

REFERENTIAL COMMUNICATION STRATEGIES AS A FUNCTION OF
ACCESSING CONCEPTUAL REPRESENTATIONS OF ABSTRACT SHAPES IN A
SECOND OR FOREIGN LANGUAGE

by

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Staatsexamen I., The University of Kiel, Germany, 1993

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

in

THE FACULTY OF GRADUATE STUDIES

(Department of Central, Eastern and Northern European Studies)

We accept this thesis as conforming to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA

JULY 2003

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Date July 30th, 2003

ABSTRACT

This thesis investigates referential communication strategies using the theoretical framework of Levelt's (1989) model of speech production and its application to second language speech production (de Bot, 1992). The investigation focuses on utterances of adult speakers who solve a referential communication task in their first language (English) and their second language (German). Two different groups participate in the study. The first group consists of students from a large West Canadian University who learn German in a foreign language classroom, whereas the second group consists of native speakers of English who work in Germany and acquire German in a second language environment. All participants describe abstract shapes while their utterances are being recorded and later transcribed for analysis.

Quantitative and qualitative methods measuring the time and words reflect the strategies used to describe the shapes. The analysis of the data reveals that the participants in Germany are more accurate in their descriptions and solve the referential problems more successfully than the participants from the West Canadian University do. The direct contact these participants have with the German language and culture proves to be beneficial to the process of generating a comprehensible message in referential communication.

The study concludes with suggestions for the teaching of German as a second language and recommendations are made for future research on language acquisition and the learning environment.

TABLE OF CONTENTS

	Abstract	ii
	Table of Contents	iii
	List of Tables	vii
	List of Figures	ix
	Acknowledgements	x
CHAPTER I	Introduction	1
	1.1 Communication Strategies	1
	1.1.1 Introduction	1
	1.1.2 Approaches	3
	1.1.2.1 The Nijmegen project	4
	1.2 Definitions	6
	1.2.1 Culture	6
	1.2.2 Language	7
	1.2.3 Concept	8
	1.3 The problem	9
	1.3.1 Concept formation in L1	10
	1.3.2 Concept formation in L2	13
	1.3.3 Research question, scope of study and expected findings.....	16
	1.4 Preview of the following chapters	22
CHAPTER II	Literature Review	24
	2.1 Introduction	24
	2.2 Approaches to the study of communication strategies	24
	2.2.1 Interactional approach	25
	2.2.2 Psycholinguistic approach	26
	2.2.3 The Nijmegen project	26
	2.2.3.1 Prior studies	27
	2.2.3.2 Studies as part of or linked to the Nijmegen project	30
	2.2.3.3 Taxonomy	32

2.3	Speech production	34
2.3.1	Speech production in the L1	35
2.3.2	Speech production in the L2	37
2.4	Concepts, language and culture	41
2.4.1	Conceptualizations in the L1	42
2.4.2	Conceptualizations in the L2	44
2.5	Second and foreign language acquisition	50
CHAPTER III	Methodology	54
3.1	Introduction	54
3.2	The Nijmegen project	54
3.3	Participants	56
3.3.1	Group C	57
3.3.2	Group G	59
3.4	Task	61
3.5	Data Collection	63
3.6	Analysis	65
3.6.1	Transcription	66
3.6.2	Quantitative analysis	67
3.6.3	Qualitative analysis	70
CHAPTER IV	Quantitative Analysis	75
4.1	Introduction	75
4.2	Task validity and discrimination power	76
4.3	Word analysis	83
4.3.1	Comparing English to German in Group C	84
4.3.2	Comparing English to German in Group G	87
4.3.3	Comparing German within Group C and within Group G	89
4.3.4	Comparing subgroups of Group C to subgroups of Group G in German	90
4.4	Time analysis	94
4.4.1	Comparing English to German in Group C	95
4.4.2	Comparing English to German in Group G	97
4.4.3	Comparing German within Group C and within Group G	99
4.4.4	Comparing subgroups of Group C to subgroups of Group G in German	100

4.5	Analysis of the word to time ratio	103
4.5.1	Comparing English to German in Group C	104
4.5.2	Comparing English to German in Group G	106
4.5.3	Comparing German within Group C and within Group G	107
4.5.4	Comparing subgroups of Group C to subgroups of Group G in German	108
4.6	Summary of quantitative analysis	110
CHAPTER V	Qualitative Analysis	112
5.1	Introduction	112
5.2	Task validity and discrimination power	113
5.3	Strategies used	117
5.4	Strategies used by Group C	127
5.4.1	Subgroup CA	129
5.4.2	Subgroup CB	137
5.4.3	Subgroup CC	144
5.4.4	Comparing the three subgroups	151
5.5	Strategies used by Group G	158
5.5.1	Subgroup GA	158
5.5.2	Subgroup GB	165
5.5.3	Subgroup GC	171
5.5.4	Comparing the three subgroups	177
5.6	Comparing the German descriptions of Group C with Group G	185
5.6.1	Subgroups CA/GA	185
5.6.2	Subgroups CB/GB	190
5.6.3	Subgroups CC/GC	196
5.6.4	Comparing the subgroups	203
CHAPTER VI	Conclusion	212
6.1	Summary and interpretation of significant findings	212
6.2	Limitations of study	220
6.3	Implications for the second language classroom ...	225
6.4	Future research	228
	Bibliography	230

Appendix A.1	Background Information	242
Appendix A.2	Background Information	243
Appendix B	Cloze-test	244
Appendix C	Shapes	245
Appendix D	Instructions English/Anweisungen auf Deutsch	246
Appendix E	Interview	247
Appendix F	Transcription Code	248
Appendix G.1	Data Group C	249
Appendix G.2	Data Group G	251

LIST OF TABLES

Table 4.1	Number of words used to describe each shape by participants of Group C in English	77
Table 4.2	Number of words used to describe each shape by participants of Group G in English	78
Table 4.3	Number of words used to describe each shape by participants of Group C in German	79
Table 4.4	Number of words used to describe each shape by participants of Group G in German	79
Table 4.5	Amount of time in seconds used to describe each shape by participants of Group C in English	80
Table 4.6	Amount of time in seconds used to describe each shape by participants of Group G in English	81
Table 4.7	Amount of time in seconds used to describe each shape by participants of Group C in German	82
Table 4.8	Amount of time in seconds used to describe each shape by participants of Group G in German	83
Table 4.9	Paired samples t-test of the number of words comparing English with German of each subgroup of Group C	87
Table 4.10	Paired samples t-test of the number of words comparing English with German of each subgroup of Group G	89
Table 4.11	Paired samples t-test of the number of words comparing Group C with Group G in German	92
Table 4.12	Paired samples t-test of the amount of time comparing English with German of each subgroup of Group C	97
Table 4.13	Paired samples t-test of the amount of time comparing English with German of each subgroup of Group G	99
Table 4.14	Paired samples t-test of the amount of time comparing Group C with Group G in German	102
Table 4.15	Paired samples t-test of the word to time ratio comparing English with German of each subgroup	105
Table 4.16	Paired samples t-test of the word to time ratio comparing English with German of each subgroup	107
Table 4.17	Paired samples t-test of the word to time ratio comparing Group C with Group G in German	109
Table 4.18	Recapitulation of the word and time analysis	110
Table 4.19	Recapitulation of the analysis of the word to time ratio	111
Table 5.1	Number of shapes described accurately in English (max. 10)	113
Table 5.2	Number of shapes described accurately in German (max. 10).....	114
Table 5.3	Number of strategies used per shape in English (holistic/partitive/linear).....	115
Table 5.4	Number of strategies used per shape in German (holistic/partitive/linear)	116

Table 5.5	Strategies used by Subgroup CA (E/G)	129
Table 5.6	Number of strategy changes made by Subgroup CA	132
Table 5.7	Strategies used by Subgroup CB (E/G)	137
Table 5.8	Number of strategy changes made by Subgroup CB	141
Table 5.9	Strategies used by Subgroup CC (E/G)	144
Table 5.10	Number of strategy changes made by Subgroup CC	147
Table 5.11	Strategies used by Group C (E/G)	153
Table 5.12	Number of strategy changes made by Group C	156
Table 5.13	Strategies used by Subgroup GA (E/G)	158
Table 5.14	Number of strategy changes made by Subgroup GA	161
Table 5.15	Strategies used by Subgroup GB (E/G)	165
Table 5.16	Number of strategy changes made by Subgroup GB	168
Table 5.17	Strategies used by Subgroup GC (E/G)	171
Table 5.18	Number of strategy changes made by Subgroup GC	176
Table 5.19	Strategies used by Group G (E/G)	178
Table 5.20	Number of strategy changes made by Group G	183
Table 5.21	Strategies used in German by Subgroups CA/GA	186
Table 5.22	Number of strategy changes made in German by Subgroups CA/GA.	189
Table 5.23	Strategies used in German by Subgroups CB/GB	190
Table 5.24	Number of strategy changes made in German by Subgroups CB/GB .	195
Table 5.25	Strategies used in German by Subgroups CC/GC	196
Table 5.26	Number of strategy changes made in German by Subgroups CC/GC.	202
Table 5.27	Strategies used in German (Group C/Group G)	204
Table 5.28	Number of strategy changes made in German (Group C/Group G) .	208
Table 6.1	Overview of hypotheses and their evaluation	218

LIST OF FIGURES

Figure 2.1	A model of speech production	36
Figure 3.1	One of the six abstract shapes (Shape Three) used in the study of this dissertation	72
Figure 4.1	Means of words used by Group C and Group G in English and German	85
Figure 4.2	Means of words used by Group C and Group G in German	91
Figure 4.3	Means of times used by Group C and Group G in English and German	96
Figure 4.4	Means of times used by Group C and Group G in German	101
Figure 4.5	Means of word to time ratio used by Group C and Group G in English and German	104
Figure 4.6	Means of word to time ratio used by Group C and Group G in German	108
Figure 5.1	Shape One	118
Figure 5.2	Shape Two	119
Figure 5.3	Shape Three	120
Figure 5.4	Shape Four	122
Figure 5.5	Shape Five	125
Figure 5.6	Shape Six	126

ACKNOWLEDGEMENTS

This dissertation presents the conclusion of a Ph.D. program at the Department of Central, Eastern and Northern European Studies at the University of British Columbia.

I would like to thank Dr. Caroline Rieger, Dr. Geoffrey Winthrop-Young, Dr. Monique Bournot-Trites, Dr. Trude Heift, Dr. Stephen Carey and Dr. Kenneth Reeder all of whom contributed in many different ways to this dissertation.

Special thanks go to Dr. David Singleton from Trinity College Dublin for his valuable comments as the external examiner.

CHAPTER ONE

INTRODUCTION

This dissertation investigates referential communication strategies in the speech production of second language learners. After defining communication strategies (Section 1.1.1), different approaches to referential communication are presented (Section 1.1.2). Next, research on relations between concepts, language and culture is introduced, the terms are defined (Section 1.2), and the problems outlined that arise when brought in connection with research on referential communication strategies (Sections 1.3.1 and 1.3.2). In conclusion, the purpose of the study of this dissertation, its scope and hypotheses are presented (Section 1.3.3) as well as a preview of the following chapters (Section 1.4).

1.1 Communication strategies

Communication strategies in second language acquisition have been studied for over 20 years. When analyzing communication strategies, it is helpful to locate them in the broader framework of studies on strategies and their function.

1.1.1 Introduction

Strategies are used by second language learners for different purposes. It is necessary to distinguish between 'strategies of learning' and 'strategies of use' (Cohen, 1998). The former are those strategies that help the learner attain greater language proficiency, for example by identifying the material that needs to be learned and

distinguishing it from other material if necessary. 'Strategies of use', in turn, are those applied in actual communication situations; they help the speaker to function linguistically in an adequate way. Substrategies here are (1) retrieval strategies: to call up language material from storage, (2) rehearsal strategies: rehearsing target language structures, (3) cover strategies: to create the impression of having control over material, and (4) communication strategies: to convey a message that is both meaningful and informative for the listener or reader.

Communication is a bilateral process between a speaker and a hearer. Gülich and Raible (1977) explain this dynamic process by drawing on Searle's speech act theory (1969). A speaker encodes a message with a certain intention and transmits it to a hearer who then decodes the message and its intention. In encoding and decoding messages, speaker and hearer refer to their respective knowledge of the world which to some degree might or might not be shared by them both.¹

This process of referring to the knowledge of the world is part of what has been labeled referential communication (Glucksberg, Kraus & Higgins, 1975). For example, a speaker is seeing his or her friend Peter. In the first step to construct a message referring to Peter, the speaker tries to think of Peter's name. Peter is the referent. In the second step, the speaker thinks of the names of other friends from which to distinguish Peter.

¹ This model of communication was developed in Linguistics. Its very structure has been criticized. The sociologist Luhmann (2000) focuses on two points of criticism. First, the notion of sender and receiver sharing knowledge and coming to some form of agreement is subject-centered; and second, every communication poses the question of acceptance and rejection, thereby putting a consensus at stake. Similar criticism comes from Bühler (1990).

The speaker constructs a reference phrase, in this case 'Peter', compares the referent to a non-referent (for example, 'Mary') and checks if his or her constructed message is sufficiently distinctive. In addition, the speaker checks different attributes of the referent. For example 'Peter' can be referred to as 'he', 'you' or 'Peter'. The speaker chooses the attribute depending on the context of the message. The reference is made to Peter and encoded in a message. The encoding of the referent by the speaker is affected by "his goals: the immediate social, physical and linguistic context, his perception of the listener, and the set of non-referents from which the referent is to be distinguished" (Glucksberg & Kraus, 1967, p. 310).

1.1.2 Approaches

The study of communication strategies in second language acquisition has been predominated by two schools of research, the interactional and the psycholinguistic approaches. Both approaches focus on the moment of speech production when a speaker must express something in a second or foreign language (L2). The speaker has only a limited knowledge of this L2 and does not have access to all the vocabulary and its pragmatic application. In addition, the speaker does not know all the rules of grammatically encoding a word.² The speaker must, nevertheless, communicate and use strategies to transmit a message as successfully as possible so that a hearer can successfully decode that message. The speaker uses strategies consciously which means

² The term 'grammatically encoding' is used by Levelt (1989) to describe the realization of a word in its semantic, morpho-syntactic and phonological form.

that he or she is able to identify the strategies employed (Bialystok, 1990; Cohen, 1998). This characteristic distinguishes strategies from processes that occur unconsciously.³

The interactional approach focuses on the product, the end result, of the speech, classifying different products such as different ways of paraphrasing or different kinds of transfers. The psycholinguistic approach, on the other hand, focuses on the process and analyzes the underlying psychological process of paraphrases or transfers (Ansarin & Pushpinder, 2000).

The study of referential communication strategies investigates processes. The most comprehensive study in this field of research using a psycholinguistic approach is the Nijmegen project that was carried out at the Max Planck Institute of Psycholinguistics in Nijmegen, The Netherlands, between 1987 and 1990. The final report of that project was written by Poulisse (1990).

1.1.2.1 The Nijmegen project

Overall, 45 learners of English took part in the Nijmegen project. Their mother tongue or first language (L1) was Dutch. Three groups were formed according to three levels of proficiency: advanced (second year university students of English ranging in age from 19 to 25 with at least seven years of learning English, English being a required language in high school in the Netherlands), intermediate (grade 11 students ranging in age from 16 to 18 with four or five years of English), and beginner (grade 9 students ranging in age from 14 to 15 with two years of English). Participants had to perform four

³ Schmidt (1994) explains that unconscious processes are neither in the focal nor the peripheral attention of the speaker.

tasks: describe a concrete picture (I), describe abstract shapes (II), retell a story (III), and participate in an oral interview (IV).

While task I, III and IV were performed in English only, task II was performed in Dutch (L1) and English (L2). Furthermore, since abstract shapes were used to create referential problems for the speaker in both languages, it allowed for a direct comparison of the strategies used in L1 and L2. All participants performing the task were told that later another person had to identify the order of the shapes based on their description. When describing the shapes in English, participants were told that this person only understood English in order to prevent them from using linguistic sources of the L1, thereby avoiding the referential problem. A taxonomy was developed that investigated underlying processes of referential communication strategies. There were three categories: holistic (seeing something as a whole; attempt to label the entire shape), partitive (dividing the shape; shape consists of a number of smaller and often simpler shapes) and linear (breaking up the shape into its ultimate components such as lines and angles). The holistic and partitive category were further divided into an analogical (reference to a 'real world' object) and a geometrical category (reference to a geometrical or arithmetic figure) thus providing five strategies (see also Section 3.5.3).

Participants were allowed to take as much time as they wanted to describe each shape. There were twelve shapes in total (based on Kraus & Weinheimer, 1964). In addition to determining the strategy participants used in L1 and L2, the Nijmegen Project also measured the time and words participants used to fulfill the task.

There were four findings. First, participants showed a clear preference for the holistic strategy in both languages because it is the most efficient strategy. Even when

they did not know the English (L2) name for the object to which they related the abstract shape, they used another name that also described the abstract shape as a whole. Second, when participants were not able to solve a referential lexical problem holistically, the next strategy employed was the partitive one. The linear strategy was used the least of the three. Speakers only fell back on it as a last resort when they were not able to use either the holistic or the partitive strategy. Again, participants handled the referential problems in much the same way when performing the exercise in Dutch (L1) and English (L2). Third, there were no significant differences among the three groups of different proficiency. Fourth, speakers used about the same time and words in Dutch and English. Again, there were no significant differences among the three groups of different proficiency.

1.2 Definitions

The terms 'culture', 'language' and 'concept' escape a definition that is accepted across disciplines such as Anthropology, Philosophy, Sociology, Psychology, and Linguistics. For the present discussion, those definitions that link culture to language and concepts to language and culture are reviewed.

1.2.1 Culture

In anthropological linguistics, the term 'culture' is often used to describe the beliefs, values and ideologies of a group of people that are expressed in rituals, customs and artifacts and that are considered to be characteristic for one people (Boas, 1911, 1966).

Sapir (1921, 1949) modified this definition that states that one people has one culture by arguing that within each culture there are different groups of people that interpret the beliefs and exercise the rituals in variation from the standard practice. In other words, there are many cultures within a culture. The sociologist Geertz (1973) took this issue further in asking who constructs the beliefs that are considered to be representative of a culture. He argues that it is through human activity and behavior that different variations of one culture are constructed within a community. Consequently, not only are there many cultures within a culture, but because of the dynamic process of human interaction with its environment these cultures constantly change. This view has been expanded by Gumperz (1993) and Kramsch (1993) who emphasize the significance of personal experience in that process. Gumperz holds that "culture is revealed in the way we react to, evaluate and talk about experience" (1993, p. 207). In the context of acquiring a second or foreign language, Kramsch views culture as the difference between the native speaker's meaning and the foreign language students' "personal voice" (1993, p. 233). She argues that the creation of culture is a process in which the language learner acquires literacy in the L2 by "expressing personal meanings that may put in question those of the speech community. The language that is being learned can be used both to maintain traditional social practices, and to bring about change in the very practices that brought about this learning." (1993, p. 233). House (1997) stresses the importance of balance between language and culture in foreign language teaching. Her view of culture is that of the community in which the target language is spoken.

1.2.2 Language

In relation to language, Hymes (1974) emphasizes the social function of speech which he defines as a sign system of cultural behavior. The channels (e.g., oral or written language), the forms (e.g., language codes), and the keys (e.g., tone of voice) depend on the specific communicative situation. In other words, language is social practice (Halliday, 1989). This view is adopted for the present study. In second or foreign language acquisition the student encounters an unfamiliar language and culture that is referred to as target language and target culture. Byram (Byram & Buttjes, 1991; Byram, 1997) calls this process 'tertiary socialization.' Students construct their own target culture through the target language (Kramsch, 1993). This thesis investigates the impact of this process on the speaker's ability to solve a referential problem by constructing a message in the target language. The referential problem is of an abstract nature and can be solved in many different ways that allow L2-speakers to use their personal experiences with the target culture.

1.2.3 Concept

In constructing a message, speakers put 'concepts' into words. For example, when seeing a robin they say 'There is a robin.' The word 'robin' is an entry in the speakers' lexical dictionary whereas the concept of a robin is an entry in their mental dictionary. There are no exact definitions of concepts. Most common is the prototype view (Rosch & Merwis, 1975; Aitchison, 1987) which, for example, sees a robin as a prototypical bird

because it flies, has feathers and lays eggs. A Penguin is not a prototypical bird.⁴ The second or foreign language learner has to match concepts of the target language onto words and their meanings (Klein, 1986). The concept of a robin in German and English, for example, is similar. However, the concept of 'space' can be quite different (Gumperz & Levinson, 1996; Bowerman & Levinson, 2001). As in the relation of language to culture, a concept of the target language is acquired through personal experience. The participants of the present study had a different amount of contact with the target language and culture. This dissertation investigates if this difference between participants has an effect on their ability to express a concept.

1.3 The problem

The taxonomy of the Nijmegen project has been widely accepted as a valid and consistent method for testing referential communication strategies. "It locates the description of communication strategies within a parsimonious cognitive framework" (Ellis, 1994, p. 402). However, it underestimates relations between concepts, language and culture.

The formation of concepts, abstract and concrete, starts early in life (Clark, 1993) and is language and culture-specific (Bowerman, 1996; Bowerman & Choi, 2001; Levinson, 1996, 2001). When learning a L2, the learner must also acquire the concepts of the target language. The holistic, partitive and linear strategies from the taxonomy developed for the Nijmegen project reflect conceptualizations of the speaker when

⁴ Membership in the category of 'birds' is graded, that is, 'most birds fly'. However, there are problems when combining words. For example, the prototype of a pet is a cat and the prototype of a fish is a trout. The prototype of a pet-fish, however, is not a catfish but a goldfish.

looking at the abstract shapes. One factor influencing the usage of these strategies to describe abstract shapes in L2 is the environment in which the L2 was acquired (Appel, 2000; De Groot, 2000; Paradis, 2000). In an environment where the learner has much contact with the target language and culture, he or she is able to acquire those concepts and use them in referential communication. Such is the case in the Netherlands where English (L2) has great presence through the media in everyday life (van Essen, 1997). In an environment where the target language and culture does not have a great presence, the learner might not be able to acquire those concepts or might need more time to do so. Such is the case learning German (L2) in Canada where the contact with German language and culture is mostly limited to the classroom. These learners might use strategies differently than the participants of the Nijmegen project.

1.3.1 Concept formation in L1

At a young age children are faced with the task of making sense of the undifferentiated speech stream surrounding them. Clark (1993) theorizes that children have a set of ontological categories such as objects, actions, events, relations, states, and properties. Children develop these categories before they start speaking a language and use them to organize their understanding of the world. Therefore, these categories are the same across all languages (Clark, 1993).

In their conceptual development, children go through different stages. As early as nine months, children begin to map words to referents (Pan & Gleason, 1997): Later, they use words to name specific objects. In the next stage, children begin to group things. Objects, entities or notions are related to each other in various ways forming so-called

pseudoconcepts (Vygotsky, 1934, 1986). At this point, children think in loose collections. An important learning step for a child is to understand that a lexical item can have multiple labels (Clark, 1974). The lexical item 'dog' does not only refer to the particular family dog but to other dogs as well. In addition, it refers to dogs seen on pictures that do not share certain characteristics with the family dog such as barking or running. This understanding of the nature of reference is necessary for children to communicate about objects, actions, and properties (Clark, 1993). Moreover, the family dog can not only be referred to as 'dog' but also with other words such as 'puppy'.

In addition, Clark states that a child tries to fit a new word into one of the ontological categories within the context of the specific situation. Vygotsky (1934, 1986) calls this the cultural development of a child. In extending Vygotsky's view, Shore (1996) attributes two sources to concepts: personal mental models and cultural models. Personal mental models are formed as a result of the child's individual life-experiences, cultural models are shared by the community in which the child grows up and are constructed through convention. Shore (1996) sees these two models as being interrelated. He argues that personal models are influenced by cultural models during the formation of ontological categories.

Reviewing Vygotsky's and Shore's research, Lantolf (1999) states that the organization of concepts varies across cultures. The same point is made by Bowerman and Levinson (2001) who edited a book in which various researchers postulated that language-specific, and therefore culture-specific, patterns have some influence on ontological categories (see Section 2.4.1). The theory that concepts can be re-organized through language led to a renewed interest in aspects of linguistic relativity first set

forward in the Sapir-Whorf hypothesis (Whorf, 1941, 1956) which states that differences in linguistic structure (lexicon, morphology, syntax) parallel differences in cognitive structure (perception, memory, reasoning). There are still only a few studies that have been conducted on the specificity of language and culture. These studies try to analyse the underlying concepts of words in different languages. Bowerman (1996), Bowerman and Choi (2001) and Levinson (1996, 2001) both researched abstract concepts of spatial relations.

Bowerman (1996) and Bowerman and Choi (2001) studied the representation of spatial categories by investigating the words uttered by young children who spoke different first languages. The children were asked to describe four actions: (1) to put an apple in a bowl; (2) to put a videocassette in its cover; (3) to put a teacup on a table; and (4) to put a lid on a bowl. In English, the preposition 'in' refers to 'containment' and the preposition 'on' to 'support'. In Korean, however, action number (1) and (3) are described with 'nehta' or 'nohta' referring to 'unfit' whereas action number (2) and (4) with 'kkita' referring to 'fit'. Bowerman's (1996) study demonstrated that children as young as 16 to 24 months used these spatial categories correctly according to their first language.

Levinson's (1996, 2001) interest is in the spatial conception of the Tenejapans, a people of the Mayan Indians of Tenejapa who speak a language called Tzeltal. Levinson explains that the Tenejapans have no terms to express 'to the left' or 'to the right'. In informal experiments they repeatedly confuse left and right inversions on mirror-images implying that the absence of these terms is not only a linguistic gap but has cognitive and therefore conceptual consequences. When describing the location of two flat planes in relation to one another, Tenejapans say that one plane is uphill or downhill or south or

north of the other. Levinson (1996) takes this as an indication of using a system of absolute orientation that fixes absolute angles regardless of the orientation of the reference object. He explains that in English, however, 'to the left' or 'in front of' are part of a system where an object is located by reference to a demarcated region projected out from another object according to its orientation. Levinson (2001) puts his research in a wider framework when he states that there are three systems of spatial relations in languages: an intrinsic (back/front), a relative (left/right) and an absolute (south/north) system. Not all languages use all three systems. The Tenejapans for instance only use the absolute system (Levinson, 2001).

Describing angles has been defined by the Nimjegen Project as a linear strategy (see Section 1.1.2). As Levinson demonstrates there are significant differences in the use of these descriptions between speakers of Tzeltal and speakers of English. The question is what happens when a speaker of English learns Tzeltal or vice versa. Is he or she able to transfer his or her concept from English to Tzeltal?

1.3.2 Concept formation in L2

Research on speech production in L2 sees links between lexical items of L1 and L2 through the conceptual representation of those items (de Bot, 1992; de Bot & Schreuder, 1993; de Bot, Cox, Ralston, Schaufeli & Weltens, 1995).⁵ Consequently, lexical items in different languages can be accessed simultaneously. In case of a L2, an individual speaker can access a concept via the L1 or directly through the L2. This

⁵ A 'lexical item', like a 'lexeme,' is the smallest contrastive unit in a semantic system of a language. It is an abstract unit underlying such sets of grammatical variants as 'walk', 'walks', 'walked' or 'walking'. In general, 'lexemes' are those terms that are listed as separate entries in dictionaries (Crystal, 1987). Levelt (1989, 1992) uses the term 'lexical item' when describing his model of speech production in L1.

research is based on a widely accepted model of speech production in L1 developed by Levelt (1989, 1992; for a discussion see Section 2.3.1).

Singleton (1999) claims that the following factors contribute to the formation of a concept in the L2 speaker's mind: formal and/or semantic similarity between the L2 and L1 words in question; perception of the L2 speaker on that similarity; how well the L2 word is known; and the ways in which the L2 word has been acquired.

A central player in the relation of concepts, language and culture in second language acquisition is the environment in which the L2 is acquired. As Paradis (2000) points out, concepts are seen to have linguistic and non-linguistic mental representations (such as odors, sounds, or taste). Therefore, language is only one way to access concept. Language properties are not actually components of concepts nor are conceptual properties part of the language system as such. The building material of conceptual representation comes from experiences of individuals with their external environment as well as through the internal thought processes that may lead to new knowledge (De Groot, 2000). This view implies that concepts can be transferred from one system to another while both systems are associated with different languages. For example a native speaker of English can transfer a concept from English to another language he or she is learning. The activation of a portion of a concept is a function of the circumstances in which the concept is evoked: the cultural background of the individual speaker and his daily life at the time of the event as well as the particular circumstances of the event will determine which portions of a concept come to mind (Appel, 2000). In other words, the amount of contact a speaker has with a specific language and culture is significant. The

relation between concepts, language and culture is a dynamic process and part of what some researchers call 'linguistic thinking' (Gumperz & Levinson, 1996).

The Nijmegen project investigated referential communication strategies in English and Dutch. Acquiring English as a L2 in the Netherlands provides the second language learner with a high amount of contact with the target language and culture outside the classroom. Baker (2001) points out the positive effect of broadcasting English language films and programs with subtitles in a country like the Netherlands. He speaks of an additive bilingual situation in which the learner receives additional input of English as L2. There are culture-specific codes transmitted in television, film and other media (Kramsch, 1993; Scollon, 1999).

Studies on media quite often draw on Saussure's (1916) distinction between the signifier and the signified. Saussure explains the nature of what a sign is and how it functions in the language system. A sign is made of two parts: a concept on the one hand (signifier) and a sound or image on the other (signified). Williamson (1978) uses this distinction to explain how a network of relations within an already existing sign system is used to transfer meaning. The visual advertisement of the perfume Chanel No. 5 uses the image of Catherine Deneuve's face (signifier) to signify glamour and beauty. The relation between Catherine Deneuve's face and beauty already exists. It functions as a referent system. The advertisement transfers Catherine Deneuve's face to the Chanel bottle, thereby giving meaning and creating the image of beauty to the perfume. The sign system used in visual media and its manipulation to create images is also used in radio. Sounds are used to stimulate associations that are based on a reference system (Crisell, 1986).

Images reinforce and supplement messages and thereby pre-structure our signification process as viewers (Dahlgren, 1987). Images transmit non-linguistic information which often is more diverse and memorable than linguistic information (Müller & Raabe, 1995). If a speaker sees the advertisement of Chanel No. 5, he or she will build a concept of a word such as 'perfume' or 'fragrance' according to the cultural codes transmitted in that advertisement.

The second language speaker of English in the Netherlands has a high amount of direct contact with music, lifestyles, cultural practices, values etc. of English-speaking cultures. Van Essen (1997) states that "English is omnipresent in Dutch society and many English words and phrases have found their way into the Dutch language." (p. 101). A recent study by Berns, de Bot & Hasebrink (2000) reported on the contact secondary education students in different European countries have with English through the media. Newspapers, magazines, radio and television are vehicles of media that distribute the English language worldwide.

For those studying relations between concepts, language and culture it comes as no surprise that the Nijmegen project did not reveal differences in the use of referential communication strategies by second language speakers when solving conceptual problems in English (L2) and Dutch (L1). When a speaker is introduced to a new concept in the language and culture of the target language, his or her new experience is embodied in that language (Byram & Buttjes, 1991; Müller, 1992). He or she is able to access concepts in L2 directly or transfer them from L1 to L2 successfully, expressing the concept using a holistic strategy (see Section 1.1.2.1).

1.3.3 Research questions, scope of study and expected findings

The results of the Nijmegen project indicate that the most frequently used strategy when solving referential problems is the holistic one due to its efficiency. Participants used this strategy to the same degree in both languages (English as L2, Dutch as L1). They also used a similar number of words and amount of time to describe the shapes (see Section 1.1.2).

The question is what happens when a second language speaker has to solve referential problems and is not able to access a concept in L2 directly or transfer it from L1 to L2. The speaker will have to re-structure the strategy in order to create an informative and meaningful message. The question then is to what degree the strategy is changed. Does the speaker stay within the holistic approach and attempt to find different references in the analogical or geometrical category or does he or she change the strategy to a partitive or linear approach? How much more time and words will he or she need to solve the referential problem?

It is the hypothesis of this dissertation that a second language speaker who acquires an L2 in an environment that does not provide him or her with a high amount of contact with the L2 and target culture has difficulties in accessing abstract concepts in L2 directly or transferring them from L1 to L2 successfully. An example is provided by De Groot (2000) who argues that in second language acquisition the concepts for the words used to describe 'Thanksgiving' differ between speakers of Spanish, Chinese and US-American English, depending on their individual experience. This dissertation argues that the conceptual representation of these words depends on how much exposure the speaker has to the target language and culture.

The amount of contact a speaker has with the target language and culture is seen as a factor that contributes to the formation of concepts. It ties into the difference between second language acquisition (SLA) and foreign language acquisition (FLA).

