by their pauses, filler words and metalinguistic comments – and finally resorted to code-switching.

- (22) Ich hab [...] wenig davon gemerkt jetzt, außer, ähm – oh, wie heißt das? – except, except, apart from, na also, wenn man jetzt nicht den Job – Du weißt, was ich meine. Du liebe Zeit! (GI15)
- (23) Und dass einfach dann, ähm – wie sagt man hier in Amerika –backfired. – Ähm, weiß gar nicht, wie das in Deutschland ist. Äh, wie sagt man in Deutschland eigentlich? (OP16)
- (24) Muss [...] investiert werden, [...] um, äh, die, den, um den, pave – Na, wie sagt man? – um die Bahnen, um das in die richtigen Bahnen zu lenken. (OP17)

Other errors belonging to the lexical domain – which occurred in the spontaneous speech data from the two bilingual groups – were instances of partial recall, where participants were unable to access the entire lexical item and only recalled parts of it. The examples below (examples 25-33) illustrate this phenomenon; the correct words are listed in brackets.

- (25) Eine meiner besten Freundinnen aus Schulzeiten hatte ihren Termin, den Schwangerschaftstermin [= Geburtstermin]. (GI7)
- (26) Weil morgens die U-Bahnen rammelvoll [= gerammelt voll] sind. (OP1)
- (27) Kann meinen eigentlichen Beruf hier nicht ausführen [= ausüben]. (OP3)
- (28) Er kommt [...] in diesen, äh, diese blaue Minna [= grüne Minna] da rein. (OP8)
- (29) Er geht in ein Café und [...] hat da also eine Festmahlzeit [= Festmahl]. (OP10)
- (30) Find ich auch einfach das Tägliche [= Alltägliche] im Büro spannend. (OP11)
- (31) Ich weiß nicht mehr genau, in welcher Folge [= Reihenfolge] das war. (OP17)
- (32) Charlie Chaplin will aber immer noch ins Gefängnis und nimmt deswegen die Schuld des Brotstahls [= Brotdiebstahls] auf sich. (OP17)
- (33) Mir scheint der, äh, Prozess hin, äh, zum Professorenstuhl [= Lehrstuhl] zumindest in Deutschland komplizierter. (OP21)

Furthermore, many of the participants in both bilingual groups often found it difficult to access correct L1 vocabulary to describe events, actions and places from the Chaplin film

retelling, such as the words for the shipyard where Charlie Chaplin begins to work, the piece of wood Charlie is instructed to find, the supervisor who gives Charlie the work assignment, the buffet restaurant where Charlie eats, the phone the police officer uses to call for the police car as well as for the police car that takes the criminals to jail. Instances of such word finding problems also occurred in the monolingual Control Group (CG), however, to a much lesser extent.

4.3.3.2.2 Semantics

In the semantic domain, participants in both bilingual groups, German Instructors (GI) and Other Professionals (OP) frequently transferred an English word to a phonologically similar word or a part-synonym in German. The following examples show transfer errors in nouns (examples 1-5), verbs (examples 6-11), adjectives and adverbs (examples 12-17), past participles (examples 18 and 19), and conjunctions (examples 20-22).

- (1) Der Wächter [= Polizist] und das Mädchen sind erst bewusstlos. (GI6)
- (2) Dann kommen also die Behörden [= das Jugendamt] und nehmen die [...] Schwestern mit. (GI15)
- (3) Die Isolation, Isolation, [= Isolierung] die Wärmedämmung ist so schlecht. (GI18)
- (4) Die Maler, die schreiben, die, die Schreiber [= Schriftsteller], die malen. (OP1)
- (5) Dass er als Held dann aus dem Gefängnis entlassen wurde, mit einer Referenz, äh, mit einem Referenz-, ähm, -schreiben [= Empfehlungsschreiben]. (OP16)
- (6) Ich konnte nicht genau lesen, was der Brief sagte [= in dem Brief stand]. (GI1)
- (7) Das Programm hat noch nicht gestartet [= begonnen]. (GI4)
- (8) Dort spricht er mit dem Chef und schauf [= zeigt] ihm [...] den Brief. (GI17)
- (9) Der hat einen Vortrag gegeben [= gehalten]. (GI19)
- (10) Ich nehme [= belege] jedes Semester ein oder zwei Kl-, äh, Klassen [= Kurse]. (OP3)
- (11) Er nimmt [= übernimmt] die Verantwortung dafür. (OP18)

- (12) Es ist nicht mehr heim [= zu Hause]. Deutschland ist nicht mehr zu Hause. (GI6)
- (13) Das Mädchen war etwas verwirrt, aber wahrscheinlich fröhlich [= froh], dass sie jetzt nicht ins Gefängnis musste. (GI7)
- (14) Weil im Moment alles sehr depressiv [= deprimierend] ist. (GI11)
- (15) Zur Zeit ärgert mich Arbeit viel [= sehr]. (OP2)
- (16) Dass die Leute ja wirklich wortwörtlich [= ?] auf die Mauer gesprungen sind. (OP16)
- (17) Unsere Tochter war dann [= damals] gerade zwei Jahre alt. (OP18)
- (18) Es ist halt alles sehr isoliert und limitiert [= beschränkt] auf den Campus. (OP11)
- (19) Man hat, äh, definierte [= feste] Jahreszeiten. (OP12)
- (20) Es sieht so aus, als wenn [= ob] es der Vormann ist. (OP1)
- (21) Darf ich auch so viel als [= wie] ich möchte Geld verdienen. (OP4)
- (22) Und wenn [= als] es dann halt an der, an die Kasse geht [...] ruft er gleich-, gleich einen Polizisten. (OP8)

In addition to transfer errors that only affect one word, calques (examples 23-29), i.e., morpheme-by-morpheme translations of English compound nouns, prepositional verbs, or idiomatic expressions, were also found in the bilinguals' spontaneous speech data.

- (23) Deren zwei Geschwister von dem Jugendamt [...] übernommen [= abgeholt] wurden. (GI1)
- (24) Weil ich doch mit meiner Familie sehr eng bin [= Weil ich mich doch mit meiner Familie sehr gut verstehe]. (GI8)
- (25) Als ich durch meine Scheidung ging [= mich scheiden ließ]. (GI11)
- (26) Und dann, ähm, überrollt [= überschlägt], überschlägt sich das Auto. (GI13)
- (27) Mit, ja, den, äh, den, den, ähm, dem niedrigen Leben [= Abschaum], den, den Leuten, [...] die wirklich alle von der Straße aufgelesen wurden. (OP1)
- (28) Charlie [...] macht lustige Rauchsignale [= Rauchzeichen]. (OP4)
- (29) Ich bin Maklerin. Ich verkauf Häuser, wenn's einen Markt gibt [= wenn der Markt gut ist]. (OP12)

4.3.3.2.3 Function Words

In the domain of function words, the speech data from both bilingual groups, German Instructors (GI) and Other Professionals (OP), revealed instances where incorrect prepositions were selected (examples 1-7).

- (1) Der hat den Brief gesehen, da stand eben drauf [= drin]. (GI1)
- (2) Hauptsächlich von Leuten, die [...] aus dem deutschsprachigen Raum in [= nach], nach Amerika gekommen sind. (GI 16)
- (3) Hat's damit relativ leicht, Arbeit zu finden, [...] am Pier oder am Dock, äh, mit [= bei] irgendeiner Schiffsbaufirma oder so. (OP2)
- (4) Da ist [...] ein Siebzehnjähriger vom [= beim] Autounfall ums Leben gekommen. (OP11)
- (5) Er lässt sich dann dadurch [= dafür] verhaften. (OP13)
- (6) Gab's viele verschiedene Gründe zu [= dafür]. (OP18)

Some of the preposition errors can clearly be attributed to transfer and crosslinguistic influence from the English language (examples 7-11).

- (7) Ich studiere *Transcultural German Studies*, transkulturell in [= auf] Deutsch (*in English*). (GI3)
- (8) Und ich mir keine Sorgen darüber [= darum] machen (*worry about*) muss (GI4)
- (9) Über [= von](*about*) Youtube hab ich von meinen Studenten erfahren. (GI10)
- (10) Wir haben verschiedene *contracts*, wo wir drauf [= dran] (*work on*)arbeiten (OP5)
- (11) Leute von [= aus](*from*) Lateinamerika. (OP21)

Deviations from the correct usage of articles (examples 12 and 13) were only found in the spontaneous speech data from one participant in the OP group. In three instances, this participant dropped the definite article of three countries which require a definite article in the German language (*die Tschechoslowakei, der Irak, der Iran*). However, the data did not reveal any instances where articles were dropped in front of street names or months.

- (12) Gegenden, wie [= die] Tschechos-, was damals *Czechoslovakia* war. (OP16)
- (13) Politik [...] in [= im] Irak, vielleicht sogar in [= im] Iran, Afghanistan. (OP16)

4.3.3.2.4 Morphology

In the morphological domain, both bilingual groups made errors in the marking of case (examples 1-5), gender (examples 6-10), and plural (examples 11 and 12). However,

morphological errors were not as frequent as lexical and semantic errors as the distribution of error types across the groups (see section 4.3.3.2.3) shows.

- (1) Und gleichzeitig sie [= ihnen] beim sich Entwickeln zuzugucken. (GI10)
- (2) Ich gebe zu, dass ich das ein bisschen vor mich [= mir] hinschie-, vor mir herschiebe und nicht so drüber nachdenke. (GI17)
- (3) Wir leben in ungefähr einen, ein [= einem] Drittel unseres Hauses. (OP12)
- (4) Das wird dann [...] verteilt auf den [= die] USA. (OP18)
- (5) Es ist dann in, ins Meer [= im] versunken, im Meer versunken. (OP20)

- (6) Gibt ihr die Rechnung quasi, kann es [= sie] aber nicht bezahlen. (OP3)
- (7) Das ist also die [= das] Ende seines, äh, Jobs. (OP8)
- (8) Ist das jetzt die europäische Gemeinschaft, bleibt es der Dollar, [...] wird es der Euro, ist es der [= das] Öl, sind es die Rohstoffe? (OP16)
- (9) Das ist der [= das] Ende des zweiten Teils. (OP18)
- (10) Er soll einen Holzkeil suchen, ein großes [= einen großen] Holzkeil. Und er findet das [= den] auch. (OP21)

- (11) Zwei Tablette [= Tablett] voll mit Essen. (GI7)
- (12) Belädt sich erst mal eine unheimliche Menge an Tabletten [= Tablett] mit viel Essen. (GI17)

In addition to errors in case, gender, and plural marking, participants in both groups made errors (examples 13-16) with regard to verb phrase morphology.

- (13) Charlie bat [= bot] ihr seinen Platz an. (GI19)
- (14) Und er dann also auch wieder arbeitslos geworden wir- [= ist], wurde. (OP16)
- (15) Da war [= habe] ich bei Pearson gearbeitet. (OP18)
- (16) Dann werden [= sind] sie total genervt, wenn man erzählt, wie's einem geht. (OP18)

4.3.3.2.5 Morphosyntax

In the morphosyntactical domain, a number of examples of structural borrowing, i.e., instances where a German verb was used with the argument structure of its English equivalent, were found in the bilinguals' speech data (1-6).

- (1) Yoga ist [= wird] hier einfach nicht wirklich auf dem Level angeboten (*is offered*). (GI10)
- (2) Er lässt sie [...] hinsetzen [= lässt sie sich hinsetzen] (*lets her sit down*). (GI13)
- (3) Er steht gleich auf und bietet diesen Sitzplatz dem jungen Mädchen an und sagt: „Erinnerst du mich [= Erinnerst du dich an mich] (*Do you remember me*) mit dem, ich war der mit dem Brot.“ (OP3)
- (4) Er bietet ihr seinen Platz [...] an und sagt ihr [= sagt zu ihr] (*tells her*): „Kennst du mich noch?“ (OP8)
- (5) Ich bin hier, äh, im Auslandsamt tätig [...], und, äh, wir sind verantwortlich [= sind dafür verantwortlich] (*are responsible to send*) [...], ähm, Studenten ins Ausland zu schicken. (OP11)
- (6) Soweit ich das also [= mich daran] erinnere (*I remember that*). (OP16)

Furthermore, two errors in negation (8 and 9) were found, where participants used analytic instead of synthetic negation, i.e., *nicht* plus the indefinite article instead of *kein(e)*, which has to be used when a noun with an indefinite article is negated.

- (8) Dass es nicht eine Provinzstadt ist. (GI11)
- (9) Und dass es zu viele Autos gibt und nicht eine richtige Fußgängerzone. (OP3)

4.3.3.2.2.6 Syntax

Although there were deviations regarding verb-subject structures in main clauses, discontinuous word order, and verb-final placement in subordinate clauses, they cannot be considered errors as they are typical for oral speech production and were found not only in the spontaneous speech data from the two bilingual quasi-experimental groups of German Instructors (GI) and Other Professionals (OP) but also in the speech data from the monolingual (or minimally bilingual) Control Group (CG).

However, with regard to the word order of elements other than verbs, a few deviations from the norm were found in the OP speech data. The examples show errors in

the word order of adverbials and adjectives (1 and 2), and the word order of indirect object and direct object (3).

- (1) Als Erstes muss ich dazu sagen, dass das alles ganz für mich neu [= ganz neu für mich] ist. (OP10)
- (2) Und da hat sich [= hat es sich] mein Sohn jetzt es zur Aufgabe gestellt, [...]. (OP11)
- (3) Charlie Chaplin [...] speist einmal endlich [= endlich einmal] ordentlich. (OP18)

4.3.3.2.3 Distribution of Error Types

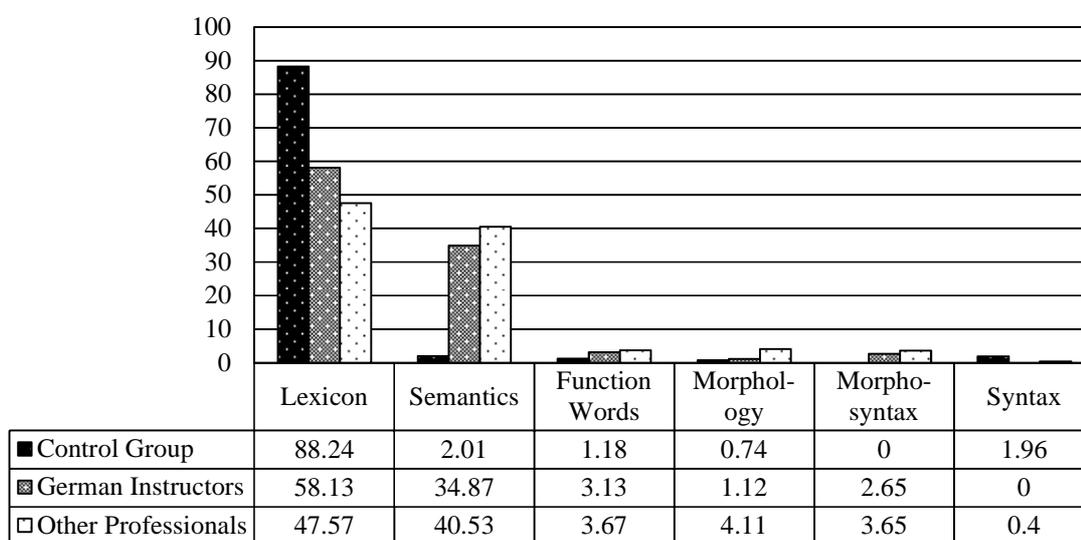
In order to analyze the distribution of the individual error types described in the sections above, the occurrences of each error type were counted for each participant and the sum of all the error types belonging to one domain was established for each of the six domains: lexicon, semantics, function words, morphology, morphosyntax, and syntax. After the number of errors per domain was quantified, a percentage in relation to the participant's total number of errors was calculated, and group means were established for the Control Group (CG), the German Instructors (GI), and the Other Professionals (OP). Percentages were calculated for the spontaneous speech samples from the Chaplin film retelling and from the semi-structured interview.

Figure 9 shows the results from the Chaplin film retelling data. The majority of errors made by the participants in the monolingual Control Group (CG) belonged to the lexical domain, with rather small mean percentages for the other domains: semantics, function words, morphology, and syntax. No morphosyntactical errors were found.

In contrast, the two bilingual groups, GI and OP, made fewer lexical errors and more semantic errors, i.e., transfer errors and morpheme-by-morpheme translations. In

addition, GI and OP had somewhat higher percentages than CG in the domains function words, morphology, morphosyntax, and syntax, and GI had lower percentages than OP. Syntactical errors were entirely absent from the GI data.

Figure 9. Mean Percentages of Errors in the Film Retelling Data for each Domain.



A one-way, between-subjects analysis of variance with the factor group (CG, GI, and OP) was conducted for each domain in order to investigate whether the percentages of speech errors from the Chaplin film retelling were significantly different. The analyses revealed significant differences for the lexical, semantic, morphological and morphosyntactical domains (lexicon: $F(2,54)=18.91$, $p<.001$; semantics: $F(2,54)=28.35$, $p<.001$; morphology: $F(2,54)=3.59$, $p<.05$; morphosyntax: $F(2,54)=4.50$, $p<.05$). The mean percentages of errors in function words and in the syntactical domain were not significantly different.

After the overall analysis of variance, pairwise comparisons were conducted to obtain more detailed results. A comparison of the Control Group (CG) and the group of

German Instructors (GI) revealed significant differences between the mean percentages of errors in the lexicon ($F(1,34)=15.35, p<.001$), semantics ($F(1,34)=49.78, p<.001$), and morphosyntax ($F(1,34)=, p<.017$). A comparison of the Control Group (CG) and the Other Professionals (OP) revealed statistically significant differences in the same domains (lexicon: $F(1,36)=36.66, p<.001$; semantics: $F(1,36)=56.29, p<.001$; and morphosyntax: $F(1,36)=9.70, p<.005$).

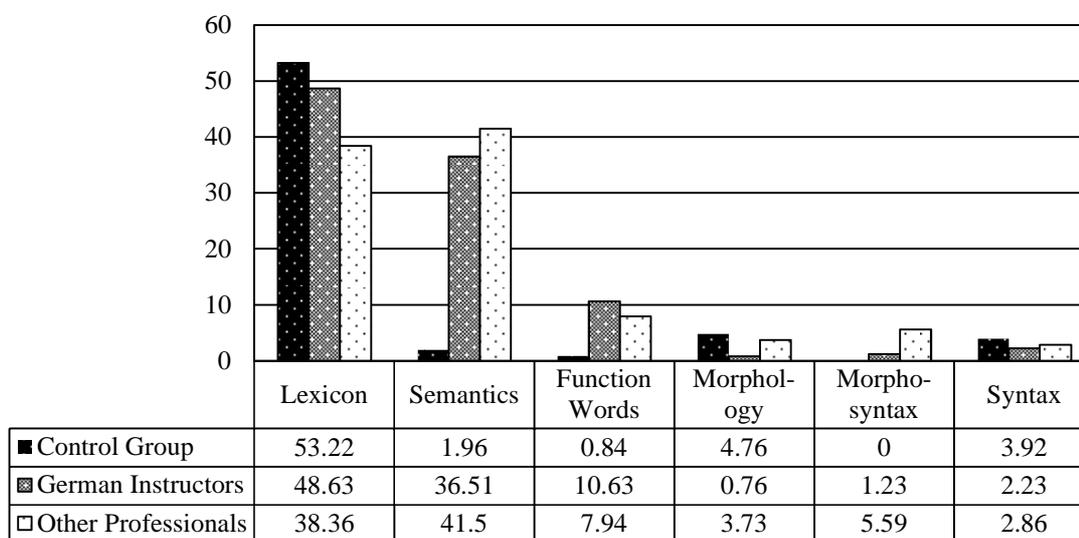
The mean percentages of errors in function words, morphology, and syntax were not significant in both comparisons, i.e., the comparison of CG and GI, and the comparison of GI and OP. Furthermore, the comparison of the two bilingual groups, GI and OP, did not yield any statistical significance.