Learning English in countries such as the Netherlands or Germany does not quite fit the definition of FLA or SLA. Second language acquisition is used as a term in two ways. First, it is a general term to describe learning any language other than the L1. Second, it is used in distinction to foreign language acquisition. The differences between FLA and SLA have been well documented. Ellis (1994) summarizes these distinctions as follows: in FLA the language plays no major role in the community and is principally learned in the classroom whereas in SLA the language does play an institutional or social role in the community. In SLA speakers have more contact with the target language than in FLA. However, the distinction is not always easily made, for example when English functions as a 'lingua franca' in a country like India.

It is not surprising that the discussion of SLA versus FLA has lost its intensity since the mid-1990s. As Ellis (1994) points out it is helpful to adopt a more lenient view. FLA and SLA should not be seen as fixed categories but rather as areas that overlap in language learning. Berns (1992, 1995) tries to avoid the terms FLA and SLA altogether arguing that English in continental Europe has the status of a potential EIL (English as International Language). In his lectures on second language acquisition to students of the University of Hamburg, Edmondson (1999) recommends to use SLA and FLA with great care.

In this dissertation the use of the terms FLA and SLA will be minimized. Instead

of FLA and SLA, the expression 'contact with target language and culture' will be used in addition to the description of how much contact the participants in the study have with the L2 and target culture.

This study investigates what kind of communicative strategies are used by a speaker when he or she solves referential problems in L2. A particular strategy chosen by a speaker is a function of the speaker's ability to access the conceptual representations of abstract items in L2 or transfer these representations from L1 to L2. The languages under investigation are English (L1) and German (L2). These two languages are closely related in being both West-Germanic languages. However, the understanding of an abstract concept such as 'space' is still different in the two languages (Bonvillain, 1997). For example one possible German translation of 'space' is 'Raum' which can also refer to a 'room' whereas in English it can not.

In order to determine the influence of the cultural environment on accessing concepts and using referential communication, verbal descriptions of abstract shapes by sixty native speakers of English who learn German as a L2 was analyzed. This is a modified version of task II of the Nijmegen project. The participants were divided into two groups, C (Canada) and G (Germany). Group C consisted of thirty speakers who learn German at the University of British Columbia in Vancouver, Canada. Group G consisted of thirty speakers who learn German in Germany in the cities of Kiel and Hamburg. The contact participants from Group C had with German language and culture was mainly limited to classroom situations while participants in Group G had contact with German language and culture in class and/or in everyday situations.

The contact participants in Group G have to German language and culture allows them to access concepts directly in their L2 (German) or transfer them from their L1 (English) to their L2 successfully. The situation for participants in Group C is different. In a classroom situation where the L2 is spoken in class and taught with the help of another language, it is very difficult for individual speakers to form a concept through the L2.⁶ The non-linguistic information provided by the instructor does not contain the same amount of information as a natural environment does. There is less contact with the culture and the culture-specific codes that are transmitted through various media. In a classroom setting concepts are not formed through a direct cultural experience but via the culture of the first language.⁷

Participants in Group G have more contact with the target language and culture than participants in Group C. For the reasons outlined above, I expect different results from participants in Group G compared to participants in Group C when performing the task of describing abstract shapes. Both groups were divided into three subgroups corresponding to three levels of proficiency (low, intermediate, high). It is expected that the lower the proficiency is, the more difficulties participants have accessing concepts in their L2 (German) because they have the least amount of contact with the target language and culture. In detail, I postulate these hypotheses:

⁶ Exceptions to this kind of classroom situation are immersion programs which not only teach foreign languages (for example French) in the foreign language classroom but also teach other subjects such as mathematics in the target language, thereby providing the second language learner with a high degree of contact with the target language.

⁷ Exceptions to these classroom settings are language courses that are taught with an intercultural approach using project work to establish a direct connection to native speakers of German. For example, the internet is used to facilitate an exchange of ideas between students in a 'German as a foreign language' class taught at the University of British Columbia and a 'English as a foreign language' class taught at the University of Kiel. Examples for this are the 'Hallo Hamburg - Hallo Montreal' project (Goldsmith-Reber, 1992) and the 'Gesamthochschule Giessen - Penn State University' project (Legutke, 2001).

- 1.1
 - a) Speakers in the Canadian group (Group C) use the holistic strategies less often in German than in English. The lower the level of proficiency, the less the holistic strategy is used in German.
 - b) Speakers of the German group (Group G) use the holistic strategies in the same manner in German and English, though speakers of a lower proficiency level use the holistic strategy less in German than speakers of a higher proficiency level.
 - c) Speakers of Group C use fewer holistic strategies in German than speakers of Group G.
- 1.2
 - a) Speakers of the Canadian group (Group C) need significantly more time to describe the abstract shapes in German than in English. The lower the level of proficiency, the more time is used in German.
 - b) Speakers of the German group (Group G) do not need significantly more time to describe the abstract shapes in German than in English, though speakers of a lower proficiency level use more time in German than speakers of a higher proficiency level.
 - c) Speakers of Group C need significantly more time to describe the abstract shapes in German than speakers of Group G.
- 1.3
 - a) Speakers in the Canadian group (Group C) use significantly fewer words to describe the abstract shapes in German than in English. The lower the level of proficiency, the fewer words are used in German.
 - b) Speakers in the German group (Group G) do not use significantly fewer words to describe the abstract shapes in German than in English, though speakers of a

lower proficiency level use fewer words in German than speakers of a higher proficiency level.

c) Speakers in Group C use significantly fewer words to describe the abstract shapes in German than speakers in Group G.

1.4 Preview of the following chapters

In Chapter Two, the relevant literature is reviewed. In the first part of this chapter, interactional and psycholinguistic approaches to the study of communication strategies are discussed in the context of their taxonomies. In the second part, research on concepts in second language acquisition is looked at in relation to speech production. The third part gives an overview of studies that attempt to establish a connection between concepts, language and culture in different first languages as well as in second language acquisition. The literature review concludes with linking the culture-specificity of concepts to the language environment (SLA/FLA).

Chapter Three describes the methodology used to conduct the study presented in great detail. The design of the study is addressed (profile of participants; preparation of task at hand; manner of data collection) as well as the descriptive and statistical parameters used in the quantitative and qualitative analysis.

Chapter Four provides the results of the quantitative analysis for both groups of participants. The measure of the word count is analyzed by using descriptive and inferential statistical methods comparing the English descriptions with the German descriptions of Group C as well as of Group G. Furthermore, the German descriptions of

Group C are compared to the German descriptions of Group G. The same procedure applied to the word count is used for the time count.

Chapter Five provides the results of the qualitative analyses for both groups of participants. First, it is determined what strategies were used and how often strategies were changed in German and English within each group. Second, the two groups are compared to each other by looking at the strategies used in German. In addition, Chapter Five also determines whether the task at hand was solved sufficiently. Finally, results from the interviews are presented.

This dissertation concludes with a summary and an interpretation of its findings in Chapter Six. It combines and compares the results of the quantitative and qualitative analysis to arrive at a conclusion about solving referential communication problems by the participants of the two different groups and their respective subgroups. The results are discussed in the broader framework of concepts, language and culture and the question if the language environment enables L2 students to access concepts in the target language and/or to transfer concepts from L1 to L2. In addition, the limitations of this study are discussed and suggestions for future research and the teaching of German as a second language are made.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses different approaches to the study of communication strategies as well as research on concepts, language and culture and its application to the project of this dissertation. The emphasis of this review is on the specificity of concepts in relation to different cultures, languages and language environments.

The interactional and psycholinguistic approaches in the study of communication strategies are discussed in view of their methods and aims (Sections 2.2.1 and 2.2.2), followed by an overview of the development of the Nijmegen taxonomy (Section 2.2.3). The next section examines a model of speech production in L1 and its application to L2 that contributes to our understanding of generating messages (Sections 2.3.1 and 2.3.2) prior to a review of studies carried out on conceptualizations in different cultures and languages (Section 2.4.1) and its application to second language acquisition (Section 2.4.2). Finally, the case of SLA and FLA with regard to German and the study of this dissertation is presented (Section 2.5).

2.2 Approaches to the study of communication strategies

The interactional and psycholinguistic approaches differ in their research aim. Whereas the former investigates speech products, the latter analyzes speech processes. Consequently, these approaches use different taxonomies. Their general attempt to classify communication strategies, however, is similar. Both approaches distinguish

between reduction and achievement strategies, a distinction first made by Faerch & Kasper (1983). An example of a reduction strategy is to abandon the message; while examples of achievement strategies are transferring knowledge from L1 to L2 or paraphrasing in L2. Essentially, there are three ways of using knowledge of L1 in L2 speech production: code-switching (one or several words from L1 inserted into the speech stream of L2 without adaptation), literal translation (e.g. German 'Spiegelbild' to 'mirror-picture'), and foreignizing (e.g. German 'schrauben' into 'schraub-ing'). There are also three ways to classify paraphrasing (Tarone, 1977): approximation (word substitution: 'pine tree' for 'Douglas Fir'), word coinage (making up words: 'fir tree'), and circumlocution (description of characteristics: 'tree with pine needles').

2.2.1 Interactional approach

Taxonomies of the interactional approach usually attempt to classify different communication strategies such as various methods of paraphrasing or different kinds of transfers. Several taxonomies have been developed to classify linguistic utterances and the non-linguistic signs of speakers (Tarone, 1977; Varadi, 1980; Paribakht, 1985; Yule & Tarone, 1990; Dörnyei & Scott, 1995). The distinction of reduction and achievement strategies is only applied to linguistic categories assuming that non-linguistic signs are used to successfully enforce the verbal message. Tarone (1977) has developed the following taxonomy: avoidance (topic/message abandonment); paraphrase (approximation: word substitution; word coinage: making up words; circumlocution: description of characteristics); conscious transfer (literal translation; language switch); appeal for assistance; mime. In 1995, Dörnyei and Scott extended the basic distinction of

reduction and achievement strategies by introducing 'fillers.' They distinguish between direct strategies (avoidance; paraphrase; transfer), interactional strategies (asking for help, clarification) and indirect strategies (fillers: well, maybe, 'em).¹

2.2.2 Psycholinguistic approach

Taxonomies of the psycholinguistic approach attempt to analyze the underlying psychological process of paraphrases or transfers. Studies in the psycholinguistic approach have developed taxonomies that differ from those employed in the interactional approach. One important difference is the assertion, in the psycholinguistic school, that the speaker does one of two things when using a communicative strategy: he or she either manipulates his or her linguistic resources or he or she manipulates the concept of what is to be expressed (Bialystok, 1990; The Nijmegen project, 1987-1990; Poulisse, 1993). When manipulating the linguistic resources, the speaker holds up his or her initial intention by integrating sources outside the L2. An example of this is the transfer of linguistic sources from the L1. When manipulating the concept, the speaker adjusts the content of his or her message, an example of this is paraphrasing. The Nijmegen project is the most comprehensive of the psycholinguistic studies on referential communication strategies and provides a large amount of data that warrants detailed investigation.

2.2.3 The Nijmegen project

As mentioned before, the study presented here was inspired by the Nijmegen Project (1987-1990) which was the most extensive study carried out on referential

¹ In addition, lexical fillers can fulfill social, interactional, discourse and symbolic function (Rieger, 2000, 2001, 2003). For example they serve as an uptake or any other link to what the previous speaker has said.

communication strategies to this date. The final report was written by Poulisse (1990). A paper reporting on particular aspects of the project was published by Bongaerts and Poulisse (1989). It used a psycholinguistic approach and drew on other research carried out in the field of psycholinguistics on languages, strategies and communication.

2.2.3.1 Prior studies

In 1964, Kraus and Weinheimer's study investigated referential communication strategies in first language speech production. It was an interactive study: the speaker and hearer were in the same room although they could not see each other. Both of them had cards with abstract shapes. The speaker's task was to describe and name the abstract shapes so that the hearer could identify them. The hearer was allowed to give feedback. Cards consisted of six shapes each drawing from a pool of fifteen abstract shapes. Speaker and hearer went through 16 trials using different cards with different combinations of shapes. Kraus and Weinheimer found, first, that the descriptions were rather long and then became shorter as speaker and listener got more practice. Second, as they got used to each other, they were able to establish common referents. The most frequently used strategy was to assimilate the shapes to variations of common objects (for example the description of a triangular shape as an 'upside- down martini glass'). In their study, Kraus and Weinheimer did not develop a taxonomy for these variations or other strategies.

The fifteen shapes were chosen because of their novel graphic design. There are no conventional names for them, they tend to elicit a wide range of verbal labels, and they are difficult to describe in a L1.

A number of studies followed the 1964 study that used the same abstract shapes and method (Kraus & Weinheimer, 1966; Glucksberg and Kraus, 1967; Kraus & Glucksberg, 1969).

In 1986, Clark and Wilkes-Gibbs carried out a replica of the 1964 study. Again, it was an interactive study on L1 speech production using the same abstract shapes and method (describing and naming the shapes over 16 trials). The difference consisted in the usage of a defined taxonomy, developed by Clark and Wilkes-Gibbs to analyze the strategies. They distinguished between two perspectives the speaker can adopt when describing the shapes: holistic (the object is conceived as a whole) and segmental (the object is conceived as consisting of segments that happen to be juxtaposed). This distinction is similar to Heider's idea of 'whole-inferential' and 'part-descriptive' encodings in verbal communication (Heider, 1971). Clark and Wilkes-Gibbs also claimed that holistic perspectives tended to be analogical (relate to natural objects) and segmental perspectives to be literal (focused on geometrical parts of the shape and their relation).

The 1986 study found that speakers started with a holistic analogical perspective and then added to their description from a segmental perspective in the first trial. In the additional trials the segmental perspective was reduced further and further until the holistic analogical perspective was left.

One year later, the first study on referential communication strategies for second language speech production was carried out by Bongaerts, Kellerman and Bentlage (1987). It was an interactive study like the studies on L1. Speaker and hearer went through six trials of matching abstract shapes with abstract shapes on the other's card. In each trial, they had to match nine of twelve shapes given on a card. The shapes were

drawn from the pool of fifteen shapes. However, six shapes were on all cards given to the speaker and hearer. The analysis was based on those six shapes. Speaker and hearer went through the six trials twice: once and first in L1 (Dutch) and once and second in L2 (English).

This study also looked at different levels of proficiency. Students were divided into four groups according to the number of years (one, three, five and seven) they had learned English in school. The analysis was based on Clark and Wilkes-Gibbs taxonomy. This was done for reasons of comparison. The study concluded that highly proficient students started to establish common referents as of trial two whereas less proficient students needed all six trials to do so. Similar to Clark and Wilkes-Gibbs results on L1, students showed a preference for the analogical perspective over the literal perspective in Dutch and English.

A major problem with the 1987 study is that once speaker and hearer established common referents in Dutch, they simply transferred those referents to English (Poullisse, 1990). It is no surprise that no differences were found between L1 and L2 strategy use. In order to avoid this problem in a study comparing L1 and L2, the interactive format of the study has to be changed. Only the descriptions of the speaker ought to be analyzed. They have to be recorded and later played back to a hearer who can identify the shapes according to what he or she hears on the tape. There should be no feedback and no numerous trials. The Nijmegen project (1987-1990) implemented these changes. However, participants of the Nijmegen project described the shapes three times with no time interval between the three tries. All participants described the shapes first in Dutch (L1), a second time in Dutch (L1), and the third time in English (L2). This format should

be changed as well and it was changed in the study of this dissertation (see Chapter Three).

2.2.3.2 Studies as part of or linked to the Nijmegen project

Two studies on L2 speech production followed the 1987 study, both of which took the above considerations into account.

Kellerman, Amerlaan, Bongaerts and Poulisse (1990) carried out another study on Dutch (L1) and English (L2). They asked 17 first-year university students who had studied English for six or more years to describe eleven shapes. These shapes differed from those used in the other studies. They were created by the researchers for the specific purpose of that new study. The descriptions of the students were taped and they were told that later another person would have to draw the shapes after listening to their tape (in task two of the Nijmegen project they were told that another person had to identify the shapes, see this Section, below). Students described the shapes in Dutch first. After a one week break they described them in English. The shapes were arranged in a different order when they were described in English.

The taxonomy of this 1990 study distinguished between three perspectives²: holistic (attempt to label an entire shape by associating it to a 'real-world' object or conventional geometric shape), partitive (shape consists of a number of smaller and often

² In the literature on communication strategies, the terms 'perspective' and 'strategy' are often used as synonyms. In the Nijmegen project, the three perspectives are broken down into five strategies: holistic analogical and holistic geometrical, partitive analogical and partitive geometrical, linear.

simpler shapes), linear (break up shape into its ultimate components such as lines, angles, dimensions, spatial relations). It can be seen that the partitive and linear perspective are a more refined version of Clark and Wilkes-Gibbs' (1986) segmental perspective.

Results indicated that speakers used mostly the holistic perspective in Dutch and English since it proved to be the most efficient strategy. If they were unable to use this particular perspective to solve the problem of describing an abstract shape, they fell back on the partitive perspective. The following hierarchy was apparent: holistic > partitive > linear. This manner of problem solving was similar in Dutch and English.

The other study is Bongaerts and Poulisse's (1989) analysis of task II of the Nijmegen project. Students were divided into three groups according to their level of proficiency. Four criteria were used to determine that level: number of years having learned English, teacher evaluation, performance in class, and cloze-test. Group I consisted of students with seven or more years of English (age 19-25), group II consisted of students with four or five years of English (age 16-18), and group III of students with two years of English (age 14-15). They had to describe twelve of the original fifteen shapes used in the other studies. Students were audio-taped and they were told that later another person would listen to the tape. That person also had the twelve shapes in front of him or her but in a different order. His or her task would be to put the shapes in the correct order according to the descriptions on the tape. Students described the shapes three times: twice in Dutch and once in English. The first Dutch recording was done to get used to the difficult task of describing abstract shapes. Only the second Dutch recording and the English recording were used for the analysis. There was no significant time gap between the recordings. Students described all twelve shapes in Dutch and

shortly thereafter they described all twelve shapes in English. The shapes were arranged in a different order in the English session.

The taxonomy used was very similar to the one used in the 1990 study: holistic (divided into the analogical and geometrical subcategories), partitive (also divided into the analogical and geometrical subcategories) and linear. The distinction of analogical and geometrical was included in the 1990 definition of the holistic perspective.

Results were similar to the 1990 study indicating that “L1 speakers and L2 learners handle their referential problems in much the same way” (Bongaerts & Poullisse, 1989, p. 265).

2.2.3.3 Taxonomy

The Nijmegen project developed a taxonomy that considers only achievement strategies. The achievement strategies can be conceptual (assuming that the concept is manipulated by the speaker to create an informative and meaningful message) and linguistic (assuming that the linguistic means are manipulated by the speaker). The manipulation of the concept is broken down into two subcategories: holistic (approximation: use of superordinate, coordinate, subordinate terms) and analytic (circumlocution, semantic coinage). In this case, the speaker stays within the L2. The manipulation of linguistic sources is also broken down in two subcategories: transfer (code-switching, literal translation, foreignizing) and morphological creativity (later renamed to ‘grammatical deviation’: grammatical coinage). In this case, the speaker integrates sources from the L1.

The advantage of such a taxonomy lies in its simplicity. Different strategies such as circumlocution (for example 'ball with air in') or semantic coinage (for example 'airball') are seen as being similar in terms of their cognitive processing: they point out the most distinct attribute of the object and are thus both analytic strategies.

Any taxonomy developed for a research project has to focus on what is actually under investigation and determine a classification of strategies that suits the study's scope. This applies to the interactional as well as the psycholinguistic approach. In general, the taxonomy developed in the Nijmegen project has been accepted as a valid and consistent method to test referential communication strategies (Ellis, 1994).

After completion of the Nijmegen project, there was some discussion among researchers on the distinction between conceptual and linguistic strategies. Poullisse, who was the main investigator of the Nijmegen project, argued that holistic and transfer strategies are the same. A word substitution in L2 and a code-switch from L1 can be essentially based on the same cognitive processes. Poullisse (1993) developed the following taxonomy: substitution (approximation, code-switching), substitution plus (foreignizing, morphological creativity) and reconceptualization (paraphrase). She regards reconceptualization as the only strategy where the concept is manipulated implying that it was in fact the only strategy tested in the Nijmegen project. This division of strategies was then criticized by Kellerman and Bialystok (1997) arguing that code-switching can originate at the conceptual level. Interestingly, Kellerman and Bialystok's (1997) argument is in line with Poullisse's (1993) idea of a language tag within the conceptualizer (see Section 2.3.2). The discussion on finding a taxonomy that meets all demands remains open. However, the study of this dissertation focused on

conceptualizations of the speaker. The issue of labeling categories such as conceptual or linguistic is left aside. The data of my study is analyzed distinguishing between holistic, partitive and linear strategies.³ These strategies were tested in the Nijmegen project and were part of its taxonomy. They reflect conceptualizations of the speaker when looking at the abstract shapes. The process from conceptualizing an idea to the articulation of this idea is explained in models of speech production.

2.3 Speech production

Communication strategies are part of the speech process. It is helpful to locate them in a general framework of speech production in order to understand how an informative and meaningful message is generated. A widely accepted model that attempts to explain processes of speaking from the initial intention to the actual articulation of the speaker in the L1 is the one developed by Levelt (1989, 1992). The only other model that attempts to explain the processes of L1 speech production is the one by Paradis (1997). For the L2, however, a model of speech production has yet to be developed. De Bot (1992) and others adapted Levelt's model (1989, 1992) and were able to establish a link between the L1 and the L2. Independently from these researchers, Paivo (1986, 1991) developed a bilingual dual coding approach. Unfortunately, his model is purely theoretical and has not been verified by experimental data as Levelt's was.

³In contrast, the methods of data collection were modified in this study compared to the Nijmegen project. All modifications are explained in detail in Chapter Three. The most significant change was the formation of two participant groups distinguishing between foreign and second language acquisition compared to one participant group in the Nijmegen project who did not implement such a distinction. Other changes were: participants described the shapes once in their L1 and once in their L2; there was a two week interval between the two descriptions; half of the participants started with their L1, half with their L2.

2.3.1 Speech production in the L1

In his model of speech production in the L1, Levelt (1989, 1992) assigns two levels of representation to items in the lexical dictionary: the lemma and the form of the lexical entry. The lemma contains semantic and syntactical information; the form contains morphological and phonological information. Based on decades of collecting experimental data, Levelt's model explains how a concept is matched onto a lexical item and grammatically encoded in the L1. In general, his model has two processing components: the conceptualizer where the content and the form of the message are planned, and the formulator where the message is grammatically and phonologically encoded. In the conceptualizer, planning the content is referred to as macroplanning and planning the form as microplanning. The macroplanning depends on the knowledge of the situation in which the speaker has to generate a message, the world knowledge (encyclopedia), and the discourse knowledge (pragmatic knowledge of possible contexts) of the speaker. This is where a concept is developed that is put into a speech plan by the speaker. A concept is best described as a mental image associated with a lexical item. The conceptualizer produces a preverbal message that feeds information to the formulator. The formulator uses this information to convert the preverbal message into words.

Another component in this model is the lexicon which can be accessed by the formulator. The lexical items stored in the lexicon consist of the level of lemma and form. The semantic and syntactical information of the lemma is linked to the grammatical encoding in the formulator, and the morphological and phonological information of the form is linked to the phonological encoding in the formulator. The processes going on in

the formulator are primarily lexically driven. The lexicon is an essential mediator between conceptualization and grammatical and phonological encoding:

The preverbal message triggers lexical items into activity. The syntactic, morphological, and phonological properties of an activated lexical item trigger, in turn, the grammatical, morphological and phonological encoding procedures underlying the generation of an utterance (p. 181).

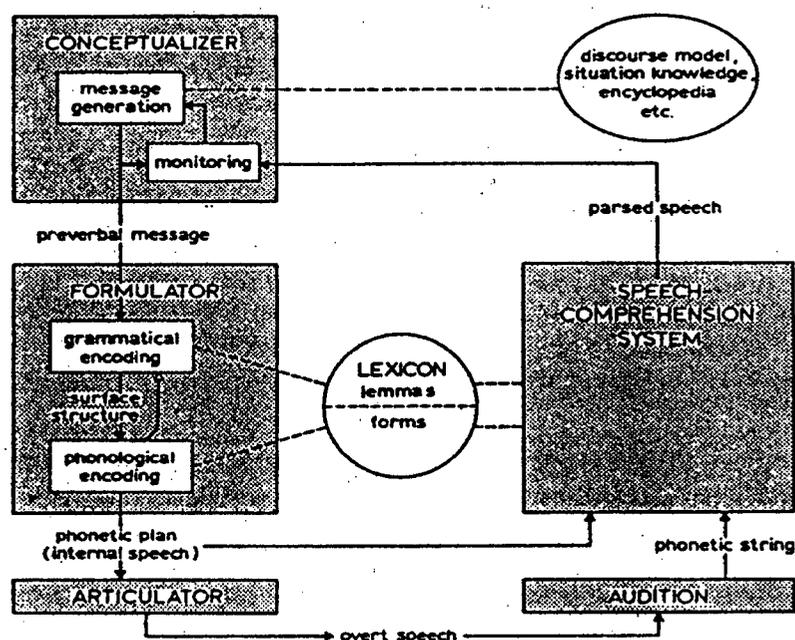


Figure 2.1: A model of speech production (adapted from Levelt, 1989, p. 9)

The different components in the model work simultaneously: various parts of the same sentence are at different processing stages at the same time. A fourth component, the articulator, is set to work after a lexical item has been processed in the conceptualizer and formulator. Once, the message that is articulated is checked by the speech

comprehension system. Alternatively, the message can be checked before articulation. The speech comprehension system is linked to the lexicon to check if the message is informative and meaningful. In addition, the message (or parsed speech) is monitored in the conceptualizer. If the concept was not adequately expressed, the process of generating a message can start again. Although Levelt argues that in general the production of the L1 is largely automatic, the monitoring system implies that a speaker can generate several messages until he or she thinks that the idea or concept in question is expressed sufficiently. In view of the present study, a speaker can employ a strategy that adjusts or changes a message.

Paradis' (1997) model explains the process of L1 speech production in clearer terms than Levelt but does not add anything new to the discussion. Similar to Levelt, Paradis distinguishes between a conceptual, semantic and lexical component. A lexical item is processed in all three components. It consists of non-linguistic information such as imagery or schemas based on experiential world knowledge (conceptual component); explicitly available information, which relates the lexical item to other items in the language (semantic component); a form with its phonological and morphosyntactic properties (lexical component).

2.3.2 Speech production in the L2

Levelt's lemma-form distinction is quite significant. It provides an insight into ways in which conceptual representations of lexical items can overlap. When speaking a L2, it is relevant to know if these overlaps also exist between lexical items of different languages. There are two questions in particular. First, what is the relationship of lemmas

and forms in different languages? Second, can lexical items of different languages be processed at the same time?

In the adaptation of Level's model for a L2, the lemma and the form of a L1 item is potentially linked to the lemma and the form of a L2 item through the conceptual representation, thus forming a link between the L1 and the L2 (De Bot, 1992; De Bot & Schreuder, 1993; De Bot, Cox, Ralston, Schaufeli & Weltens, 1995). Speakers can access lexical items in the L1 and the L2 at the same time. When speaking a L2, they can access a concept via the L1 or directly through the L2.

This has to be explained in more detail. De Bot (1992) was the first to apply Level's model for speech production in the L2. He used studies by Paradis and Green for this purpose. In 1987, Paradis formulated the subset hypothesis which sees links among elements from one language as well as links between elements from one language and the other. De Bot applied this to the lemma level as well as to the word form. He then used Green's (1986) suggestion that there can be three levels of activation in language spoken by bilinguals: the language can be selected (a language actually spoken at one point in time), active (a language undergoing the same processes as the selected language but is not articulated) or dormant (a language stored in the memory but not involved in the current process of speaking). Applying this to Level's model, De Bot argued that each lexical item has a number of characteristics (on the lemma as well as the form level) and the item whose characteristics are stimulated most is activated. Some of these characteristics are shared by a lexical item in the L1 and its counterpart in the L2, some are not. Several relations between lemma and form are possible and all together they form a network of subsets.

In De Bot's view the formulator is language-specific because the grammatical and phonological encoding differs from one language to the other. The preverbal message that leaves the conceptualizer also contains information about the language that is to be spoken because the intention of the message is put into a form in the microplanning stage. Different speech plans can be generated although only one plan is actually put into articulation.

Four points can be taken from Levelt and De Bot. One, the components in Levelt's model interact with each other in a dynamic process. Two, more than one language can be processed at the same time. Three, lexical items in different languages can be accessed simultaneously. Four, there are overlaps in the conceptual representation of lexical items in the lemma-form structure.

Paivo's (1986, 1991) dual coding approach is not as detailed as De Bot's (1992). Paivo attempts to explain how a concept is linked to a lexical item in the L1 and the L2 without the distinction of lemma and form and without the ongoing process of encoding a lexical item. For Paivo, a concept is part of what he calls an 'image system' (first code). This image system is accessed by the verbal systems (second code) of the L1 and the L2 that are also connected to each other. Thereby, Paivo (1986, 1991) and De Bot (1992) came to the same conclusion in that there is a network of subsets of lemmas and forms between the L1 and the L2.

Paivo (1986, 1991) states that only concrete lexical items can access the 'image system' within the verbal systems of the L1 and the L2, while abstract lexical items cannot access them. More interestingly, Baker (2001) did not consider this to be important. In the discussion of Paivo (1986, 1991), Baker (2001) simplifies the bilingual

dual coding model by giving access to the 'image system' to concrete and abstract items in the L1 and the L2. However, De Groot's studies (1992, 1993; see Section 2.4.2) on semantic priming confirm Paivo's idea arguing only concrete lexical items share a conceptual representation in the L1 and the L2.

Two other attempts have been made to shed light on the question of language specificity of concepts. Green (1993) and Poulishse (1993) both used Levelt's model (1989, 1992) for their argumentation. Green (1993) introduced a language tag that maps the conceptualized message with a lemma. This tag is outside the conceptualizer, the formulator and the lexicon. The initial concept can be accessed by all languages regardless of the type of lexical item (concrete or abstract). Poulishse (1993) goes in a different direction. She places the language tag inside the conceptualizer. The knowledge of the situation that is fed into the conceptualizer contains information about the language to be used making any concept language specific. A distinction between concrete and abstract lexical items is not made.

Singleton (1999) summarized the discussion on concepts. It can be assumed that concepts are partly innate and therefore universal across languages and partly the result of interaction with a particular language and culture. Their formation requires intellectual processes such as organizing, interrelating, co-ordinating and structuring. Hence, concepts are part of the cognitive development of any human being. However, any cognitive development interacts with the environment around it, part of which is language. There is a continuity between language and cognitive development (Singleton, 1999). Research on the development and functioning of the brain revealed that the process of producing neurons is significant from birth to six years of age when neurons

not only increase in size and complexity but form connections among each other. The connections are the result of an interaction of innate codes and environmental influences (Jacobs, 1988). This process continues throughout life.

The focus of the study of this dissertation is on conceptualizations that are expressed through referential communication strategies in L2. The relation of concepts in the L1 to concepts in the L2 is very complex. The formation of concepts in the L2 depends on the environment in which the L2 was acquired. Therefore, the L2 environment has an impact on the speech process. This study distinguished between a foreign and a second language environment in which speakers have a different amount of contact with the target language and culture.

2.4 Concepts, language and culture

The process of uttering a word starts with a conceptualization of that word. The speaker has an idea of what that word can express. He or she will then try to match the concept with the word. In the literature this is sometimes referred to as the 'matching problem' (Klein, 1986). The formation of concepts in the L1 has been outlined in Chapter One. This chapter discusses studies that investigated the specificity of culturally acquired concepts in different first languages (Section 2.4.1). They are well documented in the edited books by Bowerman and Levinson (2001) on language and conceptual development and by Gumperz and Levinson (1996) on linguistic relativity. Lantolf (1999) also reviews this topic briefly. In Section 2.4.2, research on mental representations of words in the L2 is reviewed as well as its application to second language acquisition (Appel, 2000; Byram, 1989, 1997; Byram & Buttjes, 1991; De Groot, 1992, 1993, 2000;

Krashen, 1981, 1982, 1989; Müller, 1992; Paradis, 2000). Finally, differences between second and foreign language acquisition are discussed in their relevance to the study of this thesis in Section 2.5 (Dittmar, 1995; Edmondson, 1999; Ellis, 1994; Glück, 1991, 1994; Rösler, 1995).

2.4.1 Conceptualizations in the L1

The realization that language might transform our thinking has generated a few studies on conceptual differences between speakers of different cultures and languages (Bowerman, 1996; Bowerman & Choi, 2001; Brown, 2001; de León, 2001; Levinson, 1996, 2001; Lucy, 1996; Ratner, 1991; Slobin, 1996).