Figure 10 illustrates the mean percentages of errors per domain for the interview data. Again, the majority of errors made by the Control Group (CG) belong to the lexical domain, and relatively small mean percentages were found in semantics, function words, morphology, and syntax. Again, no morphosyntactical errors were found in the interview data from the Control Group (CG).

The data from the German Instructors (GI) revealed that the largest mean percentage of errors belonged to the lexical domain, followed by semantics and function words. Smaller percentages of errors were found in the three other domains: morphology, morphosyntax, and syntax. In contrast, in the interview data from Other Professionals (OP), the largest mean percentage of errors was found in the semantic domain, followed by errors in the lexical domain and in function words. Smaller percentages of errors were

found in the other three domains. However, despite the rather low mean percentage, the OP group had the largest mean percentage of errors in the morphosyntactic domain. With regard to function words, the GI group had the greatest mean percentage of errors.

Figure 10. Mean Percentages of Errors in the Interview Data for Each Domain.



In order to test whether the overall differences between the groups were statistically significant, a one-way, between-subjects analysis of variance (ANOVA) with the factor group (CG < GI, and OP) was conducted for each domain. Statistically significant results were found for the domains semantics ($F(2,54)=42.45, p<.001$), function words ($F(2,54)=3.49, p<.05$), and morphosyntax ($F(2,54)=7.02, p<.005$).

Furthermore, pairwise comparisons were conducted to gain a more detailed understanding of the differences between the Control Group (CG), the German Instructors (GI), and the Other Professionals (OP). For CG and GI, significant differences were found for the semantic domain ($F(1,34)=69.17, p<.001$) and function words

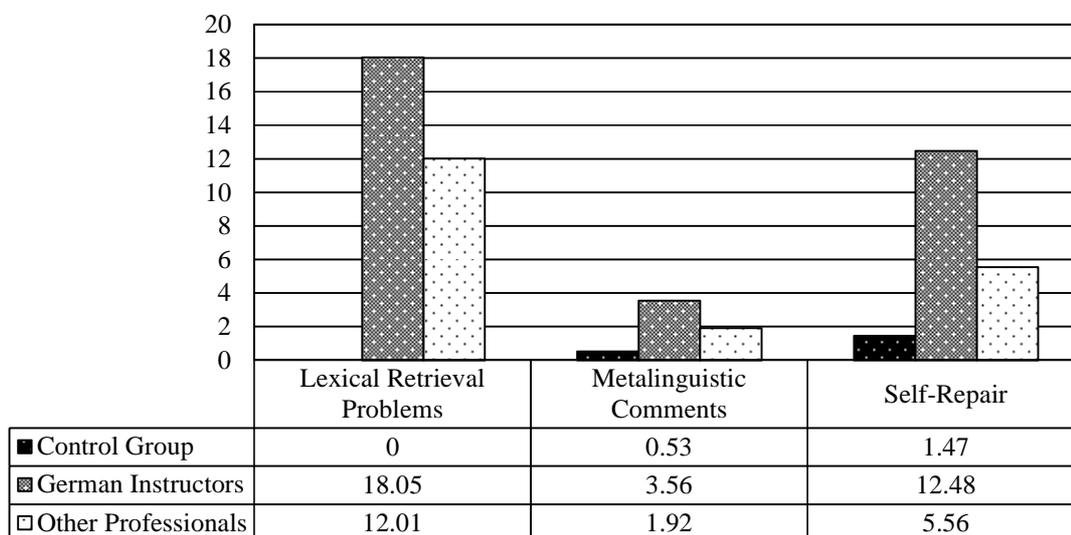
($F(1,34)=6.63, p<.017$). For CG and OP, there were significant differences in the semantic domain ($F(1,36)=82.34, p<.001$) and the morphosyntactical domain ($F(1,36)=9.32, p<.005$). Furthermore, a marginal significance was found for function words ($F(1,36)=6.05, p=.019$). Only one statistically significant difference was found between GI and OP, i.e., in the morphological domain ($F(1,38)=6.37, p<.017$).

4.3.3.2.4 Lexical Retrieval Problems, Comments, and Repairs

In addition to quantifying the speech errors from the Chaplin film retelling and the interview for each of the six domains (lexicon, semantics, function words, morphology, morphosyntax, and syntax), percentages were established for each participant's number of lexical retrieval problems, metalinguistic comments, and self-repairs in relation to the participant's overall number of errors, and group means were calculated for the Chaplin film retelling data (see figure 11) and for the interview data (see figure 12).

Figure 11 shows that lexical retrieval problems are entirely absent from the data of the monolingual Control Group (CG) and that there are rather small mean percentages of metalinguistic comments and self-repairs. In the data from the German Instructors (GI) and the Other Professionals (OP), however, rather large mean percentages of lexical retrieval problems were found; with the GI group's mean percentage exceeding the OP group's mean percentage by approximately 6%. At the same time, the film retelling data from the GI group also revealed greater percentages of metalinguistic comments and self-repairs than the data from the OP group.

Figure 11. Mean Percentages of Lexical Retrieval Problems, Metalinguistic Comments, and Self-Repairs in the Film Retelling Data.



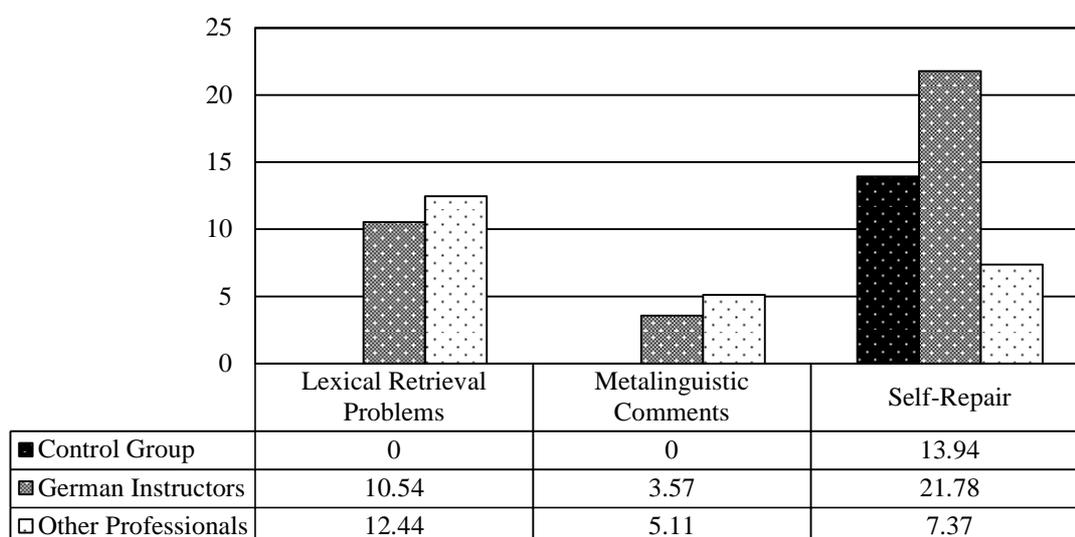
In order to establish whether the differences between the groups are statistically significant, group means for each of the categories were compared with a one-way, between-subjects analysis of variance (ANOVA) with group (CG, GI, and OP) as the factor. A significant difference was found for lexical retrieval problems ($F(2,54)=5.77$, $p=.005$). Mean percentages of the groups' metalinguistic comments and self-repairs, however, were not significantly different.

Additional pairwise comparisons were conducted in order to obtain a more detailed picture of the differences between the groups with regard to lexical retrieval problems. The analysis revealed that the differences between CG and GI ($F(1,34)=9.17$; $p=.005$) and between CG and OP ($F(1,36)=15.17$; $p<.001$) were significant. However, the difference between the two bilingual groups, GI and OP, was not statistically significant.

Figure 12 shows the mean percentages of lexical retrieval problems, metalinguistic comments, and self-repairs in the interview data. Similar to the findings from the film retelling data, lexical retrieval problems were absent from the interview data from the Control Group (CG). Likewise, there were no metalinguistic comments in the CG interview data. In the interview data from the two bilingual groups, however, lexical retrieval problems and metalinguistic comments were found, with the mean percentages of the OP group being somewhat higher than the mean percentages of the GI group for both categories.

Self-repairs occurred in the interview data from all three groups. The data from the German Instructors (GI) revealed the highest mean percentage of self-repairs, followed by the Control Group (CG), and the Other Professionals (OP).

Figure 12. Mean Percentages of Lexical Retrieval Problems, Metalinguistic Comments, and Self-Repairs in the Interview Data.



The group means for lexical retrieval problems, metalinguistic comments, and self-repairs in the interview data were also compared with one-way, between-subjects analyses of variance (ANOVA) with group (CG, GI, and OP) as the factor. Significant differences between the three groups were found for lexical retrieval problems ($F(2,54)=8.31, p<.001$) and for metalinguistic comments ($F(2,54)=3.76, p<.05$).

Pairwise comparisons revealed that the differences between CG and GI were significant for lexical retrieval problems ($F(1,34)=15.66, p<.001$) and marginally significant for metalinguistic comments ($F(1,34)=6.13, p=.018$). The differences between CG and OP were significant for lexical retrieval problems ($F(1,36)=16.83, p<.001$) and marginally significant for metalinguistic comments ($F(1,36)=7.50, p=.01$). Only one significant difference was found between the two bilingual groups, GI and OP, i.e., for self-repairs ($F(1,38)=7.51, p<.01$).

4.4 Questionnaire Data

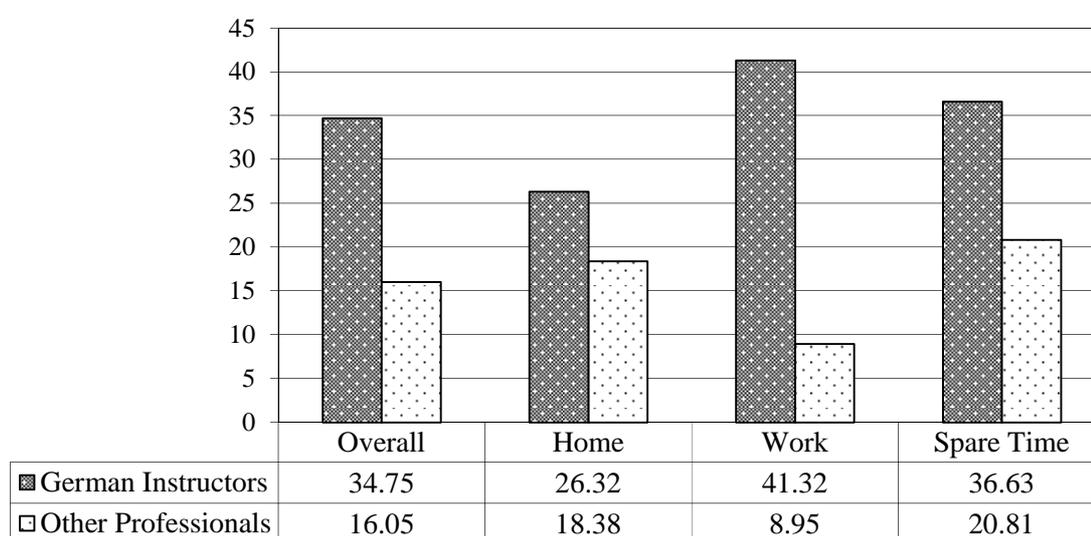
4.4.1 L1 Use

On the sociolinguistic questionnaire, participants provided estimates of how frequently they were using their native language. These estimates represent the percentage of daily L1 use overall as well as in the three domains at home, at work, and during the spare time. The group means of reported L1 use are presented in figure 13 below.

With regard to overall language use, the mean percentage provided by the German Instructors (GI) was approximately twice the amount of that of the Other Professionals (OP). Likewise, with regard to L1 use at home, at work, and during one's

spare time, the participants in the GI group reported a greater amount of L1 use than the participants in the OP group for all three domains. The largest difference between the two groups was reported for “at work” with GI using their L1 41.32% of the time and OP only 8.95%. Due the nature of the work environment of the GI group, this was to be expected.

Figure 13. Mean Percentages of L1 Use Reported by German Instructors and Other Professionals.



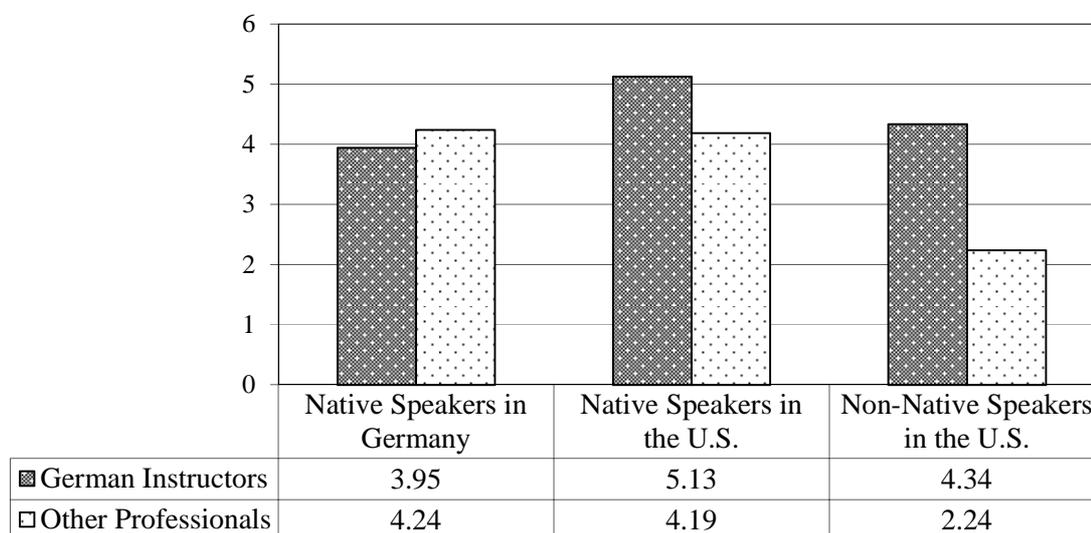
In order to establish whether the differences in the groups’ overall L1 use and their L1 at home, at work, and in their spare time were statistically significant, group means were compared with one-way, between-subjects analyses of variance with the factor group (GI, and OP). The overall difference in L1 use as well as the differences for L1 use at work and during participants’ spare time were statistically significant (overall: $F(1,38)=17.39$, $p<.001$; work: $F(1,38)=31.41$, $p<.001$; spare time: $F(1,38)=4.95$, $p<.05$). The difference between the two groups’ L1 use at home, however, was not statistically significant.

4.4.2 L1 Interlocutor Type

In order to determine with whom participants speak their L1 and how frequently they do so, participants had to indicate on a seven-point Likert-scale how often they speak with native speakers of German who live in Germany, with native speakers of German residing in the U.S., and with non-native speakers of German in the U.S. Participants had to choose one the following options: 6 = daily, 5 = several times a week, 4 = weekly, 3 = monthly, 2 = less than monthly, 1 = very seldom, and 0 = never. The group means are shown in Figure 14.

The data showed that the German Instructors (GI) speak their L1 more frequently with native speakers and non-native speakers of German who reside in the U.S. than the Other Professionals (OP). However, OP reported a somewhat higher means of L1 interaction with native speakers of German residing in Germany.

Figure 14. Mean Frequency of L1 Interaction with Different Types of Interlocutors.



Note. Frequency of interaction in the L1 with different types of L1 interlocutors was rated on a seven-point scale (6 = daily, 5 = several times a week, 4 = weekly, 3 = monthly, 2 = less than monthly, 1 = very seldom, and 0 = never).

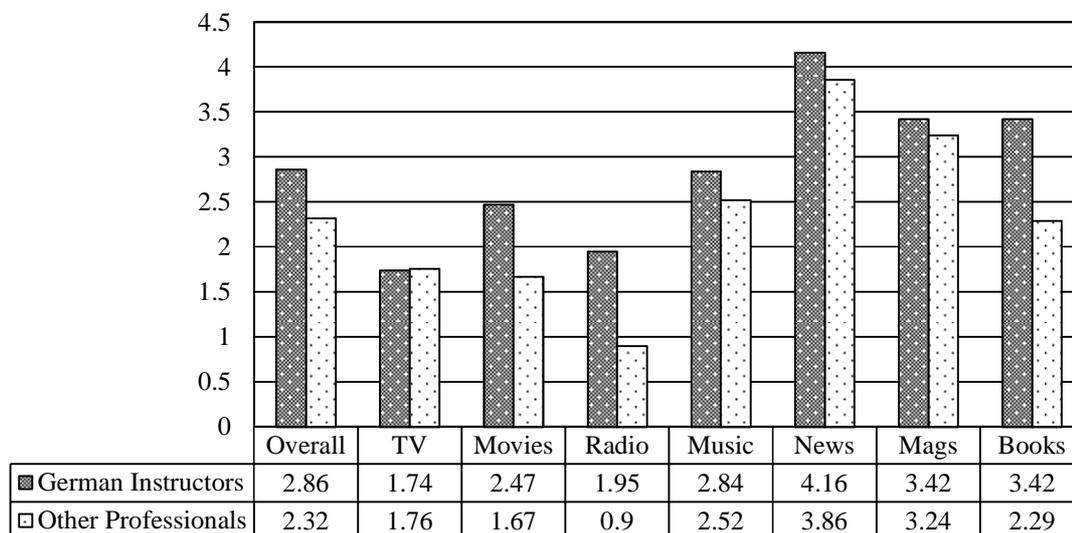
For each interlocutor type (native German speakers in Germany, native German speakers in the U.S., and non-native German speakers in the U.S.), a one-way, between-subjects analysis of variance with the factor group (GI and OP) was conducted in order to establish whether the differences in the groups' contact with three different types of L1 interlocutors were statistically significant. The only statistically significant difference that was found was the L1 interaction with non-native German speakers in the U.S. ($F(1,38)=10.84$, $p<.005$), i.e., the German Instructors (GI) interact with non-native speakers of German more frequently than the Other Professionals (OP). The two groups' interaction with native German speakers residing in Germany and in the U.S. was not significantly different.

4.4.3 L1 Input

In order to calculate the frequency of their L1 input, the German Instructors (GI) and the Other Professionals (OP) had to indicate on a seven-point Likert-scale how often they watch German language television and movies, listen to German radio broadcasts and music with German lyrics, and how often they read newspapers, magazines and books written in German. Participants had to choose one the following options: 6 = daily, 5 = several times a week, 4 = weekly, 3 = monthly, 2 = less than monthly, 1 = very seldom, and 0 = never.

Figure 15 shows that, overall, the German Instructors (GI) are exposed to L1 input somewhat more frequently than the Other Professionals (OP), with scores of 2.86 and 2.32, respectively. A closer look at the individual categories (television, movies, radio, music, newspapers, magazines, and books) revealed that the scores of the GI group exceeded those of the OP group in all categories, except for watching German-language television. The largest differences between the two groups were found for the categories movies, radio, and books, i.e., participants in the OP group watch German movies, listen to German radio and read German books less frequently than participants in the GI group.

Figure 15. Mean Frequency of L1 Input.



Note. The frequency of L1 input was rated on a seven-point scale (6 = daily, 5 = several times a week, 4 = weekly, 3 = monthly, 2 = less than monthly, 1 = very seldom, and 0 = never).