Reviewing Vygotsky's (1934, 1986) and Shore's (1996) research, Lantolf (1999) states that concepts that underly words vary across cultures (see Section 1.2.1). He cites examples by Ratner (1991) and Lucy (1996) to prove this point. Like Whorf (1941), Ratner (1991) studied the Hopi people in the Southwest of the United States. Ratner demonstrated that the Hopi people make no distinction between the meaning of 'spilling' and 'pouring'. In standard English, the concept of 'spilling' is that of an accidental act whereas the concept of 'pouring' is that of an intentional act. However, in Hopi language the association of these concepts with those words does not exist. In other words, these concepts are culture-specific and embodied in the language of that culture. Another example is provided by Lucy (1996) who studied the language and culture of the Mayan as did Levinson (1996, 2001), Brown (2001) and de León (2001). Lucy (1996) analyzed the ways in which the Mayan classify objects. He found that whereas Anglo-Americans

classify objects by shape, in Mayan culture they are organized by material, thus indicating a different way of conceptualization.

Bowerman's (1996) and Bowerman and Choi's (2001) research on English and Korean demonstrated that children at a very young age structure spatial categories according to their L1, that is, according to the language-specific principles set by their L1 (see Section 1.2.1). Slobin (1996) compared how children acquire their native language in English, German, Spanish, Turkish and Hebrew. He gives an example on spatial relations in Spanish. In standard Spanish, spatial relations are indicated using a verb of motion in combination with a description of the place. Whereas three and nine year old Spanish children follow this pattern, five year olds try to elaborate on this by using descriptions of the locative: down, inside, on top of (Slobin, 1996). Slobin draws the conclusion that eventually the Spanish language influences the thinking of Spanish children so much that they adapt to a standard use of the language. In conclusion, adult speakers of a L1 think in the language and culture-specific terms of the L1. Acquiring or speaking a L2, they have to learn the new language and culture-specific concepts of that L2. Byram (1989) calls this process 'tertiary socialisation' (see Section 2.4.2). One factor in this process is the L2 environment which is under investigation in the study of this dissertation.

More examples come from Levinson (1996, 2001), Brown (2001) and de León (2001). Levinson's (1996, 2001) research on Tzeltal demonstrated that different cultures use different conceptual systems to express spatial relations (see Section 1.2.1). Similar research was carried out by Brown (2001) and de León (2001) who confirmed Levinson's findings. Brown (2001) studied various kinds of 'up/down' expressions in Tzeltal and de

León (2001) studied verbs of path in Tzotzil, a Mayan language spoken in the highlands of Chiapas.

The studies outlined in this section show the importance of culture when conceptualizing ideas in the L1. The study of this dissertation compares different L2 learning environments. A key question is how much access a L2 speaker has to the L2 and target culture and in what ways this influences his or her conceptualizing of ideas in the L2. The following section elaborates on this question.

2.4.2 Conceptualizations in the L2

Only few theories explain the complex network of concepts, language and culture in L2, such as the well-known work by Byram (1989, 1997) and Byram and Buttjes (1991) on the attempt to intertwine language and culture in the acquisition process. Other research in this area has been done by Müller (1992) and to a lesser degree by Krashen (1982).

One of the most recent debates on concepts, language and culture in the L2 was published in the journal *Bilingualism: Language and Cognition* (2000). It centers around the question what features concepts have and how these features are related. The most detailed explanation comes from Paradis (2000): concepts have linguistic and non-linguistic mental representations (such as odors, sounds, taste); the conceptual network can therefore exist independently of language; in relation to language a concept is an abstraction of units of meaning (events, objects, properties); the relation between concepts and words is not one-to-one; a concept is never activated entirely at any given time but only those aspects are activated that are relevant to the particular situation. In

general, language is one way to access concepts. Language properties are not actually components of concepts nor are conceptual properties part of the language system as such. Concepts correspond to words via the lexicon.

The concept corresponding to the meaning of a word in L1 and that corresponding to its translation equivalent in L2 (i.e., that portion of the conceptual network that may be activated when a word is used) overlap more or less extensively; that is, some of the same components (features, for short) correspond to both words, some to the L1 word only, others to the L2 word only (Paradis, 2000, p. 22).

The building material of conceptual representation comes from experiences of individuals with their external environment as well as from the internal thought processes that may lead to new knowledge (DeGroot, 2000). This implies that concepts can be transferred from one system to another while both systems are associated with different languages. The activation of a portion of a concept is a function of the circumstances in which the concept is evoked: the cultural background of the individual speaker and his everyday life at the time of the event will determine which portions of a concept come to mind the same as the particular circumstances of the event (Appel, 2000). For example:

Russians in Russia will interpret an event in accordance with concepts corresponding to customary Russian ways of thinking; Anglo-Americans will interpret the event in accordance with common Anglo-American ways of thinking, whereas Russian immigrants will interpret the same event in ways that will depend on their degree of acculturation, that is, the extent to which they have been exposed to and have adopted American ways of looking at things, as Pavlenko demonstrates (Appel, 2000, p. 23).

Appel is here referring to Pavlenko's unpublished doctoral dissertation (1997, Cornell university) that researched associations made about abstract concepts such as 'space' and

'privacy' between classroom L2 learners of English (L1 Russian) and naturally acquired L2 speakers of English (L1 Russian) with two control groups (native monolingual speakers of Russian in Russia and native monolingual speakers of English in the United States). In her study, Pavlenko (1997) had participants give written definitions of the concepts in question and recall four 3-minute films they were shown.

It has to be noted that in research on spatial relations (see Section 2.4.1) or space (Pavlenko, 1997, this section) abstract concepts are investigated. A distinction between abstract and concrete concepts is not made in the research on speech production in the L2 by De Bot (1992) and others (see Section 2.3.2). An exception to this is Paivo's (1986, 1991) dual coding model that lacks the support of experimental data.

In her work on semantic priming, De Groot (1992, 1993) investigated conceptual representations in the lexicon of bilingual speakers distinguishing between abstract and concrete concepts. Studies in priming test how fast a word is recognized by measuring response-times. In second language acquisition the learner, for example, sees a lexical item such as 'queen' followed by a series of either other meaningful lexical items or nonsense words. He or she then sees the translation of 'queen', for example in Dutch 'reina'. The test measures if 'reina' is recognized faster when preceded by 'queen' or not. De Groot found that priming occurred when concrete lexical items (e.g. 'queen' and Dutch 'reina') and cognates (e.g. 'father' and 'vader') were used in the study but not so much when abstract lexical items (e.g. 'idea' and 'idee') and non-cognates (e.g. 'uncle' and 'oom') were used. She concluded that concrete lexical items share some conceptual representations in the L1 and the L2 whereas abstract lexical items do not.

In conclusion, abstract concepts are more difficult to access in the L2 than concrete concepts. The individual experience of the speaker is part of the environment in which the target language is acquired and in which communication takes place. As Baker (2001) argues, the increased exposure to contact with the target culture through media provides the L2 learner with additional input. This input is necessary to access or transfer abstract concepts in the L2 successfully. In application to the study of this dissertation, it can be argued that the L2 environment has an impact on the speech process that requires using referential strategies.

Krashen (1981, 1982, 1989) emphasizes the significance of context for the L2 learner and argues that acquisition is the result of comprehensible language input. The L2 learner develops from one stage to another; at each stage he or she receives input that is slightly beyond his or her L2 competence. The input is provided by the teacher whose responsibility it is to ensure that it is comprehensible. Input is made comprehensible with the help of the context.

The term context has many layers. Kramsch (1993) suggests to distinguish between context of culture, context of reference and context of utterance. Krashen's Input-hypothesis regards all these types of context as a significant factor to learn a L2. The Input-hypothesis has been criticised for placing too much emphasis on the notion of comprehensibility. First, input is not the only cause of language acquisition (Edmondson & House, 1993); second, the idea of the learner moving from one stage to another is too strict (Edmondson & House, 1993). Furthermore, input is not intake. VanPatten (1996) points out that the learner does not necessarily perceive and process all input he or she receives. In a study on tense processing in Spanish, VanPatten (1996) found that learners

pay more attention to lexical rather than grammatical features. Although learners were given numerous examples of words and their correct tense forms, the output of the learner did not reflect that the meaning and the morphological features of a word were processed at the same time. For example the use of the words 'el sábado pasado' ('this last Saturday') shows that the meaning of 'pasado' ('last') is processed but its use with 'el' ('this') indicates the past tense form twice which is not necessary in Spanish. VanPatten (1996) develops the principle that learners process input for meaning before they process it for form. Only what is processed can be called intake, therefore input and intake are not the same. The study of this dissertation investigates two different L2 environments with thirty participants learning German (L2) in Canada and thirty participants acquiring German (L2) in Germany. When the two groups are compared, the difference between input and intake has to be kept in mind. It is important to note that intake varies from learner to learner.

More research on the L2 environment and its effects on the L2 learner comes from Byram (1989, 1997), Byram and Buttjes (1991) and Müller (1992).

In his earlier research, Byram (1989) proposed that although children acquire culture-specific concepts (concrete and abstract) when learning their L1, the experience of learning a L2 can modify these concepts. Later, this was called 'tertiary socialization' (Byram & Buttjes, 1991; Byram, 1997) and a theory proposed that while a speaker is introduced to a new concept in the target language and culture, his or her new experience is embodied in that language. This is part of the language and culture teaching process. In his work, Byram (1991) attributes four sectors to the circle of mediating languages and cultures: language learning (skill-oriented), language awareness (sociolinguistic

knowledge oriented), cultural awareness (knowledge oriented: comparative focus), cultural experience (knowledge oriented: foreign culture focus). The four sectors are interwoven, are constantly exchanging information, and are all contributing to the process of 'tertiary socialization'. In view of my study, it can be argued that a speaker with a high amount of contact with the target culture is likely to understand and access concepts of the L2.

The research by Müller (1992) focuses on communication between speakers of different cultures. He points out that associations made with a lexical item such as 'beautiful' can be very different depending on the cultural background of the speaker. Therefore different classes of speech acts are realized differently in languages. In addition, they also depend on the particular situation in which the communication takes place.

The term speech act refers to the fact, that, through speaking, a person is indeed acting. For example, when someone utters the following words 'I promise to give you the money by tomorrow', that person is actually not just uttering words, but is indeed accomplishing the act of 'promising'. Within speech acts the speaker can realize his or her intentions (illocution) through different classes of speech acts (Searle, 1969): representativa (to state, to report), directiva (to order), commissiva (to promise), expressiva (to confirm, to congratulate), declarativa (rituals). Müller (1992) also points out that in carrying out a speech act the speaker relies on references to abstract items (freedom), concrete items (chair), institutions (school), events (wedding), actions (run) and emotions (beautiful).

The distinction between abstract and concrete items is important in relation to the language environment. While abstract concepts are more difficult to acquire in the target language, the amount of contact with the target language and culture plays an increasing role in accessing abstract concepts in the L2 directly or transfer these concepts from the L1 to the L2 successfully (see Sections 1.2.2 and 1.2.3).

In order to investigate the impact of the amount of contact a speaker has with the target language and culture on the speech process when expressing conceptualizations in the L2 using referential strategies, two participant groups were formed. Each group acquired the L2 in a different language environment. One participant group acquired the L2 in second language environment and the other participant group in a foreign language environment.

2.5 Second and foreign language acquisition

The amount of contact a L2 learner has with the target language and culture differs in a situation where the target language is acquired as a second or as a foreign language. In regard to 'German as a second or foreign language', a number of people wrote on the subject (Glück, 1991, 1994; Dittmar, 1995; Rösler, 1995; Edmondson, 1999).

Second language acquisition (SLA) is a term used to describe learning or acquiring any language other than the first language. This can be a L2, a L3, a L4, etc. It is also used in distinction to foreign language acquisition (FLA). The most important criteria to distinguish between SLA and FLA is the context or environment in which the L2 is acquired. If the language that is learned has a major social role in that context, if it

is part of the surrounding culture itself, then it is regarded as a second language. In other cases, it is a foreign language (Ellis, 1994; Edmondson, 1999). However, as both, Ellis and Edmondson, point out, real life is more complex. In case of English as 'lingua franca' in India one could easily argue for either term (English as SLA or FLA). Other criteria sometimes found in the literature, such as 'acceptance' and 'institutionalization', are not necessarily helpful. The way in which English is accepted in the daily life of Indians or taught through various public institutions might depend on the current government and is subject to political change (Edmondson, 1999).

Other terms that are often found are 'spontaneous language acquisition' and 'guided language learning.' Spontaneous acquisition takes place when the language learner receives no formal instruction, e.g. he or she is picking up German by interacting with Germans. Guided learning, however, takes place in a controlled classroom environment and often focuses on the teaching of the structure of the L2 (Klein, 1986; Apeltauer, 1997). These terms should not be used as synonyms for SLA or FLA as Dittmar (1995), Rösler (1995) and Edmondson (1999) point out. A Turkish immigrant to Germany might receive formal instruction of German in class while at the same time acquiring the language through his daily routines (Rösler, 1995; Edmondson, 1999).

The case of 'German as a Second Language' and 'German as a Foreign Language' in former West Germany is described by Glück (1991, 1994). He attributes a different clientele, curricula and a different goal to each of these two terms. 'German as a Second Language' developed as a result of mostly working class immigrants coming to Germany from Turkey, Italy or Greece in the 1960s who had to be taught German for the practical purposes of daily life. These immigrants received hardly any formal instruction and

acquired only very basic comprehension and production skills in German. 'German as a Foreign Language' targeted young adults and adults often from the middle classes at institutions, such as the university, in countries other than Germany. The instruction of German was based on the methods of applied linguistics and geared towards an understanding of German on an academic level. Today, a distinction as outlined by Glück is difficult to make (Rösler, 1995). Rösler argues that the type of environment as well as the type of language learning can no longer be clearly defined. The increasing mobility in Europe creates mixed types of residence across languages and cultures.

Information downloaded from the internet states that 50,000 to 60,000 immigrants come to Germany every year now (<http://www.tagesschau.de>, July 5th, 2001). These immigrants come from different social classes and different countries providing a wide spectrum of learners acquiring German in Germany and demanding a wide spectrum of instruction of German in Germany.

Following Rösler's (1995) examples it seems that a distinction between acquiring or learning German in Germany and a country other than Germany might be difficult to make. A computer programmer hired from the United Kingdom to work in Germany might not be interested in getting to know German language and culture. He stays with other English-speaking people and goes out to an Irish pub. A very interested student of German in Canada might try to contact German native speakers in Vancouver or use the internet to get in touch with German speaking people in Germany, or other German speaking communities.

It is thus necessary to avoid the terms 'SLA' and 'FLA'. The study presented here distinguished between learners of German in Germany compared to learners of German

in Canada, which makes the terms SLA and FLA difficult to use. The participants are chosen depending on the amount of contact the individual learner has to German language and culture (see Sections 3.2.1 and 3.2.2). They are all referred to as 'Speakers of German as a Second Language.'

In view of the study of this thesis it becomes clear how significant the individual background of a speaker is (Where is the speaker from? What languages does he or she speak? To what communities does he or she belong?) and the environment in which he or she operates. (Where is the speaker now? With whom does he or she speak in what language and in what situation?)

This study researches referential communication strategies. Participants have to conceptualize abstract shapes in the L1 and the L2. The question is how speakers process these conceptualizations in their mind. It is argued that these processes depend on the amount of contact a speaker has with the target language and culture (in addition to formal instruction). For that purpose L2 learners of German at the University of British Columbia in Canada are compared to L2 learners of German in Germany.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This study is based on a modified version of the methodology and taxonomy used in task II of the Nijmegen project.

First, an overview of the methodology and taxonomy of task II of the Nijmegen project is given (Section 3.2). Next, the methodology and taxonomy used in this study is described outlining the characteristics of the two different participant groups (Section 3.3), the task they had to solve (Section 3.4), the procedure of the data collection (Section 3.5), and the analysis with its quantitative and qualitative measures (Section 3.6). Changes that were made to the methodology and taxonomy of task II of the Nijmegen project are highlighted in the respective sections.

3.2 The Nijmegen project

In task II of the Nijmegen project, 45 Dutch (L1) learners of English (L2) described twelve abstract shapes developed by Kraus and Weinheimer (1964) to test referential communication strategies.

The participants were divided into three subgroups according to their level of proficiency based on the number of years they had learned English, scores in a recently conducted cloze-test¹, and a language assesment of students by their respective English teachers. The three groups of proficiency were: advanced (second year university

¹ A cloze-test contains exercises similar to 'fill in the blanks' and reveals information about proficiency levels. For details see Section 3.4.

students of English ranging in age from 19 to 25 years with at least seven years of learning English²); intermediate (grade 11 students ranging in age from 16 to 18 years with four or five years of English), beginner (grade 9 students ranging in age from 14 to 15 years with two years of English).

Participants had to describe the same twelve shapes three times back to back: twice in Dutch and once in English. The first description was performed to solve conceptual problems. Participants had to analyze the shapes in their mind and convert their thoughts into speech. This description was not recorded. Only the second Dutch and the English description were recorded on audio and video-tape. The three descriptions were carried out separately and shortly after each other. The shapes were arranged in a different order for each of the descriptions and participants were told that another person had to identify the order of the shapes later by using their, the students', descriptions. For the English descriptions participants were told that this person only understood English to avoid the use of linguistic sources of the L1.

The taxonomy used to analyze the strategies distinguished between holistic, partitive and linear strategies. The holistic and partitive strategies were further divided into analogical and geometrical categories (see Section 3.6.3).

Apart from analyzing the strategies used, task II of the Nijmegen project measured the time and the number of words participants used to fulfill the task using ANOVA (Analysis of Variance). ANOVA is a statistical test that compares the means of two or more groups taking into account the deviation within each group.

² English is a required language in high school in the Netherlands.

Each participant met with the investigator in a room set up for the task. The investigator read the instructions to the participant, asked if there were questions and then began recording everything the participant said to describe the twelve shapes.

The Nijmegen project, in particular task II of that project, served as a platform for the study of this dissertation. The following sections describe the study in detail.

3.3 Participants

This study has two participant groups. One group of thirty English (L1) learners of German (L2) was tested at the University of British Columbia (UBC) in Vancouver, Canada (Group C); one group of thirty English (L1) learners of German (L2) was tested in the cities of Kiel and Hamburg in Germany (Group G). The participants at UBC spoke Canadian English. The participants in the cities of Kiel and Hamburg spoke either Canadian, US American or British English. With both subject groups the same methodology was used.

Participants of Group C and Group G were divided into three subgroups each according to their level of proficiency. For both groups the level of proficiency was determined by the number of hours of formal instruction in German participants had received and their performance on the cloze-test (see Appendix B). In Group G an additional criterion to determine the level of proficiency was the time participants had lived in Germany.

Participants in both groups were chosen based on the amount of contact they had with German language and culture. A questionnaire determined where and with whom they spoke German (see Appendix A). It was sent by e-mail when participants were

initially contacted. This study distinguishes between learners of German in Canada and learners of German in Germany (see Section 2.5). The contact the participants of Group C have with German language and culture is mostly limited to the classroom whereas participants of Group G live in a German environment and have a lot of exposure to and interaction with the German language and culture.

3.3.1 Group C

In Group C participants were 18 to 24 years old and enrolled in different language courses offered by the Department of Germanic Studies at UBC. The three subgroups of proficiency were divided as follows. Subgroup CA consisted of participants who completed two years of intensive German courses (approximately 208 hours of formal instruction). A first- and second-year German course at UBC consists of four hours of formal instruction per week for approximately 13 weeks per term. Participants took one course per term. Subgroup CB consisted of participants who completed three years (approximately 364 to 442 hours of formal instruction). A third and fourth year German course at UBC consists of three hours of formal instruction per week for 13 weeks per term. Participants took two or three courses per term. Subgroup CC consisted of participants who completed four years of German courses (approximately 520 hours or more of formal instruction). Each subgroup consisted of ten participants. Each participant had to fill out a questionnaire (Appendix A), one part of the questionnaire determined how many hours of formal instruction each participant had received.

In addition, the questionnaire asked how much contact each participant had with German outside the classroom to ensure that there would be a significant difference

between Group C and Group G (see Section 2.5). Students who had German in high school or who had German grandparents or parents or who had extensive contact with the German community in Vancouver (for example, through the Goethe Institut) were not allowed to participate in the study. Students who grew up as English-German bilinguals were also excluded from the study. Finally, students who spoke another foreign language besides German were not eligible to participate because this study is not designed to determine if concepts are transferred from English to German directly or via another foreign language. The nature of that other foreign language could determine if a transfer is successful or not.

Each participant was initially contacted via e-mail by the investigator. The questionnaire was sent by e-mail. The investigator evaluated the questionnaire and chose participants according to their level of contact with German language and culture.

After participants were chosen, they were divided into three subgroups according to their level of proficiency. The first criteria was the number of years learned German and the second the score in a cloze-test (Appendix B). In the particular cloze-test used for this study, the highest score is twenty (see Section 3.5). Participants in the three subgroups attained the following scores: Subgroup CA 14 and below; subgroup CB between 14 and 17; and subgroup CC 17 and higher.

The abbreviation used for each participant consists of three parts. The first letter is 'C' standing for Canada referring to studying German in Canada. The second letter is 'A', 'B' or 'C' standing for subgroup 'A', 'B' or 'C' referring to the number of hours of formal instruction participants received. Participants of subgroup 'A' had the least number of hours of formal instruction and participants of subgroup 'C' the most. The third character

is a number, going from '1' to '5' and referring to the level of proficiency within the subgroup determined by the scores of the cloze-test. For example C-A1-E had a lower score in the cloze-test than C-A5-E. The fourth letter 'E' or 'G' refers to the language, English or German, with which participants had started the task (see Section 3.4).

3.3.2 Group G

In Group G the level of proficiency of participants was determined by the hours of instruction they had received formal instruction in German in connection with the time they had lived in Germany. The age of participants ranged from 22 to 34 years.

Participants in each of the subgroups in Group G had not more than one year of formal instruction in their home country (approximately 104 hours) before they came to live in Germany.³ Most of the participants worked for e-business companies and were sent to one or two German courses before moving to Germany. However, the majority of their learning of German took place in Germany. Participants of Subgroup GA had lived in Germany for about one year; participants in Subgroup GB for about two years; and participants in Subgroup GC for about three or four years.

The number of hours of formal instruction received while living in Germany varied. Participants in Group G took German courses in Germany at the Goethe Institut, the 'Volkshochschule' (continuing education), university or private schools. German

³ Participants of Group G lived in a German-speaking language environment. The main criterion for their selection was the number of years spent in Germany. This distinguished participants of Group G from participants of Group C. Living in Germany provides L2 learners with a different target language environment than learning the L2 in their home country. For participants of Group G the amount of formal instruction received in their home country as a criteria in the selection process was restricted to one year or less. Ideally, participants of Group G would not have received any formal instruction of German in their home country. Unfortunately, it was not possible to find such participants.

courses offered at all of these institutions usually run for ten weeks per course with four hours of instruction per week.

The number of hours of formal instruction overall (in Germany and the respective home countries of the participants) was lower for all subgroups in Group G compared to all subgroups in Group C. For example, participant G-A1-E who had no formal instruction in the United Kingdom and who took two courses in Germany had a total of approximately 80 hours of formal instruction compared to participant C-A1-E who completed two years of German courses at UBC (approximately 208 hours). The difference between both groups is the additional contact participants in Group G have with German language and culture. G-A1-E had one year of contact with German language and culture outside the classroom.

Each subgroup consisted of ten participants. In order to determine the hours of formal instruction the participants received, they had to fill out a questionnaire (Appendix A). In that questionnaire they were also asked how much contact they had with German language and culture to ensure that there would be a noticeable difference between Group C and G. Potential participants who stayed exclusively in their circle of friends of native English speakers could not participate and neither could those who grew up as English-German bilinguals and those who spoke another foreign language besides German (see Section 3.3.1).

Each participant was initially contacted by the investigator. The investigator sent an e-mail to the potential participants that included the questionnaire. The questionnaire was then evaluated by the investigator who chose participants according to their level of contact with the German language and culture. Then participants were divided into three

subgroups according to their level of proficiency. The first criterion was the number of hours of formal instruction in combination with the number of years lived in Germany. The second criterion was the score in the cloze-test (Appendix B). The same close-test was used for group C and G (see Section 3.5). Participants in subgroup GA had a score of 14 or below; in subgroup GB between 14 and 17; and in subgroup GC of 17 or higher.

The abbreviation system is similar to the one used for the participants in Group C.

3.4 Task

The thirty participants in each group had to perform the same task. They had to describe the same abstract shapes the Nijmegen project used and which were developed by Kraus and Weinheimer (1964) to test referential communication strategies. However, participants were only asked to describe six shapes compared to the twelve shapes in the Nijmegen project (Appendix C). As Poulisse (1990) mentioned in her final report on the Nijmegen project, describing twelve shapes bears the potential of repetition effects. After participants described four to six shapes, they kept using the same strategy or strategies. The shapes are abstract in nature and difficult to describe in both a L1 and a L2, hence they allow for a comparison of the referential communication strategies used by the participants.

The shapes were described by participants twice: once in English (L1) and once in German (L2) with a minimum of a two-week interval between the two descriptions. The task was counter-balanced. Half of the participants started with the description in L1 and the other half started with L2. These three alterations were made to minimize the possibility of an L1 to L2 translation.

Literal translation is regarded as a transfer strategy in several taxonomies of the interactional as well as the psycholinguistic approaches. The taxonomy of the Nijmegen project describes literal translation as a strategy involving the use of linguistic knowledge of the L1. However, task II of the project was designed to explore participants' conceptualizations in using holistic, partitive and linear strategies. This classification is subject to interference arising from translation effects. Describing the same shape for a second time in the same language can facilitate a translation effect, that is, participants might remember the conceptualization of a shape so well that they simply translate it or try to translate it into the L2. Little effort might be made to actually think about the shape and how it can be explained to someone who has to identify it later. Possible conceptualizations in the L2 remain untouched, making it difficult to apply the outlined taxonomy.

As in the Nijmegen project, the shapes were arranged in a different order for each of the two descriptions and participants were told that another person had to identify the order of the shapes later by using their, the participants', description.⁴ For the German descriptions, participants were told that this person only spoke German to avoid that they would integrate linguistic sources of the L1.

At the end of the task, after participants had completed the second description of the shapes, participants were engaged in a short interview about translation effects (Appendix E). Interviews are a helpful tool and are quite commonly used in studies to determine methodological problems (Cohen, 1998). Furthermore, the interview can aid in determining to what degree participants tried to solve conceptual problems in their L1

⁴ This part was carried out by the investigator of the study and a second marker. See Section 3.6.3

and L2 separately or whether they initially tried to transfer a communication strategy from their L1 to their L2.

For all participants, the interview took place after the second recording. Otherwise, participants who were not informed about the nature of their second task, might have suspected that the second task was very similar to the first and might have tried to memorize as much as possible. As mentioned, half of the participants in both groups started the task with English, the other with German. The interview had three parts (see Appendix E). In part one, participants were asked what language they thought in when doing the exercise in German and if they transferred concepts from English to German. In part two, participants were asked if they perceived transferring concepts as helpful and if they were taught how to use transfers when they learned German. In part three, participants were asked about repetition effects when solving the task the second time. They had to indicate whether the shapes were similar or identical in the two exercises, what they remembered from solving the task the first time and if they thought about that when performing the task the second time.

3.5 Data collection

All data was collected between March and August 2001. The recordings took place at UBC in Vancouver in March, April, May and June 2001 and in the cities of Kiel and Hamburg in April and August 2001. Each participant had a two week interval between the two languages.

Prospective participants filled out the questionnaire on background information (Appendix A). The investigator evaluated it and chose the participants for the study.

Next, the investigator scheduled a meeting which took place in the Resource Center in the Department of Germanic Studies at the University of British Columbia in Vancouver for participants in Group C. For participants in Group G the meeting took place in a separate room of the library of the Department of English at the University of Kiel or the University of Hamburg.

For each meeting, only the investigator and one participant were present in the room and they sat facing each other at a table. The participant was sitting in front of a microphone that was connected to an audio tape recorder. The design of these meetings followed the one used in the Nijmegen project with the exception that a video camera was not used. The investigator read the instructions to the participant (Appendix D) and the recording started when the participant was ready and stopped when the last of the six shapes had been described. Each shape was on a separate page stapled together with a blank cover page. The participant could not see a shape before turning over the page (see Section 3.6.2). Each participant had as much time to describe each shape as he or she felt necessary to have. After the first recording, a meeting for the second recording was scheduled. The minimum interval between both meetings was two weeks in order to reduce the possibility of memorization and subsequent translation. The participant was told that another task had to be performed in the second meeting.

For the second recording, the investigator and the participant met in the same room as before. After the recording, the investigator engaged the participant in a short interview (Appendix E) which was not recorded. Instead, the investigator made notes on the interview questionnaire. After the interview was completed, the investigator handed out the cloze-test which was the last task to be performed by the participant.

The design of the cloze-test followed examples given by Hughes (1989). It consisted of four different text passages of approximately fifty words each. In each passage, five specific words had been deleted from the text leaving five blank spots. Participants had to fill in the missing blanks by understanding the context of each text passage. A total of twenty lexical items was tested. Two versions of the cloze-test were pre-tested with 45 native speakers of German who attended a German 'Gymnasium' in the 9th grade (14/15 years old). They functioned as a control group. That particular age group was chosen for two reasons: first, students are able to perform formal operations; second, their language is not yet at a highly abstract level. Otherwise filling in the deleted words would pose no problems for native speakers of that age and therefore not be a reliable indicator of the test format. The native speakers of German produced a score of 0.89 on average on the first version of the cloze-test and 0.86 on the second version. The most reliable test is the one in which the control group obtains the highest score. Such a result indicates a test format that minimizes errors in understanding and completing the task at hand. Therefore, the first version was chosen for this study (Appendix B).

3.6 Analysis

A quantitative and qualitative analysis was carried out to test the three hypotheses proposing differences between the Canadian group (Group C) and the German group (Group G) in describing abstract shapes.

3.6.1. Transcription

For the purpose of this study, and in order to analyze the data efficiently, the two recordings made with each participant, one for each language, were transcribed.⁵ The format of any transcription depends on the research question. This study looks at referential communication strategies based on conceptualizations made by a speaker. These strategies are encoded in words. An exact word count, based on the transcription protocols, is used to determine if speakers were able to access lexical items that expressed the conceptualizations in question.

For the purpose of analyzing referential communication strategies all lexical and quasi-lexical items uttered by a speaker had to be transcribed following the example given by the Nijmegen project. The word count of the analysis (see Section 3.6.2) only measured lexical items, excluding code-switches. Although the design of the study discouraged code-switching, in case of such an event the code-switch was still transcribed because it revealed information about the ability to use a particular strategy. Quasi-lexical fillers, such as 'eh', 'ah', 'uhm', do not reveal information about the nature of conceptualizations, either, but might have indicated a change of strategy or difficulties to perform the task. They were transcribed using the same symbol ('h' for 'hesitation') to make the transcripts more reader-friendly.

In addition, it was important to manifest pauses, laughter and speed of speaking in the transcripts because they might indicate a change of strategy and/or difficulties with the task at hand.

⁵ For Transcription Conventions see Appendix F.

The process of transcription led to twelve protocols per participant, one for each language for each of the six shapes to be described.

3.6.2 Quantitative analysis

The quantitative analysis measuring times and words used descriptive and inferential statistical methods to determine differences in the English and German descriptions of each subgroup and to compare the German descriptions of Group C with Group G. Each subgroup consisted of ten participants which is too small of a number in referential statistics to get reliable results. Therefore, the focus of the analysis was on descriptive methods. The statistical test used in referential statistics is the Paired Samples Test that compares two populations.

The time each participant used to describe each shape in each language was measured by listening to the recordings and using a stop-watch. The time count included all pauses. Introductory remarks such as 'Shape One' were included if the participant had turned the page to the particular shape (see Section 3.5) because it was considered as starting the thought process. On the other hand, if a participant said 'Shape One' before turning the page to the actual shape, the investigator marked these cases for his own reference but did not include these introductory remarks in the time measure. They were put in brackets in the transcription protocols (see Appendix F). The same criteria were applied to concluding remarks at the end of the description such as 'That's it'.

The word count was based on the transcription protocols and only words that carry meaning were counted. There were two criteria. First, the word did not have to be an entry in the dictionary. Words created such as 'Königshut' ('King's hat') for 'crown' (for

example used by participant C-A1-E) did count. Second, the stem and the inflection had to be identifiable. Errors in morphology or pronunciation were not considered if the word could still be recognized. For example 'aussehe, aussieht' ('look like, looks like'; participant C-A1-E) counted for two words whereas 's= scoop' (participant C-A1-E) counted for one because 's' alone cannot be identified. A word like 'nen' (participant G-A3-E) did count because it is used in colloquial German as a synonym for 'einen' ('a/an'). Repetitions and phrases that did not describe the shape as such were also counted. Examples for repetition are 'ein ein' (participant C-B5-E) and 'a a' (participant C-A1-E) counted as two words each. Examples for phrases are 'Was seh ich da?' ('What do I see here?'; participant G-A1-G), 'Ich habe keine Ahnung' ('I have no idea') or 'I really have no idea' (both uttered by participant G-A3-E), 'this one is tough' (participant G-A4-E), 'Ich weiss nicht, wie man das auf Deutsch sagt' ('I don't know how to say this in German'; participant C-C3-G) and 'I'm not sure how to even describe the shape' (participant G-B4-E). These phrases are part of the thought process when the participant is trying to solve the referential problem and to come up with a strategy to describe the shape. This kind of speech is also referred to as 'private speech' and is an indication for solving problems that require conceptual thinking.⁶ The transcription code used in the protocol (pauses, [h], code-switching, see Appendix F) was not included in the word count. Fillers such as

⁶ The phenomenon was first described by Piaget (1972/1923) who called it 'egocentric speech' and attributed it to children who talk to themselves. Piaget did not attribute a specific function to this kind of speech. Vygotsky (1986/1934) questioned Piaget's view arguing that this kind of speech functions as a vehicle of thinking which children use to solve problems. As children grow up, so Vygotsky, this speech "goes underground as verbal thought, or inner speech." (Lantolf & Appel, 1994: 14). 'Inner speech' is found in adults. The externalized form of 'inner speech' is 'private speech', a term that is more widely accepted today than 'egocentric speech' (Lantolf & Appel, 1994). Adults use 'private speech' in L1 as well as in L2. In a 1985 study, Frawley and Lantolf (1985) applied Vygotsky's view of 'inner speech' or 'private speech' to second language acquisition and found that adult L2 learners use 'private speech' in communicative tasks in order to gain control over solving the task. These findings were confirmed by McCafferty (1992, 1994). In these two studies, McCafferty also showed a decrease in the production of 'private speech' with an increase in the proficiency of L2 adult learners when solving communicative tasks.

'ehm' or 'eh' or 'mm' (transcription code symbol [h]) were included in the time measure; however, they were excluded from the word count. In using a code-switch, a participant avoids using a referential communication strategy in the L2. The words were counted by computer using Microsoft Word Office. In order to run that program the transcription protocols were edited until only words that carry meaning were left which were then counted.

The investigator measured the time and calculated the number of words each participant used to describe each shape in each language. The design of the task presupposed a validity in the description of the shapes, that is, no particular shape was described by participants of the six subgroups all using the same amount of time or the same number of words. In other words, the shapes had discrimination power. In order to report the validity, the maximum and minimum times each subgroup used to describe each shape in each language were calculated. Some shapes were more complex than others in that they were made of different shapes. They were not necessarily more difficult to describe because their structure gave participants a number of opportunities to start the description. The purpose in determining 'validity' is to verify that the task was solved differently depending on the level of proficiency.

The analysis consists of three parts, the word analysis, the time analysis and the analysis of the word to time ratio. In each part, descriptive and inferential statistical methods are applied. They are used to compare the English with the German descriptions of each subgroup and to compare the German descriptions of Group C with Group G. The first part calculated the words each participant used to describe all six shapes in each language. This calculation was used to determine the mean, the Standard Deviation and

the t-value (paired samples t-test) of each subgroup in the English and the German descriptions. A low number of words used indicates that participants were either very accurate in describing the shapes or not able to solve the referential problems. A high number of words indicates that participants needed many words to describe the shapes accurately or they decided to elaborate on the already accurate descriptions. It has to be noted that the quantitative analysis is used as an addition to the qualitative analysis which will also provide information on this issue.

The second part employs the same procedures that are used for the word count to the time measure. If participants use much time in their descriptions it indicates that they had to pause to think of an accurate descriptions. If they do not use much time, they either quickly gave up on solving the referential problems or were efficient describing the shapes.

The third part of the analysis therefore calculates the word to time ratio to determine efficiency. As in the other two parts, the English and German descriptions of each subgroup are compared as well as the German descriptions of Group C with Group G.

3.6.3 Qualitative analysis

The qualitative analysis identified strategies and strategy changes. Strategies used by the participants to describe the shapes were identified by the investigator and second marker using the task II taxonomy of the Nijmegen project.

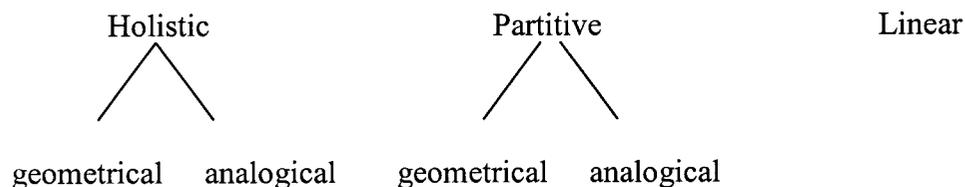
The investigator and the second marker used a scoring procedure to determine what strategy was used by each individual speaker describing each shape. In addition,

they determined if shapes were described accurately (see Section 3.4). The investigator and the second marker assumed that a particular shape triggered the use of different strategies among participants to determine the referential problems that the participants encountered. In this aspect, the shapes had to be valid in the sense of having discrimination power. The validity is reported in Section 5.2.

The analysis consists of three parts. One, the strategies used in English and German by participants of the same subgroup are compared. Two, the three levels of proficiency in each group are compared. Three, Group C and G are compared with regard to their German descriptions.

All in all, the scoring procedure led to 720 protocols (thirty speakers in each group describing six shapes each) in each language. These protocols were the basis for the analysis to determine if the hypothesis outlined in Section 1.2.3 was sustained or rejected.

The taxonomy of task II of the Nijmegen project distinguished between five strategies, namely:



In this study, the analysis was based on these five strategies.

The following is one of the shapes that had to be described by the participants:

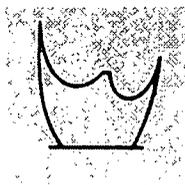


Figure 3.1: One of the six abstract shapes (Shape Three) used in the study of this dissertation

Participants described it in a variety of ways: 'eine schematische Repräsentation der Krone' ('a schematic representation of the crown'; participant C-B2-G) fits the holistic analogical strategy; 'ein verlängertes Kreis ohne die beiden Enden' ('an extended circle without the two ends'; participant G-C4-E) the holistic geometrical strategy; 'in der Mitte sieht es wie Pfosten aus' ('in the middle it looks like a post/posts'; participant G-B5-E) the partitive analogical strategy; 'Beide Seite hat gekrümt Linie und Punkte' ('both sides have bend lines and points'; participant C-A4-G) the partitive geometrical strategy; 'zwischen diesen Spitzen geht eine Linie' ('between those points is a line'; participant G-B1-E) the linear strategy. There was total of six shapes that had to be described (see Appendix C).

Each description was dissected into the strategies used based on the transcription protocols. Examples for each shape are given in Section 5.3.

The investigator and the second marker also determined cases of strategy change, that is, when a participant used more than one strategy to describe one shape. A strategy change is seen as a method used by a participant to either adjust a message until a shape is accurately described or to elaborate on an already accurate description. It was determined if a strategy change occurred only in English, only in German or in both

languages. If it occurred in both languages, it was further distinguished if the same strategy change was made by the participant when describing the same shape in English and German, e.g. if he or she changed the strategy from holistic analogical to partitive analogical in both languages, or not, e.g. if he or she changed the strategy from holistic analogical to partitive analogical in one language and from holistic analogical to holistic geometrical in the other language. In addition, a distinction was made between single (one strategy change), double (two strategy changes) and multiple (three or more strategy changes) changes.

Finally, the interviews are summarized (see Appendix E). The interviews were five to ten minutes long and the answers supplied by the participants were not necessarily accurate or informative. One reason was that the interviews were carried out at the end of the second description of the shapes. At this point, participants showed signs of fatigue. The second reason was the time gap between the two descriptions. In the interviews, participants had to rely on their memory. It was expected that particular participants who started the exercise in German would have difficulties answering the questions about transfers from English to German. However, answers varied across participants regardless whether they had started the exercise in English or in German. Answers were double-checked against the actual descriptions done by the participants to see how accurate they were. For example, participant C-C3-G answered that he or she did not think about English while doing the exercise in German but used code-switches in the descriptions. It has to be noted that there were also insightful comments made by some of the participants that were taken into account. Question number five of the interview, asking when participants transfer knowledge of English to German, was similar to

questions number four and three. Question number four asked if participants find transferring concepts from English to German helpful and question number three asked if participants were taught in class to use transfers. Question number five functioned as a control question to see if the answers given by participants were consistent.

CHAPTER FOUR

QUANTITATIVE ANALYSIS

4.1 Introduction

In this chapter, I will present the quantitative analysis of the study. Two sets of quantitative data were collected. One set measured the number of words used to describe the shapes, the other set measured the amount of time used.

The analysis is based on the assumption that the task of describing all six shapes fulfilled the requirement of validity, that is, it is valid in its discrimination power among the participants. The ten participants of each subgroup (low, intermediate, high proficiency) used different numbers of words and varying amount of times to describe the shapes. For example, if participants of all subgroups described Shape One with the most words compared to descriptions of the other five shapes, the analysis would not reveal a difference between the three levels of proficiency and the two groups. The term validity in this part of the analysis means that each shape posed a referential problem to participants in the English as well as the German descriptions depending on their level of proficiency. The validity of the descriptions of the shapes is reported in Section 4.2.

The analysis of the data that measures the number of words and the amount of time used to describe the six shapes in English and German by all participants is divided into three sections. In Section 4.3, the number of words used by participants are analyzed; in Section 4.4, the amount of time; and in Section 4.5, the word to time ratio. In each analysis, descriptive and inferential statistical methods are applied reporting the mean, the standard deviation and the t-value (paired samples t-test) of each subgroup in the

English and the German descriptions. The paired samples t-test was used to determine if differences between the two populations compared are significant.

4.2 Task validity and discrimination power

Each shape had to be described by each participant in each language. The validity of the task refers to the fact that each shape posed a referential problem to the speaker in English as well as in German. Participants were divided into three levels of language proficiency resulting in three subgroups of Group C and three subgroups of Group G. In each subgroup participants encountered difficulties when attempting to solve the referential problems to trigger the use of communication strategies. These difficulties are reflected in the number of words and the amount of time used to describe each shape in English or German. These numbers were expected to differ between the subgroups because of the participants' different language proficiency. The validity of the task assumes that these differences existed when participants described each shape.

The analysis shows that completion times and number of words used differed greatly among participants, shapes and the two languages (see Tables 4.1 to 4.8). Some participants used as little as one, two, three or four words and three, four or five seconds to describe a shape and some used as many as 205, 220 and 235 words and more than four minutes. These low and high scores are found in all six subgroups for both, the English and German descriptions.

The first part of the analysis of task validity and discrimination power looks at the word count. Tables 4.1 to 4.4 display the minimum number of words used by a

participant in a subgroup of Group C or Group G to describe a shape in English or German, the maximum number of words used, and the range.

Table 4.1 shows that each shape is described differently in English by the three subgroups of Group C. For example, the lowest number of words used by a participant in subgroup CA is five words in the description of Shape Two. Five words are also used by a participant in subgroup CB, however, in the description of Shape Six. In subgroup CC, it is Shape Four that is described with the lowest number of words, i.e., four words. Participants used those few words to describe the shapes because they either solved the referential problems quickly or they were not able to solve it. In either case they were either unwilling or unable to elaborate on the description. The fact that there was a large variance within and between the subgroups in the number of words used to describe the shapes shows the validity and the discriminative power of the task.

Table 4.1: Number of words used to describe each shape by participants of Group C in English.

	Words CA			Words CB			Words CC		
	Min	Max	Ran	Min	Max	Ran	Min	Max	Ran
Shape One	8	97	89	19	97	78	4	104	100
Shape Two	5	100	95	11	98	87	19	123	104
Shape Three	14	235	221	14	84	70	13	149	136
Shape Four	11	204	193	16	95	79	25	205	180
Shape Five	8	183	175	17	80	63	18	168	150
Shape Six	10	144	134	5	79	74	26	233	207

Legend: The abbreviations CA, CB, CC refer to the three subgroups of Group C: participants with a low level of proficiency (CA), an intermediate level of proficiency (CB), and a high level of proficiency (CC). Each subgroup had ten participants. The abbreviation Min refers to the minimum number of words used, the abbreviation Max to the maximum number and the abbreviation Ran to the range of the data.

The same results are found in the English descriptions of Group G as shown in Table 4.2. In subgroup GA, Shape Four is described with the least number of words, in

subgroup GB Shape Five, and in subgroup GC Shape One. If the same shape had been described by all three subgroups with the lowest number of words used, the referential problems that shape created would be the same for all levels of proficiency.

Table 4.2: Number of words used to describe each shape by participants of Group G in English.

	Words GA			Words GB			Words GC		
	Min	Max	Ran	Min	Max	Ran	Min	Max	Ran
Shape One	8	38	30	12	74	62	17	84	67
Shape Two	4	45	41	14	49	35	25	100	75
Shape Three	4	72	68	12	96	84	33	101	68
Shape Four	1	124	123	15	115	100	25	199	174
Shape Five	2	43	41	6	81	75	27	95	68
Shape Six	5	86	81	7	75	68	35	208	173

Legend: The abbreviations GA, GB, GC refer to the three subgroups of Group G: participants with a low level of proficiency (GA), an intermediate level of proficiency (GB), and a high level of proficiency (GC). Each subgroup had ten participants. The abbreviation Min refers to the minimum number of words used, the abbreviation Max to the maximum number and the abbreviation Ran to the range of the data.

Describing the shapes in German, the number of words used by participants of Group C also differs from shape to shape (see Table 4.3). In subgroup CA, the lowest number of words used is zero in the description of Shape Six, indicating that this participant was not able to solve the referential problems. In subgroup CB, the lowest number of words used is also in the description of Shape Six, using five words to describe that shape. The shape might have also posed problems for this participant but he or she was able to describe it with a few words. Another possibility is that he or she solved the referential problems but decided not to elaborate on the description. In subgroup CC, the lowest number of words used is also five, but it is in the description of Shape One. Shape Six is described using sixteen words. Shape Six as well as the other

shapes are described differently by participants at each level of proficiency. The validity of the task is demonstrated.

Table 4.3: Number of words used to describe each shape by participants of Group C in German.

	Words CA			Words CB			Words CC		
	Min	Max	Ran	Min	Max	Ran	Min	Max	Ran
Shape One	6	103	97	11	105	94	5	117	112
Shape Two	14	58	44	12	106	94	7	85	78
Shape Three	14	117	103	16	103	87	10	105	95
Shape Four	9	160	151	13	135	122	14	147	133
Shape Five	10	77	67	15	88	73	13	121	108
Shape Six	0	132	132	5	90	85	16	177	161

Legend: The abbreviations CA, CB, CC refer to the three subgroups of Group C: participants with a low level of proficiency (CA), an intermediate level of proficiency (CB), and a high level of proficiency (CC). Each subgroup had ten participants. The abbreviation Min refers to the minimum number of words used, the abbreviation Max to the maximum number and the abbreviation Ran to the range of the data.

The results of the German descriptions of Group G also confirmed the validity of the task as illustrated in Table 4.4.

Table 4.4: Number of words used to describe each shape by participants of Group G in German.

	Words GA			Words GB			Words GC		
	Min	Max	Ran	Min	Max	Ran	Min	Max	Ran
Shape One	2	38	36	13	70	57	16	145	129
Shape Two	4	30	26	19	51	32	19	96	77
Shape Three	3	37	34	20	50	30	12	196	184
Shape Four	6	55	49	10	61	51	23	205	182
Shape Five	4	53	49	18	67	49	22	115	93
Shape Six	2	38	36	8	60	52	18	220	202

Legend: The abbreviations GA, GB, GC refer to the three subgroups of Group G: participants with a low level of proficiency (GA), an intermediate level of proficiency (GB), and a high level of proficiency (GC). Each subgroup had ten participants. The abbreviation Min refers to the minimum number of words used, the abbreviation Max to the maximum number and the abbreviation Ran to the range of the data.

In subgroup GA, the lowest number of words used is for Shape One and Shape Six. In both cases, it is two words. In subgroup GB the lowest number of words used is for Shape Six (eight words) and in subgroup GC it is for Shape Three (twelve words). Participants either did not elaborate on the descriptions because they did not know the words necessary to describe the shapes solving the referential problems or they chose not to do it. In either case, at each level of proficiency a different shape required the least words in the descriptions.

The second part of the analysis of task validity applied the same method that was used for the word count to the time count. Results are shown in Tables 4.5 to 4.8, which display the lowest amount of time used by a participant in a subgroup of Group C or Group G to describe a shape in English or German, the highest amount of time used, and the calculated difference between the lowest and the highest amount of time used.

Table 4.5 shows that there are differences in the amount of time used by participants of the three subgroups of Group C when describing the shapes in English.

Table 4.5: Amount of time in seconds used to describe each shape by participants of Group C in English.

	Times CA			Times CB			Times CC		
	Min	Max	Ran	Min	Max	Ran	Min	Max	Ran
Shape One	10	61	51	14	139	125	4	116	112
Shape Two	16	65	49	10	54	44	14	134	120
Shape Three	12	118	106	10	93	83	11	96	85
Shape Four	12	155	143	14	79	65	19	244	225
Shape Five	14	118	104	12	73	61	12	174	162
Shape Six	9	87	78	5	94	89	4	262	258

Legend: The abbreviations CA, CB, CC refer to the three subgroups of Group C: participants with a low level of proficiency (CA), an intermediate level of proficiency (CB), and a high level of proficiency (CC). Each subgroup had ten participants. The abbreviation Min refers to the minimum amount of time used, the abbreviation Max to the maximum amount of time and the abbreviation Ran to the range of the data.

For example, in subgroup CA the highest amount of time used is two minutes and thirty-five seconds to describe Shape Four, in subgroup CB it is two minutes and nineteen seconds to describe Shape One, and in subgroup CC it is four minutes and twenty-two seconds to describe Shape Six. In each subgroup, a different shape needed the most time to be described indicating that participants had either difficulties solving the task or elaborated on their descriptions. In either case, the shape posed referential problems that needed time to be solved. The task was valid because at each level of proficiency a different shape posed these problems. There is a large variance between and within subgroups for the time used to describe the shapes.

These kinds of results are found in the English descriptions of Group G as well (see Table 4.6).

Table 4.6: Amount of time in seconds used to describe each shape by participants of Group G in English.

	Times GA			Times GB			Times GC		
	Min	Max	Ran	Min	Max	Ran	Min	Max	Ran
Shape One	6	30	24	11	92	81	11	56	45
Shape Two	4	31	27	10	45	35	14	61	47
Shape Three	5	42	37	14	41	27	15	56	41
Shape Four	10	76	66	14	46	32	14	101	87
Shape Five	3	34	31	8	63	55	19	70	51
Shape Six	3	38	35	7	58	51	21	113	92

Legend: The abbreviations GA, GB, GC refer to the three subgroups of Group G: participants with a low level of proficiency (GA), an intermediate level of proficiency (GB), and a high level of proficiency (GC). Each subgroup had ten participants. The abbreviation Min refers to the minimum amount of time used, the abbreviation Max to the maximum amount of time and the abbreviation Ran to the range of the data.

In subgroup GA, the highest amount of time used is in the description of Shape Four, in subgroup GB it is in Shape One, and in subgroup GC in Shape Six. It took participants considerable time to describe these shapes indicating that they posed

problems to the speakers in either finding an accurate description or elaborating on it. For the present purpose, it was important that different shapes posed these problems.

The German descriptions of Group C and Group G produced similar results in terms of validity compared to the English descriptions. Tables 4.7 and 4.8 show that the amount of time used to describe the shapes in German differs from shape to shape among participants of the three subgroups.

In subgroup CA (see Table 4.7), the highest amount of time used is two minutes and ten seconds to describe Shape Four, in subgroup CB it is two minutes and sixteen seconds to describe Shape Four also, and in subgroup CC it is four minutes and twenty-eight seconds to describe Shape Six. In subgroup CA, the second highest amount of time is in the description of Shape Six, in subgroup CB in the description of Shape Two and in subgroup CC of Shape Five. The validity of the shapes can be assumed because different shapes required a maximum amount of time to be described.

Table 4.7: Amount of time in seconds used to describe each shape by participants of Group C in German.

	Times CA			Times CB			Times CC		
	Min	Max	Ran	Min	Max	Ran	Min	Max	Ran
Shape One	5	82	77	11	94	83	6	89	83
Shape Two	9	106	97	14	111	97	6	104	98
Shape Three	11	105	94	20	106	86	14	84	70
Shape Four	18	130	112	14	136	122	16	82	66
Shape Five	12	82	70	21	105	84	14	168	154
Shape Six	0	118	118	9	103	94	14	268	254

Legend: The abbreviations CA, CB, CC refer to the three subgroups of Group C: participants with a low level of proficiency (CA), an intermediate level of proficiency (CB), and a high level of proficiency (CC). Each subgroup had ten participants. The abbreviation Min refers to the minimum amount of time used, the abbreviation Max to the maximum amount of time and the abbreviation Ran to the range of the data.

In subgroup GA (see Table 4.8), the highest amount of time used is in the description of Shape Five, in subgroup GB in the description of Shape One, and in subgroup GC in the description of Shape Six.

Table 4.8: Amount of time in seconds used to describe each shape by participants of Group G in German.

	Times GA			Times GB			Times GC		
	Min	Max	Ran	Min	Max	Ran	Min	Max	Ran
Shape One	4	46	42	10	51	41	14	114	100
Shape Two	4	22	18	13	38	25	12	61	49
Shape Three	4	58	54	18	41	23	12	121	109
Shape Four	10	49	39	9	30	21	20	136	116
Shape Five	3	72	69	12	42	30	14	74	60
Shape Six	2	51	49	9	41	32	16	159	143

Legend: The abbreviations GA, GB, GC refer to the three subgroups of Group G: participants with a low level of proficiency (GA), an intermediate level of proficiency (GB), and a high level of proficiency (GC). Each subgroup had ten participants. The abbreviation Min refers to the minimum amount of time used, the abbreviation Max to the maximum amount of time and the abbreviation Ran to the range of the data.

In summary, every shape posed a referential problem at each level of proficiency. Therefore, the validity of the task can be assumed. Results of this analysis show that the number of words used and the amount of time used in English or German by participants of the six subgroups varied depending on the shape which was described. In each subgroup, participants needed more or less words or time to describe each shape in English or German. Each shape fulfilled the purpose of creating referential problems.

4.3 Word analysis

The word analysis determined the number of words used by participants to describe the shapes in English and German. A low number of words indicates that participants were either not able to process many lexical items or they chose only a few

words to describe the shapes. A high number of words indicates that participants either had to process many lexical items to describe the shapes accurately or they chose to play with the language. The reasons can only be determined in connection with the qualitative analysis (see Chapter Five).

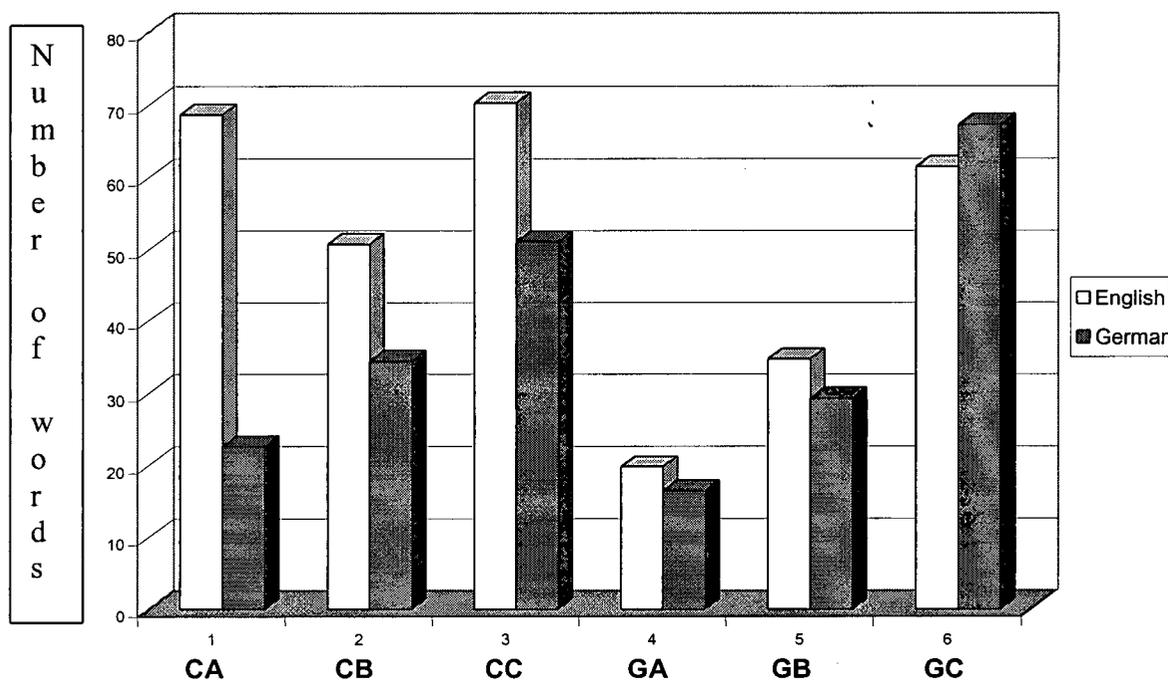
First, the means and standard deviations of the English and the German descriptions of each subgroup are presented as well as the means and standard deviations of the German descriptions of each subgroup of Group C and Group G. Second, the *t*-value of the paired samples *t*-test comparing the means of two populations is reported as well as the probability (*p*), the level of significance of the differences between the means of the two populations.

4.3.1 Comparing English to German in Group C

The first question of this analysis is to determine if participants in Group C used more or less words in the German descriptions than in the English descriptions. The hypothesis stated that participants of Group C will use fewer words to describe the abstract shapes in German than in English. Speakers of Group C do not have much contact with German language and culture and therefore will have difficulties processing L2 lexical items in referential communication.

Figure 4.1 presents the means of words used by each subgroup to describe the shapes in English as well as in German.

Figure 4.1: Means of words used by Group C and Group G in English and German



Legend: The abbreviations CA, CB, CC refer to the three subgroups of Group C; the abbreviations GA, GB, GC to the three subgroups of Group G.

All three subgroups of Group C used fewer words to describe the shapes in German than English. In subgroup CA, the difference (46.1 words) is higher than in subgroups CB (16.4 words) and CC (19.2 words).

In the English descriptions, the mean and standard deviation of Subgroups CA and CC are equally high (see Table 4.9). Some participants used only a few words to describe the shapes in English and some used many. In subgroup CB, this is different. The mean and the standard deviation are lower compared to the other two subgroups. The proficiency of participants in English (L1) was similar and it was expected that there would be a similar pattern in the number of words used to describe the shapes comparing the three subgroups. The proficiency in L1 of participants was not tested in the study. The assumption that it was similar was based on the educational background of participants

who all went to college or university. The fact that participants of subgroup CB used fewer words than the other subgroups to describe the shapes in English needs to be explained. Recent research on word recognition (Jared & Kroll, 2001) and word naming (Kroll, Michael, Tokowicz, & Dofour, 2002) has shown that L2 acquisition has an impact on the L1. Kroll, Micheal, Tokowicz, & Dofour conducted two experiments with English (L1) and French (L2). Three groups of speakers were tested that were beginners of learning French (group 1), fluent in French (group 2), and highly bilingual (group 3). In a word naming task in English (L1), participants of group 1 and group 2 were slower and less accurate naming words in their L1 compared to participants of group 3. The researchers explain this phenomenon by stating that the acquisition of new information to the lexicon when learning a L2 affects the processing of the L1 because it takes time and practice to integrate this new information into the lexical network of the L1 and the L2. It is something that is achieved by highly bilingual speakers. As Figure 4.1 shows, participants at the intermediate level used fewer words to describe the shapes in English. It might be that at this level of proficiency the impact of the L2 on the L1 is particularly noticeable.

In the German descriptions, the higher the proficiency level, the higher the means and standard deviations (see Table 4.9). In subgroup CA, all participants used only a few words to describe the shapes. The number of words used for the descriptions in English is significantly higher than the number of words used for the descriptions in Germany, $t(9) = 3.291$, $p < .05$. In subgroup CB, most participants did not use many words in the German descriptions, the difference between the means of the German and English descriptions is also significant, $t(9) = 2.826$, $p < .05$. In subgroup CC, some participants

used many words to describe the shapes in German and some did not. Although the mean is lower in German than in English, the difference is not significant, $t(9) = 1.327$, $p > .05$. In conclusion, the hypothesis stating that participants of Group C use fewer words in German than English is supported for the two subgroups of a lower level of proficiency but not for the subgroup of a high level of proficiency.

Table 4.9: Paired samples t-test of the number of words comparing English with German of each subgroup of Group C

	Mean En	SD En	Mean Ge	SD Ge	t-value	Sig. (p)
Subgroup CA	69.00	48.30	22.56	7.64	3.291	.009*
Subgroup CB	50.79	28.93	34.42	15.17	2.826	.020*
Subgroup CC	70.31	47.41	51.13	34.30	1.327	.217

*Differences between the two populations are significant, $p < .05$.

4.3.2 Comparing English to German in Group G

The second question of this analysis is to determine if participants in Group G used more or less words in the German descriptions than in the English descriptions. The hypothesis stated that participants of Group G will not use fewer words to describe the abstract shapes in German than in English. Speakers of Group G have much contact with German language and culture which allows them to process L2 lexical items in referential communication successfully.

In Group G, participants of Subgroups GA and GB used fewer words in German than English and participants of Subgroup GC used more (see Figure 4.1). The

differences are minimal. In Subgroup GA, the difference is 3.3 words, in Subgroup GB 5.4 words, and in Subgroup GC 5.8 words.

In the English descriptions, the higher the level of proficiency, the higher the means. In Subgroup GA, the standard deviation is almost as high as the mean indicating that the distribution is quite heterogeneous (see Table 4.10). At the low and intermediate level of proficiency of Group G, the L2 has an impact on the L1 as was the case for subgroup CB. In addition, in Group G participants were not used to the type of exercise they had to do in this study. The task required solving referential problems. In regard to communication strategies, Bialystok (1990) and Cohen (1998) mention that L2 classroom instruction is a context where L2 speakers learn how to solve problem oriented tasks. Whereas participants of Group C learned German in a formal classroom setting, participants of Group G acquired it by living in Germany for a number of years with little formal instruction. Another explanation is that in Germany speakers are not necessarily in a situation of additive bilingualism as speakers in Canada are (Baker, 2001).

In the German descriptions, the higher the proficiency, the more words were used (see Figure 4.1). The mean for Subgroups GA and GB are low (see Table 4.10). In Subgroup GC, the mean is higher than for Subgroups GA and GB. For the three subgroups, the mean number of words used to describe the shapes in English and in German is not statistically different for Subgroup GA, $t(9) = .957, p > .05$; for Subgroup GB, $t(9) = 1.532, p > .05$; and for Subgroup GC, $t(9) = -.781, p > .05$. The hypothesis stating that participants in Group G do not use more words in German than in English is supported.

Table 4.10: Paired samples t-test of the number of words comparing English with German of each subgroup of Group G

	Mean En	SD En	Mean Ge	SD Ge	t-value	Sig. (p)
Subgroup GA	19.83	18.99	16.52	9.64	.957	.364
Subgroup GB	34.68	18.97	29.34	8.61	1.532	.160
Subgroup GC	61.54	27.15	67.26	36.44	-.781	.455

4.3.3 Comparing German within Group C and within Group G

The third question of this analysis is to determine if participants within Group C and Group G used more or less words in the German descriptions depending on the level of proficiency. The hypothesis for both groups stated that speakers of a lower proficiency level will use fewer words in German than speakers of a higher level of proficiency. It is more likely that participants of a higher proficiency level process L2 lexical items more successfully than participants of lower level proficiency level.

In Group C, differences between the low and high level of proficiency are significant, $t(9) = -2.363$, $p = .042$ as the paired samples t-test comparing Subgroups CA and CC shows. However, differences between the low and the intermediate level of proficiency and the intermediate and high level of proficiency are not significant, $t(9) = -2.108$, $p = .064$ (Subgroups CA and CB), $t(9) = -1.441$, $p = .183$ (Subgroups CB and CC). The hypothesis is not supported comparing the intermediate level of proficiency with another level of proficiency. It is supported comparing the lowest and the highest level of proficiency. The word analysis showed that Subgroups CB and CC are not homogeneous (see Section 4.3.1). Some participants in these two subgroups processed

many L2 lexical items and some did not. Therefore, a significant difference between the intermediate and the two other levels of proficiency could not be established. The performance of participants at the intermediate level of proficiency seems to be particularly interesting and warrants further investigation (see Chapter Five).