In order to establish whether the differences in L1 input between the two groups are statistically significant, group means for the overall frequency of L1 input and for each L1 input category were compared with a one-way, between-subjects analysis of variance with the factor group (GI and OP). The only significant difference that was found in the analysis was the difference in the category books ($F(1,38)=4.65$, $p<.05$). The overall difference in L1 input and the differences for all other categories, however, were not statistically significant

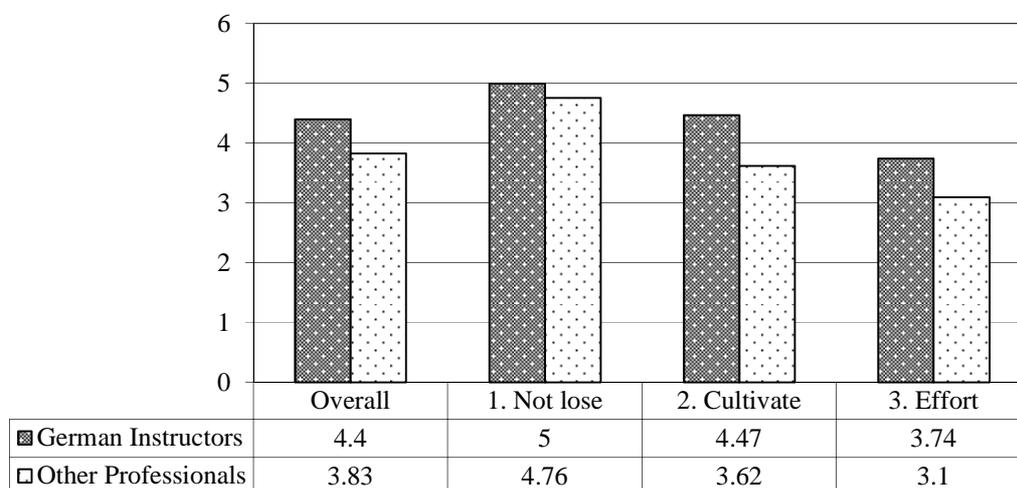
4.4.4 Motivation for L1 Maintenance

In order to determine the participants' motivation to maintain their native language, they had to indicate how much they agree or disagree with the following three statements: 1) "I do not want to lose my native language;" 2) "I want to cultivate my native language at

the highest level;” and 3) “I put forth an active effort to maintain my native language.” In order to indicate their level of agreement or disagreement, participant had to select one of six options on a six-point Likert scale (5 = strongly agree, 4= agree, 3 = somewhat agree, 2 = somewhat disagree, 1 = disagree, or 0 = strongly disagree).

Figure 16 shows that, overall, the GI ratings show a somewhat greater motivation to maintain the L1 than the OP ratings, with ratings of 4.4 and 3.83 respectively. The average ratings for the three individual statements show that GI agreed more strongly than OP with all three statements. The least difference between the two groups was reported for statement 1) “I do not want to lose my native language” (GI: 5, OP: 4.76), followed by statement 3) “I put forth an active effort to maintain my native language” (GI: 3.74, OP: 3.1) The largest difference between the two groups was found in the ratings for statement 2) “I want to cultivate my native language at the highest level” (GI: 4.47, OP: 3.62).

Figure 16. Mean Scores for Motivation to Maintain the L1.



Note. Motivation to maintain the L1 was measured by rating three statements on a six-point scale (5 = strongly agree, 4= agree, 3 = somewhat agree, 2 = somewhat disagree, 1 = disagree, and 0 = strongly disagree).

For the overall motivation score as well as for the three individual statements, a one-way, between-subjects analysis of variance with the factor group (GI, and OP) was conducted. Significant differences were found for overall motivation ($F(1,38)=4.34$, $p<.05$) and for the statement 2) I want to cultivate my native language at the highest level ($F(1,38)=6.06$, $p<.05$). For the other two statements 1) I do not want to lose my native language, and 3) I put forth an active effort to maintain my native language, the between-group differences were not statistically significant.

4.4.5 Identity and Attitudes towards the L1 and C1

To arrive at a better understanding of the participants' identity and their attitudes towards their native language, country and culture, they were asked to indicate how much they

agree or disagree with the following seven statements: 1) I think of myself as a member of the German-speaking world; 2) I want others to recognize me as being German; 3) I call Germany *home*; 4) It is important to me to maintain strong ties to Germany; 5) It is important to me to have German friends in the U.S.; 6) I want to return to Germany for good at some point in the future; and 7) I would never give up my German citizenship. In order to indicate their level of agreement or disagreement, participant had to select one of the following options: 5= strongly agree, 4 = agree, 3 = somewhat agree, 2 = somewhat disagree, 1 = disagree, or 0= strongly disagree.

Figure 17 shows the overall score, i.e., the average score of the ratings for all seven statements combined, and the individual mean scores for the seven statements. For the overall score, there was only a small difference of 0.2 between the two groups' mean scores (GI: 3.21, OP: 3.01). With the exception of statement 3) and statement 6), the German Instructors (GI) had higher mean scores than the Other Professionals (OP). For statement 3) "I call Germany *home*," the ratings were the same, and statement 6) "I want to return to Germany for good at some point in the future," was rated higher by the participants in the OP group than by participants in the GI group, with mean scores of 2.12 and 1.61, respectively.

Figure 17. Mean Scores for Attitudes towards the L1 and C1

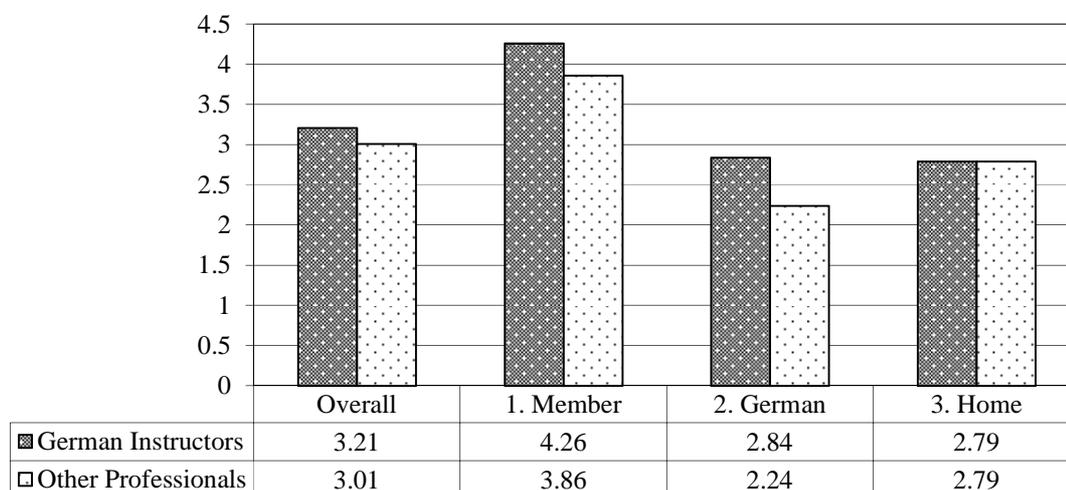
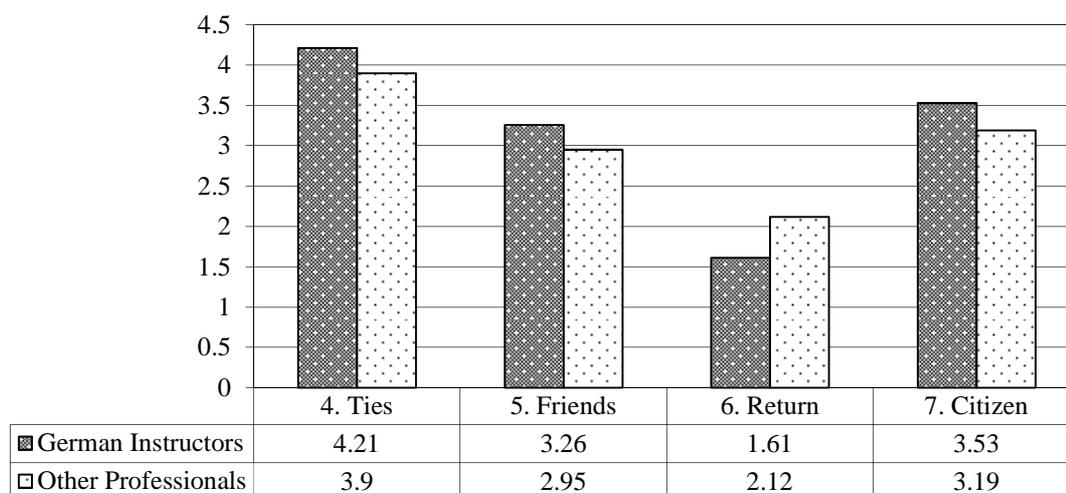


Figure 17. (continued)



Note. Attitudes towards the L1 and C1 were measured by rating seven statements on a six-point scale (5 = strongly agree, 4 = agree, 3 = somewhat agree, 2 = somewhat disagree, 1 = disagree, and 0 = strongly disagree).

In order to establish whether the differences in the groups' attitudes towards their native language, country and culture are statistically significant, group means were compared with one-way, between-subjects analyses of variance with group (GI and OP) as the

factor. The overall difference in attitude was not statistically significant and the mean ratings for the individual statements did not reveal any statistically significant differences between the two bilingual groups either.

4.5 Correlations between Sociolinguistic Variables and Linguistic Measures

After the data elicited through the phonetic and semantic verbal fluency tasks, the Chaplin film retelling task, and the semi-structured interview, as well as the data from the sociolinguistic questionnaire were analyzed separately, all data were examined together in order to investigate whether there are significant correlations between the data sets. The goal was to determine if there is a relationship between the sociolinguistic variables (length of residence, L1 use, L1 interlocutor type, L1 input, motivation for L1 maintenance, and identity and attitudes towards the L1 and C1) and the linguistic measures (phonetic verbal fluency, semantic verbal fluency, lexical diversity and error rates for the film retelling and the interview) (see table 6).

Table 6. Correlations between Sociolinguistic Variables and Linguistic Measures.

Sociolinguistic Variables	Linguistic Measures
Length of Residence	Phonetic Verbal Fluency
L1 Use	Semantic Verbal Fluency
L1 Interlocutor Type	Lexical Diversity (Film Retelling)
L1 Input	Lexical Diversity (Interview)
Motivation for L1 Maintenance	Error Rate (Film Retelling)
Attitudes towards the L1	Error Rate (Interview)

4.5.1 Length of Residence

Regarding the number of years participants have resided in the U.S., a significant correlation was found between their length of residence and their error rates from the semi-structured interview ($r(40)=.343$, $p<.05$). The correlations of length of residence with all other linguistic measures were not significant.

The significant correlation between length of residence and the interview error rate was positive, i.e., the more years participants have resided in the U.S., the higher their error rate in the speech samples from the semi-structured interview.

Table 7. Correlations between Length of Residence and Linguistic Measures.

	Phonetic Verbal Fluency	Semantic Verbal Fluency	Lexical Diversity (Film Retelling)	Lexical Diversity (Interview)	Error Rate (Film Retelling)	Error Rate (Interview)
Length of Residence	-.181	.014	-.052	-.166	.227	.343*

Note. *r*-values marked with an asterisk are significant at $p<.05$.

4.5.2 L1 Use

Significant correlations were found for the participants' reported overall L1 use and their overall semantic verbal fluency scores ($r(40)=.346$, $p<.05$), and between overall L1 use and their error rates from the film retelling and the interview (film retelling: $r(40)=-.414$, $p<.01$; interview: $r(40)=-.377$, $p<.05$).

Regarding the L1 use in the specific domains (at home, at work, and during the spare time), significant correlations were found between participants' L1 use at home and

their lexical diversity measures from the film retelling ($r(40)=.324, p<.05$) and the error rates from the film retelling ($r(40)=-.339, p<.05$). A significant correlation was also found between participants' L1 use at work and their error rates from the semi-structured interview ($r(40)=-.463, p<.005$). With regard to participants' L1 use during their spare time, a statistically significant correlation was found with their overall semantic verbal fluency measures ($r(40)=.418, p<.01$).

The significant correlations of L1 use with semantic verbal fluency scores and lexical diversity measures were positive, i.e., the more the L1 is used, the higher are the values of the linguistic measures. The significant correlations with the error rates from the Chaplin film retelling and the interview were all negative, i.e., the greater the L1 use, the lower the percentage of errors in the speech samples.

Table 8. Correlations between L1 Use and Linguistic Measures.

	Phonetic Verbal Fluency	Semantic Verbal Fluency	Lexical Diversity (Film Retelling)	Lexical Diversity (Interview)	Error Rate (Film Retelling)	Error Rate (Interview)
Overall L1 Use	.139	.346*	.168	.132	-.414*	-.377*
L1 Use at Home	.100	.115	.324*	.188	-.339*	-.040
L1 Use at Work	.166	.186	.021	.030	-.210	-.463*
L1 Use during Spare Time	.244	.418*	-.038	.034	-.279	-.286

Note. r -values marked with an asterisk are significant at $p<.05$.

4.5.3 L1 Interlocutor Type

With respect to the different types of interlocutors with whom the bilingual participants in the GI and OP groups use their L1, significant correlations were found between their L1 use with native speakers of German in the U.S. and their phonetic verbal fluency ($r(40)=.384$, $p<.05$) and between their L1 use with non-native speakers of German in the U.S. and their error rates from the Chaplin film retelling ($r(40)=-.371$, $p<.05$). Correlations between the other L1 interlocutor types and the other linguistic measures were not significant.

The significant correlation between L1 use with native speakers of German in the U.S. and phonetic verbal fluency was positive, i.e., the more participants communicate in their L1 with native speakers of German in the U.S., the more lexical items they produced on the phonetic verbal fluency tasks. The significant correlation between L1 use with non-native speakers of German in the U.S. and the error rates from the film retelling was negative, i.e., the more participants communicate in their L1 with non-native speakers of German in the U.S, the less errors they make in the film retelling or vice versa.

Table 9. Correlations between L1 Interlocutor Type and Linguistic Measures.

	Phonetic Verbal Fluency	Semantic Verbal Fluency	Lexical Diversity (Film Retelling)	Lexical Diversity (Interview)	Error Rate (Film Retelling)	Error Rate (Interview)
Native Speakers in Germany	.100	-.055	-.022	.249	-.057	-.090
Native Speakers in the U.S.	.384*	.219	-.132	-.109	-.164	-.222
Non-Native Speakers in the U.S.	.176	.244	-.104	-.031	-.371*	-.294

Note. *r*-values marked with an asterisk are significant at $p < .05$.

4.5.4 L1 Input

With regard to the participants' overall L1 input, no statistically significant correlations were found between the overall L1 input and any of the linguistics measures (verbal fluency scores, lexical diversity measures, and error rates). Likewise, correlations between the different types of L1 input (TV, movies, radio, music, newspapers, magazines, and books) and the linguistic measures did not yield any statistically significant results.

Table 10. Correlations between L1 Input and Linguistic Measures.

	Phonetic Verbal Fluency	Semantic Verbal Fluency	Lexical Diversity (Film Retelling)	Lexical Diversity (Interview)	Error Rate (Film Retelling)	Error Rate (Interview)
Overall L1 Input	.194	.027	-.004	.044	-.264	-.142
TV	-.107	-.171	-.113	-.087	.052	.081
Movies	.157	.124	.099	.022	-.081	.000
Radio	-.217	-.309	.040	.076	-.025	.169
Music	-.066	-.273	-.051	.023	-.180	.048
Newspapers	-.142	-.174	.286	.000	-.040	.102
Magazines	-.003	-.195	-.005	-.113	-.057	.170
Books	.147	.111	.270	-.022	-.217	-.191

4.5.5 Motivation for L1 Maintenance

No significant correlations were found between the overall scores for motivation to maintain the L1 and any of the linguistic measures. A closer examination of correlations between the participants' ratings of statements regarding their motivation for L1 maintenance, (I do not want to lose my native language, I want to cultivate my native language at the highest level; and I put forth an active effort to maintain my native language) and their linguistic measure did also not reveal any statistical significance.

Table 11. Correlations between Motivation for L1 Maintenance and Linguistic Measures.

	Phonetic Verbal Fluency	Semantic Verbal Fluency	Lexical Diversity (Film Retelling)	Lexical Diversity (Interview)	Error Rate (Film Retelling)	Error Rate (Interview)
Overall motivation for L1 maintenance	.099	.097	.094	-.011	-.290	-.203
I do not want to lose my native language.	.114	.163	.138	.105	-.210	-.153
I want to cultivate my native language at the highest level.	.117	.175	.153	.052	-.253	-.248
I put forth an active effort to maintain my native language.	.057	-.002	.014	-.087	-.270	-.133

4.5.6 Identity and Attitudes towards the L1 and C1

No significant correlations were found between the participants' overall scores for attitudes towards the L1 and the C1 and any of the linguistic measures. However, a closer look at the individual statements participants were asked to rate (I think of myself as a member of the German-speaking world; I want others to recognize me as being German; I call Germany *home*; It is important to me to maintain strong ties to Germany; It is important to me to have German friends in the U.S.; I want to return to Germany for good at some point in the future; and I would never give up my German citizenship) did reveal some statistically significant correlations. One of these significant correlations was between the participants' ratings of the statement "It is important to me to have German friends in the U.S." and their lexical diversity measures from the interview ($r(40)=-.401$, $p=.01$). A second statistically significant correlation was found between the participants' ratings of the statement "I want to return to Germany for good at some point in the

future” and their overall semantic verbal fluency ($r(40)=-.317, p<.05$). Surprisingly, both significant correlations were negative, i.e., the values of their linguistic measures increased when their level of agreement with the two statements decreased or vice versa.

Table 12. Correlations between Attitudes towards the L1/C1 and Linguistic Measures.

	Phonetic Verbal Fluency	Semantic Verbal Fluency	Lexical Diversity (Film Retelling)	Lexical Diversity (Interview)	Error Rate (Film Retelling)	Error Rate (Interview)
Overall attitudes towards the L1/C1	.107	.013	-.159	-.144	-.087	.050
I think of myself as a member of the German-speaking world.	.279	.111	.002	-.234	-.169	-.004
I want others to recognize me as being German.	.076	.081	-.114	-.157	-.041	.108
I call Germany <i>home</i> .	.232	-.017	-.147	.039	-.133	.028
It is important to me to maintain strong ties to Germany.	.014	-.038	-.078	-.101	.017	-.075
It is important to me to have German friends in the U.S.	.041	.157	-.097	-.401*	.060	.217
I want to return to Germany for good at some point in the future.	-.210	-.317*	-.160	.030	.055	.010
I would never give up my German citizenship.	.020	.046	-.128	.111	-.150	-.058

Note. *r*-values marked with an asterisk are significant at $p<.05$.

CHAPTER 5: DISCUSSION

5.1 Introduction

In the following sections, the results presented in Chapter 4 are summarized, interpreted and discussed in order to answer the five research questions that guided this study:

- (1) What are the participants' phonetic and semantic verbal fluency scores, and how do the data from the three groups under investigation (Control Group, German Instructors, and Other Professionals) compare?
- (2) What is the amount of lexical diversity in the participants' speech samples, and how do the data from the three groups compare?
- (3) What are the participants' error rates, and which error types occur in the spontaneous speech data? How do the data from the three groups compare?
- (4) Do the two bilingual groups (German Instructors and Other Professionals) differ with respect to sociolinguistic variables (amount of L1 use, L1 interlocutor type, L1 input, motivation to maintain the L1, and identity and attitudes towards the native language, country and culture)?
- (5) Do the bilingual participants' linguistic measures (phonetic and semantic verbal fluency scores; lexical diversity measures, and error rates from the film retelling and the interview) show correlations with the sociolinguistic variables (length of residence, amount of L1 use, L1 interlocutor type, L1

input; motivation to maintain the L1; and identity and attitudes towards the native language, country and culture)?

5.2 Verbal Fluency

The first research question explored potential differences and/or similarities in the phonetic and semantic verbal fluency of the monolingual (or minimally bilingual) Control Group (CG), the German Instructors (GI), and the Other Professionals (OP). In order to answer this research question, data elicited through three phonetic verbal fluency tasks (*F*, *A*, and *S*) and three semantic verbal fluency tasks (*animals*, *fruits and vegetables*, and *things in the kitchen*) were analyzed.