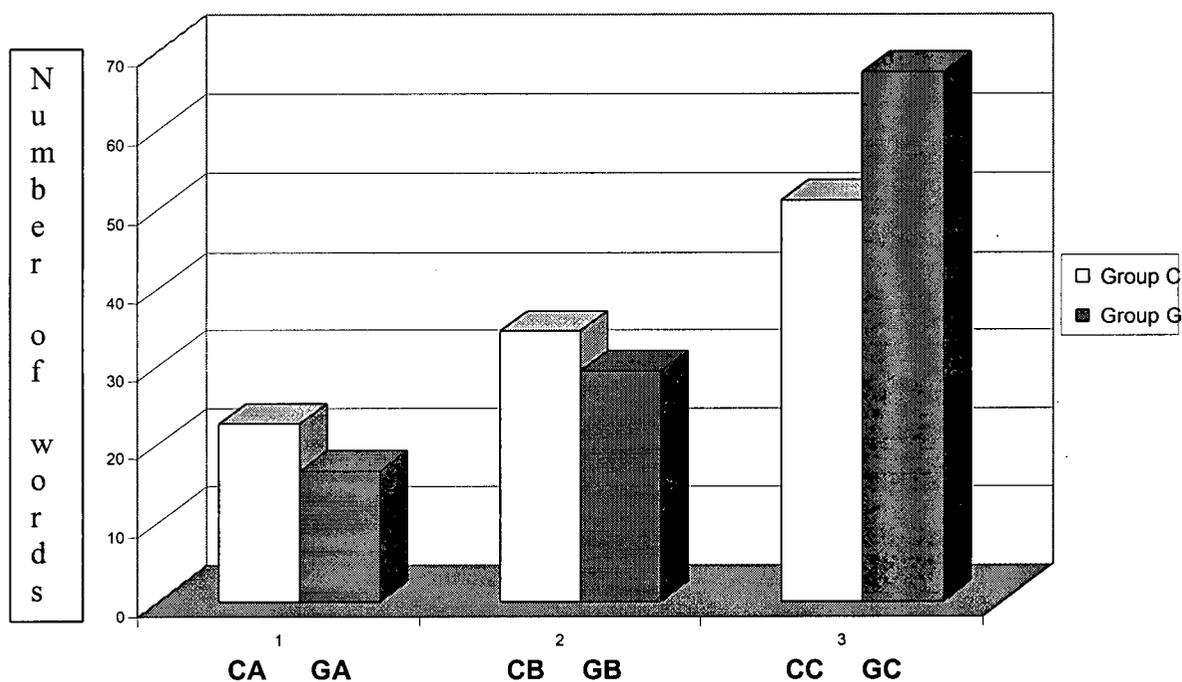
In Group G, the hypothesis is supported. Differences between all three levels of proficiency are significant, $t(9) = -2.694$, $p = .025$ (Subgroups GA and GB); $t(9) = -4.337$, $p = .002$ (Subgroups GA and GC); $t(9) = -3.887$, $p = .004$ (Subgroups GB and GC). Participants of Subgroup GC did not perform in a homogeneous way (see Section 4.3.2), however this did not effect differences to the other two subgroups in a significant way.

4.3.4 Comparing subgroups of Group C to subgroups of Group G in German

The fourth question of this analysis is to determine if participants of Group C used more or less words in the German descriptions than participants of Group G. The hypothesis stated that speakers of Group C would use fewer words in German than speakers of Group G because speakers of Group C have less contact with German language and culture and therefore more difficulties to process L2 lexical items.

Figure 4.2 displays a comparison of Group C with Group G in the number of words used in the German descriptions.

Figure 4.2: Means of words used by Group C and Group G in German



Legend: The abbreviations CA, CB, CC refer to the three subgroups of Group C; the abbreviations GA, GB, GC to the three subgroups of Group G.

Differences in the number of words used are minor at the low and intermediate level of proficiency. The mean number of words used in German is higher for Subgroups CA and CB than for Subgroups GA and GB (see Table 4.11). The standard deviation is low for Subgroups CA and GA. The standard deviation is low for Subgroup GB but not for Subgroup CB indicating more variation in Subgroup CB than in Subgroup GB. At the high level of proficiency, the mean is lower for Subgroup CC using fewer words in the German descriptions than Subgroup GC while the standard deviation is high for both subgroups. The mean number of words used and the variability in the number of words used to describe the shapes in German seems to increase with the level of proficiency.

Table 4.11: Paired samples t-test of the number of words comparing Group C with Group G in German

	Mean Subgroups C	SD Subgroups C	Mean Subgroups G	SD Subgroups G	t-value	Sig. (p)
Low level of proficiency	22.56	7.64	16.52	9.64	1.706	.122
Intermediate level of proficiency	34.42	15.17	29.34	8.61	.895	.394
High level of proficiency	51.13	34.30	67.26	36.44	-.941	.371

Differences between the subgroups are not significant at any level of proficiency, $t(9) = 1.706$, $p > .05$ (Subgroups CA/GA); $t(9) = .895$, $p > .05$ (Subgroups CB/GB); $t(9) = -.941$, $p > .05$ (Subgroups CC/GC). The hypothesis that stated that participants of Group C would use fewer words than participants of Group G is not supported.

The hypothesis was based on the assumption that participants of Group C would have difficulties processing L2 lexical items because they do not have much contact with the L2 and target culture that would enable them to understand L2 lexical items better. Their difficulties would result in producing only a few words. Another explanation for using only a few words in German is that participants would be very efficient. This will be determined in the word to time ratio analysis (see Section 4.5). However, it was assumed that only at higher levels of proficiency, participants would have the ability to be efficient.

The means of the number of words produced by the three subgroups in Group C show a gradual incline from a low to a high level of proficiency. In Group G, the incline is more radical. Participants of Subgroup GC produced more than twice as many L2 lexical items than participants of Subgroup GB and four times as many L2 lexical items

than participants of Subgroup GA. Participants of Subgroup GC processed the most lexical items of all six subgroups in German and participants of Subgroup GA the least.

These results indicate that at the low level of proficiency, participants of both groups had difficulties to access German lexical items necessary to describe the shapes. The lexicon is at the center of the process of speech production in the model developed for L1 by Levelt (1989, 1992). Based on this model, a theory of lexical access was developed (Levelt, Roelofs, & Meyer, 1999). In that theory, Levelt, Roelofs and Meyer explain the term lemma in more detail. In Levelt (1989, 1992) a lexical item has two levels of representation, the lemma and the form. The lemma contains the semantic and syntactic information of a lexical entry. In Levelt, Roelofs and Meyer (1999) the lemma is defined as a binding device that links semantic nodes, referred to as lexical concepts, to syntactic nodes. The lexical concept dictates the lemma in a one-to-one node relation which syntactic nodes to choose. If the syntactic nodes do not match the lemma, the speaker might try to access a different lexical item.

In application of this theory of L1 lexical access to L2, the question is how lexical concepts in the L2 are retrieved. Applying Levelt's model (1989, 1992) to L2 speech production, de Bot and his colleagues (de Bot, 1992; de Bot & Schreuder, 1993; de Bot, Cox, Ralston, Schaufeli & Weltens, 1995) argue that L1 and L2 lexical items share representations at the conceptual level. Levelt, Roelofs and Meyer (1999) do not elaborate on this issue. In view of this study, speaking few words in German indicates that access of L2 lexical items at the conceptual level was inhibited and consequently L2 lexical items were not processed further.

At the intermediate level of proficiency, participants of Subgroups CB and GB produced a similar number of words in German and were more successful in binding L2 lexical concepts to syntactic nodes compared to participants of the low level of proficiency. As mentioned, using a small number of words can be an indication that participants were efficient in describing the abstract shapes accurately. This is particularly interesting at higher levels of proficiency. The analysis of the word to time ratio (see Section 4.5) will provide more information on this issue.

At the high level of proficiency, there are no differences between Subgroup CC and Subgroup GC. Both subgroups used many L2 lexical items indicating that they were able to carry out the process of binding L2 lexical concepts to syntactic nodes. A high number of words indicate that participants used many words to describe the shapes accurately or they decided to elaborate on the already accurate descriptions. In the latter case, the participant was either not aware that the description was accurate or wanted to make sure that the imagined person to whom he or she described the shape would recognize the shape, or possibly demonstrate his or her ability to successfully use the language in question for the task at hand. Baker (2001) points out that in a classroom situation teachers often observe highly bilingual speakers attempting to show the teacher how well they know both languages. The qualitative analysis will determine how accurate the descriptions of these participants were (see Chapter Five).

4.4 Time analysis

The next step of the analysis measured the time used by participants to describe the shapes in English and German. If participants use much time in their descriptions it

indicates that they either had to pause to think of an accurate description or they used many lexical items to describe the shapes. If they do not use much time, they either quickly gave up on solving the referential problems or were efficient at describing the shapes.

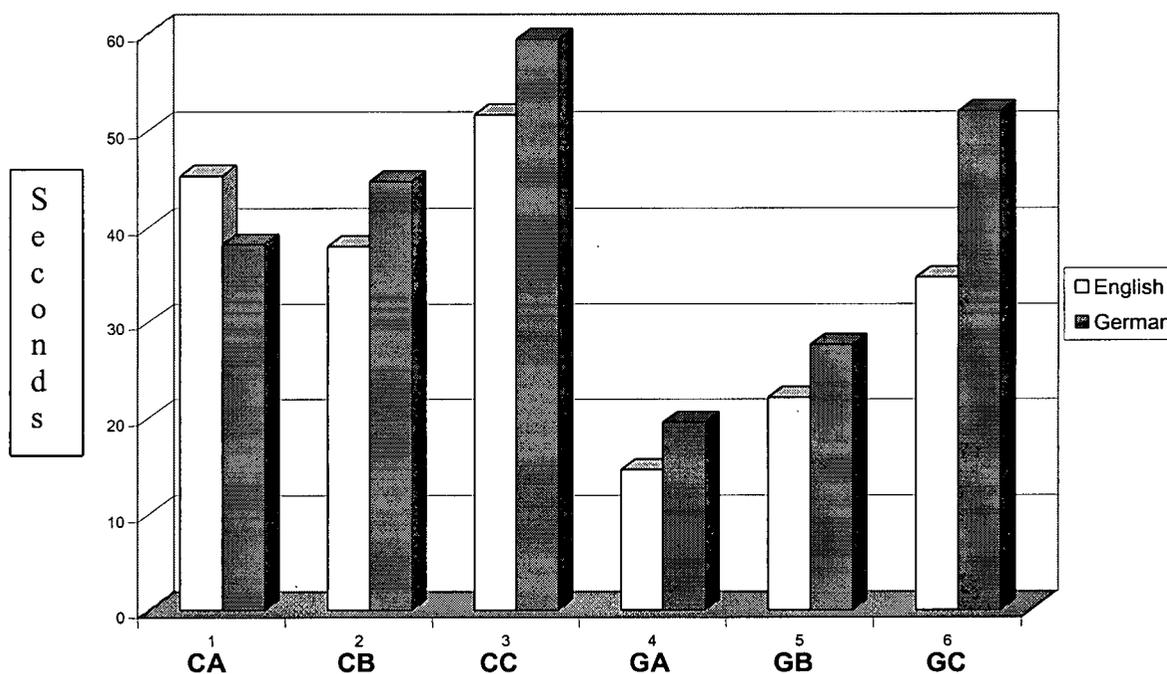
The same procedure that is used for the word analysis is applied to the time analysis.

4.4.1 Comparing English to German in Group C

The first question of this analysis is to determine if participants in Group C used more or less time in the German descriptions than in the English descriptions. The hypothesis stated that in Group C speakers would need more time to describe the abstract shapes in German than in English. Speakers of Group C do not have much contact with the L2 and target culture. Consequently, they may have difficulties processing L2 lexical items and articulating those items.

Figure 4.3 presents the mean times used by each subgroup to describe the shapes in English as well as in German.

Figure 4.3: Means of times used by Group C and Group G in English and German



Legend: The abbreviations CA, CB, CC refer to the three subgroups of Group C; the abbreviations GA, GB, GC to the three subgroups of Group G.

In Group C, Subgroups CA and CC used more time to describe the shapes in English than Subgroup CB. The standard deviation is high for all three subgroups (see Table 4.12), in particular for Subgroup CC, indicating a high variability in time especially for the highest proficiency group. This pattern echoes results of the word analysis that showed an impact of the L2 on the L1.

In German, the higher the proficiency the more time participants used to describe the shapes also reflecting the number of words used in German. Whereas the mean and standard deviations for Subgroups CA and CB are similar, the mean and standard deviation for Subgroup CC is much higher than for the other two subgroups (see Table 4.12). It indicates that at the highest level of proficiency, there is more variability among the participants in the time used.

In Group C, the hypothesis stated that participants would use more time in German than in English. Differences in the amount of time used to describe the shapes in English compared to German are not significant for any of the three subgroups, $t(9) = .725$, $p > .05$ for Subgroup CA; $t(9) = -.980$, $p > .05$ for Subgroup CB; $t(9) = -.882$, $p > .05$ for Subgroup CC. The hypothesis is not supported.

The hypothesis was based on the argument that transferring concepts from the L1 to the L2 or conceptualizing shapes in the L2 is difficult for speakers who do not have much contact with the L2 and target culture. Therefore, they need time to do so. However, using less time can also indicate that participants gave up on the task quickly or were very efficient describing the shapes. This will be determined in the qualitative analysis (see Chapter Five).

Table 4.12: Paired samples t-test of the amount of time comparing English with German of each subgroup of Group C

	Mean En	SD En	Mean Ge	SD Ge	t-value	Sig. (p)
Subgroup CA	45.29	30.25	38.21	20.19	.725	.487
Subgroup CB	38.00	28.70	44.66	15.87	-.980	.353
Subgroup CC	51.60	42.39	59.43	43.87	-.882	.401

4.4.2 Comparing English to German in Group G

The second question of this analysis is to determine if participants in Group G used more or less time in the German descriptions than in the English descriptions. The hypothesis stated that participants of Group G will not use more time to describe the

abstract shapes in German than in English. Speakers of Group G have much contact with German language and culture which allows them to process L2 lexical items in referential communication as successfully as in their L1.

In Group G, the higher the proficiency the more time was used in English as well as in German (see Figure 4.3) echoing results of the word analysis. In the English descriptions, the means are low for all three subgroups of Group G compared to Group C (see Tables 4.12 and 4.13). In German, the means are also low for Subgroups GA and GB but high for Subgroup GC. At each level of proficiency in Group G, the mean is higher in German than English.

The hypothesis stated that participants should not use more time in German than in English. The paired samples t-test shows that differences between English and German are in fact significant for two subgroups, $t(9) = -2.481$, $p < .05$ (Subgroup GB); $t(9) = -3.237$, $p < .05$ (Subgroup GC). For Subgroup GA, the differences were not significant, $t(9) = -2.253$, $p = .051$. The hypothesis is not supported. One explanation is that some participants of Subgroup GA gave up on the task. Another explanation is that despite the contact with German language and culture, the transfer of concepts from the L1 to the L2 or conceptualizing shapes in the L2 took time. The word to time analysis will determine whether processing lexical items also took more time (see Section 4.5).

Table 4.13: Paired samples t-test of the amount of time comparing English with German of each subgroup of Group G

	Mean En	SD En	Mean Ge	SD Ge	t-value	Sig. (p)
Subgroup GA	14.55	11.02	19.50	10.11	-2.253	.051
Subgroup GB	22.06	7.18	27.62	9.35	-2.481	.035*
Subgroup GC	34.81	13.03	51.97	24.63	-3.237	.010*

* The difference between the two populations is significant ($p < .05$)

4.4.3 Comparing German within Group C and within Group G

The third question of this analysis is to determine if participants within Group C and Group G used more or less time in the German descriptions depending on the level of proficiency. The hypothesis for both groups stated that speakers of a lower proficiency level would use more time in German than speakers of a higher level of proficiency. Participants of a higher proficiency level should process L2 lexical items as successfully as L1 lexical items whereas participants of lower level proficiency level might have difficulties in their L2.

In Group C, differences between the three levels of proficiency are not significant, $t(9) = -.764$, $p = .464$ (Subgroups CA and CB); $t(9) = -1.230$, $p = .250$ (Subgroups CA and CC), $t(9) = -.989$, $p = .348$ (Subgroups CB and CC). The hypothesis is not supported. Difficulties of participants at a lower level of proficiency to describe the shapes in the L2 might have caused them to give up on the task (see Section 4.4.1).

In Group G, the paired samples t-test showed no significant differences comparing Subgroups GA and GB, $t(9) = -1.635$, $p = .136$ but a significant difference comparing Subgroups GA and GC, $t(9) = -3.918$, $p = .004$ and Subgroups GB and GC,

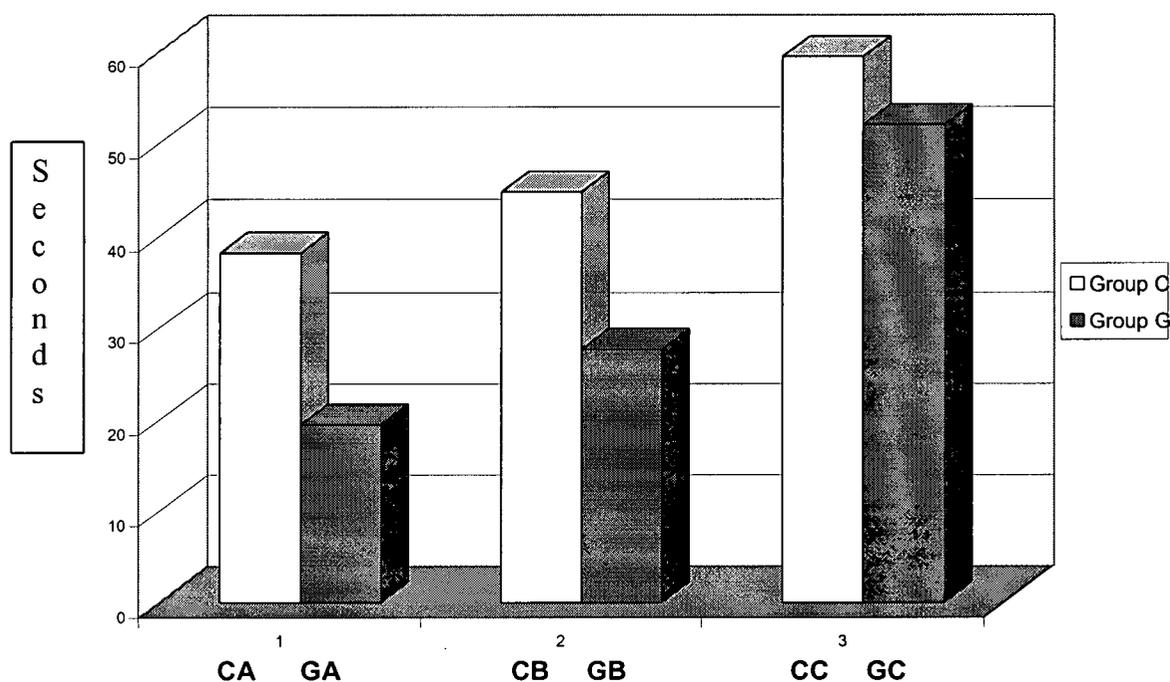
$t(9) = -2.732, p = .023$. The hypothesis is not supported comparing the two lowest levels of proficiency but it is supported comparing the lowest and the highest level of proficiency and the two highest levels of proficiency. Participants of Subgroup GA might have had difficulties describing the shapes in their L1 and their L2 (see Section 4.4.2). Therefore a significant difference to the other two subgroups could not be established. Results of Subgroup GA warrant further investigation (see Chapter Five).

4.4.4 Comparing subgroups of Group C to subgroups of Group G in German

The fourth question of this analysis is to determine if participants of Group C used more or less time in the German descriptions than participants of Group G. The hypothesis stated that speakers of Group C use more time in German than speakers of Group G because speakers of Group C have less contact with German language and culture and therefore more difficulties to process L2 lexical items.

Figure 4.4 displays a comparison of Group C with Group G in the amount of time used in the German descriptions.

Figure 4.4: Means of times used by Group C and Group G in German



Legend: The abbreviations CA, CB, CC refer to the three subgroups of Group C; the abbreviations GA, GB, GC to the three subgroups of Group G.

The higher the proficiency the more time participants of all six subgroups used to describe the six shapes in German. At all three levels of proficiency, the means are higher in Group C than in Group G (see Table 4.14). The standard deviations are also higher for all three subgroups of Group C than of Group G. At the low and intermediate level of proficiency, differences between the subgroups are nevertheless significant, $t(9) = 2.832$, $p < .05$ (Subgroups CA/GA); $t(9) = 2.998$, $p < .05$ (Subgroups CB/GB). At the highest level of proficiency, differences between the two subgroups are not significant, $t(9) = .421$, $p > .05$. The hypothesis, stating that participants of Group C need more time to describe the shapes in German than participants of Group G is supported at the two lowest levels of proficiency but not at the highest level of proficiency.

Table 4.14: Paired samples t-test of the amount of time comparing Group C with Group G in German

	Mean Subgroups C	SD Subgroups C	Mean Subgroups G	SD Subgroups G	t-value	Sig. (p)
Low level of proficiency	38.21	20.19	19.50	10.11	2.832	.020*
Intermediate level of proficiency	44.66	15.87	27.62	9.35	2.998	.015*
High level of proficiency	59.43	43.87	51.97	24.63	.421	.684

* The difference between the two populations is significant ($p < .05$)

Before these results are explained, it is helpful to go back to Levelt's (1989, 1992) model. The process of binding lexical concept nodes to syntactic nodes via lemmas takes time. Once this process has been completed, the lexical item still has to be grammatically encoded and articulated. In addition, speakers monitor their speech constantly through a comprehension system that checks for errors on the conceptual as well as the grammatical level (Levelt, 1989, 1992; Levelt, Roelofs & Meyer, 1999). Hartsuiker and Kolk (2001) argue that Levelt's model allows to explain two kinds of repairs once an error has been detected. The first occurs during the articulation of a lexical item, the second after a lexical item has been articulated. In both cases, errors result in hesitation pauses or utterances such as 'eh'. Both phenomena are found in the transcriptions¹ and they both take time (Hartsuiker & Kolk, 2001). In view of this study, they indicate if speakers have difficulties processing lexical concepts. The results of the time analysis show that speakers of Group C had more difficulties than speakers of Group G.

¹ See Appendix F for transcription conventions and Appendix H for transcription protocols.

4.5 Analysis of the word to time ratio

The third part of the analysis calculates the word to time ratio to determine efficiency, that is, how much time participants used to process a lexical item. A low efficiency indicates that participants had difficulties processing lexical items making many pauses in their descriptions. It does not indicate the accuracy of the descriptions which is determined in the qualitative analysis (see Chapter Five). A high word to time ratio indicates that participants processed lexical items fast, that is, participants had no difficulties accessing lexical concepts and binding them to syntactic nodes.

The word analysis showed that participants of Group C used fewer words in German than in English whereas participants of Group G did not. Therefore, the hypotheses about Group C and Group G were supported. The hypothesis that the lower the proficiency level, the fewer words are used in German by both groups was not supported for Group C but it was supported for Group G. In Group C, the variability within the subgroups was high so that in particular for the intermediate level of proficiency no significant differences to the other subgroups could be established. The hypothesis that participants of Group C use fewer words in German than participants of Group G was not supported. One explanation is that participants of both groups were efficient when processing lexical items.

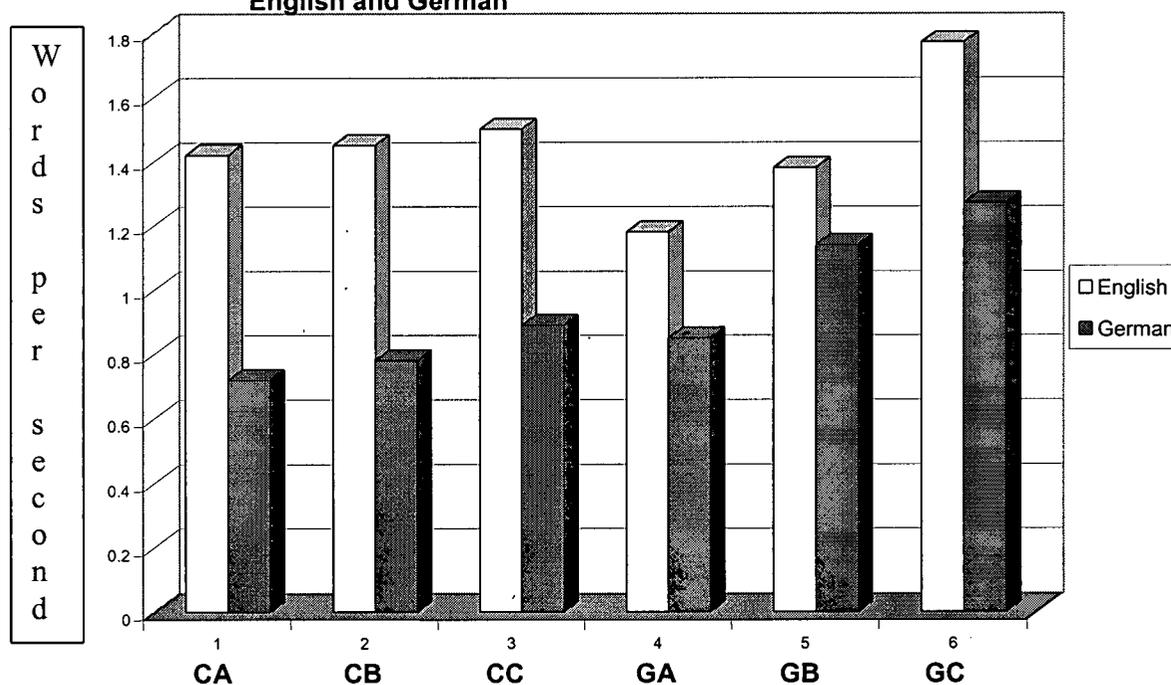
The time analysis did not support the two hypotheses stating that participants of Group C use more time to describe the shapes in German than English whereas participants of Group G do not. The hypothesis that speakers of Group C need more time to describe the shapes than speakers of Group G was supported at the two lowest but not at the highest level of proficiency. In Group C, the analysis did not support the hypothesis

that participants of a lower proficiency level need more time in German. In Group G, this hypothesis was supported for the two highest levels of proficiency but not for the two lowest levels of proficiency. One explanation for all of these results is that some participants at a lower level of proficiency in Group C as well as in Group G gave up on the task quickly. Another explanation is that participants of a higher proficiency used more words in German and therefore used more time. The word to time ratio will clarify this point by determining how much time participants used to process lexical items.

4.5.1 Comparing English to German in Group C

The first question of this analysis is to determine if participants in Group C were more or less efficient in the German descriptions than in the English descriptions.

Figure 4.5: Means of word to time ratio used by Group C and Group G in English and German



Legend: The abbreviations CA, CB, CC refer to the three subgroups of Group C; the abbreviations GA, GB, GC to the three subgroups of Group G.

Figure 4.5 presents the means of the word to time ratio used by each subgroup to describe the shapes in English as well as in German.

In relation to the word count, participants of all six subgroups were more efficient for processing lexical items in English than in German. In Group C, the means and standard deviations in English are similar for all three subgroups (see Table 4.15). The standard deviations are high indicating that there was variability in all subgroups. The L2 did not have an impact on the L1 in regards to processing lexical items. In German, the higher the proficiency, the higher the means and the lower the standard deviations. Comparing the English with the German descriptions, participants in Group C were less efficient in German than English at all three levels of proficiency. Differences in the word to time ratio are significant, $t(9) = 6.508$, $p < .05$ (Subgroup CA); $t(9) = 4.035$, $p < .05$ (Subgroup CB); $t(9) = 4.167$, $p < .05$ (Subgroup CC). The difficulties participants had processing L2 lexical items explains why they used fewer words in German than in English (see word analysis). They were less efficient in German than in English and therefore used a similar amount of time to describe the shapes in the two languages (see time analysis).

Table 4.15: Paired samples t-test of the word to time ratio comparing English with German of each subgroup

	Mean En	SD En	Mean Ge	SD Ge	t-value	Sig. (p)
Subgroup CA	1.52	0.49	0.72	0.33	6.508	.000*
Subgroup CB	1.45	0.50	0.78	0.21	4.035	.003*
Subgroup CC	1.50	0.48	0.89	0.17	4.167	.002*

* The difference between the two populations is significant ($p < .05$)

4.5.2 Comparing English to German in Group G

The second question of this analysis is to determine if participants in Group G were more or less efficient in the German descriptions than in the English descriptions.

In Group G, the higher the proficiency level, the more lexical items were processed in English and German. The number of words processed per second in English by Subgroups GA is low as seen in the mean and standard deviation (see Table 4.16). Participants had difficulties solving the task because the L2 had an impact on the L1, participants were not necessarily in an additive bilingual situation, and they were not familiar with solving problem oriented tasks in L1 or L2. Results of Subgroup GB are particularly interesting because the standard deviation is the highest of all three subgroups. It indicates the highest level of variability among the subgroups. Participants of Subgroup GC were efficient.

In German, the lower the level of proficiency, the more time was used to process lexical items. In Subgroup GB, the standard deviation is high whereas in Subgroups GA and GC it is low. Participants of Group G did not process lexical items in German as fast as in English, differences are significant for all three subgroups, $t(9) = 4.180, p < .05$ (Subgroup GA), $t(9) = 4.954, p < .05$ (Subgroup GB), $t(9) = 5.669, p < .05$ (Subgroup GC). Despite their contact with the L2 and target culture, they were not efficient enough to process a similar number of words (see word analysis) in a similar amount of time (see time analysis) in German compared to English.

Table 4.16: Paired samples t-test of the word to time ratio comparing English with German of each subgroup

	Mean En	SD En	Mean Ge	SD Ge	t-value	Sig. (p)
Subgroup GA	1.18	0.27	0.85	0.18	4.180	.002*
Subgroup GB	1.48	0.40	1.14	0.43	4.954	.001*
Subgroup GC	1.77	0.30	1.27	0.16	5.669	.000*

* The difference between the two populations is significant ($p < .05$)

4.5.3 Comparing German within Group C and within Group G

The third question of this analysis is to determine if participants within Group C and Group G were more or less efficient in the German descriptions depending on the level of proficiency.

In Group C, differences between the three levels of proficiency are not significant, $t(9) = -.635$, $p = .541$ (Subgroups CA and CB); $t(9) = -1.393$, $p = .197$ (Subgroups CA and CC), $t(9) = -1.819$, $p = .102$ (Subgroups CB and CC). Participants at a higher level of proficiency were not more efficient in German than the lower level proficiency groups. It indicates that participants at all three levels of proficiency might have had difficulties describing the shapes in German. This will be determined in the qualitative analysis (see Chapter Five).

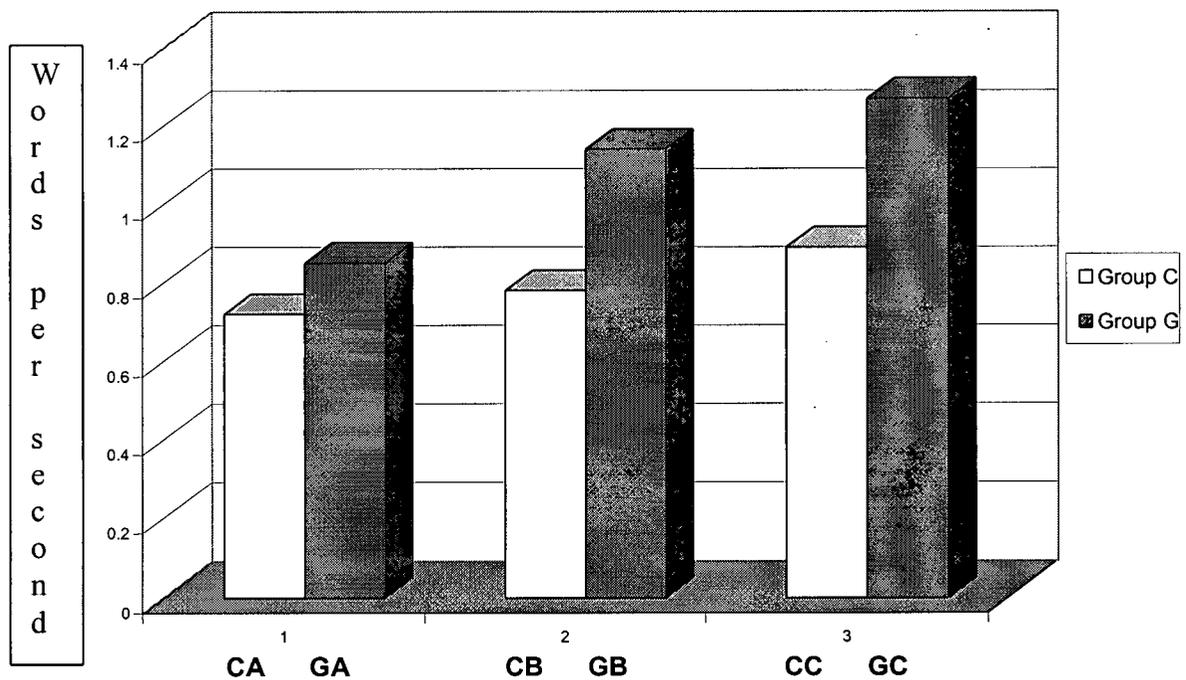
In Group G, the paired samples t-test showed significant differences comparing Subgroup GA with the other two subgroups, $t(9) = -2.523$, $p = .033$ (Subgroups GA and GB), $t(9) = -6.498$, $p = .000$ (Subgroups GA and GC) but not comparing Subgroups GB and GC, $t(9) = -.975$, $p = .355$. These results support the argument that participants of Subgroup GA had difficulties describing the shapes in German.

4.5.4 Comparing subgroups of Group C to subgroups of Group G in German

The fourth question of this analysis is to determine if participants of Group C were more or less efficient in the German descriptions than participants of Group G.

Figure 4.6 displays a comparison of Group C with Group G of the word to time ratio in the German descriptions.

Figure 4.6: Means of word to time ratio used by Group C and Group G in German



Legend: The abbreviations CA, CB, CC refer to the three subgroups of Group C; the abbreviations GA, GB, GC to the three subgroups of Group G.

Participants of Group G were more efficient in describing the shapes in German than participants of Group C at all levels of proficiency, that is, processing lexical concepts and/or binding them to syntactic nodes took them less time (see Table 4.17). At the intermediate and high level of proficiency, differences are significant, $t(9) = -2.648$, p

< .05 (Subgroups CB/GB), $t(9) = -7.421$, $p < .05$ (Subgroups CC/GC). At the low level of proficiency, differences are not significant, $t(9) = -1.186$, $p > .05$.

In the word analysis, the hypothesis that participants of Group C use fewer words than participants of Group G was not supported. The analysis showed that they used a similar number of words. One explanation was that participants of both groups were equally efficient. The results of the word to time ratio do not support that argument. Participants of Group G, in particular at the intermediate and high level of proficiency, were more efficient than participants of Group C. Results of the time analysis indicated that at a lower level of proficiency participants might have given up on the task. This view is supported. In Subgroup GA, participants might have had difficulties processing L2 lexical items. In Group C, participants of all three subgroups might have given up on some of the descriptions when lexical items in the L2 could not be processed at an efficient rate. Consequently, differences at the low level of proficiency are not significant.

Table 4.17: Paired samples t-test of the word to time ratio comparing Group C with Group G in German

	Mean Subgroups C	SD Subgroups C	Mean Subgroups G	SD Subgroups G	t-value	Sig. (p)
Low level of proficiency	0.72	0.33	0.85	0.18	-1.186	.266
Intermediate level of proficiency	0.78	0.21	1.14	0.42	-2.648	.027*
High level of proficiency	0.89	0.17	1.27	0.16	-7.421	.000*

* The difference between the two populations is significant ($p < .05$)

4.6 Summary of quantitative analysis

In summary of the word analysis and the time analysis, the following hypothesis were supported or not supported (see Table 4.18).

4.18: Recapitulation of the word and time analysis

Word analysis	If supported
Subgroup CA: German < English	Y
Subgroup CB: German < English	Y
Subgroup CC: German < English	Y
Subgroup GA: German = English	Y
Subgroup GB: German = English	Y
Subgroup GC: German = English	Y
German: Subgroup CA < Subgroup CB	
German: Subgroup CA < Subgroup CC	Y
German: Subgroup CB < Subgroup CC	
German: Subgroup GA < Subgroup GB	Y
German: Subgroup GA < Subgroup GC	Y
German: Subgroup GB < Subgroup GC	Y
German: Subgroup CA < Subgroup GA	
German: Subgroup CB < Subgroup GB	
German: Subgroup CC < Subgroup GC	
Time analysis	
Subgroup CA: German > English	
Subgroup CB: German > English	
Subgroup CC: German > English	
Subgroup GA: German = English	Y
Subgroup GB: German = English	
Subgroup GC: German = English	
German: Subgroup CA > Subgroup CB	
German: Subgroup CA > Subgroup CC	
German: Subgroup CB > Subgroup CC	
German: Subgroup GA > Subgroup GB	
German: Subgroup GA > Subgroup GC	Y
German: Subgroup GB > Subgroup GC	
German: Subgroup CA > Subgroup GA	Y
German: Subgroup CB > Subgroup GB	Y
German: Subgroup CC > Subgroup GC	

Legend: A 'Y' indicates that the hypothesis was supported.

In addition, the analysis of the word to time ratio produced the following results:

4.19: Recapitulation of the analysis of the word to time ratio

Efficiency		Significant
Subgroup CA:	German < English	Y
Subgroup CB:	German < English	Y
Subgroup CC:	German < English	Y
Subgroup GA:	German < English	Y
Subgroup GB:	German < English	Y
Subgroup GC:	German < English	Y
German:	Subgroup CA < Subgroup CB	
German:	Subgroup CA < Subgroup CC	
German:	Subgroup CB < Subgroup CC	
German:	Subgroup GA < Subgroup GB	Y
German:	Subgroup GA < Subgroup GC	Y
German:	Subgroup GB < Subgroup GC	
German:	Subgroup CA < Subgroup GA	
German:	Subgroup CB < Subgroup GB	Y
German:	Subgroup CC < Subgroup GC	Y

Legend: A 'Y' indicates that differences were significant ($p < .05$)

In conclusion, at the intermediate and high level of proficiency participants of Group G were able to use lexical concepts, bind them to syntactic nodes and articulate them in German more efficiently than participants of Group C. Their contact with the L2 and target culture allowed them to use L2 lexical items by either transferring concepts from the L1 to the L2 or by conceptualizing the shapes in their L2. The qualitative analysis will determine how accurate the descriptions of these participants were (see Chapter Five). At the low level of proficiency, participants of Group C and Group G had difficulties processing lexical items in their L2. Participants of Group C also might have had difficulties at the intermediate and high level of proficiency whereas participants of Group G did not.

CHAPTER FIVE

QUALITATIVE ANALYSIS

5.1 Introduction

This chapter investigates the relationship between conceptualizations in the L1 and the L2. Participants had four options when solving the task described in Chapter Three. First, the abstract shape to be described could not be conceptualized in the L1. Second, it was conceptualized in the L1 but the concept could not be transferred to the L2 because the L2 lexical items did not match the L1 concepts. Third, the L1 concept was successfully transferred and articulated in the L2. Fourth, the abstract shape was conceptualized in the L2.

720 protocols produced by sixty participants (360 in each language) are analyzed using a scoring procedure to determine the strategies used by participants to describe each shape in German and English.

The qualitative analysis assumes a validity among the shapes similar to the one of the quantitative analysis (see Section 4.2). Two criteria are applied to every shape in terms of its validity. First, each shape is described accurately by the majority of the participants, i.e. the investigator and a second marker could determine which shapes had been described, and second, each shape triggered the use of different strategies among participants, i.e. the shapes were not described by all six subgroups using the same strategy. Otherwise, the shape would not be abstract enough in its form to pose a referential problem to the speaker. Validity is reported in Section 5.2.

Section 5.3 provides examples of how the taxonomy was applied to the transcription of all speakers' utterances, that is, how the investigator and the second marker determined what strategies and strategy changes were made by participants.

There are three parts to the qualitative analysis. One, the manner in which participants of each subgroup of Group C and Group G handled the referential problems is analyzed. The number of shapes accurately described, the type of strategies used, and the rate of strategy changes are determined. A summary of participants' interviews complements the analysis. Two, one subgroup is compared against the other two subgroups within Group C and within Group G. Results for Group C are reported in Section 5.4 and for Group G in Section 5.5. Three, the German descriptions are analyzed comparing all three levels of proficiency of Group C with Group G in Section 5.6.

5.2 Task validity and discrimination power

All six shapes are described accurately by all six subgroups in English and German (see Tables 5.1 and 5.2).

Table 5.1: Number of shapes described accurately in English (max. 10)

	CA	CB	CC	GA	GB	GC
Shape One	9	10	10	9	10	10
Shape Two	8	9	8	8	9	10
Shape Three	9	10	10	9	10	10
Shape Four	7	9	10	6	9	9
Shape Five	9	10	9	9	10	10
Shape Six	9	9	10	9	10	10

Legend: The abbreviations CA, CB, CC refer to the three subgroups of Group C and GA, GB, GC to the three subgroups of Group G: participants with a low level of proficiency (CA, GA), an intermediate level of proficiency (CB, GB), and a high level of proficiency (CC, GC). Each subgroup had ten participants. For example, in Subgroup CA nine participants accurately described Shape One.

The number of shapes described accurately in English is high for all six shapes in all six subgroups. The lowest score in Group C and Group G is for Shape Four. Seven participants described Shape Four accurately in Subgroup CA and six in Subgroup GA. The same shape is accurately described by nine participants in Subgroups CB, GB, GC and ten participants in Subgroup CC. In both groups, all shapes are described accurately by nine or all ten participants of at least one subgroup.

The number of shapes described accurately in German is lower than in English. Table 5.2 shows that in Group C the lowest score is five, and that Shape Two and Shape Four are accurately described by five participants of Subgroup CA. Seven participants of Subgroup CB and eight participants of Subgroup CC described Shape Two precisely, and so did eight participants of both subgroups describing Shape Four. The other four shapes are described accurately by nine or all ten participants of at least one subgroup of Group C.

Table 5.2: Number of shapes described accurately in German (max. 10)

	CA	CB	CC	GA	GB	GC
Shape One	6	7	10	9	9	9
Shape Two	5	7	8	6	7	10
Shape Three	8	9	9	9	9	10
Shape Four	5	8	8	5	8	9
Shape Five	9	8	9	9	10	10
Shape Six	9	9	10	8	10	10

Legend: The abbreviations CA, CB, CC refer to the three subgroups of Group C and GA, GB, GC to the three subgroups of Group G: participants with a low level of proficiency (CA, GA), an intermediate level of proficiency (CB, GB), and a high level of proficiency (CC, GC). Each subgroup had ten participants. For example, in Subgroup CA six participants accurately described Shape One.

In Group G, the lowest score is also five. In Subgroup GA, five participants gave an exact description of Shape Four. Eight participants described this shape precisely in Subgroup GB and nine in Subgroup GC. The second lowest score is six (Shape Two). Each shape is accurately described by at least nine or ten participants of at least one subgroup of Group G.

The results indicate that Shapes Two and Four were more difficult to describe. However, eight or more participants of one of the subgroups of each group gave an exact description of Shape Two and Four. None of the six shapes was too difficult to be described by the majority of the participants. The validity of the task is established.

The second criteria demanded that every shape had to trigger the use of different strategies among participants. Tables 5.3 and 5.4 display the strategies used by the participants of each subgroup of Group C and G to describe each shape in English and German.

Table 5.3: Number of strategies used per shape in English (holistic/partitive/linear)

	CA	CB	CC	GA	GB	GC
Shape One	9/14/4	14/13/3	14/20/5	13/0/0	14/0/0	18/3/1
Shape Two	12/9/2	12/5/2	14/7/3	10/1/0	9/0/1	13/8/2
Shape Three	20/0/1	16/2/1	17/3/1	11/2/1	10/1/4	13/5/1
Shape Four	13/10/5	13/10/4	12/11/5	7/2/3	8/3/1	11/6/7
Shape Five	11/7/4	13/10/0	13/11/3	13/3/0	13/0/0	12/11/1
Shape Six	11/14/4	12/9/1	8/20/5	10/1/0	12/0/0	11/9/3

Legend: The abbreviations CA, CB, CC refer to the three subgroups of Group C and GA, GB, GC to the three subgroups of Group G: participants with a low level of proficiency (CA, GA), an intermediate level of proficiency (CB, GB), and a high level of proficiency (CC, GC). Each subgroup had ten participants. For example, in Subgroup CA participants used the holistic strategy (holistic analogical and holistic geometrical) nine times to describe Shape One, the partitive strategy (partitive analogical and partitive geometrical) fourteen times, and the linear strategy four times.

In Group C, participants of all three subgroups used all three strategy categories to describe Shape One, Shape Two, Shape Four and Shape Six in English. For the English descriptions of Shape Three and Shape Five they used two of the three categories. In Group G, participants of all three subgroups used all three categories to describe Shape Three and Shape Four in English and two of the three categories to describe Shape Two. In the English descriptions of Shape One, Shape Five, and Shape Six one or two of the three subgroups used the holistic strategies only. However, while Shape One is described by participants of Subgroup GA and Subgroup GB using holistic strategies only, participants of Subgroup GC used all three strategies. Shape Five and Shape Six are described by participants of Subgroup GB using only holistic strategies but participants of Subgroup GA also used partitive strategies and participants of Subgroup GC used all three categories.

Table 5.4 shows the strategies used by participants of the six subgroups in German.

Table 5.4: Number of strategies used per shape in German (holistic/partitive/linear)

	CA	CB	CC	GA	GB	GC
Shape One	10/4/1	10/7/2	10/19/2	13/0/0	14/0/0	16/6/0
Shape Two	8/3/0	11/3/0	14/9/0	10/0/0	10/3/0	12/5/3
Shape Three	10/1/0	11/0/1	15/7/1	9/0/0	10/1/1	11/4/2
Shape Four	9/2/1	12/10/0	13/9/0	6/3/1	10/4/1	13/11/4
Shape Five	9/5/2	12/5/1	15/8/0	9/2/0	14/3/1	14/13/4
Shape Six	9/4/0	8/6/1	7/20/2	8/1/1	10/1/0	11/11/3

Legend: The abbreviations CA, CB, CC refer to the three subgroups of Group C and GA, GB, GC to the three subgroups of Group G: participants with a low level of proficiency (CA, GA), an intermediate level of proficiency (CB, GB), and a high level of proficiency (CC, GC). Each subgroup had ten participants. For example, in Subgroup CA participants used the holistic strategy (holistic analogical and holistic geometrical) ten times to describe Shape One, the partitive strategy (partitive analogical and partitive geometrical) four times, and the linear strategy once.

In Group C, each of the six shapes is described in German by participants of all three subgroups using strategies of either two or all three categories. In Group G, Shape Four, Shape Five, and Shape Six are also described by participants of each subgroup using strategies of at least two categories. Shape One, Shape Two, and Shape Three are described by participants of Subgroup GA using the holistic strategies only. Participants of Subgroup GB also used holistic strategies only in the description of Shape One whereas participants of Subgroup GC used holistic and partitive strategies. In the German description of Shape Two and Shape Three, participants of Subgroup GB used at least two of the three categories and participants of Subgroup GC all strategies.

In summary, in the English as well as the German descriptions participants of Group C and Group G described each shape using different strategies. There might be some concern regarding Shape One because only four of the six subgroups used different strategies. However, the shapes described were indeed abstract and posed a referential problem to the speaker. In this aspect, the task was valid.

5.3 Strategies used

Each description by each participant was transcribed in order to determine what strategies and strategy changes were used applying the taxonomy specified in Chapter Three. There were six shapes in total that were described by each participant in English and German. Here are a few examples to illustrate how the transcription protocols are analyzed.

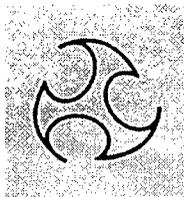


Figure 5.1: Shape One

Shape One resembled a circle or Ninja-throwing star according to many participants. For example, Participant G-B3-G used two strategies describing this shape in English:

{*Holistic geometrical*} 'First figure is a circular shape with a <1.5> {*Change of strategy: Holistic analogical*} looks like a Ninja throwing star [h] ... three holed out areas forming three sharp edges ... looks like a cutting saw but with smooth edges.'¹

Another participant (G-B5-G) described this shape similarly in German:

{*Holistic geometrical*} 'Erste ist wie ein Kreis mit drei [h] Kreisen rausgenommen, {*Change of strategy: Holistic analogical*} es sieht wie eine Waffe aus ... vielleicht es ist (sic!) aus Asien, das man so werfen könnte [h] <1> und mit Piksen und man könnte vielleicht ein Auge verlieren.'

(Translation: {*Holistic geometrical*} First is like a circle with three [h] circles taken out, {*Change of strategy: Holistic analogical*} it looks like a weapon ...

¹ For Transcription Conventions see Appendix F

maybe from Asia, that you could throw [h] <1> and with pikes and you could loose an eye.)

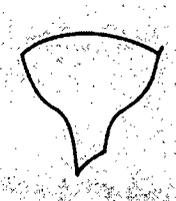


Figure 5.2: Shape Two

Shape Two was very simple in its design and most participants saw a funnel or part of a glass in it. For example, Participant G-A4-E used a holistic and a partitive strategy to describe the shape in English:

{*Holistic analogical*} '[h] 'na ja' it looks like the bottom <1> it looks like a glass without the stem and the foot on it, so it's slightly rounded on two sides {*Change of strategy: Partitive analogical*} going on to the stem [h] ... on the bottom and [h] with a line on the top joining the two curve sides.'

Participant C-C4-E also used two strategies to describe this shape in English:

{*Holistic analogical*} 'This looks like a funnel ... it is rounded at the top and ends in a point <1> at the bottom {*Change of strategy: Partitive geometrical*} [h] but it does not end in one really sharp point. It ends in a slanted rectangular shape with one pointy end.

An example of how this shape was described in German is provided by

Participant G-B1-E:

{*Partitive geometrical*} ‘Die zweite Figur ist nicht symmetrisch und [h] hat oben einen Bogen und die linke und rechte Seite <2> {*Change of strategy: Holistic analogical*} eigentlich eine Vase, die unten schmaler wird.’

(Translation: {*Partitive geometrical*} The second shape is not symmetrical and [h] on top is a curve and the left and right side <2> {*Change of strategy: Holistic analogical*} actually a vase that gets narrower at the bottom.)

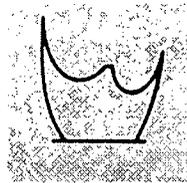


Figure 5.3: Shape Three

Shape Three triggered a variety of descriptions among participants although most participants saw a similarity to a crown. For example, Participant C-C3-E used three strategies to describe this shape in English:

{*Holistic analogical*} ‘This shape looks like a crown <3> {*Change of strategy: Partitive analogical*} the top part is broken and the top part ... the top line consists of two curves of what looks like a letter <9> but at the bottom of the

shape there is a line which is parallel to the surface and {*Change of strategy: Linear*} it goes slightly beyond the shape, a few millimeters.'

Participant G-A4-E described this shape differently in English compared to Participant C-C3-E:

{*Linear*} '[h] straight line horizontal with {*Change of strategy: Holistic analogical*} what looks like a half moon >> {*Change of strategy: Holistic geometrical*} so it's a circle with two smaller circles inside << but only half circles ... and it's open on top.'

In German, Participant G-B5-G used a different approach altogether compared to most participants for this shape:

'[h] picture F ist, was ist F? <1.5> es ist eine Form, {*Linear*} auch so die Wellen mit drei <1> [h] da ist ein bisschen picksen (sic!) oben. Ich finde es nicht so interessant ... unten ist es flach, als ob es sitzt, {*Change of strategy: Holistic analogical*} es könnte vielleicht ein Schiff sein ohne Segel.'

(Translation: [h] picture F, what is F? <1.5> it is a shape, {*Linear*} as are the waves with three <1> [h] there are a few pikes on top. I don't find it very interesting ... at the bottom it is flat, as if it is sitting, {*Change of strategy: Holistic analogical*} it could be a ship without sails.)

However, many participants did describe this shape as a crown in German. For example, Participant C-A2-E:

{*Holistic analogical*} '[h] <4> Der Hutte (sic!) eines Königs {*Change of strategy: Partitive geometrical*} aber die Linksseite (sic!) ist höher als [h] ... die Rechtsseite (sic!) <1> und [h] <5> gibt es (sic!) nur <2> eine (sic!), ein (sic!) anderer (sic!) Punkt [h] <3> in [h] in der Mitte, zwischen [h] zwischen die (sic!) Links (sic!) und Rechtsseite (sic!) <14> und die (sic!) Punkt in der Mitte ist [h] ist am kleinsten <4>.'

(Translation: {*Holistic analogical*} [h] <4> The hat of a king {*Change of strategy: Partitive geometrical*} but the left side is higher than [h] ... the right side <1> and [h] <5> there is only <2> one, one other point [h] <3> in [h] the centre, between [h] between the left and the right side <14> and this point in the centre is [h] the smallest <4>.)

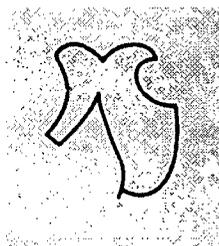


Figure 5.4: Shape Four

Although the investigator and the second marker thought that Shape Four did not

resemble anything in particular, some participants described it as an elephant head, a butterfly or a heart. For example, Participant C-C1-G used two strategies to describe this shape in English:

{*Holistic analogical*} 'Looks like the wing of a butterfly, an open wing, yes ... it's like a butterfly's wing, very asymmetrical, very irregular object <2.5>
 {*Change of strategy: Partitive analogical*} the right side of the object is bigger than the left side ... if you cut right down the middle, where it comes together, where they come together. The left side is two times smaller and [h] yeah=
 {*Change of strategy: Holistic analogical*} But all together it's one wing.'

In German, Participant G-B1-E used three strategies to describe this shape:

{*Partitive geometrical*} 'Das <3> [h] <3> das einzig symmetrische ist die obere Linien (sic!). {*Change of strategy: Holistic analogical*} Wie man sich ein Herz vorstellt ... {*Change of strategy: Partitive analogical*} links eher wie ein Rüssel, rechts eine grosse Fläche ... {*Change of strategy: Holistic analogical*} aber doch wie ein Herz.'

(Translation: {*Partitive geometrical*} The <3> [h] the only symmetrical part is the top line. {*Change of strategy: Holistic analogical*} Like you imagine a heart ... {*Change of strategy: Partitive analogical*} on the left like a trunk, on the right a larger area ... {*Change of strategy: Holistic analogical*} but overall like a heart.)

Participant G-C2-E also used three strategies to describe this shape in German:

{*Partitive geometrical*} 'Das nächste Bild ist unsymmetrisch. Da ist alles auf der linken Seite kleiner als auf der rechten Seite ... da sind <3> das obere Stück fängt an, {*Change of strategy: Holistic analogical*} das könnte ein Herz werden, aber {*Change of strategy: Linear*} sobald die Striche nach unten gehen sind auf der {*Change of strategy: Partitive geometrical*} linken Seite wie auf der rechten Seite ... werden die erst eingezogen und gehen dann wieder nach außen [h] die rechte Seite ist wesentlich höher als die linke Seite und hört mit einem Bogen unten auf und das Bild endet indem die Striche ... >> ziemlich fast oben wieder an dem Bild zusammenkommen.'

(Translation: {*Partitive geometrical*} The next picture is asymmetrical.

Everything on the left side is smaller than on the right side ... and there <3> the top part begins, {*Change of strategy: Holistic analogical*} that could turn into a heart, but {*Change of strategy: Linear*} as soon as the lines go to the bottom, {*Change of strategy: Partitive geometrical*} on the left side as well as on the right side ... they are drawn in and then go outwards [h] the right side is significantly higher than the left side and ends with a curve at the bottom and the picture ends by having lines ... >> almost join at the top of the picture.)

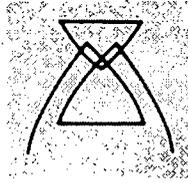


Figure 5.5: Shape Five

The complexity of Shape Five was broken down into sets of triangles as most participants described this shape in English and German. A typical description is provided by Participant G-B2-E:

{*Holistic geometrical*} 'Third picture <3> is [h] very [h] <3> is a set of triangles forms (sic!), triangular forms.'

In German, Participant G-A5-E described this shape by making one strategy change:

{*Holistic geometrical*} 'Das sind zwei Dreiecke übereinander u=nd {*Change of strategy: Partitive analogical*} ein 'M' in der Mitte.'

(Translation: {*Holistic geometrical*} There are two triangles overlapping a=nd {*Change of strategy: Partitive analogical*} an 'M' in the middle.)

Participant G-C2-G described this shape in German as follows:

'<3> {*Holistic analogical*} sieht aus wie eine Sanduhr ... {*Change of strategy: Partitive geometrical*} in der Mitte ... mit zwei Dreiecken quasi und [h] {*Change of strategy: Partitive analogical*} dann sind auf der obendrüber (sic!) ist eine Figur wie ein 'M' das etwas ein [h] ... anders aussieht, da die Mitte von dem 'M' nicht ganz durchgeht.'

(Translation: <3> {*Holistic analogical*} Looks like an hour-glass ... {*Change of strategy: Partitive geometrical*} in the middle ... with two triangles as if and [h] {*Change of strategy: Partitive analogical*} then there is a shape on top like an 'M' that is a little [h] ... looks different because the middle of the 'M' is not going all the way through.)

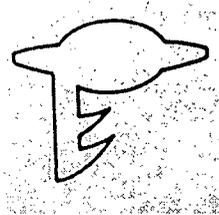


Figure 5.6: Shape Six

The descriptions of Shape Six varied very little among participants in either English or German. In many cases, this shape was described as a U.F.O. For example, Participant C-C1-E used two strategies to describe this shape in English:

{*Holistic analogical*} 'That looks like a flying saucer. A U.F.O. oval shaped and [h] {*Change of strategy: Partitive analogical*} something else on the bottom ... I don't know what, but overall it's like a U.F.O.'

In German, Participant C-A5-G described this shape also using two strategies:

{*Holistic analogical*} ‘Diese Form sieht aus wie eine (sic!) Raumschiff aus [h] <3> der (sic!) Raumschiff ist rotlich (sic!) wie Saturn ohne der Ringen (sic!) und der (sic!) Seiten sind ... zwei Flügeln (sic!) und {*Change of strategy: Partitive analogical*} oben <1> hinten << au=f der rechten Seite ist eine dicke <3> mit zwei Fahnen aufhängende (sic!) Stange.’

(Translation: {*Holistic analogical*} This shape looks like a spacecraft [h] <3> the spacecraft is red like Saturn without the rings and the sides are ... two wings and {*Change of strategy: Partitive analogical*} on top <1> behind << on the right side is a thick <3> pole with two flags attached.)

5.4 Strategies used by Group C

The qualitative analysis reports on the types and frequency of strategies used by participants to describe the shapes and the rate of change of those strategies. For each subgroup results of the qualitative analysis are summarized in two tables. The first table displays the number of strategies used by type for the English and the German descriptions as well as the total number of strategies, and the number of shapes described accurately, that is, if the investigator and the second marker could determine which shapes had been described. The abbreviations used are HA (Holistic analogical), HG (Holistic geometrical), PA (Partitive analogical), PG (Partitive geometrical), L (Linear), T (total number of strategies used), and N (number of shapes described accurately).

The second table displays how often participants changed strategies in English, German or both languages. The abbreviations used are E1 (one strategy change made in English but not in German when describing the same shape), E2 (two strategy changes), E3 (three or more strategy changes)²; G1 (one strategy change made in German but not in English when describing the same shape), G2 (two strategy changes), G3 (three or more strategy changes); E/G1 (one strategy change made in English as well as in German), E/G2 (two strategy changes in both languages), E/G3 (three or more strategy changes in English and German). In the E/G categories a further distinction was made if the same strategy change was made, e.g., if the participant changed the strategy from holistic analogical to partitive analogical in both languages, or not, e.g., if the participant changed the strategy from holistic analogical to partitive analogical in one language and from holistic analogical to holistic geometrical in the other language. In general, there are two possible reasons why participants change strategies. One, they want to elaborate on their descriptions. Two, they need to adjust their descriptions because the first strategy chosen fails to describe the shape accurately. In this context, using the exact same strategy change when describing the same shape in English and German, which is labeled as an identical change, is seen as an indicator for a transfer from the L1 to the L2. The next question is how successful these transfers are and if there is a difference between the subgroups.

In addition, the results of the interviews that were conducted with the participants are reported in this chapter. The interviews consist of three parts (see Appendix E). The

² A further distinction into E4, E5 etc. categories was not made because the number of strategy changes that exceeded more than three was very small. In Group C that number was six for the English (E), German (G), and English/German (E/G) categories combined, in Group G that number was one.

first part refers to the language in which participants were thinking when solving the task and if they transferred concepts from English to German. The second part asks about their perception on when and how they used transfers.³ In the third part, participants had to recollect how they did the task the first time compared to the second time.

5.4.1 Subgroup CA

Table 5.5 displays the frequency and types of the strategies used, the total number of strategies used, and the number of shapes described accurately by participants of Subgroup CA in English and German. The ten participants of the subgroup are divided into the five participants who started the task in English (Participants C-A1-E to C-A5-E) and the five participants who started the task in German (Participants C-A1-G to C-A5-G).

Table 5.5: Strategies used by Subgroup CA (E/G)

	HA	HG	PA	PG	L	T	N
C-A1-E to C-A5-E	35/24	8/1	20/2	14/7	11/2	88/36	27/20
C-A1-G to C-A5-G	27/24	6/6	12/3	8/7	9/2	62/42	24/22

Legend: The abbreviations used are HA (Holistic analogical), HG (Holistic geometrical), PA (Partitive analogical), PG (Partitive geometrical), L (Linear), T (total number of strategies used), and N (number of shapes described accurately). The numbers on the left in each column refer to the English descriptions and the numbers on the right in each column to the German descriptions. For example, the five participants who started the task in English (Participants C-A1-E to C-A5-E) used the holistic analogical strategy (HA) 35 times when describing the shapes in English and 24 times when describing the shapes in German.

³ The term transfer refers to the transfer of concepts, see Sections 1.2.2 and 1.2.3.

In Subgroup CA, all ten participants used more strategies to describe the six shapes in English than in German. All ten participants used the holistic analogical strategy the most and had difficulties solving the task in German, with Participants C-A1-E to C-A5-E describing only 20 shapes and Participants C-A1-G to C-A5-G only 22 shapes accurately. Although the task at hand was designed to be difficult, it was expected that participants would solve the referential problems in their L1. However, participants who started the task in German only described 24 shapes successfully whereas participants who started the task in English described 27 shapes successfully. Three of the five participants who started the task in German used the same strategies when describing the shapes in the two languages. This caused problems in English when the task was not always successfully solved in German. For example, Participants C-A1-G described Shape Four in German as follows:

{*Holistic analogical*} 'Diese (sic!) Bild [h] sehr <5> wie eine (sic!) Schuhe aber <6> es ist nicht [h] fertig.'

(Translation: {*Holistic analogical*} This picture [h] is like <5> like a pair of shoes but <6> it is not [h] finished.)

In English this participant used a very similar description that is also inaccurate:

{*Holistic analogical*} 'This picture ... looks like the shoes (sic!) of an elf although the word elf can also be some kind of other mythical figure [h] ... like a dwarf

<1.5> but it is a shoe of an elf and the heel is missing (laughs) ... it looks like that someone cut the shoe in half of a circle.'

Furthermore, the same three participants described all shapes holistically. Other strategies were rarely used. All ten participants used the holistic approach the most in both languages although it was used more dominantly in German than in English. In relation to the total number of strategies used, Participants C-A1-E to C-A5-E used the holistic analogical strategy at 66.7% of all strategies in German and at 39.8% of all strategies in English. In both languages, the partitive strategies were used the second most. In German, the partitive geometrical strategy is used at 19.4% while in English the partitive analogical strategy is used at 22.7%. Participants C-A1-G to C-A5-G used the holistic analogical strategy at 57.1% of all strategies in German and at 43.5% in English; the partitive geometrical strategy is used the second most in German at 16.6% while the partitive analogical strategy is used the second most in English at 19.4%. As mentioned, one difficulty three of the five participants who started the task in German encountered was using the same strategies in English as in German which limited their expressions in English. Another difficulty was their inability to change strategies to describe the shapes accurately.

Table 5.6 displays how many strategy changes were made by participants in English, German, or both languages.

Table 5.6: Number of strategy changes made by Subgroup CA

	E 1	E 2	E 3	G 1	G 2	G 3	E/G 1	E/G 2	E/G 3
C-A1-E to C-A5-E	6	6	5	2	0	0	3/3	0/0	0/0
C-A1-G to C-A5-G	2	3	0	0	0	0	4/5	1/1	0/0

Legend: The abbreviations used are E1 (one strategy change made in English but not in German when describing the same shape), E2 (two strategy changes), E3 (three or more strategy changes); G1 (one strategy change made in German but not in English when describing the same shape), G2 (two strategy changes), G3 (three or more strategy changes); E/G1 (one strategy change in English as well as in German when the same shape was described. The number on the left refers to identical changes, e.g. in both languages the change occurred from holistic analogical to partitive analogical. The number on the right refers to non-identical changes), E/G2 (two strategy changes), E/G 3 (three or more strategy changes). The abbreviations C-A1-E to C-A5-E refer to the five participants who started the task in English and the abbreviations C-A1-G to C-A5-G to five participants who started the task in German. For example the five participants who started the task in English made a total of six strategy changes in the E1 category.

The participants who started the task in English made more strategy changes in English than the participants who started the task in German. This indicates that they adjusted their descriptions in order to describe the shapes accurately. They had more success than participants who started the task in German. Neither group made many changes in German. The protocols show that in some cases participants wanted to elaborate on their descriptions but were not able to do so. For example, participant C-A2-E described Shape One as a Swiss cheese using the holistic analogical strategy. However, this participant makes long pauses which could be interpreted as an indication that he or she was thinking of a more accurate description:

{*Holistic analogical*} '<14> Eine (sic!) Teil <3> [h] <1> eine (sic!) Teil schweiz-, schweizer Käse <16> eine (sic!) runde (sic!) Teil [h] schweizer Käse <13>.'

(Translation: {*Holistic analogical*} <14> A part <3> [h] <1> a part of Swi-, Swiss cheese <16> a round part [h] of Swiss cheese <13>.)