Table 13 provides an overview of the results. Statistical analyses of the phonetic verbal fluency data did not yield any significant differences between the CG, GI and OP group means, neither for the individual scores on each of the three tasks nor the overall phonetic verbal fluency scores. The analyses of the semantic verbal fluency data, however, revealed significant differences between the groups, for two of the three individual scores, i.e., for the categories *fruits and vegetables* and *things in the kitchen*) as well as for the overall semantic verbal fluency scores. Furthermore, differences between the three groups were detected with regard to the number of incorrect lexical items, English intrusions, and lexical retrieval problems. Though, the difference was only statistically significant for the semantic verbal fluency tasks.

Table 13. Overview of Differences between the Groups for the Verbal Fluency Data.

Linguistic Measure		Overall Difference	Difference between CG and GI	Difference between CG and OP	Difference between GI and OP
Phonetic Verbal Fluency	F				
	A				
	S				
	Overall				
<hr/>					
	Incorrect Lexical Items				
	English Intrusions				
	Lexical Retrieval Problems				
<hr/>					
Semantic Verbal Fluency	Animals				
	Fruits/Vegetables	$p<.05$			$p<.017$
	Things in the Kitchen	$p<.05$		($p=.019$)	
	Overall	$p<.05$		$p<.017$	$p<.017$
<hr/>					
	Incorrect Lexical Items	$p<.05$		$p<.01$	
	English Intrusions	$p<.05$		$p<.01$	
	Lexical Retrieval Problems	$p<.05$	$p<.01$	$p<.005$	

Note. The p -levels indicate a statistically significant difference. All other results were not statistically significant. The results of the overall analyses of variance were significant at $p<.05$. The results of the pairwise comparisons were adjusted with the Bonferroni correction which lowered the p -level to $p<.017$. (Marginally significant differences are presented in parentheses.)

5.2.1 Phonetic Verbal Fluency

5.2.1.1 Number of Lexical Exemplars

Normative data for the English language (cf. Spreen & Strauss, 1998) suggest that a normal adult between the ages of 16 and 59, with 13 to 21 years of education can produce about 12-17 words belonging to a specific phonetic category. Unfortunately, there are no normative data for phonetic verbal fluency in German, but since English is a Germanic language, English may be used as a point of comparison for the German verbal fluency data from this study.

On the three phonetic verbal fluency tasks with the letter categories *F*, *A*, and *S*, the Control Group (CG) named between 11.9 and 17.1 correct lexical items, the German Instructors (GI) produced between 11.2 and 17.6, and the Other Professionals between 10 and 15 exemplars. The CG and GI data showed only small deviations from the patterns established by the normative English data, although the average number of exemplars GI produced for the letters *F* and *A* was somewhat less than 12 words (11.7 and 11.2, respectively). The data from the OP group, however, showed a greater deviation from the normative data as OP produced between 10 and 15 words for the three phonetic verbal fluency tasks with the letters *F*, *A*, and *S*.

According to normative data for English (cf. Spreen & Strauss, 1998), the highest number of exemplars is produced for the letter *S*, followed by *F* and *A* which shows that the number of lexical items for a letter category is not directly related to the letter's dictionary volume. For example, normative studies consistently find the letter *A* more difficult than *F*, despite the fact that *F* has a lower dictionary frequency than *A* in English as well as in German (cf. data reported in Spreen & Strauss, 1998). The Control Group (CG) and the German Instructors (GI) followed the patterns established by normative data for the English language, i.e., they named the largest number of lexical items for the letter *S*, followed by *F* and produced the lowest number for the letter *A*. However, the Other Professionals (OP) behaved differently; they produced more lexical exemplars for the letter *A* than for the letter *F*.

5.2.1.2 Performance on Individual Phonetic Verbal Fluency Tasks

A comparison of the group means for each of the three phonetic verbal fluency tasks showed that for the letter *F*, the Control Group (CG) named the most words, followed by the German Instructors (GI) and the Other Professionals (OP) who produced the smallest number of words, namely two words less than CG. For the letter *A*, CG obtained the best result and the two other groups performed slightly lower, though the differences between the group means are minimal. For the letter *S*, GI slightly outperformed CG (with a difference of 0.5), and OP named approximately two words less than the other two groups. Though, statistical analyses revealed that the differences in phonetic verbal fluency were not statistically significant in any of the three tasks. Likewise, pairwise comparisons did not show any statistically significant differences between CG and GI, between GI and OP, and between CG and OP either. This finding suggests that phonetic verbal fluency in bilingual speakers living in an L2 environment remains unaffected by L1 attrition.

5.2.1.3 Overall Phonetic Verbal Fluency

With regard to the overall phonetic verbal fluency scores, i.e., an average over the three individual phonetic verbal fluency tasks, the Control Group (CG) achieved the highest score, followed by the German Instructors (GI) and the Other Professionals (OP). The difference between CG and GI was very small, while the differences between CG and OP as well as between GI and OP were somewhat larger, although less than two words. However, the differences were not statistically significant.

The findings reported above confirm results from previous studies on verbal fluency by Rosselli et al. (2000) and by Portocarrero, Burright and Donovanick (2007) which revealed that monolingual and bilingual participants' performed equally in phonetic verbal fluency tasks. According to Rosselli et al. (2000), this similar performance of monolingual and bilingual speakers can be attributed to the fact that phonetic categories allow for non-concrete words to be named, which reduces the amount of crosslinguistic interference.

Though, despite the fact that the differences in overall phonetic verbal fluency between the three groups were not statistically significant, it is noteworthy that the difference between the bilingual group of German Instructors (GI) and the monolingual Control Group (CG) was rather small, whereas the difference between the second bilingual group of Other Professionals (OP) and the Control Group (CG) was somewhat more pronounced. This allows for a first – albeit very cautious – hypothesis that the phonetic verbal fluency of the German Instructors (GI) may be somewhat less affected by the bilingual, German-English environment the participants live in, than the phonetic verbal fluency of the Other Professionals (OP).

5.2.2 Semantic Verbal Fluency

5.2.2.1 Number of Lexical Exemplars

Group means were calculated for each of the three semantic verbal fluency tasks *animals*, *fruits and vegetables*, and *things in the kitchen*. On average, the Control Group (CG)

named between 24.3 and 28.1 correct lexical items, the German Instructors (GI) produced between 22.5 and 28.6, and the Other Professionals between 20.5 and 24.1 exemplars.

All three groups named the most exemplars for the category *animals*, a finding which is in line with the results of a number of research studies (cf. Rosselli et al., 2002). These studies have shown that more lexical items are generated for the category *animals* than for the category *fruits* or *vegetables*, which is corroborated by the data from the three groups (CG, GI, and OP).

Unfortunately, normative data regarding semantic verbal fluency only exist for the English language for the category *animals*. While Goodglass and Kaplan (1983) reported that average adults can be expected to name about 18 words in 60 seconds, Spreen and Strauss (1998) reported higher numbers. They found that a normal adult can produce about 16-30 exemplars for the category *animals*. Consequently, the CG, GI, and OP group means for the category *animals* (28.1, 28.6, and 24.1 respectively) fall into this normal range.

A number of research studies investigating L1 attrition also provide semantic verbal fluency data that can be used for comparison. For example, Waas (1993) tested German immigrants' semantic verbal fluency in German and English. On the German animal naming task, the bilingual immigrants produced circa 20 exemplars and the monolingual control group produced circa 24 exemplars. Yağmur (1997) elicited data from forty Turkish immigrants in Australia and a reference group of forty monolingual speakers in Turkey through two semantic verbal fluency tasks with the categories

‘animals’ and ‘fruit and vegetables.’” For each of the two categories, bilinguals produced on average 14-15 exemplars and monolinguals produced 23-25 exemplars.

Therefore, semantic verbal fluency scores from the monolingual as well as from the bilingual participants in this study are somewhat higher (approximately four words) than those reported by Waas (1993) and much higher (up to ten words) than the semantic verbal fluency scores reported by Yağmur (1997). These differences may be attributed to a number of sociolinguistic variables, such as, e.g., length of residence, age of arrival, or years and level of education in the L1 country. The participants in this study all completed thirteen years of schooling in Germany, and immigrated to the U.S. after the age of twenty. Therefore, the characteristics of participants in all three groups (CG, GI, and OP) differ from those in other research studies quite a bit.

5.2.2.2 Performance on the Individual Semantic Verbal Fluency Tasks

For the category *animals* and *fruits and vegetables*, the German Instructors (GI) named the most lexical items, followed by the Control Group (CG) and the Other Professionals (OP). For the category *things in the kitchen*, CG produced the most correct words, followed by GI and OP. Therefore, in all three categories, CG and GI produced more exemplars than OP. In each of the three categories, the differences between CG and GI were smaller than the differences between CG and OP.

Statistical analyses showed that the differences between the three groups were significant for the categories *fruits and vegetables* and *things in the kitchen*, but not for the category *animals*. Additional pairwise comparisons revealed a statistically significant

difference between GI and OP for the category *fruits and vegetables*, and a marginally significant difference between CG and OP for the category *things in the kitchen*. No statistically significant differences were found between the Control Group (CG) and the German Instructors (GI).

A possible explanation for the lack of a statistically significant difference between the three groups for the category *animals* may be the fact that L2 animal vocabulary is generally used rather infrequently or not at all by the majority of bilinguals. In fact, some bilinguals may not even be familiar with a number of animal names, especially L1 words for rather uncommon animals. Therefore, in categories like *animals*, bilinguals are most likely not as affected by crosslinguistic interference as in other semantic categories.

In contrast, L2 vocabulary for *fruits and vegetables* and *things in the kitchen* is frequently used by bilingual speakers as shopping for groceries, cooking, preparing food in the kitchen, and eating are integral parts of the bilingual speakers' daily lives. Consequently, participants may experience and have to resolve a greater amount of crosslinguistic interference when asked to name L1 words belonging to categories such as *fruits and vegetables* and *things in the kitchen*, i.e., categories requiring L1 words whose L2 equivalents are used on a daily, or at least a regular, basis.

Regarding the category *things in the kitchen*, it could be speculated that – due to context familiarity – female participants may have performed better than male participants, and that the statistically significant differences between the groups may therefore be attributed to the fact that there were more women in the GI group than in the CG and OP groups. However, a breakdown of the data did not reveal any significant

differences between the female and the male participants on this particular semantic verbal fluency task.

5.2.2.3 Overall Semantic Verbal Fluency

For overall semantic verbal fluency, a statistical analysis of the data from the monolingual Control Group (CG) and the two bilingual groups of German Instructors (GI) and Other Professionals (OP) revealed that there was a significant difference between the three groups. Furthermore, pairwise comparisons revealed significant differences between CG and OP, and between GI and OP. The difference between CG and GI, however, was not statistically significant.

The significant difference between the monolingual Control Group (CG) and the bilingual group of Other Professionals (OP) supports findings by Portocarrero, Burright and Donovan (2007) and Rosselli et al. (2000) whose data also revealed significant differences in the performance of monolingual and bilingual participants on semantic verbal fluency tasks. Furthermore, it is also similar to findings in L1 attrition research conducted by Schmid (2009b), Waas (1993), and Yağmur (1997), in which monolingual participants also outperformed the bilingual participants on semantic verbal fluency tasks. Although Schmid (2009b) described the differences between the monolingual and the bilingual speakers as “hardly dramatic” (p. 225), Waas (1993) and Yağmur (1997) did attribute the poorer performance of the bilingual speakers to L1 attrition and a reduction in the L1 lexicon.

The findings that the difference between CG and GI was not statistically significant and that the difference between GI and OP was statistically significant suggests that the linguistic performance of the bilingual group of German Instructors (GI) who are residing in the U.S. is closer to the performance of the monolingual (or minimally bilingual) Control Group (CG) and rather different from the performance of the other group of bilinguals residing in the U.S., i.e., the Other Professionals (OP).

The statistically significant difference between the overall semantic verbal fluency scores of the two quasi-experimental groups suggests that the linguistic performance of the Other Professionals (OP) is more affected by L1 attrition than that of the German Instructors (GI). But how is it possible that one group of bilingual immigrants (GI) performs significantly better on a linguistic task than another group of bilingual immigrants (OP) with similar characteristics regarding length of residence, age of arrival in the U.S. and education level but differences regarding their profession? The answer may be found in the two populations' different frequency of L1 use.

Reduced verbal fluency in bilingual speakers has generally been attributed to either crosslinguistic interference or weaker S-to-P connections, i.e., the neurological connections between semantic and phonological representations. Crosslinguistic interference describes the direct competition between the L1 and the L2 during language production, i.e., when a bilingual tries to retrieve a word in the L1 belonging to a specific category there is direct competition from the translation equivalent in the L2. This competition has to be resolved prior to the production of an L1 word and, therefore, slows down the retrieval process.

The other more likely explanation for weaker performance of the Other Professionals (OP) on the semantic verbal fluency tasks is that their L1 system is characterized by weaker S-to-P connections, i.e., by weaker links between the semantic concept and its phonological representation. The links are weaker – compared to those of a monolingual speaker – as a result of less frequent L1 vocabulary use. Since the Other Professionals (OP) use their L1 less often than the German Instructors (GI), they strengthen the link between the semantic and the phonological representation less often (cf. Bialystok, Craik & Luk, 2008; Gollan, Montoya & Werner, 2002). Therefore, the statistically significant difference between the two quasi-experimental groups (GI and OP) may be attributed to the Other Professionals' weaker S-to-P connections, a result of less frequent usage and lower activation levels of German compared to the German Instructors (GI).

5.2.3 Incorrect Words, English Intrusions, and Lexical Retrieval Problems

After quantifying the number of lexical items produced for the phonetic and the semantic verbal fluency tasks, the data was also analyzed for incorrect words, English intrusions, and metalinguistic comments regarding difficulties such as correct language choice or inability to retrieve a word. Such errors and lexical retrieval problems have also been observed by Waas (1993) in her study on L1 attrition in German immigrants in Australia. She found that bilingual participants experienced difficulties during the semantic verbal fluency task which manifested themselves in “direct and literal translations from L2, pausing, halting speech, L2 pronunciations and intonation, code-switches to L2, slip-of-

the-tongue mistakes, metatheses, abandoning attempts, lack of self-corrections and recognition markers” (p. 142). Similarly, Gollan, Montoya and Werner (2002) and Portocarrero, Burright and Donovanick (2007) found errors such as non-words and cross-language errors in their data. However, regarding the number of errors, statistical analyses of their data revealed no significant differences between monolingual and bilingual speakers.

The statistical analyses of the CG, GI, and OP group means for incorrect lexical items, English intrusions, and lexical retrieval problems in the phonetic verbal fluency data did not reveal any significant differences. The analyses of the semantic verbal fluency data, however, yielded significant findings, which contradicts findings from previous research (Gollan, Montoya & Werner, 2002; Portocarrero, Burright & Donovanick, 2007). However, significant differences for all three categories (incorrect lexical items, English intrusions, and lexical retrieval problems) were mainly found between the Control Group (CG) and the Other Professionals (OP). The Control Group (CG) and the German Instructors (GI) differed only with regard to lexical retrieval problems, and the differences between the two bilingual groups, GI and OP, were not significant.

As the statistical analyses have shown, incorrect lexical items occurred most frequently when the participants were prompted with a semantic category. In most instances, the lexical errors were caused by transfer from the L2 or by partial recall of the L1 word. A small number of such mistakes occurred when prompted with the categories *animals* and *fruits and vegetables*, the largest number of deviant forms, however,

manifested itself in responses for the category *things in the kitchen*. A possible explanation for this observation may be the fact that L2 vocabulary for *things in the kitchen* is frequently used by bilingual speakers as the kitchen, cooking and eating are integral parts of a bilingual's daily life. In comparison, vocabulary naming animals in the L2 is used rather infrequently. Due to the greater frequency of L2 vocabulary use regarding *things in the kitchen*, participants may have to deal with more crosslinguistic interference when prompted with the category *things in the kitchen* than when prompted with the category *animals*.

Observations regarding English intrusions were similar to those made with regard to incorrect lexical items. With the exception of one single L2 intrusion in the phonetic verbal fluency data, all other instances of lexical intrusions from the L2 were found in the semantic verbal fluency data. However, when asked for additional feedback on the data collection or on their language(s), a number of bilingual participants reported difficulties keeping the L1 and the L2 apart during both, the phonetic as well as the semantic verbal fluency tasks. Participants GI4 even stated that she found it more difficult to keep her languages apart during the phonetic verbal fluency tasks. Similarly, GI15, OP2, and OP14 reported that English words came to mind when they were thinking of German words beginning with a certain letter (examples 1-3).

- (1) When I did the task with the letters (name things with "F"), I thought of a lot of English words in between the German ones. (GI15)
- (2) In the verbal fluency task, I thought of "fire" first and then "Feuer." (OP2)
- (3) Trying to think of German words, starting with a certain letter, English words came up. (OP14)

Additional evidence pointing to a simultaneous activation of the bilingual speakers' two languages, German and English, were L2 intrusions of phonetic nature. On a number of occasions, participants pronounced a German-English cognate noun using the L2 instead of the L1 pronunciation required for the verbal fluency task. In most instances, the bilingual speakers did not even notice their error and continued the task.

In a few cases, however, the participants did notice their errors or English intrusions, and attempted to correct themselves by trying to retrieve the correct word – sometimes successfully, sometimes not. Frequently, the process of accessing vocabulary was accompanied by metalinguistic comments, questions, or attempts at circumlocution. Such metalinguistic observations suggest that the participants are rather aware of their lexical retrieval problems. According to Halmari (2005), “self-initiated repair indicates the subjects' awareness of the mistakes they produce in their L1” and “the fact that they have the ability to self-repair these mistakes is an indication of the vitality of the L1” (p.425).

While some participants tried to self-repair once they noticed their errors, other participants were experiencing lexical retrieval problems – as indicated by a metalinguistic comment – but moved on to the next item right away, without trying to retrieve the word. Considering Halmari's (2005) claim, it could be speculated that the L1 of these participants may not be as vital as the L1 of those participants who tried to self-repair their utterance or tried to access the word in question. However, this difference in the participants' behavior and performance on the verbal fluency tasks may also be attributed to personality traits. Most likely, some participants were more focused on completing the

task to the best of their ability without letting lexical retrieval problems slow them down, whereas other participants seemed to ‘get stuck’ on one particular item and spent an extended period of time on trying to access that lexical item without worrying about the sixty minute time limit and the time lost because of the prolonged retrieval process.

5.3 Spontaneous Speech

5.3.1 Sample Length

An analysis of the speech samples elicited through the Chaplin film retellings and the semi-structured interviews revealed rather large differences regarding sample length. The speech samples for the film retellings ranged from 411 to 1,929 tokens for the Control Group (CG), from 135 to 1,348 for the German Instructors (GI), and from 243 to 971 for the Other Professionals (OP). The interview transcripts were between 436 and 3,208 tokens for CG, between 453 and 1,741 for GI, and between 543 and 3,426 words for OP.

Though, a comparison of the group means showed no statistically significant difference between the three groups, the question remains how these different sample lengths may be explained. One plausible reason for these differences is certainly the participants’ style of communication and personality, i.e., the fact that some participants are simply more verbose than others. A number of participants provided more detailed descriptions of the events in the Chaplin film montage and more elaborate answers to interview questions while the descriptions and answers of other participants were more precise and to the point, and therefore, usually shorter.

A closer look at the length of speech samples from each group did not reveal any clustering of one type or the other in any of the three groups. On the contrary, expansive and succinct participants seemed to be equally distributed in the three groups. The fact that a statistical comparison of group means was not statistically significant supports this argument.

5.3.2 Lexical Diversity

The second research question sought to determine the amount of lexical diversity in the participants' speech samples and explored how the data from the three groups contrast and compare. In order to answer the second research question, spontaneous speech data elicited through the Chaplin film retelling task and through a semi-structured, face-to-face interview was analyzed with the *vocd* software and lexical diversity measures D were established for each participant.