The number of identical strategy changes, e.g. a participant changing from a holistic analogical to a partitive geometrical strategy in the English and German description of the same shape, is low for all participants. The protocols show that participants who started the task in English were able to conceptualize the shapes in their L1 but sometimes could not transfer the concept to their L2. For example, Participant C-A3-E described Shape Four in English as a horse using the holistic analogical strategy:

{*Holistic analogical*} 'It's like an animal's head. Its mouth with (sic!) the left side and the neck on the right. Like a horse.'

The same participant used the holistic analogical strategy in German but chose words that did not describe this shape accurately:

{*Holistic analogical*} 'Ist wie ein <5> Kopf eines Tieres [h] ... vielleicht ein Tierkopf.'

(Translation: {*Holistic analogical*} Like an <5> animal head [h] ... maybe an animal head.)

Participants who started the task in German also had difficulties transferring concepts from the L1 to the L2. In addition, they also had difficulties conceptualizing the shapes in their L1 as in the case of Participant C-A1-G describing Shape Four inaccurately in German and English. Another example is provided by Participant C-A3-G in the description of Shape Four:

{*Holistic analogical*} '<3> Eine lustige Blume oder eine Banana (sic!) mit ein (sic!) andere (sic!) Früchte (sic!) ... und die andere Frucht (sic!) hat (sic!) ein bisschen gegessen.'

(Translation: {*Holistic analogical*} <3> A funny flower or a banana with another fruit ... and the other fruit has been eaten a bit.)

The English description is similarly inaccurate:

{*Partitive analogical*} 'It looks like there is a banana on the left and a pear that is bitten on the right ... and it combines together.'

The difficulties participants of Subgroup CA had transferring concepts from their L1 to their L2 or conceptualizing concepts in their L1 can be explained with Levelt's model. Levelt (1989) and Green and Capella (1986) argue that processing semantic-conceptual information, i.e. accessing lexical concepts and binding them to syntactic nodes, places high demands on the cognitive system that may result in disfluent L1 speech. This can be applied to the L2. Green and his colleagues (Green & Lindsey, 1989; Green, Lindsey, & Hawn, 1990; Green, McDaniel, Buksa, & Ravizza, 1993) showed evidence that L1 speech is the least fluent the more complex the discourse is, a result confirmed by Roberts and Kirsner (2000) in their research on spontaneous spoken discourse. Using a L2, the speaker has to work with two language systems. Each system has a discourse. This adds to the complexity of language production. Hirst (1999) argues

that it puts the L2 speaker at a disadvantage because the lexical concepts are fully language specific.

The results show that at a low level of proficiency, L2 speakers indeed have difficulties solving referential problems in the L2 as well as in the L1. Concepts have linguistic and non-linguistic mental representations (Paradis, 2000). Their building material comes from cultural experiences of the speakers in their environment (DeGroot, 2000). The more contact L2 learners have with the L2 environment providing this material, the more likely the L2 learner will succeed in using L1 and L2 concepts in referential communication⁴. However, the examples of Subgroup CA attest disfluent L1 speech (participants who started in German) and L2 speech (all participants). In most cases, participants stayed with the holistic approach. Some participants wanted to elaborate on their descriptions using another strategy. However, often there were many pauses and only a few words were articulated, as shown in the quantitative analysis of the word and time measures. These difficulties participants had in solving the task are attributed to the lack of sufficient contact with the L2 environment.

The interviews show that the successful use of concepts in the L1 and the L2 or the transfer of concepts from the L1 to the L2 is linked to the confidence level of the participants. In Subgroup CA, all five participants who started the exercise in English said that they were thinking in both languages when doing the exercise in German. They acknowledged transferring concepts from English to German and considered this practise helpful. Solving the task in German, they remembered how they described the shapes in

⁴A high contact with the L2 environment provides the L2 learner with a high input and likely a higher intake (see Section 2.4.2 for the differentiation between input and intake).

English. All of them considered the shapes to be the same. The analysis showed that some descriptions of four of these five participants were inaccurate in German. They used different and fewer strategies in German than English. Three of these four participants reported having difficulties solving the task in German. For example, Participant C-A3-E said: "I tried to think in German but nothing came to mind." Participant C-A4-E answered: "Everything was blank in German, I tried but not much came to my mind." Participant C-A2-E mentioned the use of translations in order to get by: "I translated what I know in English in order to be able to describe them in German". The realisation of these participants that they are not able to solve the task sufficiently in German, might have caused them to eventually give up. For example, participant C-A2-E did not describe Shape Six at all.

The answers given by the participants who started the task in German are similar. All five participants said that they were thinking in both languages and were transferring concepts from English to German. Three of them said that it is easier that way. Participant C-A1-G said: "It's hard in German because the shapes are so abstract"; Participant C-A2-G answered similarly: "I always think in English first because I don't know enough German yet." Participant C-A3-G explained a way to compensate for the lack of knowledge of German: "It is easier that way, in German I can't do it, I have to use English". The analysis showed that these three participants consistently used the same strategies in German and English even if in some cases neither the German nor the English descriptions were accurate. All participants considered transfers to be helpful. They considered the shapes to be the same. All participants remembered how they did the

task in German when solving it in English. One interpretation is that by remembering the difficulties they had when trying to solve the task in German, these participants then had difficulties solving the task in English as well. The two language systems interfered with one another.

5.4.2 Subgroup CB

Table 5.7 displays the frequency and types of strategies used, the total number of strategies used, and the number of shapes described accurately by participants of Subgroup CB in English and German.

Table 5.7: Strategies used by Subgroup CB (E/G)

	HA	HG	PA	PG	L	T	N
C-B1-E to C-B5-E	31/29	8/3	10/9	12/7	4/3	65/51	28/21
C-B1-G to C-B5-G	35/26	8/6	12/11	17/4	7/2	79/49	29/27

Legend: The abbreviations used are HA (Holistic analogical), HG (Holistic geometrical), PA (Partitive analogical), PG (Partitive geometrical), L (Linear), T (total number of strategies used), and N (number of shapes described accurately). The numbers on the left in each column refer to the English descriptions and the numbers on the right in each column to the German descriptions. The abbreviations C-B1-E to C-B5-E refer to the five participants who started the task in English, the abbreviations C-B1-G to C-B5-G to the five participants who started the task in German. For example, the five participants who started the task in English used the holistic analogical strategy (HA) 31 times when describing the shapes in English and 29 times when describing the shapes in German.

In Subgroup CB, all ten participants solved the task in English describing 28 shapes (Participants C-B1-E to C-B5-E) and 29 shapes (Participants C-B1-G to C-B5-G) accurately. All ten participants used more strategies to describe the six shapes in English than in German. The holistic analogical strategy is used the most by all ten participants in both languages. Participants who started the task in English were not always successful

solving the task. They described only 21 shapes in German accurately, whereas participants who started the task in German described 27 shapes in German accurately.

For example, Participant C-B3-E described Shape Four in English as a pair of trousers:

{*Holistic analogical*} 'It looks like trousers with one end of stocking much larger than the other ... and a rounded bottom top of trousers <1> looks like the top of a heart.'

In the German description of this shape, the participant did not know the German word for trousers but instead used the French word 'pantalon':⁵

'<6> {*Holistic analogical*} Es sieht wie eine Pantalone (sic!) mit eine (sic!) Seite viel grösser als die andere und der ... Topf (sic!) wie der Topf (sic!) eines Herz. (sic!).'

(Translation: <6> {*Holistic analogical*} It looks like a [word does not exist in standard German] with one side much larger than the other and the ... the pot like the pot of a heart.)

In this case, the shape was not described accurately in German. The

⁵ Although the participant did not know French (see Chapter Three: Methodology), he or she could have heard that word before.

participant transferred the concept but was not proficient enough to do so successfully. The participant was not able to come up with a different description that was accurate by using an alternate strategy. All participants who started the task in English used the holistic analogical strategy dominantly in both languages. In English, it was used at 47.7% of all strategies followed by the partitive geometrical strategy at 18.5%; in German it was used at 56.9% of all strategies followed by the partitive analogical strategy at 17.6%. With one exception, these numbers are similar for the participants who started the task in German. They used the holistic analogical strategy at 43.5% of all strategies in English followed by the partitive geometrical strategy at 21.5% and at 57.1% of all strategies in German followed by the partitive analogical strategy at 22.4%. Using the partitive analogical strategy in the German descriptions, some participants who started the task in German were able to describe the shapes accurately.

For example, Participant C-B3-G described Shape Six in German as a U.F.O and a key:

{Holistic analogical} 'Es ist eine U.F.O. [h] ein (sic!) fliegen (sic!) Untertasse.

{Change of strategy: Partitive analogical} Das ist oben. Und unten ist über dem Schlüssel <1> also die fliegende Untertasse und der Schlüssel sind verbunden ... sie sind zusammen.'

(Translation: *{Holistic analogical}* It is a U.F.O. [h] a flying saucer. *{Change of strategy: Partitive analogical}* That is the top. And on the bottom above the key <1> so the flying saucer and the key are connected ... they are together.)

The English description of this shape by participant C-B3-G is very similar:

{*Holistic analogical*} 'It looks like a U.F.O. {*Change of strategy: Partitive analogical*} set on a key.'

In this last example the use of the partitive analogical strategy does not divide the shape into two or more parts as clearly as in the German description of this shape. There are two possibilities. The participant either conceptualized the shape in German and transferred the concept from the L2 to the L1 when doing the task in English, or the participant thought in English when solving the task in German and transferred the concept to the L2. In either case, the shape was accurately described.

Participants who started the task in German had more success when describing the shapes than participants who started the task in English. One possible explanation is that participants who started the task in German did not use many identical transfers as can be seen in the number of strategy changes made (see Table 5.8). Participants who started the task in English made most strategy changes when describing the same shape in English and German and eight of those eleven changes were identical changes. This might have restricted them in using other strategies.

Table 5.8 displays the frequency of strategy changes made by participants in English, German, or both languages.

Table 5.8: Number of strategy changes made by Subgroup CB

	E 1	E 2	E 3	G 1	G 2	G 3	E/G 1	E/G 2	E/G 3
C-B1-E to C-B5-E	3	2	1	2	0	0	8/3	2/2	0/0
C-B1-G to C-B5-G	6	6	2	1	0	0	4/1	2/2	0/0

Legend: The abbreviations used are E1 (one strategy change made in English but not in German when describing the same shape), E2 (two strategy changes), E3 (three or more strategy changes); G1 (one strategy change made in German but not in English when describing the same shape), G2 (two strategy changes), G3 (three or more strategy changes); E/G1 (one strategy change in English as well as in German when the same shape was described. The number on the left refers to identical changes, e.g. in both languages the change occurred from holistic analogical to partitive analogical. The number on the right refers to non-identical changes), E/G2 (two strategy changes), E/G3 (three or more strategy changes). The abbreviations C-B1-E to C-B5-E refer to the five participants who started the task in English and the abbreviations C-B1-G to C-B5-G to five participants who started the task in German. For example the five participants who started the task in English made a total of three strategy changes in the E1 category.

Participants who started the task in German made most strategy changes in English but not in German when describing the same shape. For example, Participant C-B1-G described Shape Four as a seahorse using three strategies:

{Holistic analogical} 'It looks as if it could be a flower or a seahorse [h] that's how it looks *{Change of strategy: Partitive analogical}* it looks as if it has a big nose on the left side and on the top it has two things that look sort of like *{Change of strategy: Partitive geometrical}* circles that are attached but the whole thing is connected by one line ... so it's one line, one line, *{Change of strategy: Holistic analogical}* but it looks like a seahorse.'

In German, the same participant described this shape also as a seahorse using only the holistic analogical strategy:

{*Holistic analogical*} 'Das sieht wie ein Seepferd aus und [h] <4> eine (sic!) mehr (sic!) Arme und [h] <6> es hat eine lange Nase <5> und zwei grosse ... Dings (sic!).'

(Translation: {*Holistic analogical*} That looks like a seahorse and [h] <4> an arm and [h] <6> it has a long nose <5> and two large ... things.)

The example of participant C-B3-G shows that some participants who started the task in German were successful in solving the referential problems in German by using the partitive analogical strategy in addition to the holistic analogical strategy. The example of participant C-B1-G shows that some participants accurately described the shapes in German by using the holistic analogical strategy. The descriptions of all ten participants are often similar comparing German with English. However, Participants C-B1-G to C-B5-G were able to make adjustments to their descriptions in both languages whereas Participants C-B1-E to C-B5-E sometimes failed to do so.

In the interviews, participants C-B1-G to C-B5-G displayed a positive attitude towards using transfers. All five participants said that they were thinking in both languages when doing the exercise in German, four of them considered transfers to be very helpful, and all five remembered how they did the task in German when solving it in English and considered the shapes to be the same. In view of the example by Participant C-B3-G describing Shape Six as a combination of a U.F.O and a key, this indicates that the shape was not conceptualized in German but the concept was transferred from the L1 to the L2. In contrast, three of the five participants who started the task in English displayed a negative attitude towards using transfers although they answered that they

thought in English and German when doing the exercise in German, transferred concepts, remembered how they did the task in English when doing it in German and considered the shapes to be the same. Participant C-B2-E said: "Using transfers sometimes helps, but not always, it can be confusing," and Participant C-B4-E answered: "The shapes are abstract and I don't always know how to transfer the idea". Participant C-B3-E who used the French word 'pantalon' for the description of Shape Four also referred to the abstract form of the shapes: "Some shapes reminded me of nothing. I had to use English, I can't do that in German."

The abstract nature of the shapes caused the descriptions of all ten participants to be disfluent in German, which is confirmed by the quantitative analysis of the word and time measure. It showed that participants were less efficient processing lexical items in their L2 than in their L1 (see Chapter Four, Section 4.5.1). With 364 to 442 hours of formal instruction in the L2, it can be expected that students communicate fluently in the L2. However, communicating about abstract concepts in their L2 is more difficult than communicating about concrete concepts because concrete lexical items share some conceptual representations in the L1 and the L2, whereas abstract lexical items do not (DeGroot, 1992, 1993). The results indicate that at this level of proficiency some participants lacked familiarity with abstract concepts because their L2 experience is restricted to formal instruction. In particular, some participants of Subgroup CB who started the task in English showed signs of frustration knowing that they relied on their knowledge of English to solve the task in German. This might be the reason why sometimes they did not adjust their descriptions although the description was not accurate.

5.4.3 Subgroup CC

Table 5.9 displays the frequency and type of each of the five strategies used, the total number of strategies used, and the number of shapes described accurately in Subgroup CB in English and German.

Table 5.9: Strategies used by Subgroup CC (E/G)

	HA	HG	PA	PG	L	T	N
C-C1-E to C-C5-E	34/29	9/7	18/20	19/7	11/2	91/65	30/27
C-C1-G to C-C5-G	28/33	7/5	20/21	15/24	11/3	81/86	27/27

Legend: The abbreviations used are HA (Holistic analogical), HG (Holistic geometrical), PA (Partitive analogical), PG (Partitive geometrical), L (Linear), T (total number of strategies used), and N (number of shapes described accurately). The numbers on the left in each column refer to the English descriptions and the numbers on the right in each column to the German descriptions. The abbreviations C-C1-E to C-C5-E refer to the five participants who started the task in English, the abbreviations C-C1-G to C-C5-G to the five participants who started the task in German. For example, the five participants who started the task in English used the holistic analogical strategy (HA) 34 times when describing the shapes in English and 29 times when describing the shapes in German.

In Subgroup CC, all ten participants most often used the holistic analogical strategy in both languages, and all ten participants described 27 shapes in German accurately. The participants who started the task in English described 30 shapes accurately in English whereas the ones who started the task in German provided 27 accurate English descriptions.

The protocols show that some participants who started the task in German needed to adjust their descriptions in German in order to describe the shapes accurately. For example, Participant C-C2-G started to describe Shape Two using a holistic approach but then changed to partitive strategies:

{*Holistic analogical*} 'Dies ist ein, wie sagt man auf deutsch [h] man braucht es [h] um Wasser mit einer Flasche eingiessen (sic!) [h] die sieht aus wie [h] <4> wie heisst es [h] [h] <5> [h] {*Change of strategy: Partitive geometrical*} die obere Hälfte sieht aus wie [h] die Halbe (sic!) eines Kreises und da, davon läuft (sic!) [h] [h] {*Change of strategy: Partitive analogical*} ein Fuss [h] oder ein Bein [h] [h] es ist ganz kurz [h].'

(Translation: {*Holistic analogical*} That is a, how do you say that in German [h] you need that [h] to pour water with a bottle [h] it looks like [h] <4> what's the name [h] [h] <5> [h] {*Change of strategy: Partitive geometrical*} the top half looks like [h] half of a circle and there, there is [h] [h] {*Change of strategy: Partitive analogical*} a foot [h] or a leg [h] [h] it is very short [h].)

In English, this participant simply described this shape as a funnel:

{*Holistic analogical*} 'It looks like a funnel [h] a funnel which has been shortened [h] shortened by ... it looks like someone cut a piece of it.'

In comparison, Participant C-C2-E who started the task in English did not have to make adjustments to the description of Shape Two in German:

{*Holistic analogical*} 'Diese Forme (sic!) hier ist ein umgedrehter Trichter [h] aber die Ecken sind ein bisschen glatter u=nd ist (sic!) nicht genau symmetrisch.'

(Translation: *{Holistic analogical}* This shape is an upside down funnel [h] but the corners are a bit smoother and it is not symmetrical.)

In relation to the total number of strategies used, participants who started the task in German used the holistic analogical strategy less often than participants who started the task in English, thus confirming that Participants C-C1-G to C-C5-G needed to use other strategies in German to solve the referential problems. Of the five strategies, Participants C-C1-E to C-C5-E used the holistic analogical strategy 37.4% in English and 44.6% in German, Participants C-C1-G to C-C5-G used it 34.6% in English and 38.4% in German. The partitive strategies are used the second most. In English, the partitive geometrical strategy is used the second most at 20.9% by Participants C-C1-E to C-C5-E and in German the partitive analogical strategy is used the second most at 30.8%. Participants C-C1-G to C-C5-G used the partitive analogical strategy the second most in English representing 24.7% and the partitive geometrical strategy the second most in German representing 27.9%.

The differences between Participants C-C1-E to C-C5-E and Participants C-C1-G to C-C5-G mentioned are also evident in the number of strategy changes made. Table 5.10, which displays the number of strategy changes made by participants in English, German, or both languages, shows that participants who started the task in German made most strategy changes in German. These participants also made non-identical strategy changes in the E/G 2 category. Both types of changes indicate a need for adjustments when describing the shapes in German.

Table 5.10: Number of strategy changes made by Subgroup CC

	E 1	E 2	E 3	G 1	G 2	G 2	E/G 1	E/G 2	E/G 3
C-C1-E to C-C5-E	4	1	2	1	0	0	4/8	1/2	0/2
C-C1-G to C-C5-G	1	1	1	6	1	0	3/3	3/6	0/2

Legend: The abbreviations used are E1 (one strategy change made in English but not in German when describing the same shape), E2 (two strategy changes), E3 (three or more strategy changes); G1 (one strategy change made in German but not in English when describing the same shape), G2 (two strategy changes), G3 (three or more strategy changes); E/G1 (one strategy change in English as well as in German when the same shape was described. The number on the left refers to identical changes, e.g. in both languages the change occurred from holistic analogical to partitive analogical. The number on the right refers to non-identical changes), E/G2 (two strategy changes), E/G3 (three or more strategy changes). The abbreviations C-C1-E to C-C5-E refer to the five participants who started the task in English and the abbreviations C-C1-G to C-C5-G to five participants who started the task in German. For example the five participants who started the task in English made a total of four strategy changes in the E1 category.

In contrast, participants who started the task in English made only one strategy change in German. In English, they made a few changes. If they made changes in both languages when describing the same shape, they are mostly in the E/G 1 rather than the E/G 2 or E/G 3 category. Most of the changes are non-identical. It suggests that these participants did not use many transfers from their L1 to their L2 but conceptualized some shapes in German. For example, Participant C-C2-E described Shape One in English as a wheel using two strategies:

{*Holistic analogical*} 'It's like a ... a wheel [h] a kind of wheel that is specific to fire, a wind fire wheel. It's some kind of [h] ... okay, it's just that kind of wheel and then it is <3> {*Change of strategy: Holistic geometrical*} like a circle but [h] it is a big circle with three little circles cut out from it ... the shape of it would

look like the resultant figure and [h] the three circles are like on ... they are on the side of the circle so= they are not randomly scattered but they are on the side.'

In German, this participant describes the shape as an axe using two strategies:

{*Holistic geometrical*} 'Diese Form hier ist <3> ein [h] ein Kreis <3> aber (sic!) nicht ganz ein Kreis. {*Change of strategy: Holistic analogical*} Es sieht [h] eigentlich wie der Kopf von einer Axt (sic!) ... aber normalerweise Axte (sic!) <2> haben nur zwei Teilen (sic!) [h] und jetzt gibt es drei <1> [h] <3> drei Teilen (sic!) und {*Change of strategy: Holistic geometrical*} es sieht wie ein Kreis aus.' (Translation: {*Holistic geometrical*} This form here is <3> a [h] a circle <3> but not a whole circle. {*Change of strategy: Holistic analogical*} It looks [h] really like the head of an axe ... but normally axes <2> have only two parts [h] and now there are three <1> [h] <3> three parts and {*Change of strategy: Holistic geometrical*} it looks like a circle.)

The question remains if participants who started the task in German had to adjust the descriptions because they conceptualized some shapes in German or because they made transfers made from the L1 to the L2. The example of Participant C-C2-G, who did not know the German word for funnel when describing Shape Two, suggests the use of transfers. However, examples from other participants suggest that some shapes were conceptualized in German. For example, Participant C-C4-G described Shape Four as an elephant in German:

{*Holistic analogical*} ‘Die Form ist wie ein Elephant, wie ich denke [h] <2> es (sic!) hat <1> eine (sic!) Augen und [h] keine (sic!) Mund, ‘oh no’, es (sic!) hat einen Mund, aber [h] unter <11> unter dem Rüssel dieser (sic!) Elephantes (sic!) [h] <3> [h] der Rüssel ist [h] <3> [h] längs und [h] <2> am (sic!) rechten Seit (sic!) es (sic!) geht nur bis <9> zu dem Hals [h] <1> und es ist <1> die Linie <1> dies (sic!) Hals ist [h] <1> ist eine große Kurve [h] <4> [h] <2> an der (sic!) Rücke (sic!) dieser (sic!) Elephantes (sic!) ist ein großer (sic!) Horn [h] es ist sehr, viele (sic!) , es ist sehr [h] <3> es ist nicht [h] gerade, aber hat zwei Kurve (sic!) [h] <2> und ein (sic!) Spitze wenn man <16> es (sic!) hat keine Ohren und ich denke das ist alles.’

(Translation: {*Holistic analogical*} This shape is like an elephant, I think [h] <2> it has <1> one eye and [h] no mouth, ‘oh, no’, it has a mouth, but [h] below <11> the elephant’s trunk [h] <3> [h] the trunk is [h] <3> [h] long and [h] <2> on the right side it only stretches <9> to the neck [h] <1> and it is <1> the line <1> this neck is [h] <1> is one big curve [h] <4> [h] <2> at the back of this elephant is a big horn [h] it is very, is has [h] <3> it is not [h] even, but it has two curves [h] <2> and one peak if you <16> it has no ears and I think that is all.)

In English, which was the second time this participant described the shape, Participant C-C4-G choose a different approach describing the shape as a person:

{*Partitive analogical*} [h] okay <3> this shape [h] has really two parts that are connected in the middle [h] the left hand part is sort of like a person’s arm going

from the shoulder to the end of the sleeve [h] {*Change of strategy: Partitive geometrical*} it's curving <4> in a semi-circle ... not, not quite a semi-circle [h] <1> about [h] with <1> the top of the bottom being close to the left and the middle being close to the right [h] <1> then it widens out {*Change of strategy: Partitive analogical*} and then [h] the shoulders <1.5> is (sic!) slightly narrow again =but the top part of the shoulder is quite curved [h] then <1> [h] where the line would be [h] on the right hand side just below the top curve [h] there is no line because it is attached to the other shape.

The examples show that conceptualizing in German was difficult for participants of Subgroup CC resulting in disfluent speech.

The interviews reveal that regardless of the language the participants used first for solving the task, some participants solved the referential problems in German conceptualizing the shapes in German and some used transfers. Six participants said that they were thinking in German when solving the task in German, three of them had started the task in English and three in German. All six participants claimed they avoided transfers. However, one of these participants, Participant C-C3-G, used code-switches. Most interesting are the comments by Participants C-C3-E and C-C4-G who made very long descriptions in German. Participant C-C3-E said: "I had to really think in German and it took a while to describe the shapes" and Participant C-C4-G answered: "The more I said in German the more came to my mind." When approaching the task the second time, all six participants remembered how they solved the task the first time. The remaining four participants said that they were thinking in both languages when solving

the task in German. They used transfers and considered the practise to be helpful. These four participants remembered how they performed the task the first time when solving it the second time. All ten participants considered the shapes to be the same.

The question why Participants C-C1-G to C-C5-G had more difficulties solving the referential problems than Participants C-C1-E to C-C5-E remains open. One possible explanation is that participants who started the task in English did remember their success when solving the task in English describing all 30 shapes accurately. They were motivated to also do well in the German descriptions. Another explanation is that some participants who started the task in German needed some time to get familiar with the task at hand. This might explain the many words Participant C-C4-G and Participant C-C5-G used in their German descriptions. However, Participant C-C3-E also used many words. There is no evidence for either explanation.

In summary, all participants successfully transferred concepts from their L1 to their L2 or conceptualized the shapes in German when describing them in German. Their speech was more disfluent in German than in English indicating that they had some difficulties solving the task in German. However, at this level of proficiency participants managed to communicate about referential problems even if they had not had much contact with the L2 and target culture.

5.4.4 Comparing the three subgroups

In Group C, there are substantial differences in the performance of the three subgroups. Table 5.11 displays the frequencies by type of strategies used and the total

number of strategies used by each subgroup in addition to the number of shapes described accurately.

The total number of strategies used in the English descriptions is higher than the total number of strategies used in the German descriptions at each level of proficiency. The lower the level of proficiency the greater are the differences. In Subgroup CA, the total number of strategies used in German is 47.8% less compared to English; in Subgroup CB it is 30.6% less; and in Subgroup CC it is 12.2% less. The total number of strategies used in English is similar at each level of proficiency except for the highest level of proficiency, differences are in the German descriptions. At the low level of proficiency, participants only described 42 shapes accurately in German. The analysis of Subgroup CA showed that in particular Participants C-A1-G to C-A5-G also had difficulties solving the task in English. At the intermediate level of proficiency, participants described 48 shapes accurately. The analysis of Subgroup CB showed that in particular Participants C-B1-G to C-B5-G had difficulties solving the referential problems in German. At the high level of proficiency, participants did solve the task in German describing 54 shapes accurately.

Table 5.11: Strategies used by Group C (E/G)

	HA	HG	PA	PG	L	T	N
CA	62/48	14/7	32/5	22/14	20/4	150/78	51/42
CB	66/55	16/9	22/20	29/11	11/5	144/100	57/48
CC	62/62	16/12	38/41	34/31	22/5	172/151	57/54

Legend: The abbreviations used are HA (Holistic analogical), HG (Holistic geometrical), PA (Partitive analogical), PG (Partitive geometrical), L (Linear), T (total number of strategies used), and N (number of shapes described accurately). The numbers on the left in each column refer to the English descriptions and the numbers on the right in each column to the German descriptions. The abbreviations CA, CB, CC refer to the three subgroups. For example, the ten participants of Subgroup CA used the holistic analogical strategy (HA) 62 times when describing the shapes in English and 48 times when describing the shapes in German.

The differential success in solving the referential problems in German is linked to the use of strategies by participants of the three subgroups. Of all strategies used, participants of all three levels of proficiency used the holistic analogical strategy most in English and German. There are no substantial differences in the English descriptions comparing the three subgroups. The use of this strategy is at 36% for Subgroup CC, 45.8% for Subgroup CB, and 41.3% for Subgroup CA. However, in the German descriptions there are differences. The holistic analogical strategy is used at 41.1% for Subgroup CC, 55% for Subgroup CB, and 61.5% for Subgroup CA. The numbers indicate two things: One, the holistic analogical strategy is used more dominantly at a lower level of proficiency. Two, it is used more dominantly in German than in English. At the same time, there are differences in the use of the second most used strategy between the English and the German descriptions. The second most used type of strategy by participants of the three subgroups in English and German is one of the partitive strategies. In English, the partitive analogical or partitive geometrical strategy is used

similarly at all three levels of proficiency at 22.1% for Subgroup CC, 20.1% for Subgroup CB, and 21.3% for Subgroup CA. In German, the use of the partitive strategies increases with the level of proficiency at 27.2% for Subgroup CC, 20% for Subgroup CB, and 17.9% for Subgroup CA.

The following three examples of the German description of Shape Six illustrate some differences. For example, Participant C-A3-G used the holistic analogical strategy to describe the shape as a fishing-line. The description is inaccurate, and the participant did not use another strategy to describe the shape in more detail but instead resorted to a code-switch:

{Holistic analogical} '[h] Ein Zug (sic!) das die Leute zum Fischen benutzen mit einem Dinge (sic!) das [h] ... es sieht wie ein 'fish-hook' aus.'

(Translation: *{Holistic analogical}* [h] A line that people use to fish with a thing that [h] ... it looks like a fish-hook.)

Participant C-B1-E described Shape Six as a musical instrument using the holistic analogical strategy. Using that strategy, the description is not accurate. However, the participant adds to the description by using the partitive analogical strategy which results in an accurate description:

{Holistic analogical} 'Aussieht (sic!) wie [h] [h] wie ein <8> [h] <4>

musikalische (sic!) Instrument. Ja, ein Instrument. *{Change of strategy: Partitive analogical}* Oben dick und unten spitz.'

(Translation: *{Holistic analogical}* It looks like [h] [h] like a <8> [h] <4> musical instrument. Yes, an instrument. *{Change of strategy: Partitive analogical}*. Thick on top and thin at the bottom.)

Pointing out the features 'thick' and 'thin' is something that a participant of Subgroup CA should also be able to do. However, the interviews with participants of Subgroup CA and Subgroup CB showed that the attitude of participants played a role when solving the task. Some participants of Subgroup CA lacked confidence in their abilities.

Participant C-C2-G described Shape Six accurately using two strategies:

{Holistic analogical} 'Sieht aus [h] wie ein Planete (sic!), vielleicht Uran (sic!) oder Pluto, es hat [h] es ist rund es hat [h] man kann die Rubriken sehen und *{Change of strategy: Partitive analogical}* auf der linken Seite, da kommt so etwas wie ein Schlüssel zu (sic!) <2> [h] <4> der Schlüssel, den man zu (sic!) [h] Schrauben benutzt und es hängt herunter an der Seite.'

(Translation: *{Holistic analogical}* Looks like [h] a planet, maybe Uranus or Pluto, it has [h] it is round and it has [h] you can see the areas and *{Change of strategy: Partitive analogical}* on the left side, there is something like a key <2> [h] <4> the key, that is [h] used to screw something and it is hanging down at the side.)

The example of Participant C-C2-G shows that at this level of proficiency participants used different strategies to give an accurate description. Compared to Subgroup CA and Subgroup CB, participants of Subgroup CC made most non-identical changes (see Table 5.12) in the E/G 1, E/G 2 and E/G 3 categories. They also made most changes in German but not in English when describing the same shape. These numbers support the argument that some of these participants conceptualized shapes in German.

Table 5.12 displays the number of strategy changes made by the three subgroups.

Table 5.12: Number of strategy changes made by Group C

	E 1	E 2	E 3	G 1	G 2	G 3	E/G 1	E/G 2	E/G 3
CA	8	9	5	2	0	0	7/8	1/1	0/0
CB	9	8	3	3	0	0	12/4	4/4	0/0
CC	5	2	3	7	1	0	7/11	4/8	0/4

Legend: The abbreviations used are E1 (one strategy change made in English but not in German when describing the same shape), E2 (two strategy changes), E3 (three or more strategy changes); G1 (one strategy change made in German but not in English when describing the same shape), G2 (two strategy changes), G3 (three or more strategy changes); E/G1 (one strategy change in English as well as in German when the same shape was described. The number on the left refers to identical changes, e.g. in both languages the change occurred from holistic analogical to partitive analogical. The number on the right refers to non-identical changes), E/G2 (two strategy changes), E/G 3 (three or more strategy changes). The abbreviations CA, CB, CC refer to the three subgroups. For example the ten participants of Subgroup CA made a total of eight strategy changes in the E 1 category.