The data revealed that the interview speech samples from all three groups (CG, GI, and OP) were more lexically diverse than the speech samples elicited through the Chaplin film retelling. This was not a surprising finding as the film retelling task is more controlled and requires specific vocabulary whereas the semi-structured interview allows the participants to discuss a range of different issues and topics and, consequently, to use a more diverse vocabulary. As a result of this variety and diversity of topics and vocabulary, the lexical diversity measures are higher than those for the speech samples elicited through the film retelling task.

A look at the group means revealed that, on both tasks, the lexical diversity measures of the CG group were greater than those of the two GI and OP groups, i.e., the native speech of the bilingual speakers is not as lexically diverse as the native speech of monolingual speakers. According to Laufer (2003), such a decrease in lexical diversity may be related to a temporarily reduced accessibility of lexical items under time constraints and to a strategy of avoidance in the use of certain vocabulary.

Furthermore, the German Instructors (GI) performed better than the Other Professionals (OP) on both tasks. However, a significant difference between the three groups was found only in the overall analysis of variance of the lexical diversity measures from the interview data. Pairwise comparisons for the interview data revealed that the significant difference was between the lexical diversity measures from the CG and the OP groups. Additionally, pairwise comparisons of the lexical diversity measures from the film retelling data also yielded a significant difference between participants in the CG and participants in the OP group (see table 14).

Table 14. Overview of Differences between the Groups for the Lexical Diversity Measures.

Linguistic Measure		Overall Difference	Difference between CG and GI	Difference between CG and OP	Difference between GI and OP
Lexical Diversity	Film Retelling			$p < .017$	
	Interview	$p < .05$		($p = .017$)	

Note. The p -levels indicate a statistically significant difference. All other results were not statistically significant. The results of the overall analyses of variance were significant at $p < .05$. The results of the pairwise comparisons were adjusted with the Bonferroni correction which lowered the p -level to $p < .017$. (Marginally significant differences are presented in parentheses.)

These results seemingly contradict findings from previous research conducted by Schmid (2009b) and by Dewaele and Pavlenko (2003). Similar to this study, Schmid (2009b) analyzed German speech data from a semi-structured autobiographical interview and the Chaplin film-retelling task, but found only one statistically significant difference for one of two immigrant groups on the film retelling task. These findings lead her to the conclusion that immigrants' lexical diversity may not be affected by a prolonged residence abroad and the resulting influence of the L2. The same conclusion was reached by Dewaele and Pavlenko (2003) who compared lexical diversity measures of bilingual and monolingual Russian speakers and also found no significant difference between the two groups.

However, since this study was interested in comparing not only monolingual and bilingual speakers but also two different groups of bilingual speakers, i.e., those teaching their native language at American institutions of secondary and higher education (GI) and those working in other professions (OP), the results of the pairwise comparisons are of greater interest than the results of the overall analysis of variance. They revealed significant differences in lexical diversity between the Control Group (CG) and the Other Professionals (OP) for both tasks, but found no significant differences between the Control Group (CG) and the German Instructors. These findings indicate that the participants in the OP group do have a greater decrease in lexical diversity than the participants in the GI group, whose lexical diversity is similar to that of the participants in the monolingual (or minimally bilingual) CG group. The difference between the two

bilingual groups may be attributed to the frequency as well as the linguistic complexity and sophistication of the bilingual participants' L1 use and L1 input.

5.3.3 Speech Errors

Linguistic deviations were the focal point of the third research question which examined the participants' error rates and the distribution of error types as well as differences and similarities between the three groups. In order to answer the third research question, the spontaneous speech data were coded for deviant linguistic forms – based on an adapted version of Schmid's (2002) error categories (see section 3.4.2.1) – and analyzed quantitatively. The statistical analyses showed that there were significant differences between the mean error rates from the Control Group (CG), German Instructors (GI), and the Other Professionals (OP) on both tasks. Likewise, all pairwise comparisons contrasting each group with each other group were also significant (see table 14).

Furthermore, an analysis of the distribution of different error types in the spontaneous speech data from all three groups revealed that the majority of errors belonged to the lexical domain. In the speech data from the two bilingual groups, GI and OP, semantic errors also occurred rather frequently. Only smaller numbers of errors belonging to the domains function words, morphology, morphosyntax, and syntax were found. Statistical analyses yielded significant differences in the lexical, semantic, morphological, and morphosyntactical domains, and pairwise comparisons revealed that the differences were between CG and GI and between CG and OP; the differences between the two bilingual groups were not significant (see table 15).

Table 15. Overview of Differences between the Groups for Error Rates and Error Types.

Linguistic Measure		Overall Difference	Difference between CG and GI	Difference between CG and OP	Difference between GI and OP
Error Rates	Film Retelling	$p < .001$	$p < .001$	$p < .001$	$p < .001$
	Interview	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Error Types (Film)	Lexicon	$p < .001$	$p < .001$	$p < .001$	
	Semantics	$p < .001$	$p < .001$	$p < .001$	
	Function Words				
	Morphology	$p < .05$			
	Morphosyntax	$p < .05$	$p < .017$	$p < .005$	
	Syntax				
Error Types (Interview)	Lexicon				
	Semantics	$p < .001$	$p < .001$	$p < .001$	
	Function Words	$p < .05$	$p < .017$	($p = .019$)	
	Morphology				$p < .017$
	Morphosyntax	$p < .005$		$p < .005$	
	Syntax				

Note. The p -levels indicate a statistically significant difference. All other results were not statistically significant. The results of the overall analyses of variance were significant at $p < .05$. The results of the pairwise comparisons were adjusted with the Bonferroni correction which lowered the p -level to $p < .017$. (Marginally significant differences are presented in parentheses.)

A comparison of the error rates for the two different types of speech samples, i.e., the Chaplin film retelling and the semi-structured interview, showed that the participants in all three groups, i.e., the Control Group (CG), German Instructors (GI), and Other Professionals (OP), made more errors in the Chaplin film retelling than in the interview. This difference may be attributed to the controlled and more challenging nature of the Chaplin film retelling task and the less controlled nature of the semi-structured, face-to-face interview conducted by the researcher. In contrast to the film retelling task, during which participants were required to render the exact details of the Charlie Chaplin episode they had seen, the semi-structured interview gave them the opportunity to pick

topics of their choice and to avoid difficult subjects, grammatical structures, and lexical fields they were insecure about.

5.3.3.1 Error Rates

Not surprisingly, a comparison of the group means showed that, on both tasks, the Control Group (CG) had a drastically lower error rate than the German Instructors (GI) and the Other Professionals (OP). The overall statistical analysis revealed significant differences and additional pairwise comparisons showed that the differences between CG and GI and between CG and OP were statistically significant, suggesting lexical attrition in both bilingual groups. Such differences between monolingual (or minimally bilingual) speakers residing in the L1 country and bilingual speakers residing in an immigrant context have also been found in other research studies investigating L1 attrition in migration settings (e.g., Köpke & Nespoulous, 2001; Olshtain & Barzilay, 1991; Schmid, 2009b).

Furthermore, between-group differences have been reported for groups with different lengths of residence in the immigrant country (e.g., De Bot, Gommans & Rossing, 1991) and for groups with the same L1 but different immigrant settings (e.g., Köpke & Nespoulous, 2001). However, to this day, no research had been carried out comparing the L1 speech and linguistic deviations of bilingual speakers who use their L1 for professional purposes, such as the German Instructors who teach their L1 at institutions of secondary and higher education, and the Other Professionals (OP) who do not use their L1 at the work place.

The goal of study was to compare the L1 speech of these two populations, and the data did reveal significant differences between the group of German Instructors (GI) and the Other Professionals (OP). On both tasks, the Chaplin film retelling task and the semi-structured interview, the GI error rate was lower than the OP error rate, and a pairwise comparison showed that the difference between the two bilingual groups, GI and OP, was statistically significant. This suggests that the native language of the German Instructors (GI), is less affected by L1 attrition, most likely due to the frequency as well as the linguistic complexity and sophistication of their L1 use and L1 input.

5.3.3.2 Error Types

5.3.3.2.1 Lexicon

A quantitative analysis of the distribution of individual error types revealed that in the two bilingual groups of German Instructors (GI) and Other Professionals (OP) as well as in the monolingual (or minimally bilingual) Control Group (CG), the majority of errors occurred in the lexical domain. This finding supports the results from previous research which has also found errors in the lexicon (e.g., Boyd, 1993; Clyne, 1972; Schmid, 2002; Skaaden, 2005, Tóth, 2007; Waas, 1996).

In the speech data from both tasks, i.e., from the Chaplin film retelling and the semi-structured interview, lexical errors of unknown origin were the most frequently found error type in the speech data from all three groups. Other errors belonging to the lexical domain were borrowings of single lexical items from the L2, code-switching, i.e.,

the integration of longer stretches of L2 material, instances of partial recall, and lexical retrieval problems.

Lexical errors of unknown origin were more frequent in the Chaplin film retellings, as the participants either did not know or experienced difficulties accessing the correct L1 words to describe events, actions and places from the Chaplin film retelling, such as the German words for the shipyard where Charlie Chaplin begins to work, the piece of wood Charlie is instructed to find, the supervisor who gives Charlie the work assignment, the buffet restaurant where Charlie eats, the phone the police officer uses to call for the police car as well as for the police car that takes the criminals to jail. Instances of such word finding problems occurred in all three groups, however, to a much lesser extent in the monolingual Control Group (CG).

Some of the incorrect lexical items selected by the participants in the two bilingual groups to describe these events, actions and places suggest that less specificity is maintained in their native language, i.e., that while they have retained basic meanings, they are less sensitive to specific selectional restrictions (cf. Olshtain & Barzilay, 1991). Examples from the GI and the OP data such as using the word *Blech* (= metal plate) instead of *Tablett* (= tray), or using the words *Holz* (= wood), *Holzsplit* (= log) and *Stock* (= stick) instead of *Keil* (= chock) illustrate such a reduction in specificity.

5.3.3.2.1.1 Borrowing of Single Lexical Items and Code-Switching

Though, borrowings of single lexical items from the L2 occurred in all three groups in both tasks, they were utilized with much greater frequency by the participants in the two

bilingual groups during the semi-structured, face-to-face interview with the researcher. Such borrowings frequently occurred when participants described something that does not exist in Germany, such as, e.g., university-specific concepts (e.g., *tenure*, *credits*, *provost*, etc.) or things typical for the U.S. American setting (e.g., *downtown*, (*strip malls*, *suburbia*, etc.). In these cases, i.e., when lexical items in the L2 were used to refer to things and concepts that have no equivalent in the L1, code-switching was obviously used as a discourse strategy and as means to make communication more efficient (cf. De Bot, 2002; Halmari, 2005). Other L2 intrusions found in the bilinguals' speech data, however, occurred despite a clear L1 equivalent and therefore have to be distinguished from the lexical borrowings used to describe foreign things and concepts. In these cases, code-switching was used in order to solve linguistic difficulties caused by lexical retrieval problems and gaps in the linguistic knowledge of a bilingual speaker (cf. De Bot, 2002; Halmari, 2005).

Both types of code-switching – i.e., the integration of L2 material into the L1 speech due to the lack of an L1 equivalent or due to a gap in L1 vocabulary knowledge – point to a certain flexibility in language production and the ability to use both languages to solve linguistic problems (cf. Myers-Scotton, 1993). Furthermore, the majority of code-switches found in the spontaneous GI and OP speech data were situationally appropriate, i.e., participants were in full control of their two languages, and the L2 elements which were integrated into the L1 speech observed the language-specific constraints of the borrowing language (cf. De Bot, 2002).

A few examples, however, may be interpreted as signs of incipient L1 attrition, e.g., insertional switches, or instances where bilingual participants uttered the beginning of an English word and then managed to switch back to the L1. Insertional switches such as *anyway*, or *Oh my God!* from the spontaneous speech data were also reported by Halmari (2005) who found that many instances of code-switching are fixed expressions “which in bilingual language often occur as insertional switches” (p.421). In the data from the German Instructors (GI) and the Other Professionals (OP), however, these types of code-switches were rather infrequent.

5.3.3.2.1.2 Lexical Retrieval Problems

While lexical retrieval problems were entirely absent in both spontaneous speech samples from the Control Group (CG), they were rather frequent in the speech data from the two bilingual groups, the German Instructors (GI) and the Other Professionals (OP). This finding suggests a reduction in speed and fluency in the native speech of the bilingual participants as crosslinguistic interference and/or L1 attrition most prominently manifests itself in lexical retrieval difficulties, in addition to lexical borrowings, loan translations, and semantic extensions (cf. Olshtain & Barzilay, 1991; Pavlenko, 2003).

A closer analysis revealed that the majority of the lexical retrieval problems in the two bilingual groups occurred with low frequency words. This observation supports Altenberg’s (1991) claim that “word frequency is a well-known variable affecting lexical retrieval processing” (Altenberg, 1991, p. 200) and that “low frequency items will be lost in language before high frequency items” (Andersen, 1982, cited in Altenberg, 1991, p.

201). Moreover, these examples corroborate the Activation Threshold Hypothesis, which states that the activation of low frequency words takes longer than the activation of high frequency words due to a higher activation threshold (Paradis, 1997).

Though, while the data suggest that bilingual participants from the GI and OP groups seem to have a more restricted stock of lexical items at their disposition and, therefore, experience difficulties accessing infrequent and very specific items during active L1 production, it is rather likely that these items are available for interpretation (cf. Olshtain & Barzilay, 1991). Therefore, the phenomenon of L1 attrition should not be understood as the complete loss of lexical items but rather as a temporary impairment in lexical retrieval (cf. Ammerlaan, 1996; Ecke & Hall, 2011)

5.3.3.2.2 Semantics

Aside from lexical errors of unknown origin, on both tasks, the largest percentages of errors made by the German Instructors (GI) and the Other Professionals (OP) were transfer errors, i.e., the transfer of an English word to a phonologically similar word or a part-synonym in German. Such instances of transfer and crosslinguistic influence have also been detected in previous research by Jarvis (2003), Pavlenko (2003), Pavlenko and Jarvis (2002), and Stolberg and Tracy (2008).

Haugen (1953) made the claim that if an L1 and an L2 word are similar in sound, the L1 word is often given the meanings of the L2 word. This claim is supported by the data from this study. A closer look at the transfer errors from the spontaneous speech data from the GI and OP groups suggests that transfer generally occurs when the words in the

L1 and the L2 are similar. Similar examples of crosslinguistic convergence of homophone elements with similar or partially identical semantic meanings, such as, e.g., *wenn* and *when*, have also been reported by Stolberg and Tracy (2008).

While Schmid (2002), in her categorization of error types by domain, assigned transfer errors to the semantic domain, Pavlenko's (2003) speech data collected from Russian-English bilinguals revealed that transfer can also affect the lexicon, morphosyntax, and linguistic framing. Furthermore, Jarvis (2003) also reported "L2 effects in certain limited areas of grammar, and more broadly in areas of lexicosemantics and general idiom" (p. 99). Similarly, the data from this study also revealed a number of calques where L2 compound nouns or idiomatic expressions are translated morpheme by morpheme.

5.3.3.2.3 Function Words

In addition to errors belonging to the lexical and semantic domains, smaller percentages of errors were found in the domains of function words, morphology, morphosyntax, and syntax. In these domains, the largest percentages of errors were found for the deviant use of prepositions by participants in both bilingual groups and to a lesser extent by the participants in the Control Group (CG). Such incorrect usage of prepositions has also been found, e.g., in research by Clyne (1972), Köpke and Nespoulous (2001), and Tóth (2007). Additionally, Porte (1999) reported that one of the interferences most frequently mentioned by EFL teachers in Spain, was the "perceived leveling of prepositions" (p. 30).

Clyne (1972) ascribed the confusion and uncertainty about which preposition to use to “not only to the great disparity in semantic range between [...] [prepositions] in most pairs of languages, but also to the place of most [...] [prepositions] between content and function words” (Clyne, 1972, p.22). Furthermore, based on his observations regarding the deviant use of prepositions in the speech of German immigrants in Australia, Clyne (1972) concluded that prepositions are one of the main sources of L2 transfer. Similarly, Köpcke and Nespoulous (2001) claimed that “substitutions of prepositions [...] are largely due to L2 interference” (p. 232). This claim can be supported by a number of errors detected in the spontaneous speech samples from the bilingual participants in the GI and OP groups (see chapter 4.3.3.2.2.3. examples 7-11).

5.3.3.2.4 Morphology and Morphosyntax

Based on her in-depth review of recent research focusing on the effects of L1 attrition on the morphosyntactical domain, Gürel (2008) concluded that “however slow and limited, L1 attrition of morphosyntax is possible” and change manifests itself in a “reduction of morphosyntactic complexity as well as loosening of morphosyntactic restrictions, which will eventually give the speaker a smaller number of linguistic constructions and devices” (p. 446f).

Among the common examples of morphosyntactic reduction or simplification are loss of case morphology, loss of gender-marking and adjective/noun convergence, omission of indefinite articles, elimination of relative pronouns, reduction of allomorphic variation, simplification of verbal agreement, use of lexemes instead of bound morphemes to encode grammatical relations, simplification of word order, reductions of restrictions in the binding domain, and elimination of the perfective/imperfective aspectual distinction. (Gürel, 2008, p. 446)

Similarly, Schmitt (2009) found a selective loss of L1 morphosyntactic components in the native speech of Russian immigrants in the U.S. In the spontaneous speech data from this study, a small number of deviant forms were found in the morphological and the morphosyntactical domains which support previous findings (e.g., Gürel, 2008; Schmitt, 2009) that L1 attrition in these domains is possible.

With regard to morphology, the data revealed incorrect marking of case, gender, and plural, and errors regarding verb phrase morphology; and in the morphosyntactical domain, instances of structural borrowing and analytic vs. synthetic negation were found. It appears that on both tasks, the Chaplin film retelling and the semi-structured, face-to-face interview, the Other Professionals (OP) made more errors in case and gender marking than the German Instructors (GI). Moreover, the OP data also included more structural borrowings, i.e., instances where a German verb was used with the argument structure of its English equivalent. This greater frequency of morphological and morphosyntactical errors seems to suggest that the native speech of the group of Other Professionals (OP) is more affected by L1 attrition.

Overall, however, speech errors in the domain of morphology and morphosyntax occurred less frequently than errors in in the lexical and semantic domains. This finding supports results from previous research studies which have also shown a greater number of speech errors in lexicon and semantics than in morphology, morphosyntax, and syntax (e.g., Andersen, 1982; Jarvis, 2003; Köpke, 1999; Köpke & Nespoulous, 2001; Sharwood Smith, 1983; Weinreich, 1953). However, research has also shown that morphology seems to be more vulnerable to L1 attrition than syntax (cf. Köpke & Nespoulous, 2001).

5.3.3.2.5 Syntax

Apart from a negligible number of smaller errors in word order in the spontaneous speech data from the Control Group (CG), the German Instructors (GI), and the Other Professionals (OP), the syntactical domain remained free of errors. There were no deviations in the order of time and place adverbials, order of indirect and direct objects, verb-subject structures in main clauses, discontinuous word order of the finite auxiliary verb and the infinitive, or verb-final placement in subordinate clauses. The few deviations that were found in word order were generally instances where single lexical items, e.g., an adverb or the negation word, were placed incorrectly. Since there were no deviations with regard to grammatical structures, it can be assumed that the syntactical domain is not affected by crosslinguistic interference and/or L1 attrition.

This finding is in line with findings from a recent study by Tsimpli et al. (2008) who also did not find any attrition with regard to syntax. Similarly, an analysis of spontaneous speech data by Köpcke and Nespoulous (2001) clearly showed that “bilingual subjects are more affected by difficulties in lexical processing than by difficulties in grammatical processing” (p. 232).

In contrast, Waas (1993), however, reported that all of her participants had difficulties with German word order and followed L2 rules when constructing sentences in the L1. However, at the time of data collection, her participants had spent an average time of sixteen years in Australia, whereas the average length of residence of the participants in this study was 9.7 years for the German Instructors (GI) and 11 years for

the Other Professionals (OP). Therefore, these contrasting findings may be ascribed to the difference in length of residence.

5.3.3.2.6 Metalinguistic Comments and Self-Repairs

Interesting observations were also made with respect to the participants' metalinguistic comments and self-repairs, i.e., speech errors that were subsequently corrected by the participant. While the data from the Chaplin film retelling and the semi-structured interview showed similar percentages of metalinguistic comments for the two bilingual groups, the German Instructors (GI) and the Other Professionals (OP), no metalinguistic comments were found in the data from the Control Group (CG). As all metalinguistic comments in the GI and OP data coincided with lexical retrieval problems, the absence of metalinguistic comments in the CG data can, most likely, be attributed to the fact that the participants in the CG group were not experiencing any problems with lexical retrieval.

While metalinguistic comments were absent from the CG interview data, instances of self-repair were found in both data sets from all three groups. In the film retelling data, GI had the largest percentage of self-repairs, followed by OP and CG, while in the interview data, the most self-repairs were made by CG, followed by GI and OP. The interview data – where the participants in the monolingual (or minimally bilingual) Control Group (CG) self-repaired more of their speech errors than the German Instructors (GI) who in turn self-repaired more errors than the Other Professionals (OP) – may be interpreted to support Halmari's (2005) claim that linguistic awareness and the ability to self-repair speech errors can be seen as indicators of the vitality of the L1.

Based on this interpretation, the L1 speech of the GI groups could be considered more vital than that of the OP group. The distribution of self-repairs in the speech data from the Chaplin film retelling, however, shows a rather different picture, as the GI group made the largest number of self-repairs, followed by OP and CG. Therefore, it is impossible to draw a conclusion regarding native language vitality. Another explanation for the larger number of self-repairs in the GI data may be that, due to their profession, the German Instructors (GI) are more aware of language and linguistics deviations and therefore are more capable of repairing their linguistic output.

The low mean percentage of self-repairs in the CG film retelling data may be explained by the types of errors found in the data. A closer look (see figure 9) revealed that the majority of errors in the CG film retelling data were lexical errors of unknown origin, which can likely be ascribed to the fact that participants in the Control Group (CG) lacked some of the vocabulary required to describe events, actions and places from the Chaplin film retelling such as the German words for the shipyard where Charlie Chaplin begins to work, the piece of wood Charlie is instructed to find, etc. Consequently, due to the gap in lexical knowledge, a self-repair was not possible.

5.4 Sociolinguistic Variables

Participants in the two bilingual groups, German Instructors (GI) and Other Professionals (OP), had to complete a sociolinguistic questionnaire designed to elicit information on a number of sociolinguistic variables (L1 use, L1 interlocutor type, L1 input, motivation to maintain the L1, and identity and attitudes towards the L1 and C1). For each of these

variables, a score was computed for each participant, and group means were established. The group means for each of these sociolinguistic variables were then compared with an analysis of variance in order to determine whether there were statistically significant differences between the GI and OP group.

Furthermore, the participants' scores for each of the sociolinguistic variables as well as the participants' length of residence, i.e., the number of years they have resided in the U.S., were correlated with their phonetic and semantic verbal fluency scores as well as their lexical diversity measures and their error rates from the Chaplin film retelling and the semi-structured, face-to-face interview.

5.4.1 Differences between the Quasi-Experimental Groups

The fourth research question explored differences and similarities between the two quasi-experimental groups, German Instructors (GI) and Other Professionals (OP), with respect to the sociolinguistic factors L1 use, L1 interlocutor type, L1 input, motivation to maintain the L1, and identity and attitudes towards the L1 and C1.

Table 16 provides an overview of the significant differences between the participants in the GI group and the participants in the OP group. Statistical analyses of the questionnaire data for each of the sociolinguistic variables revealed that with respect to L1 use, there were significant differences between the two bilingual groups in overall L1 use, L1 use at work and L1 use during the participants' spare time. Regarding the types of L1 interlocutors, a statistically significant difference between GI and OP was found for their reported L1 interaction with non-native German speakers in the U.S.

While the difference in overall frequency of L1 input was not significantly different for the GI and OP, the difference for the L1 input category *books* was significant. With regard to the motivational and attitudinal variables, statistically significant differences between GI and OP were found for the overall motivation to maintain the L1 as well as for the desire to cultivate the native language at the highest level. The differences regarding identity and attitudes towards the native language and culture were not significant.

Table 16. Overview of Differences between the Groups for the Sociolinguistic Variables.

Sociolinguistic Variable		Difference between GI and OP
L1 Use	Overall L1 Use	$p < .001$
	L1 Use at Home	
	L1 Use at Work	$p < .001$
	L1 Use during Spare Time	$p < .05$
L1 Interlocutor Type	L1 Use with Native Speakers in Germany	
	L1 Use with Native Speakers in the U.S.	
	L1 Use with Non-Native Speakers in the U.S.	$p < .005$
L1 Input	Overall L1 input	
	Television	
	Movies	
	Radio	
	Music	
	News	
	Magazines	
	Books	$p < .05$
Motivation for L1 Maintenance	Overall score	$p < .05$
	I do not want to lose my L1.	
	I want to cultivate my L1 at the highest level.	$p < .05$
	I put forth an active effort to maintain my L1.	
Identity and Attitudes towards the L1/C1	Overall score	
	I think of myself as a member of the German-speaking world.	
	I want others to recognize me as being German.	
	I call Germany <i>home</i> .	
	It is important to me to maintain strong ties to Germany.	
	It is important to me to have German friends in the U.S.	
	I want to return to Germany at some point in the future.	
	I would never give up my German citizenship.	

Note. The p -levels indicate a statistically significant difference. All other results were not statistically significant. The results of the analyses of variance were significant at $p < .05$.

Whenever a significant difference was found between the two groups, the German Instructors (GI) had higher scores or ratings than the Other Professionals (OP), i.e., they use their L1 more often, they interact with non-native German speakers more frequently,

they are more motivated to maintain their native language, and they have a greater desire to cultivate their L1 at the highest level.

5.4.1.1 L1 Use

5.4.1.1.1 Overall L1 Use and L1 Use in Different Domains

Participants in the two bilingual groups, German Instructors (GI) and Other Professionals (OP), were asked to provide a percentage of their overall L1 use on a typical day. In addition, participants were asked to give an estimate of how frequently they use their L1 on a daily basis at home, at work, and during their spare time. The data showed that the German Instructors (GI) use their L1 more often than the Other Professionals (OP) in all three domains. The largest difference between GI and OP was reported for L1 use at work. However, only the differences for overall L1 use, L1 use at work, and L1 use during the spare time were statistically significant, i.e., both bilingual groups reported a similar amount of L1 use at home.

The statistically significant difference of L1 use at work can be attributed to the nature of the work environment of the German Instructors (GI), who speak German with colleagues at the office and with German students in the classroom. It can be hypothesized that the frequency or lack of interaction with German speakers at the work place also affects the L1 use during the spare time as individuals often make friends at the work place, with whom they interact in their spare time. Therefore, it may be likely that the participants in the GI group have more German friends and acquaintances than those in the OP group. In addition, the German Instructors (GI) indicated in another part of the

questionnaire that they found it important to have German friends in the U.S. – more so than the Other Professionals (OP) (cf. chapter 5.4.1.5).

5.4.1.1.2 L1 Interlocutor Type

In addition to reporting the frequency of their German use, German Instructors (GI) and Other Professionals (OP) provided information regarding their interlocutors, i.e., with whom they interact in the L1. Participants were asked to indicate how often they speak German with native German speakers who reside in Germany, native German speakers who live in the U.S., and non-native German speakers who reside in the U.S.

While participants in the OP group reported a somewhat higher means of L1 interaction with native speakers of German in Germany, participants in the GI group indicated that they use the L1 more frequently with native as well as non-native speakers of German who reside in the U.S. However, only the latter difference between GI and OP was statistically significant. Once again – similar to the reported frequency to L1 use at work – this difference can be attributed to the professional context of German Instructors (GI) who interact in their L1 with non-native speakers of German on a regular basis. It can be assumed that the proficiency of these non-native speakers ranges from A1 to C2 (cf. *Common European Framework of Reference*) as German Instructors (GI) interact with undergraduate and graduate students at different stages of German language acquisition as well as with colleagues who are highly proficient in German.

5.4.1.1.3 Language Mode

When looking at L1 use and L1 interaction with different types of L1 interlocutors, it is important to keep in mind the bilingual speaker's language mode (cf. Grosjean, 1998, 2001). The information provided by the German Instructors (GI) revealed that they use their native language in the intermediate as well as in the bilingual mode. They are in intermediate mode when speaking German with their students in the classroom as most German classrooms do have an explicit or tacit German only policy. Interactions with German students outside of the classroom, however, may be in bilingual mode, just like the L1 interactions with friends and colleagues.

Considering the language mode in which an L1 interaction takes place is important, as it has implications for the activation and inhibition of the two languages (cf. Grosjean, 1998, 2001; Schmid, 2007). According to Schmid (2007), bilingual speakers who frequently use their L1 in intermediate mode may find it easier to inhibit their L2 and have less difficulty with lexical retrieval. Considering that – for professional reasons – the German Instructors (GI) interact in the L1 in intermediate mode more frequently than the Other Professionals (OP), it can be assumed that they have more practice inhibiting L2 vocabulary when communicating in their L1.

Inhibition is thought to reduce the level of activation for a given response [in the L2], preventing it from achieving threshold. In doing so, this process permits weaker, but more contextually appropriate responses [in the L1] to be expressed, enabling flexible, context-sensitive behavior. This is known as inhibitory control. (Anderson, 2003, p. 417)

Consequently, such greater inhibitory control may be responsible for the fact that the participants in the GI group achieved higher verbal fluency scores, higher lexical diversity measures, and lower error rates than the participants in the OP group.

5.4.1.2 L1 Input

In L1 attrition research, a discussion of the amount of L1 input is paramount, as increased exposure to current and authentic L1 input in the form of German-language magazines and newspapers, movies, television or radio shows has often been viewed as one of the factors that could potentially reduce – or even counteract – the effects of L1 attrition.

In order to measure the amount of German-language input the German Instructors (GI) and the Other Professionals (OP) are exposed to, they were asked to fill in a questionnaire section reporting how frequently they watch German language television and movies, listen to German language radio broadcasts and music with German lyrics, and how often they read newspapers, magazines and books written in German.

The data revealed that participants in the OP group are less frequently exposed to L1 input than those in the GI group. Upon closer examination of the individual input categories, it became apparent that – with the exception of German language television – GI scores exceeded OP scores in all categories. The largest differences between GI and OP were found in the categories movies, radio, and books. However, only one statistically significant difference was found between the two groups, i.e., in the category books. In all likelihood, this difference can be ascribed to the professional context of the GI group, as the majority of the German Instructors (GI) teach at institutions of higher

education – either as teaching assistants and associates or as professors – and therefore regularly read German literature and/or textbooks in order to prepare for seminars.

Frequently reading books in the native language may have a beneficial effect on a bilingual speaker's overall L1 abilities as the speaker is exposed to a very complex and sophisticated variety of the L1, which in such complexity and sophistication is not often found in other sources of L1 input. Therefore, the finding that the German Instructors (GI) read books in the L1 more frequently suggests that they have a greater exposure to a more complex and sophisticated variety of the German language than the Other Professionals (OP).

5.4.1.3 Motivation for L1 Maintenance

In order to determine the level of motivation for L1 maintenance, participants in the two bilingual groups had to indicate how much they agree or disagree with the statements 1) “I do not want to lose my native language;” 2) “I want to cultivate my native language at the highest level;” and 3) “I put forth an active effort to maintain my native language.”

Overall, the ratings indicate that the German Instructors (GI) are somewhat more motivated to maintain their native language than the Other Professionals (OP), as participants in the GI group agreed more strongly with all three statements than participants in the OP group. The smallest difference between GI and OP was reported for statement 1) “I do not want to lose my native language,” followed by statement 3) “I put forth an active effort to maintain my native language.” Both differences, however, were statistically not significant. The biggest difference – and the only statistically

significant one – was found in the ratings for statement 2) “I want to cultivate my native language at the highest level.”

Obviously, participants in both groups do not want to lose their native language and put forth an effort to maintain their L1, but the German Instructors (GI) have a much greater interest in cultivating their L1 at the highest level. This greater interest can most likely be attributed to professional demands as “the authenticity or contemporaneity of the language model presented by [...] [the] teacher may be brought into question”, “if attrition is found to act significantly upon the L1 of the unprepared or unaware resident native speaker [...] teacher” (Porte 1999, p. 67). Therefore, as the German Instructors (GI) have to provide an accurate model of their L1 in the communicative classroom, a conscious and active effort to maintain the native language at the highest level possible is paramount.

The finding, that German Instructors (GI) have a greater interest in cultivating their native language at the highest level, can also be discussed within the motivational framework proposed by Gardner and Lambert (1972). In this framework, the distinction is made between instrumental and integrative motivation. Instrumental motivation stems from the potential pragmatic gains and rewards of being proficient in an L2 (or, in this case, from maintaining the L1), such as getting a better job or a promotion. Integrative motivation refers to the language learner’s positive disposition towards the members of the L2 (or L1) group, the interest and desire to socially interact with them, and even become (or continue to be) a member of the group (cf. Gardner, 2001; Gardner & Lambert, 1972). It has been suggested that instrumental motivation plays a more

important role in L2 learning (or L1 maintenance) than integrative motivation. Therefore, it is possible that bilingual speakers who use their L1 for professional purposes, such as the German Instructors (GI), may be more successful at maintaining their native language and less susceptible to L1 attrition than the Other Professionals (OP) because their level of instrumental motivation is higher

5.4.1.4 Identity and Attitudes towards the L1 and C1

As previous research (Hulsen, 2000; Major, 1993; Schmid, 2002, 2004b; Waas, 1996) has shown, identity and attitude towards their native language, country and culture are assumed to play a role in L1 attrition. Consequently, it was important to elicit information which helps to understand identities and attitudes of the German Instructors (GI) and the Other Professionals (OP). Therefore, the sociolinguistic questionnaire included a section in which the bilingual participants were asked to indicate their level of agreement or disagreement with the following seven statements: 1) I think of myself as a member of the German-speaking world; 2) I want others to recognize me as being German; 3) I call Germany *home*; 4) It is important to me to maintain strong ties to Germany; 5) It is important to me to have German friends in the U.S.; 6) I want to return to Germany for good at some point in the future; and 7) I would never give up my German citizenship.

The ratings of these statements made it possible to obtain a better understanding of the participants' attitudes towards and their level of identification with the native language, country and culture, as well as their degree of integrative motivation. In the context of L1 attrition research, integrative motivation can be defined as a positive

disposition towards the members of the L1 group and the interest and desire to socially interact with them and to remain a member of the L1 group (cf. Gardner, 2001).

A statistical comparison of the mean ratings obtained from the German Instructors (GI) and the Other Professionals (OP) showed that there was no statistically significant difference between the two groups for any of the seven statements. Though, despite the absence of statistical significance, it is interesting to note that – with the exception of statements 3) and 6) – the GI ratings were somewhat higher than the OP ratings. Therefore, it may be concluded that the German Instructors (GI) identify with their native language, country, and culture to a somewhat greater degree than the Other Professionals (OP). Possibly, the level of integrative motivation may also be somewhat higher in the GI group than in the OP group. However, both groups call Germany *home* to an equal degree, as the identical group means reveal.

An interesting observation was made with regard to statement 6) “I want to return to Germany for good at some point in the future,” which was rated higher by OP than by GI, which indicates that the Other Professionals (OP) consider a return to Germany more likely than the German Instructors (GI). A possible explanation for this difference in ratings may be professional prospects, which make a return to Germany easier for the OP group than for the GI group. Many of the participants in the OP group work in the sciences or engineering and, therefore, have more professional opportunities in Germany, than the German Instructors (GI) who mostly work and wish to remain in academia where transitioning is not as easy.

5.4.2 Correlations with the Linguistics Measures

The goal of the fifth research question was formulated to investigate whether the participants' sociolinguistic variables (length of residence, L1 use, L1 interlocutor type, L1 input, motivation to maintain the L1, and identity and attitudes towards the L1 and C1) show correlations with their linguistic measures (phonetic and semantic verbal fluency scores, and lexical diversity measures and error rates from the Chaplin film retelling and the interview). In order to answer this question, Pearson's correlation coefficients were established for the linguistic measures and the sociolinguistics scores and ratings computed from the questionnaire data. An overview of the significant correlations is presented in table 17.

A statistically significant correlation was found between length of residence and the error rate from the interview, i.e., the longer participants had resided in the U.S., the more errors they made on in the spontaneous speech sample from the interview. Furthermore, significant correlations were found between the participants' overall L1 use and their semantic verbal fluency scores as well as their error rates from the film retelling and the interview. The reported frequencies of L1 use at home were significantly correlated with the lexical diversity measures and the error rates from the film retelling; L1 use at work was correlated with the error rate from the interview; and L1 use during the participants' spare time was correlated with their semantic fluency scores. With regard to the different types of L1 interlocutors, significant correlations were found between L1 use with native German speakers in the U.S. and the phonetic verbal fluency scores and between L1 use with non-native German speakers in the U.S. and the error

rates from the film retelling. No significant correlations were found between overall L1 input and the individual L1 input categories and any of the linguistic measures. Likewise, correlations between the participants' motivation ratings and their linguistic measures were not statistically significant.

Table 17. Overview of Correlations between Sociolinguistic Variables and Linguistic Measures.

	Phonetic Verbal Fluency	Semantic Verbal Fluency	Lexical Diversity (Film Retelling)	Lexical Diversity (Interview)	Error Rate (Film Retelling)	Error Rate (Interview)
Length of Residence						.343
Overall L1 Use		.346			-.414	-.377
L1 Use at Home			.324		-.339	
L1 Use at Work						-.463
L1 Use during Spare Time		.418				
L1 Use with Native Speakers in Germany						
L1 Use with Native Speakers in the U.S.	.384					
L1 Use with Non-Native Speakers in the U.S.					-.371	
L1 Input						
Overall Motivation for L1 Maintenance						
Overall Identity and Attitudes towards the L1/C1						

Note. The *r*-values indicate statistically significant correlations. All other correlations were not statistically significant.

When interpreting these statistically significant correlations, it is important to keep in mind, that significant correlations do not necessarily equal causation. Nevertheless, a significant correlation may be interpreted as an indication of a potential causal relationship.

5.4.2.1 Length of Residence

The number of years the German Instructors (GI) and Other Professionals (OP) have resided in the U.S. was significantly correlated with their error rates from the semi-structured interview. The correlations between length of residence and the other linguistic measures (phonetic and semantic verbal fluency scores, lexical diversity measures from the film retelling and the interview, and the error rate from the film retelling) were not significant.

This finding, i.e., that the bilingual participants' length of residence was correlated only with their error rates from the semi-structured, face-to-face interview suggests that the number of years spent in the migration setting plays a greater role in spontaneous, free speech than in more controlled linguistic tasks. The absence of a significant correlation between length of residence and the error rates from the Chaplin film retelling, which is a more controlled task for the elicitation of spontaneous speech data than the interview, supports this assumption.

A significant effect of length of residence on L1 speech and the severity of L1 attrition was also found by de Bot, Gommans and Rossing (1991), who examined spontaneous speech data elicited from Dutch immigrants in France. However, further analyses showed that the relation between length of residence and L1 attrition is only linear when there is little to no contact with the L1 which indicates that the variables length of residence should not be used as an independent measure in L1 attrition research, as it can interact with L1 use and possibly other factors.

5.4.2.2 L1 Use

The estimates for overall L1 use obtained from the sociolinguistic questionnaire were significantly correlated with the overall semantic verbal fluency scores, the error rates from the Chaplin film retelling, and the error rates from the semi-structured interview. These correlations support results from previous research, which has also shown an effect of L1 use on linguistic measures (e.g., De Bot, Gommans & Rossing, 1997; De Leeuw, Schmid & Mennen, 2010; Hulsen, 2000).

Regarding the participants' native language use in the three different domains, i.e., at home, at work, and during their spare time, significant correlations were found between participants' L1 use at home and their lexical diversity measures and error rates from the Chaplin film retelling, and L1 use during the spare time was significantly correlated with overall semantic verbal fluency measures. Furthermore, L1 use at work was significantly correlated with the error rates from the semi-structured interview, which partially supports findings by Schmid (2007), whose data revealed that L1 use for professional purposes had an impact on the linguistic measures.

All significant correlations of L1 use – overall as well as for the individual domains – with the semantic verbal fluency scores and lexical diversity measures were positive. This means that the more frequently the bilingual participants use their L1, the more lexical items they are able to produce on the semantic verbal fluency tasks and the more lexically diverse are their retellings of the Charlie Chaplin episode. The significant correlations with the error rates from the Chaplin film retelling and the interview were all

negative, i.e., the greater the L1 use, the lower the percentage of errors in the spontaneous speech samples.

Interestingly, the bilingual participants' L1 use at home was correlated with the linguistics measures – lexical diversity measures and error rates – from the Chaplin film retelling while L1 use at work was significantly correlated with the error rates from the semi-structured interview. This observation may be explained by the nature of the two methods used to collect spontaneous speech data.

For the Chaplin film retelling, the researcher and each participant watched the first episode of the film together and then, the researcher left the room while the participant watched the second episode of the movie alone. At the end of the second episode, the participant had to retell the events that had taken place in the second episode to the researcher (cf. Perdue, 1993). Such a film retelling is a rather authentic task which may actually occur at home, in real life, when one's partner or child leaves the room during a movie or TV show and, upon their return to the room, asks what has happened during their absence. Therefore, the correlations between the L1 use at home and the lexical diversity measures and the error rates for the film retelling task may be ascribed to the similarity between the data collection method and an authentic, real-life situation.

Likewise, the finding that L1 use at work was significantly correlated with the error rates from the semi-structured interview may be attributed to the nature of the interview, as it included questions about topics, which are typical at the work place. For example, participants were asked about their work, their studies, and their research interests. It is quite logical that participants who frequently use their L1 at work, to

discuss such issues and topics, would make fewer errors during the interview than those who use their L1 less frequently or never.

5.4.2.3 L1 Interlocutor Type

With respect to the different types of L1 interlocutors, L1 use with native speakers of German in the U.S. was significantly correlated with the phonetic verbal fluency scores. The correlation was positive, i.e., bilingual participants who frequently speak German with native speakers of German living in the U.S. achieved higher scores on the phonetic verbal fluency tasks and those who have few interactions with native speakers of German in the U.S. named fewer lexical exemplars.

Furthermore, a significant correlation was found between the L1 use with non-native speakers of German in the U.S. and the error rates from the Chaplin film retelling. This was negative, i.e., participants who frequently interact in the L1 with non-native speakers of German in the U.S. make fewer speech errors in the Chaplin film retelling than those participants who have fewer contact with non-native speakers of German.

L1 use with native German speakers in Germany was not correlated with any of the linguistic measures. In light of very recent research findings by de Leeuw, Schmid and Mennen (2010) which suggest that L1 contact in the monolingual mode, i.e., L1 use with monolingual – or minimally bilingual – German speakers in Germany is especially conducive to maintaining the stability of native language, this finding was somewhat surprising. Though, the contrasting finding may be due to the different focal point of the

two studies: de Leeuw, Schmid and Mennen (2010) examined L1 pronunciation whereas the study investigated verbal fluency, lexical diversity, and speech errors.

A comparison of the two bilingual groups, German Instructors (GI) and Other Professionals (OP), has shown that the participants in the GI group have significantly more L1 interaction with non-native speakers of German in the U.S. and have lower error rates in the speech samples from the Chaplin film retelling. These lower error rates may be attributed to the fact that – due to their profession – the German Instructors (GI) are more familiar – and possibly even have more practice – with tasks such as the Chaplin film retelling task. In a foreign language classroom, such controlled tasks are rather common, as students often have to narrate a picture story, retell a story they have heard or a film they have watched.

5.4.2.4 L1 Input

Based on the findings of previous research (cf. De Bot et al., 1991), correlations between L1 input and linguistic measures (verbal fluency scores, lexical diversity measures, and error rates) were expected to be significant – at least for some of the linguistic measures. However, statistical analyses revealed no significant correlations between overall L1 input and any of the linguistic measures. Likewise, correlations between the different types of L1 input (TV, movies, radio, music, newspapers, magazines, and books) and the linguistic measures did not yield any statistically significant results.

The significant correlation found between the participants' L1 use and their linguistic measures and the absence of significant correlations with L1 input, suggests

that productive L1 use, i.e., speaking and interacting with native as well as non-native speakers of German, plays a more important role in L1 maintenance and has a greater potential to counteract L1 attrition than receptive L1 input, i.e., reading newspapers, magazines, and books; watching TV shows and movies, and listening to radio and music in the native language.

5.4.2.5 Motivation for L1 Maintenance

In order to obtain a measure of the bilingual participants' motivation to maintain their L1, they were asked to indicate their level of agreement or disagreement with the following three statements: 1) I do not want to lose my native language, 2) I want to cultivate my native language at the highest level; and 3) I put forth an active effort to maintain my native language. A calculation of Pearson's correlation coefficients for the overall scores as well as the three individual ratings did not yield any statistically significant results.

Based on claims that motivation can be considered to be a strong predictor for language learning success and L2 retention (cf. Gardner et al., 1987; Gass & Selinker, 2001), it seemed reasonable to assume that a bilingual speaker's motivation to maintain the native language may also have a beneficial effect with regard to L1 maintenance. However, this assumption could not be supported by significant correlations between the linguistic and sociolinguistic data from German Instructors (GI) and Other Professionals (OP) as an increased motivation to maintain the L1 was not significantly correlated with greater verbal fluency and lexical diversity as well as reduced error rates.

It may, however, be possible that the bilingual speakers' motivational orientation is nonetheless implicated in their L1 maintenance, as the degree of motivation is likely to determine the amount and frequency of a bilingual speaker's L1 use (cf. Gardner et al., 1987). And results regarding the bilingual participants' L1 use (cf. chapter 5.4.2.1) have shown that overall L1 use as well as the L1 use in different domains was significantly correlated with a number of linguistic measures.

5.4.2.6 Identity and Attitudes towards the L1 and C1

In addition to questions regarding L1 use, L1 input and motivation to maintain the L1, the German Instructors (GI) and Other Professionals (OP) were also asked to indicate their level of agreement with seven statements formulated to obtain information about their degree of identification with and attitudes towards the native language, country and culture. These statements were 1) I think of myself as a member of the German-speaking world; 2) I want others to recognize me as being German; 3) I call Germany *home*; 4) It is important to me to maintain strong ties to Germany; 5) It is important to me to have German friends in the U.S.; 6) I want to return to Germany for good at some point in the future; and 7) I would never give up my German citizenship.

The participants' overall scores – an average of the ratings of the seven statements – for identity and attitudes towards the L1 and the C1 were not significantly correlated with any of the linguistic measures (phonetic and semantic verbal fluency scores, and lexical diversity measures and error rates from the Chaplin film retelling and the semi-structured interview). Similarly, Waas (1996) and Yağmur (1997) who also did not detect

significant correlations between their participants' ethnolinguistic vitality (cf. Yağmur, 1997) or ethnic affiliation (cf. Waas, 1996) and their linguistic performance and level of L1 attrition. Based on these findings, it may be assumed that affective variables do not significantly affect L1 maintenance and L1 proficiency. Other researchers, however, concluded that identity and attitudes towards the native language, country and culture do play a role in the process and the severity of L1 attrition (e.g., Hulsen, 2000; Major, 2003; Marx, 2002; Schmid, 2002, 2004b).

Even though the correlation between the participants' overall scores for identity and attitudes towards the native language, country, and culture and their linguistic measures did not yield a significant result, the calculation of Pearson's correlation coefficients for each of the seven statements yielded two statistically significant correlations. The participants' ratings of the statement "It is important to me to have German friends in the U.S." was correlated with their lexical diversity measures from the interview, and the ratings of the statement "I want to return to Germany for good at some point in the future" was correlated with overall semantic verbal fluency. However, both correlations were negative, i.e., the higher the values of the linguistic measures, the lower the level of agreement with the two statements or vice versa.

The contradictory nature of the findings may be attributed to flaws in the questionnaire items used to elicit information on the participants' identity and attitudes towards the native language, country and culture. While questionnaire items to measure L1 use and L1 input have frequently been used in L1 attrition research and are therefore relatively fine-tuned, instruments to measure identity and attitudes towards the native

language, country, and culture still need to be improved. Potentially, a greater number of more detailed questionnaire items that ‘dig deeper’ may yield more reliable results and provide a more in-depth look at a bilingual speaker’s identity and attitudinal variables. Furthermore, such improved instruments in combination with a greater focus on identity and attitudes may generate more satisfying and less contradictory results.

CHAPTER 6: CONCLUSION

6.1 Summary of Findings

This study examined the native speech of a Control Group (CG) of seventeen monolingual (or minimally bilingual) participants in Germany, and of two groups of bilingual German immigrants in the U.S., i.e., nineteen German Instructors (GI) and twenty-one Other Professionals (OP). The data were elicited using phonetic and semantic verbal fluency tasks, the Chaplin film retelling task, a semi-structured, face-to-face interview, and a sociolinguistic questionnaire.

The goal of the research was to determine whether the bilingual participants suffer from reduced verbal fluency, a decrease in lexical diversity, and an increase in speech errors. Furthermore, this study focused on exploring potential differences between the linguistic measures of the two bilingual groups, the German Instructors (GI) and the Other Professionals (OP). It was hypothesized that German immigrants in the U.S. who use their L1 for professional purposes may be less vulnerable to L1 attrition than immigrants who do not use their L1 at the workplace.

In addition, the GI and OP groups were compared with respect to the sociolinguistic variables L1 use, L1 interlocutor type, L1 input, motivation for L1 maintenance, and identity and attitudes towards the native language, country and culture. Last but not least, linguistic measures were correlated with the sociolinguistic variables length of residence, L1 use, L1 interlocutor type, L1 input, motivation for L1 maintenance, and identity and attitudes towards the native language, country and culture.

Analyses of the linguistic measures revealed significant differences between the monolingual (or minimally bilingual) Control Group (CG) and the Other Professionals (OP) for almost all of the measures, i.e., the overall semantic verbal fluency scores as well as the lexical diversity measures and the error rates from the film retelling and the interview. In comparison, significant differences between the Control Group (CG) and the German Instructors (GI) were found only for the error rates. Furthermore, significant differences between the linguistic measures of the two bilingual groups, GI and OP, were found for overall semantic verbal fluency and for the error rates from the film retelling and the interview.

These findings suggest that the native speech of the Other Professionals (OP) deviates from that of a monolingual speaker more than the native speech of the German Instructors (GI). Consequently, the native speech of the participants in the GI group seems to be less affected by L1 attrition which suggests that L1 attrition may be caused by a weakening of S-to-P connections, i.e., weaker links between the semantic and the phonological representation of a word (cf. Bialystok, Craik & Luk, 2008; Gollan, Montoya & Werner, 2002), rather than by crosslinguistic interference (cf. Gollan, Montoya & Werner, 2002; Rosselli et al., 2000).

A comparison of the scores for a number of sociolinguistic variables showed that the two bilingual groups, GI and OP, differed with regard to their overall L1 use, their L1 use at work, L1 use during their spare time and L1 use with non-native speakers of German, i.e., the German Instructors (GI) use their L1 more frequently than the Other Professionals (OP). Furthermore, significant differences were found for the frequency

with which participants in the GI and OP groups read German-language books as well as for their overall motivation scores and for the desire to cultivate their L1 at the highest level. The higher scores of the German Instructors (GI) can be attributed to their work environment and professional demands, which do not only facilitate but require frequent use of the L1 at rather complex and sophisticated levels.

The calculation of Pearson's correlation coefficients to determine potential relationships between the linguistic measures and sociolinguistic variables revealed significant correlations only for the variables length of residence, L1 use, and L1 interlocutor type. Motivation for L1 maintenance and identity and attitudes towards the native language, country, and culture were not significantly correlated with any of the linguistic measures, which suggests that the effect of motivational and attitudinal variables on the process and severity of L1 attrition is rather limited.

The significant correlations regarding length of residence and L1 use support findings from previous research studies, which have also found a significant effect of these variables (e.g., De Leeuw, Schmid & Mennen, 2010; Hulsen, 2000). The non-significant correlations, however, contradict the results from a number of studies that did detect a significant effect of motivational and attitudinal variables (e.g., Ben-Rafael & Schmid, 2007; Hulsen, 2000; Schmid, 2002, 2004b), while supporting the findings of other studies which did not yield significant results (e.g., Waas, 1996; Yağmur, 1997).

6.2 Implications

This study has some important implications for L1 attrition research. The finding that the German Instructors (GI) achieved higher scores than the Other Professionals (OP) in the semantic verbal fluency tasks as well as lower error rates in the speech samples from the Chaplin film retelling and the semi-structured interview suggests that L1 attrition may be a result of the weakening of bilingual speakers' S-to-P connections rather than crosslinguistic interference.

If one assumed competition between the L1 and the L2, i.e., crosslinguistic interference, to be the main cause of L1 attrition, one would have expected the German Instructors (GI) to have experienced a larger amount of crosslinguistic interference as – due to the nature of their profession – they continuously use both languages (which are simultaneously activated at high levels), and therefore have to resolve more competition between the L1 and the L2. Consequently, the participants in the OP group should have performed better on the linguistic tasks as they use their L1 less frequently, may separate their languages more and, therefore, would not be as affected by crosslinguistic interference.

However, the finding that the two bilingual groups behaved directly opposite, i.e., that the German Instructors (GI) seem to be less affected by L1 attrition than the Other Professionals (OP), suggests that L1 attrition may be attributed to a weakening of S-to-P connections, i.e., by weaker links between the meaning and the form of a word, which are caused by less frequent use of the L1. Due to weaker S-to-P connections, higher levels of activation are needed to access a word form which consequently slows down the lexical

retrieval process and, at times, leads to partial recall – as evidenced in tip-of-the-tongue states – or results in errors, if access of the target fails and a related item is activated subsequently.

Furthermore, the differences between the German Instructors (GI) and the Other Professionals (OP) with respect to some of the linguistic measures and sociolinguistic variables as well as the similarities with respect to other linguistic measures and sociolinguistic variables point to a complex interplay of factors involved in the L1 attrition process. Therefore, in order to arrive at a better understanding of this interplay, further and more detailed investigations need to be conducted, and this study and its findings may help generate hypotheses for future research.

In addition to the study's implications for L1 attrition research, its findings are also relevant for language instructors teaching their L1 at institutions of secondary or higher education. The study revealed that the native language of the German Instructors (GI) is indeed affected by L1 attrition and, therefore, supports findings from previous studies, which reported an awareness of changes in L1 proficiency as well as lexical, grammatical and phonetic deviations (Isurin, 2007; Major, 1992; Porte, 1999, 2003). However, this study also showed that the effects are relatively small. Moreover, L1 attrition in the native speech of the German Instructors (GI) seemed to be less severe than in the native speech of the Other Professionals (OP) and mostly limited to lexical retrieval problems and errors in the lexical and semantic domains. This finding is good news for individuals teaching their native language who may, at times, be concerned about potential effects of L1 attrition causing their L1 proficiency to be less native-like.

Last but not least, since the superior performance of the German Instructors (GI) may also be attributed to their heightened linguistic awareness, the results of this study suggest that raising linguistic awareness and educating bilingual speakers about the process as well as the manifestations of L1 attrition may potentially reduce or slow down the L1 attrition process.

6.3 Limitations and Suggestions for Future Research

This study has yielded interesting findings on L1 attrition in two different populations of German immigrants in the U.S. and the effect of sociolinguistic variables on the severity of L1 attrition. Though, due to the relatively small sample size of only fifty-seven participants (seventeen in the Control Group, nineteen German Instructors, and twenty-one Other Professionals) and the relative heterogeneity of the participant pool, the statistical findings of this study have relatively low power and may therefore not readily be generalized.

Therefore, it would be advisable to replicate the study with a larger and more homogeneous participant pool in order to reduce unwanted variability which is the most difficult obstacle on the way to gain a better understanding of L1 attrition and the sociolinguistic variables that predict its amount and speed. A larger sample size would also enable the L1 attrition researcher to split the two bilingual groups into subgroups based on length of residence and/or age of arrival in the migrant country. Furthermore, examining the L1 speech of different populations would be beneficial to understanding the interaction of the sociolinguistic variables affecting L1 attrition (cf. Isurin, 2007).

Future investigations in the field of L1 attrition may also benefit from eliciting phonetic and semantic verbal fluency as well as spontaneous speech data for both, the L1 and the L2, as this can potentially provide greater insights into the verbal fluency and lexical diversity of bilingual speakers and possible linguistic developments and shifts. This suggestion is supported by Schmid (2007), who concluded – based on the assumption that there is a delicate balance between the L1 and L2 systems – that “it is relatively meaningless to study the attrition and use of only one of a bilingual’s languages in isolation, and exclude the development and use of the other” (p. 151).

Additionally, while research instruments to measure L1 use and L1 input have frequently been utilized in L1 attrition research and are therefore relatively fine-tuned, significant efforts have to be made to create improved and more detailed instruments to measure motivational and attitudinal variables, such as motivation for L1 maintenance or identity and attitude towards the native language, country and culture. Furthermore, a questionnaire may be complemented by an in-depth sociolinguistic interview, as such an interview may provide the L1 attrition researcher with opportunities to ‘dig deeper’ and to gain a better understanding of affective, motivational, and attitudinal variables.

In an attempt to find ways to counteract L1 attrition, it would also be paramount to “study the extent to which subjects can themselves be trained to attend more to their own output and criticize their own performance” (Porte, 2003, p. 117). The results of this study, i.e., the findings that the German Instructors (GI) were less affected by L1 attrition than the Other Professionals (OP), suggests that raising such linguistic awareness may be especially relevant for immigrants who do not use their L1 for professional purposes.

APPENDIX A: INSTRUCTIONS FOR THE VERBAL FLUENCY TASKS

(adapted from Spreen and Strauss, 1998, p. 448)

Phonetic Verbal Fluency Tasks:

Ich werde einen Buchstaben nennen und ich möchte, dass Sie in 60 Sekunden so viele Wörter wie möglich sagen, die mit diesem Buchstaben beginnen. Wenn ich zum Beispiel „D“ sage, könnten Sie „Decke, dunkel, draußen, usw.“ sagen. Ich möchte nicht, dass Sie Eigennamen, wie z.B. „Darmstadt“ oder „Diana“ benutzen. Bitte nennen Sie nicht dasselbe Wort mit einer anderen Endung wie z.B. „Decke“ und „Decken“ oder „Dach“ und „Dachstuhl“ oder „Dachdecker.“ Haben Sie Fragen? [Pause] Bitte fangen Sie sofort an, nachdem ich den Buchstaben gesagt habe. Der erste Buchstabe ist ____.

Semantic Verbal Fluency Tasks:

Ich werde eine semantische Kategorie nennen und ich möchte, dass Sie in 60 Sekunden so viele Wörter wie möglich sagen, die zu dieser Kategorie gehören. Wenn ich zum Beispiel „Fahrzeuge“ sage, könnten Sie „Fahrrad, Auto, usw.“ sagen. Ich möchte nicht, dass Sie Eigennamen, wie z.B. „Mercedes“ oder „Porsche“ benutzen. Bitte nennen Sie nicht dasselbe Wort mit einer anderen Endung wie z.B. „Motorrad“ und „Motorräder.“ Haben Sie Fragen? [Pause] Bitte fangen Sie sofort an, nachdem ich die Kategorie gesagt habe. Die erste Kategorie ist ____.

APPENDIX B: SUMMARY OF THE CHARLIE CHAPLIN EPISODES

(adapted from Perdue, 1993, p. 211f)

Episode 1:

Charlie gets into a demonstration against unemployment, is taken for the leader and put into prison. At dinner one of his fellow-prisoners hides heroin in the salt-cellar, and Charlie helps himself by mistake. With the drug he gains a heroic force: he foils an escape attempt and frees the governor, who, in gratitude, releases him with a letter of recommendation for a job. Charlie is not too enthusiastic about this because he feels he is better off in prison than at liberty. Parallel with this we see a second story: a young girl (whose father is a widower, unemployed and without the means to feed his three children) steals food for her family. Her father is shot in a demonstration, and the children are sent to an orphanage. The girl manages to escape at the last moment.

Episode 2:

Charlie finds work in a shipyard. Clumsily, he causes the launching of a ship that was not finished. He is immediately fired and all the more determined to return to prison. Meanwhile the girl, alone and hungry, sees a bakery van unloading bread at a bakery. As she steals a loaf of bread, a woman comes round the corner, sees her, tells the baker, who in turn calls the police. In flight, the girl bumps into Charlie, and when the policeman arrives, he admits to the theft in order to return to jail. As the policeman is preparing to take him away, the woman arrives to say that in fact the girl stole the bread. The policeman arrests the girl and releases Charlie. Still determined to return to jail, Charlie goes into a restaurant, eats, and as he is standing at the cash desk, sees a policeman outside the window. He calls the policeman in and tells him that he has no money. Again, Charlie is arrested. While the policeman is calling a police van from a phone next to a kiosk, Charlie orders a cigar and generously gives chocolate to two boys who happen to stop there. Again, he cannot pay. The police van arrives, and Charlie enters to find it crowded with other unfortunates. Eventually the van stops and the girl gets in. There is a struggle and Charlie, the girl and the policeman fall out. The policeman is unconscious; Charlie and the girl escape.

APPENDIX C: INTERVIEW QUESTIONS

Control Group:

1. Was machen Sie beruflich?
2. Welche Aspekte Ihres Berufs/Studiums interessieren Sie am meisten? Warum?
3. Wie lange leben Sie schon hier in XYZ?
4. Was gefällt Ihnen hier? Was gefällt Ihnen nicht?
5. Wie sehen Ihre Zukunftspläne aus?
6. Könnten Sie sich vorstellen, irgendwann einmal im Ausland zu leben?
7. Was hat Sie in der letzten Woche besonders gefreut?
8. Und was hat Sie besonders geärgert? (Persönliches, Nachrichten, Politik, etc.)
9. Machen Sie sich Sorgen wegen der momentanen Finanz- und Wirtschaftskrise?
10. Wie könnte sich diese Krise auf Ihr Leben auswirken?

Quasi-Experimental Groups:

1. Was machen Sie beruflich?
2. Welche Aspekte Ihres Berufs/Studiums interessieren Sie am meisten? Warum?
3. Wie lange leben Sie schon hier in XYZ?
4. Was gefällt Ihnen hier? Was gefällt Ihnen nicht?
5. Wie sehen Ihre Zukunftspläne aus?
6. Könnten Sie sich vorstellen, irgendwann einmal wieder in Deutschland zu leben?
7. Was hat Sie in der letzten Woche besonders gefreut?
8. Und was hat Sie besonders geärgert? (Persönliches, Nachrichten, Politik, etc.)
9. Machen Sie sich Sorgen wegen der momentanen Finanz- und Wirtschaftskrise?
10. Wie könnte sich diese Krise auf Ihr Leben auswirken?

APPENDIX D: QUESTIONNAIRE (CONTROL GROUP)

A. Persönlicher, schulischer und linguistischer Hintergrund

1. Geschlecht: weiblich männlich
2. Name: _____
3. Geburtsdatum: _____
4. Wohnort: _____

5. Höchster Bildungsgrad:

<input type="checkbox"/> Fachabitur	<input type="checkbox"/> Abitur
<input type="checkbox"/> Zwischenprüfung (Universität)	<input type="checkbox"/> Magister, Diplom, Staatsexamen
<input type="checkbox"/> Promotion	<input type="checkbox"/> _____

6. Haben Sie längere Zeit (d.h. mehr als drei Monate) im Ausland gelebt? Wenn ja, in welchem Land bzw. in welchen Ländern und wie lange?

7. Bitte kreuzen Sie die Beschreibung an, die Ihren englischen Sprachfertigkeiten am ehesten entspricht:
 - (A1) Ich kann vertraute, alltägliche Ausdrücke und ganz einfache Sätze verstehen und verwenden, die auf die Befriedigung konkreter Bedürfnisse zielen. Ich kann mich und andere vorstellen und anderen Leuten Fragen zu ihrer Person stellen – z.B. wo sie wohnen, was für Leute sie kennen oder was für Dinge sie haben – und ich kann auf Fragen dieser Art Antwort geben. Ich kann mich auf einfache Art verständigen, wenn die Gesprächspartnerinnen oder Gesprächspartner langsam und deutlich sprechen und bereit sind zu helfen.
 - (A2) Ich kann Sätze und häufig gebrauchte Ausdrücke verstehen, die mit Bereichen von ganz unmittelbarer Bedeutung zusammenhängen (z.B. Informationen zur Person und zur Familie, Einkaufen, Arbeit, nähere Umgebung). Ich kann mich in einfachen, routinemäßigen Situationen verständigen, in denen es um einen einfachen und direkten Austausch von Informationen über vertraute und geläufige Dinge geht. Ich kann mit einfachen Mitteln die eigene Herkunft und Ausbildung, die direkte Umgebung und Dinge im Zusammenhang mit unmittelbaren Bedürfnissen beschreiben.
 - (B1) Ich kann die Hauptpunkte verstehen, wenn klare Standardsprache verwendet wird und wenn es um vertraute Dinge aus Arbeit, Schule, Freizeit usw. geht. Ich kann die meisten Situationen bewältigen, denen man auf Reisen im Sprachgebiet begegnet. Ich kann mich einfach und zusammenhängend über vertraute Themen und persönliche Interessengebiete äußern. Ich kann über Erfahrungen und Ereignisse berichten, Träume, Hoffnungen und Ziele beschreiben und zu Plänen und Ansichten kurze Begründungen oder Erklärungen geben.

- (B2) Ich kann die Hauptinhalte komplexer Texte zu konkreten und abstrakten Themen verstehen; ich verstehe im eigenen Spezialgebiet auch Fachdiskussionen. Ich kann mich so spontan und fließend verständigen, dass ein normales Gespräch mit Muttersprachlern ohne größere Anstrengung auf beiden Seiten gut möglich ist. Ich kann mich zu einem breiten Themenspektrum klar und detailliert ausdrücken, einen Standpunkt zu einer aktuellen Frage erläutern und die Vor- und Nachteile verschiedener Möglichkeiten angeben.
- (C1) Ich kann ein breites Spektrum anspruchsvoller, längerer Texte verstehen und auch implizite Bedeutungen erfassen. Ich kann mich spontan und fließend ausdrücken, ohne öfter deutlich erkennbar nach Worten suchen zu müssen. Ich kann die Sprache im gesellschaftlichen und beruflichen Leben oder in Ausbildung und Studium wirksam und flexibel gebrauchen. Ich kann mich klar, strukturiert und ausführlich zu komplexen Sachverhalten äußern und dabei verschiedene Mittel zur Textverknüpfung angemessen verwenden.
- (C2) Ich kann praktisch alles, was ich lese oder höre, mühelos verstehen. Ich kann Informationen aus verschiedenen schriftlichen und mündlichen Quellen zusammenfassen und dabei Begründungen und Erklärungen in einer zusammenhängenden Darstellung wiedergeben. Ich kann mich spontan, sehr flüssig und genau ausdrücken und auch bei komplexeren Sachverhalten feinere Bedeutungsnuancen deutlich machen.

8. Beherrschen Sie (eine) andere Fremdsprache(n) außer Englisch? ja nein

Wenn ja, welche? Bitte geben Sie auch an, auf welchem Niveau Sie diese Sprachen sprechen (siehe oben: A1-C2)

B. Berufliche Information

Bitte beschreiben Sie kurz Ihren Beruf und Ihre Aufgabengebiete.

C. Kommentare

Sie können an dieser Stelle erläuternde oder auch kritische Kommentare zum Fragebogen, zu bestimmten Fragen, zum Interview, zur Filmnacherzählung und zu den Aufgaben zur mündlichen Flüssigkeit abgeben.

APPENDIX E: QUESTIONNAIRE (QUASI-EXPERIMENTAL GROUPS)

A. Personal, Educational, and Linguistic Background

1. Gender: female male
2. Name: _____
3. Date of Birth: _____
4. Hometown (in Germany): _____
5. Citizenship: German American Other: _____
6. Highest level of education completed in...

GERMANY: <input type="checkbox"/> Abitur <input type="checkbox"/> Zwischenprüfung (Universität) <input type="checkbox"/> Magister, Diplom, Staatsexamen <input type="checkbox"/> Promotion <input type="checkbox"/> _____	UNITED STATES: <input type="checkbox"/> High school diploma (or equivalent) <input type="checkbox"/> Bachelor's Degree <input type="checkbox"/> Master's Degree <input type="checkbox"/> Doctorate <input type="checkbox"/> _____
---	---
7. How many years have you been living in the United States? _____
8. How old were you when you arrived in the US: _____
9. Have you lived in other countries besides the U.S. and Germany for an extended period of time, i.e., longer than 3 months? If yes, please list the countries and the amount of time you lived there.

10. Please check the description that fits best your proficiency level in English.
 - (A1) I can understand and use familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concrete type. I can introduce myself and others and can ask and answer questions about personal details such as where I live, people I know and things I have. I can interact in a simple way provided the other person talks slowly and clearly and is prepared to help.
 - (A2) I can understand sentences and frequently used expressions related to areas of most immediate relevance (e.g., very basic personal and family information, shopping, local geography, employment). I can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. I can describe in simple terms aspects of my background, immediate environment and matters in areas of immediate need.
 - (B1) I can understand the main points of clear standard input on familiar matters regularly encountered in work, school, leisure, etc. I can deal with most situations

likely to arise whilst travelling in an area where the language is spoken. I can produce simple connected text on topics, which are familiar, or of personal interest. I can describe experiences and events, dreams, hopes and ambitions and briefly give reasons and explanations for opinions and plans.

- (B2) I can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in my field of specialization. I can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. I can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.
- (C1) I can understand a wide range of demanding, longer texts, and recognize implicit meaning. I can express myself fluently and spontaneously without much obvious searching for expressions. I can use language flexibly and effectively for social, academic and professional purposes. I can produce clear, well-structured, detailed text on complex subjects, showing controlled use of organizational patterns, connectors and cohesive devices.
- (C2) I can understand with ease virtually everything heard or read. I can summarize information from different spoken and written sources, reconstructing arguments and accounts in a coherent presentation. I can express myself spontaneously, very fluently and precisely, differentiating finer shades of meaning even in more complex situations.

11. Besides German and English, do you speak any other language(s)? yes no

If yes, please specify which language(s) and provide your proficiency level by choosing on of the categories above (A1-C2):

B.1 Professional Information (for language instructors ONLY)

1. What is your academic position?

- | | |
|---|--|
| <input type="checkbox"/> German Instructor (K-12) | <input type="checkbox"/> Teaching Assistant/Associate/Fellow |
| <input type="checkbox"/> Lecturer | <input type="checkbox"/> Adjunct Faculty |
| <input type="checkbox"/> Professor | <input type="checkbox"/> _____ |

2. How many years have you been teaching German? _____

3. Please check all levels of German courses you have taught in German and, if applicable, indicate whether the courses were at the undergraduate or graduate level.

- | | | |
|---|--|-----------------------------------|
| <input type="checkbox"/> Basic Language Classes (= first – fourth semester) | | |
| <input type="checkbox"/> Phonetics/Translation/Business German | <input type="checkbox"/> undergraduate | <input type="checkbox"/> graduate |
| <input type="checkbox"/> Literature/Culture/Film | <input type="checkbox"/> undergraduate | <input type="checkbox"/> graduate |

- Linguistics/Applied Linguistics undergraduate graduate
 Other: _____

4. When teaching these classes,...

- a) I speak German _____ % of the class time.
 b) my students speak German _____ % of the class time.

B.2 Professional Information (for non-language instructors ONLY)

1. Please provide brief description of current and past employments:

2. Please explain which languages you use(d) at work.

C. Overall Language Use

1. By assigning a percentage, please estimate how much German and English (and other languages) you generally speak each day.

- a) at home: German: ____ % English: ____ % _____: ____ %
 b) at work: German: ____ % English: ____ % _____: ____ %
 c) in my spare time: German: ____ % English: ____ % _____: ____ %

D. Language Preference and Dominance

- | | German | English | undecided |
|---|--------------------------|--------------------------|--------------------------|
| 1. Generally, when speaking to other bilingual German-English speakers, which language do you prefer to express yourself in <u>personal</u> matters (i.e., talking to friends, about feelings and emotions, when you're angry, etc.)? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. In general, when speaking to other bilingual German-English speakers, which language do you prefer to express yourself in <u>impersonal</u> matters (i.e., discussing work-related issues, etc.)? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Generally, which language do speak with greater confidence? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Which language do you consider to be your dominant language? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

E. L1 (= German) Use and Input

Please indicate how often you do the following actions/tasks by checking the appropriate box.

	daily	several times a week	weekly	monthly	less than monthly	very seldom	never
1. I communicate in German with German family members/friends who live in Germany.							
a) over the phone or Skype.	<input type="checkbox"/>						
b) via instant messenger.	<input type="checkbox"/>						
c) via email/letters.	<input type="checkbox"/>						
2. I communicate in German with German family members, friends, co-workers, etc. who live in the U.S.							
a) in person	<input type="checkbox"/>						
b) over the phone or Skype.	<input type="checkbox"/>						
c) via instant messenger.	<input type="checkbox"/>						
d) via email/letters.	<input type="checkbox"/>						
3. I communicate in German with non-native German speakers (family members, friends, co-workers, etc.).							
a) in person	<input type="checkbox"/>						
b) over the phone or Skype.	<input type="checkbox"/>						
c) via instant messenger.	<input type="checkbox"/>						
d) via email/letters.	<input type="checkbox"/>						
4. I watch German language TV (via satellite, internet).	<input type="checkbox"/>						
5. I watch German language movies (DVD, at the theater).	<input type="checkbox"/>						
6. I listen to German language radio (on the internet).	<input type="checkbox"/>						
7. I listen to music with German lyrics.	<input type="checkbox"/>						
8. I read German language newspapers (in print or online).	<input type="checkbox"/>						
9. I read German language magazines (in print or online).	<input type="checkbox"/>						
10. I read books written in German.	<input type="checkbox"/>						
11. I attend lectures, conference talks, etc. in German.	<input type="checkbox"/>						
12. I give lectures, conference talks, etc. in German.	<input type="checkbox"/>						

13. Has there been a change in the extent to which you use German since you moved to the U.S.? Can you indicate when and for what reason this change occurred? (*It is possible to check more than one box, e.g., if you think that your use of German first decreased, then increased again.*)

My German language use has remained the same.

My German language use has decreased.

When? _____

Why? _____

I. L2 (= English) Use and Input

Please indicate how often you do the following actions and tasks by checking the appropriate category.

	daily	several times a week	weekly	monthly	less than monthly	very seldom	never
1. I communicate in English with family members, friends, co-workers, etc....							
a) in person	<input type="checkbox"/>						
b) over the phone or Skype.	<input type="checkbox"/>						
c) via email/letters.	<input type="checkbox"/>						
d) via instant messenger.	<input type="checkbox"/>						
2. I watch English language TV.	<input type="checkbox"/>						
3. I watch English language movies (DVD, at the theater).	<input type="checkbox"/>						
4. I listen to English language radio.	<input type="checkbox"/>						
5. I listen to music with English lyrics.	<input type="checkbox"/>						
6. I read English language newspapers (in print or online).	<input type="checkbox"/>						
7. I read English language magazines (in print or online).	<input type="checkbox"/>						
8. I read books written in English.	<input type="checkbox"/>						
9. I attend lectures, conference talks, etc. in English.	<input type="checkbox"/>						
10. I give lectures, conference talks, etc. in English.	<input type="checkbox"/>						

K. Additional Comments

Please use this space for additional comments regarding this questionnaire in general, specific questionnaire items, the interview, the film retelling, and the verbal fluency tasks. Please reflect on your thoughts, feelings, worries, etc. regarding your language use and linguistic performance during these tasks. Do you remember any instances where you switched from German to English, had trouble finding the right words, etc.?

APPENDIX F: STANDARD DEVIATIONS

Table 18. Standard Deviations for the Phonetic Verbal Fluency Tasks

Group		F	A	S
Control Group	Mean	12.12	11.94	17.06
	N	17	17	17
	Std. Deviation	5.01	2.97	4.87
German Instructors	Mean	11.68	11.21	17.63
	N	19	19	19
	Std. Deviation	3.11	3.58	4.62
Other Professionals	Mean	9.95	11.24	14.95
	N	21	21	21
	Std. Deviation	2.40	3.08	4.14

Table 19. Standard Deviations for the Semantic Verbal Fluency Tasks

Group		Animals	Fruits/ Vegetables	Kitchen
Control Group	Mean	28.12	24.29	24.82
	N	17	17	17
	Std. Deviation	7.14	5.34	6.98
German Instructors	Mean	28.63	25.00	22.53
	N	19	19	19
	Std. Deviation	7.05	6.09	3.53
Other Professionals	Mean	24.14	20.95	20.48
	N	21	21	21
	Std. Deviation	4.87	3.96	3.74

Table 20. Standard Deviations for Overall Phonetic and Semantic Verbal Fluency Scores

Group		Phonetic	Semantic
Control Group	Mean	13.71	25.75
	N	17	17
	Std. Deviation	3.51	5.62
German Instructors	Mean	13.51	25.39
	N	19	19
	Std. Deviation	2.94	5.00
Other Professionals	Mean	12.05	21.86
	N	21	21
	Std. Deviation	2.55	3.05

Table 21. Standard Deviations for the Lexical Diversity Measures from the Film Retelling and the Interview

Group		Film Retelling	Interview
Control Group	Mean	85.74	118.14
	N	17	17
	Std. Deviation	14.95	15.84
German Instructors	Mean	78.80	107.84
	N	19	19
	Std. Deviation	24.51	16.53
Other Professionals	Mean	71.21	105.75
	N	21	21
	Std. Deviation	17.63	14.56

Table 22. Standard Deviations for the Error Rates from the Film Retelling and the Interview

Group		Film Retelling	Interview
Control Group	Mean	1.20	.43
	N	17	17
	Std. Deviation	.72	.42
German Instructors	Mean	3.47	2.34
	N	19	19
	Std. Deviation	1.71	1.08
Other Professionals	Mean	5.99	4.44
	N	21	21
	Std. Deviation	2.68	2.28

Table 23. Standard Deviations for Length of Residence and Age of Arrival

Group		Length of Residence	Age of Arrival
German Instructors	Mean	9.74	25.16
	N	19	19
	Std. Deviation	7.11	5.00
Other Professionals	Mean	11.00	29.62
	N	21	21
	Std. Deviation	8.71	5.58

Table 24. Standard Deviations for Overall L1 Use and Overall L1 Input

Group		L1 Use	L1 Input
German Instructors	Mean	34.75	2.86
	N	19	19
	Std. Deviation	16.37	.90
Other Professionals	Mean	16.05	2.32
	N	21	21
	Std. Deviation	11.85	1.21

Table 25. Standard Deviations for Overall Motivation for L1 Maintenance and Overall Attitude towards the L1/C1

Group		Motivation	Attitude towards L1
German Instructors	Mean	4.40	3.21
	N	19	19
	Std. Deviation	.65	.87
Other Professionals	Mean	3.83	3.01
	N	21	21
	Std. Deviation	1.04	.96

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