Participants of Subgroup CB and Subgroup CA made strategy changes in English but not in German when describing the same shape. A difference between the two subgroups is that participants of Subgroup CB made more identical than non-identical changes in the E/G 1 category whereas for participants of Subgroup CA the number of identical and non-identical changes is similar. Participants of Subgroup CB also made

more strategy changes in the E/G 2 category than participants of Subgroup CA. The analysis of Subgroup CA and Subgroup CB showed that using transfers from L1 to L2 participants of Subgroup CB were more successful in solving the referential problems than participants of Subgroup CA. It also showed that the use of identical changes in some cases restricted participants of Subgroup CB in their descriptions. However, the number of strategy changes made comparing these subgroups indicates that by simply making more changes, participants of Subgroup CB were able to describe the shapes more accurately in English as well as in German than participants of Subgroup CA.

In summary, participants at the low and intermediate levels of proficiency relied on transfers from the L1 to the L2 to solve the task at hand. In subgroup CA, the referential problems were not always solved in either English or German; in subgroup CB participants had difficulties in German. At the high level of proficiency, participants managed to describe the shapes accurately. Apart from using transfers they also conceptualized some shapes in German. The analysis showed that not relying on the holistic analogical strategy alone but using all strategies is beneficial. Only in Subgroup CC all strategies were used successfully in the L2. Creating a comprehensible message using different strategies requires the speaker to replace one semantic-conceptual framework with another. Levelt (1989) describes this when explaining the process of generating a message to achieve a communicative goal. The results show that at a lower level of proficiency participants often could not carry out this process. The lexical concepts that are language-specific (Hirst, 1999) could not be expressed in the L2. Processing and expressing abstract concepts is a difficult task that requires contact with the target language and culture.

5.5 Strategies used by Group G

For each subgroup, results of the qualitative analysis of Group G are summarized in two tables similar to the analysis of Group C. One table shows the frequency of the five strategies and the total number of strategies used in English and German and how many shapes were described accurately. The other table shows the number of strategy changes in English, German or both languages. In addition to the analysis, the interviews are summarized.

5.5.1 Subgroup GA

Table 5.13 displays the frequency of strategies by type as well as the total number of strategies used, and the number of shapes described accurately by Subgroup GA in English and German. The ten participants of the subgroup are divided into the five participants who started the task in English (Participants G-A1-E to G-A5-E) and the five participants who started the task in German (Participants G-A1-G to G-A5-G).

Table 5.13: Strategies used by Subgroup GA (E/G)

	HA	HG	PA	PG	L	T	N
G-A1-E to G-A5-E	32/25	5/4	3/2	5/1	2/0	47/32	25/22
G-A1-G to G-A5-G	23/23	4/3	0/2	1/1	2/2	30/31	25/24

Legend: The abbreviations used are HA (Holistic analogical), HG (Holistic geometrical), PA (Partitive analogical), PG (Partitive geometrical), L (Linear), T (total number of strategies used), and N (number of shapes described accurately). The numbers on the left in each column refer to the English descriptions and the numbers on the right in each column to the German descriptions. For example, the five participants who started the task in English (Participants G-A1-E to G-A5-E) used the holistic analogical strategy (HA) 32 times when describing the shapes in English and 25 times when describing the shapes in German.

In Subgroup GA, the participants who started the task in English used more strategies to describe the six shapes in English than in German whereas the participants who started the task in German used an almost equal number of strategies in English and German. All ten participants used the holistic analogical strategy the most of all five strategies in both languages. Participants G-A1-E to G-A5-E described 25 shapes accurately in English and 22 shapes accurately in German whereas Participants G-A1-G to G-A5-G described also 25 shapes accurately in English but 24 shapes accurately in German.

All participants used the holistic analogical strategy to solve the referential problems but had difficulties in both languages. For example, Participant G-A2-E described Shape Five inaccurately in English:

{Holistic analogical} 'This is like [h] what you use diablo joggling (sic!), to joggle with, so it has [h] <4> yeah, the dark, it also looks there is a person wearing glasses, like, yeah.'

In German, the same participant described this shape inaccurately as well:

{Holistic analogical} 'Dann wir haben (sic!) ein 'diablo' oder auf deutsch es (sic!) könnte auch ein 'egg-timer' oder Eizeit (sic!) sein [h] <1> mit Sand und der Sand kommt dann herunter <1> es gibt auch, es könnte eine Hexe sein ... auch, (sic!) grosse Hexe.'

(Translation: {*Holistic analogical*} Then there is a 'diablo' or in German it is an 'egg-timer' or egg-time [h] <1> with sand and the sand trickles down <1> there is also, it could be a witch ... also, big witch.)

The example shows that the participant used different references to describe the shape but all references were holistic analogical. In German, the participant used code-switches indicating an unsuccessful transfer of a concept from the L1 to the L2.

Participants who started the task in German often used the holistic analogical strategy in English and German as well. For example, Participant G-A2-G described Shape Four inaccurately in English and German:

{*Holistic analogical*} 'The head of <2> waves. Like waves crushing down a=nd one bigger than the other.'

In German, the description is very similar:

{*Holistic analogical*} 'Zwei Wellen mit <4> (sic!) Halbkreis, zwei Wellen [h] die (sic!) lang und eine kurz u=nd eine grösser als die andere.'

(Translation: {*Holistic analogical*} Two waves with <1> a half circle, two waves [h] that are long and one is short a=nd one is bigger than the other.)

All participants used the holistic analogical strategy most in English as well as in German. Participants G-A1-E to G-A5-E used it 68.1% of all strategies in English and

78.1% of all strategies in German; Participants G-A1-G to G-A5-G used it 76.7% of all strategies in English and 74.2% of all strategies in German. Other strategies to describe the shapes were hardly used. Participants G-A1-E to G-A5-E used the partitive geometrical strategy the second most in English representing only 10.6% of all strategies, in German they used the holistic geometrical strategy the second most representing 12.5% of all strategies. Participants G-A1-G to G-A5-G used the holistic geometrical strategy the second most in English at 13.3% as well as in German at 9.6%. In addition, only few strategy changes are made in either language. Table 5.14 displays how many strategy changes were made by participants in English, German, or both languages.

Table 5.14: Number of strategy changes made by Subgroup GA

	E 1	E 2	E 3	G 1	G 2	G 3	E/G 1	E/G 2	E/G 3
G-A1-E to G-A5-E	4	3	0	0	0	0	1/4	0/0	0/0
G-A1-G to G-A5-G	2	0	0	1	0	0	0/1	0/0	0/0

Legend: The abbreviations used are E1 (one strategy change made in English but not in German when describing the same shape), E2 (two strategy changes), E3 (three or more strategy changes); G1 (one strategy change made in German but not in English when describing the same shape), G2 (two strategy changes), G3 (three or more strategy changes); E/G1 (one strategy change in English as well as in German when the same shape was described. The number on the left refers to identical changes, e.g. in both languages the change occurred from holistic analogical to partitive analogical. The number on the right refers to non-identical changes), E/G2 (two strategy changes), E/G 3 (three or more strategy changes). The abbreviations G-A1-E to G-A5-E refer to the five participants who started the task in English and the abbreviations G-A1-G to G-A5-G to five participants who started the task in German. For example, the five participants who started the task in English made a total of four strategy changes in the E1 category.

Participants of Subgroup GA made very few strategy changes (the number of strategy changes in the E1, E2 and E/G 1 category are mostly employed by Participant G-A4-E), especially if they started the task in German. Participants either did not want to change strategies because their descriptions were accurate or they were not able to

change strategies. In several cases, the transcribed recordings attest that the descriptions of participants of Subgroup GA were not as disfluent as those for Subgroup CA. Often participants used the holistic analogical approach to describe the shapes with few words making few pauses or hesitations. This might be an indication that these participants assumed that their descriptions were accurate and did not want to change their strategy. Interestingly, in some cases the descriptions were not accurate. For example, Participant G-A2-E described Shape Two in English as a drum:

{Holistic analogical} 'The next one is like a jambe African drum, in my opinion, it has [h] the curves are like an African drum [h] yeah.'

In German, the description of this shape by the same participants is very similar to the one in English:

{Holistic analogical} 'Die (sic!) zweite Bild erinnert mich auch an ein (sic!) 'jambe' afrikanische Trommel oder es könnte auch ein Hut sein <1> in die andere Richtung [h] ... ja.'

(Translation: *{Holistic analogical}* The second picture reminds me also of a 'jambe' African drum or it could also be a hat <1> in the other direction [h] ... yes.)

This example shows the use of transfers as did the description of Shape Five .

by this participant. The transfer of a concept was not successful resulting in an inaccurate description. Another example is provided by Participant G-A5-G who described Shape Two inaccurately in English and German:

{*Holistic analogical*} 'This looks like a ship on dry land.'

The German descriptions of this shape was:

{*Holistic analogical*} 'Sieht aus wie ein Boot [h] ... [h] mit einem Unterteil.'

(Translation: {*Holistic analogical*} Looks like a boat [h] ... [h] with a bottom part.)

The protocols confirm the quantitative analysis of the word and time measures. Participants of Subgroup GA used only few words to describe the shapes in both languages. There are two possible explanations for the dominant use of the holistic analogical approach and the problems these participants had solving the task: One, participants used this approach because it is the most economical and allows them to function socially and efficiently in the L2 environment on a daily basis. Participants of Subgroup GA are able to function that way through their contact with the German language and culture that enables them to develop their cultural awareness and experience. Byram emphasizes the importance of those two skills in language learning (Byram & Buttjes, 1991; Byram, 1997) to mediate between language and culture. However, the protocols showed that these participants used code-switches and transfers

from their L1 to their L2 supporting the argument that at this level of proficiency those skills are not fully developed to use abstract concepts in the L2. Instead, participants relied on their L1 skills. This is the same result that was found for Subgroup CA. Two, participants of Subgroup GA did not use the other four strategies very often because they did not learn how to use them. In relation to communication strategies, Bialystok (1990) and Cohen (1998) mention that a foreign language classroom is a source where students can learn how to solve problems. The small amount of the L2 formal instruction participants of Subgroup GA had might have worked as a disadvantage. In summary, while participants of Subgroup CA and of Subgroup GA relied on their L1 skills to solve the referential problems, the former sometimes had difficulties solving the task because of the lack of contact with the L2 and target culture while the latter sometimes had difficulties solving the task due to a lack of formal instruction.

The answers given in the interviews by participants of Subgroup GA are different from the ones given by participants of Subgroup CA. Participants of Subgroup GA did not consider their use of transfers very helpful. Some participants showed signs of frustration by having to use transfers to solve the task. For example, Participant G-A1-E said: "Some things in English don't exist in German. So you can't solve the problem in German and when you try to translate from English it doesn't work, either," and Participant G-A2-G answered: "I am not sure what I did in the exercise. I mean, I used English but I didn't want to." There are no differences in the answers between the participants who started the task in English and the ones who started the task in German. All ten participants of Subgroup GA said that they were thinking in both languages when solving the task in German. Three of the five participants who started the task in English

remembered how they solved the task in English when solving it in German. Two of them considered the shapes to be the same, the other three participants considered them to be similar. Four of the five participants who started the task in German remembered how they solved the task in German when solving it in English. Three of them considered the shapes to be the same and the other participants considered them to be similar.

In conclusion, it should be noted that although participants of Subgroup GA were critical about using transfers from the L1 to the L2, these transfers were used often to describe the shapes. In some cases, they were used efficiently to describe the shapes accurately.

5.5.2 Subgroup GB

Table 5.15 displays the types and rates of strategies used, the total number of strategies used, and the number of shapes described accurately in Subgroup GB in English and German.

Table 5.15: Strategies used by Subgroup GB (E/G)

	HA	HG	PA	PG	L	T	N
G-B1-E to G-B5-E	21/24	8/10	3/3	0/6	6/1	38/44	29/26
G-B1-G to G-B5-G	29/28	8/6	1/2	0/1	0/2	38/39	29/27

Legend: The abbreviations used are HA (Holistic analogical), HG (Holistic geometrical), PA (Partitive analogical), PG (Partitive geometrical), L (Linear), T (total number of strategies used), and N (number of shapes described accurately). The numbers on the left in each column refer to the English descriptions and the numbers on the right in each column to the German descriptions. The abbreviations G-B1-E to G-B5-E refer to the five participants who started the task in English, the abbreviations G-B1-G to G-B5-G to the five participants who started the task in German. For example, the five participants who started the task in English used the holistic analogical strategy (HA) 21 times when describing the shapes in English and 24 times when describing the shapes in German.

In Subgroup GB, the number of strategies used to describe the six shapes by all ten participants is not substantially different comparing the English with the German descriptions. All participants used the holistic analogical strategy the most of all five strategies in both languages and there are no considerable differences using this strategy in English compared to German. Participants described most shapes very similarly in English and German regardless in what language they had started the task. For example, Participant G-B1-E described Shape One in English as a circle:

{Holistic geometrical} 'This shape is a circle with three little circles in it.'

In German, the description also refers to a circle:

{Holistic geometrical} 'Das ist eigentlich ein Kreis ... der ist aber unterbrochen durch drei andere Kreise, also drei Kreise in einem Kreis.'

(Translation: *{Holistic geometrical}* That is really a circle ... however, that is broken up by three other circles, so three circles in a circle.)

Participants of Subgroup GB used one of the holistic strategies to describe the shapes as illustrated in the example. They were able to solve the task in English and most participants also solved the task in German regardless of the language they used first. Participants G-B1-E to G-B5-E used the holistic analogical strategy 55.3% of all strategies used in English and 54.5% of all strategies used in German. The second most used strategy is the holistic geometrical strategy at 21.1% in English and at 22.7% in

German. These participants accurately described 29 shapes in English and 26 shapes in German. Participants G-B1-G to G-B5-G used the holistic approach more often. The holistic analogical strategy is used 76.3% of all strategies in English and 71.8% of all strategies used in German. The second most used strategy is the holistic geometrical strategy at 21.1% in English and at 15.4% in German. These participants accurately described 29 shapes in English and 27 shapes in German.

The example of the description of Shape One of Participant G-B1-E shows that the holistic geometrical strategy was transferred from the L1 to the L2. Participants of Subgroup GB often used these transfers. Another example is provided by Participant G-B1-G who described Shape Five as an hour-glass with two antennas in German which was the first of the two descriptions:

{*Holistic analogical*} '[h] <4> das sieht wie eine (sic!) Stundenglas (sic!) aus mit [h] ... zwei Antennen ... Antenne (sic!), ja.'

(Translation: {*Holistic analogical*} [h] <4> it looks like an hour-glass with [h] ... two antennas ... antenna, yes.)

The use of the word 'Stundenglas' in German indicates that the concept was transferred from English because the equivalent of hour-glass in German is 'Sanduhr' (sand-clock). In English, this participant used a very similar description:

{*Holistic analogical*} [h] <3.5> 'This is an hour-glass with definitely two antennas pointing out of the top half of the hour-glass downwards.'

Some descriptions of participants of Subgroup GB also show that shapes were conceptualized in German (see below). Table 5.16 illustrates that participants who started the task in English made most strategy changes in German but not in English when describing the same shape. They also made a few non-identical changes (E/G 1 category). It indicates that they adjusted their descriptions in German successfully. These adjustments were made when transfers were used as well when a shape was conceptualized in German. Table 5.16 displays the frequency of strategy changes made by participants in English, German, or both languages.

Table 5.16: Number of strategy changes made by Subgroup GB

	E 1	E 2	E 3	G 1	G 2	G 3	E/G 1	E/G 2	E/G 3
G-B1-E to G-B5-E	2	1	0	7	1	0	1/3	0/0	0/0
G-B1-G to G-B5-G	2	0	0	2	0	0	2/3	0/0	0/0

Legend: The abbreviations used are E1 (one strategy change made in English but not in German when describing the same shape), E2 (two strategy changes), E3 (three or more strategy changes); G1 (one strategy change made in German but not in English when describing the same shape), G2 (two strategy changes), G3 (three or more strategy changes); E/G1 (one strategy change in English as well as in German when the same shape was described. The number on the left refers to identical changes, e.g. in both languages the change occurred from holistic analogical to partitive analogical. The number on the right refers to non-identical changes), E/G2 (two strategy changes), E/G 3 (three or more strategy changes). The abbreviations G-B1-E to G-B5-E refer to the five participants who started the task in English and the abbreviations G-B1-G to G-B5-G to five participants who started the task in German. For example, the five participants who started the task in English made a total of two strategy changes in the E1 category.

An example of conceptualizing a shape in German is provided by Participant G-B1-E who described Shape Two in English using the partitive geometrical strategy:

{*Partitive geometrical*} 'Is round on top and the left side >> and the right side are symmetrical.'

In German, this participant described Shape Two by making reference to a vase and changing the strategy:

{*Partitive geometrical*} 'Die zweite Figur is nicht symmetrisch und [h] hat oben einen Bogen und die linke und rechte Seite <2> {*Change of strategy: Holistic analogical*} eigentlich eine Vase, die unten schmaler wird.'

(Translation: {*Partitive geometrical*} The second shape is not symmetrical and [h] on top is a curve and the left and right side <2> {*Change of strategy: Holistic analogical*} actually a vase that gets narrower at the bottom.)

Table 5.16 illustrates that the participants who started the task in German only made few strategy changes. The analysis revealed that Participants G-B1-G to G-B5-G used the holistic analogical strategy more often than Participants G-B1-E to G-B5-E. Consequently there are fewer changes. Similar to the participants who started the task in English, they also conceptualized some shapes in German.

The interviews give more insight into how participants approached the task. The answers given in the interviews differed among participants who started the task in English from those who started the task in German. The participants who started the task in English all said that they were using their knowledge of how they solved the task the first time to solve it the second time. They considered the shapes to be the same. Of the participants who started the task in German only two gave this answer. Of the other three participants, one participant answered not remembering how he or she solved the task in German when it had to be solved in English, and two participants said that they

remembered it half way through the second time they did the task. These three participants hesitated when answering the question if the shapes were similar or the same. Their answers indicate that starting the task in German was difficult. These participants could not draw on their experience solving referential problems when doing the task in German. Consequently, they showed less flexibility when solving the task. However, participants who started the task in German were equally successful in describing the shapes in German accurately as those who started the task in English.

The remaining answers of the interviews are similar among all ten participants. They all said that they were thinking in English and German when describing some of the shapes in German. They transferred concepts and all saw limitations in using transfers. For example, participant G-B4-E said: "It is difficult when you cannot make a connection." However, they also said that they were thinking in German when describing some of the shapes. For example, Participant G-B3-E did not want to use transfers: "It's more difficult to transfer because it cannot be expressed the same way." Participants G-B3-G said: "It depends. Some shapes reminded me of something in German. Then I used German. Some didn't."

In summary, participants of Subgroup GB solved most of the referential problems in German by using transfers from the L1 to the L2 and sometimes conceptualizing a shape in their L2. The protocols also show that their speech was disfluent to some degree in German but not as disfluent as it was for Subgroup CB. The contact, participants of Subgroup GB had with the L2 and target culture, seemed to benefit them in referential communication.

5.5.3 Subgroup GC

Table 5.17 displays the frequency by type of the strategies used, the total number of strategies used, and the number of shapes described accurately in Subgroup GC in English and German.

Table 5.17: Strategies used by Subgroup GC (E/G)

	HA	HG	PA	PG	L	T	N
G-C1-E to G-C5-E	31/31	7/8	9/7	10/15	12/11	69/72	29/29
G-C1-G to G-C5-G	31/30	9/8	16/14	7/14	3/5	66/71	30/29

Legend: The abbreviations used are HA (Holistic analogical), HG (Holistic geometrical), PA (Partitive analogical), PG (Partitive geometrical), L (Linear), T (total number of strategies used), and N (number of shapes described accurately). The numbers on the left in each column refer to the English descriptions and the numbers on the right in each column to the German descriptions. The abbreviations G-C1-E to G-C5-E refer to the five participants who started the task in English, the abbreviations G-C1-G to G-C5-G to the five participants who started the task in German. For example, the five participants who started the task in English used the holistic analogical strategy (HA) 31 times when describing the shapes in English and 31 times when describing the shapes in German.

In Subgroup GC, the English and German descriptions of all ten participants are very similar in the number of strategies used as well as in the type of strategy used most frequently in both languages, namely the holistic analogical strategy. In addition, some of the other four strategies were used. Participants G-C1-E to G-C5-E described 29 shapes in English and German accurately. Participants G-C1-G to G-C5-G described 30 shapes in English and 29 shapes in German accurately. An example of a similar description in English and German of the same shape is provided by Participant G-C3-E:

{*Holistic analogical*} 'Yeah, this looks like some sort of a spaceship ... an alien spaceship. {*Change of strategy: Partitive analogical*} The top part is of a classic flying saucer design and sort of flattened out diagram of Saturn and coming out of the bottom ... I see something that looks like ... almost like a wrench <2> it goes straight down and it has spikes on the right side. That's it.'

In German, the participant used the same two strategies to describe this shape:

{*Holistic analogical*} Das letzte Bild wir haben (sic!) ist ein ausserirdische (sic!) Raumkraft (sic!) oder etwas verflachter Saturn ... also so wie das (sic!) Ringe sein werden [h] {*Change of strategy: Partitive analogical*} der (sic!) untere Seite sieht man [h] ein [h] eine Art Werkzeug ... eine (sic!) Werkzeug oder was <1.5> glaube ich (sic!) das falsche Wort ... diese ... [h] Zange hat zwei Spitzen, die zusammengreifen.

(Translation: {*Holistic analogical*} The last picture is an alien spaceship or a slightly flattened Saturn ... as the rings would be [h] {*Change of strategy: Partitive analogical*} on the bottom you see [h] a [h] a kind of tool ... a tool or something <1.5> I think that word is incorrect ... these ... [h] pliers have two points that grip.)

Often, participants used more than one strategy to describe a shape. Regardless of the language in which they had started the task, participants solved the referential problems. Of the five strategies, participants who started the task in English used the

holistic analogical strategy 44.9% in English and 43.1% in German; participants who started the task in German used it 47.0% in English and 42.3% in German. Participants G-C1-E to G-C5-E used the linear strategy the second most in English representing 17.4% of all strategies used, in German they used the partitive geometrical strategy the second most at 20.8% of all strategies used. Participants G-C1-G to G-C5-G used the partitive analogical strategy the second most in English representing 24.2% of all strategies used, in German they used the partitive geometrical and analogical strategy each at 19.7% of all strategies used. The protocols show that participants did not use different strategies to adjust the description of a shape so it would be accurate but to simply elaborate on the description. Similar to Participant G-C3-E, Participant G-C4-G describes Shape Six as a U.F.O.:

{Holistic analogical} 'Last one, 'I', is [h] like a U.F.O., *{Change of strategy: Partitive analogical}* the top part is like the drawing of a U.F.O., the middle is rounded, the edges are slightly narrowed in ... the end is a tube like shape coming down from the left side of the shape [h] the tube like shape has two pointed edges and they look a little bit like the handle of a side or something like that ... that's what one would grab, but they are very pointy. Okay.'

In German, this participant also described this shape as a U.F.O. using the same two strategies.

{*Holistic analogical*} 'Und diese letzte Form sieht oben aus wie ein UFO, das heisst, es ist eine runde Form [h] die etwas enger wird an den Spitzen ... es sieht wirklich aus wie eine fliegende Untertasse (laughs) aber das, das Teil das unterhalb diese (sic!) Form ist ... {*Change of strategy: Partitive analogical*} unterhalb diese (sic!) Form ist <3> so eine Art Rohr (laughs) ein Rohr, dieses Rohr hat aber zwei Zacken <2> ja, sieht ein bisschen aus wie ein Griff oder so, dieser Zacken ist sehr spitz.'

(Translation: {*Holistic analogical*} And this last shape looks on top like a U.F.O, that is, it is a round shape [h] that narrows towards the edges ... it really looks like a flying saucer (laughs) but that, that part that is below this shape is ... *Change of strategy: Partitive analogical*} below this shape is <3> a kind of pipe (laughs) a pipe, but this pipe has two points <2> yes, looks a bit like a handle or so, this point is very sharp.)

The protocols also show that some shapes were conceptualized in German. For example, Participant G-C5-E described Shape One in English as follows:

{*Holistic analogical*} 'The next shape is [h] <1> a slide three blade of the fan except it looks more sort of like a weapon, like a throwing star kind of shape ... so where the fan has three straight edges, three straight blades [h] as if [h] arranged in a difficult tri [h] three part pattern [h] or under twenty degrees to each other, (sic!) the end of this fan shape [h] <2.5> so the tree ends [h] sort of X-

shaped, so it's by it's axe heads joined together [h] but they don't have smooth lines.'

The same shape was described differently in German by the same participant:

{*Holistic geometrical*} 'Figur eins ist [h] ein bisschen wie eine (sic!) Kreis und es hat drei Abschnitten (sic!) dort und die sind eierförmig und ... ja, es ist als oben (sic!) man (sic!) nimmt eine Kreiseteig (sic!) und dann nimmt (sic!) ein (sic!) eiförmige Schnitte und man macht drei Eiformen auf (sic!) der (sic!) Kreis und ein= (sic!) ist oben links, ein (sic!) ist [h] rechts und ein (sic!) ist unten <1> und ja, das ist das erste.'

(Translation: {*Holistic geometrical*} Shape one is [h] a little bit like a circle and it has three parts and they are egg-shaped and ... yes, it is as if on top you take a circle dough and then you take an egg-shaped piece and you form three egg-shapes onto the circle and one= is top left, one is [h] right and one is below <1> and yes, that is the first one.)

Considering the length of the descriptions of the examples provided, the speech is not disfluent in German. Regardless of the language in which the participants had started the task, they solved the referential problems by using transfers from the L1 to the L2 or conceptualizing shapes in their L2. Participants made most strategy changes in the E/G categories. Some shapes were described making two or more changes in English as well as in German describing the same shape. The majority of the changes are non-identical.

Table 5.18 displays the number of strategy changes made by participants in English, German, or both languages.

Table 5.18: Number of strategy changes made by Subgroup GC

	E 1	E 2	E 3	G 1	G 2	G 3	E/G 1	E/G 2	E/G 3
G-C1-E to G-C5-E	4	1	0	2	1	0	3/4	1/3	0/2
G-C1-G to G-C5-G	4	0	0	3	1	0	4/5	3/4	0/1

Legend: The abbreviations used are E1 (one strategy change made in English but not in German when describing the same shape), E2 (two strategy changes), E3 (three or more strategy changes); G1 (one strategy change made in German but not in English when describing the same shape), G2 (two strategy changes), G3 (three or more strategy changes); E/G1 (one strategy change in English as well as in German when the same shape was described. The number on the left refers to identical changes, e.g. in both languages the change occurred from holistic analogical to partitive analogical. The number on the right refers to non-identical changes), E/G2 (two strategy changes), E/G 3 (three or more strategy changes). The abbreviations G-C1-E to G-C5-E refer to the five participants who started the task in English and the abbreviations G-C1-G to G-C5-G to five participants who started the task in German. For example, the five participants who started the task in English made a total of four strategy changes in the E1 category.

Results indicate that the German proficiency of participants of Subgroup GC was high enough that they had all strategies at their disposal and chose whatever strategy seemed appropriate to describe the shapes. This supports the quantitative analysis of the word and time measures indicating that these participants 'played' with the language by choosing several accurate descriptions. The interviews show that by living in Germany for three or four years, participants had developed their German language skills sufficiently so that they could solve abstract L2 problems successfully.

In Subgroup GC, all ten participants said that they were thinking in German when solving the task in German. However, four participants also answered that they used transfers to some degree. For example, Participant G-C3-G answered: "That depends on the shape. When it reminds me of something in Canada, I translate it from English, when

it reminds me of something in Germany, I don't." Participant G-C4-E replied: "The shapes are so abstract that it was difficult to differentiate where the concept came from, but I tried to think in German all the time." In addition to these four participants, Participant G-C2-E described the shapes very similarly although giving no indication for the use of transfers. All ten participants considered the shapes to be the same and remembered how they solved the task the first time once they started it the second time and had to solve it again.

In summary, participants of Subgroup GC were confident using the German language when solving referential problems. They met the high demands that the processing of semantic-conceptual information places on the cognitive system (Greene & Capella, 1986; Levelt, 1989) in their L1 as well as in their L2. The quantitative analysis showed that participants of Subgroup GC were less efficient processing a message in German than in English. However, the daily contact with the L2 and target culture enabled participants of Subgroup GC to use L2 concepts in their referential communication.

5.5.4 Comparing the three subgroups

In Group G, there are substantial differences in the performance of the three subgroups. Table 5.19 displays the frequency of strategies used by type, the total number of strategies used and the number of shapes described accurately by the three subgroups.

Table 5.19: Strategies used by Group G (E/G)

	HA	HG	PA	PG	L	T	N
GA	55/48	9/7	3/4	6/2	4/2	77/63	50/46
GB	50/52	16/16	4/5	0/7	6/3	76/83	58/53
GC	62/61	16/16	25/21	17/29	15/16	135/143	59/58

Legend: The abbreviations used are HA (Holistic analogical), HG (Holistic geometrical), PA (Partitive analogical), PG (Partitive geometrical), L (Linear), T (total number of strategies used), and N (number of shapes described accurately). The numbers on the left in each column refer to the English descriptions and the numbers on the right in each column to the German descriptions. The abbreviations GA, GB, GC refer to the three subgroups. For example, the ten participants of subgroup GA used the holistic analogical strategy (HA) 55 times when describing the shapes in English and 48 times when describing the shapes in German.

In Subgroup GA, the total number of strategies used is 18.2% less in German compared to English; in Subgroup GB it is 8.4% more and in Subgroup GC it is 5.6% more. The holistic analogical strategy is used the most in both languages. The lower the proficiency level, the more dominantly it is used in English as well as in German. In Subgroup GA it is used at 71.4% of all strategies in English and 76.2% in German; in Subgroup GB it is used at 65.8% of all strategies in English and 62.7% in German; in Subgroup GC it is used at 45.9% of all strategies in English and 47.2% in German. At the low level of proficiency, other strategies are not used much while participants described 50 shapes accurately in English and 46 shapes in German. At the intermediate level of proficiency participants stayed within the holistic approach describing 58 shapes accurately in English and 53 shapes in German. At the high level of proficiency of Group G all strategies are used and 59 shapes are described accurately in English and 58 in German. Participants of Subgroup GC used approximately twice as many strategies to describe the shapes in English and German compared to Subgroups GA and GB.

The following examples of the description of Shape One in English and German show differences between the three subgroups. Participant G-A1-G described this shape inaccurately in both languages using the holistic analogical strategy:

{Holistic analogical} 'A weather-symbol for a tornado turned backwards.'

In German, the participant also described this shape as a weather-symbol:

{Holistic analogical} 'Okay' <1> sieht aus wie ein Wetter, ein Wetter ...

Wettersymbol [h] es ist ein Wettersymbol aber << andersrum (sic!) ein

Wettersymbol für ein (sic!) Tornado ... aber andersrum.'

(Translation: *{Holistic analogical}* 'Okay' <1> looks like a weather, a weather ... weather-symbol [h] it is a weather-symbol but << backwards, a weather-symbol for a tornado ... but backwards.)

In the description above, the participant transferred a concept from the L1 to the L2 which was a commonly used strategy of Subgroup GA. Participants did not use many other strategies to adjust the descriptions in German. However, often the descriptions were accurate. In Subgroup GB, participants also transferred concepts from the L1 to the L2. In addition, they sometimes conceptualized a shape in their L2. They solved more referential problems than participants of Subgroup GA. In addition to the holistic analogical strategy participants of Subgroup GB also used the holistic geometrical

strategy in both languages. For example, Participant G-B5-E described Shape One in English as a circle, a Celtic symbol and ice-skates:

{*Holistic analogical*} 'Next one is like a Celtic symbol [h] ... {*Change of strategy: Holistic geometrical*} it's like a circle but within the circle there is (sic!) three points, almost like the Isle of Man sign ... so it's got three circles missing out of the main circle and it's got all drawn lines [h] so you can see where the three circles have been cut out. It's got three points, no, it's got six points, I guess, {*Change of strategy: Holistic analogical*} it's a bit like pointy shoes, ice-skates, going in front a bit and then back.'

In German, this participant also described the shape as a circle and a skate, transferring from the L1 to the L2:

{*Holistic geometrical*} 'Wieder ist das so eine Kreisform <1> >> aber es ist auch kein vollständiger Kreis, das ist ein bisschen eiförmig << und wieder sind diese Halbkreise daraus <2> geschnitten ... aber wieder mit den dicken schwarzen Linien halt, die [h] da diese [h] zeigen, dass die nicht da sind, also das die dann fehlen [h] <2> (laughs) es ist auch scharfkantig wieder <3> {*Change of strategy: Holistic analogical*} diese Schlittschuhform irgendwie ganz unten ... diese drei Schlittschuhformen [h] ja, daran könnte man das erkennen vielleicht.'

(Translation: {*Holistic geometrical*} Again a circular shape <1> >> but it is not a full circle, it is a bit like an egg << and there are those half-circles cut <2> out ...

again with the thick black lines, that [h] that [h] show, that they are not there, so that they are missing [h] <2> (laughs) again it is sharply edged <3> {*Change of strategy: Holistic analogical*} but that ice-skate-shape below ... those three ice-skate-shapes [h] yes, maybe you can recognized it by that.)

Participants of Subgroup GC used all five strategies in both languages to describe the shapes. They transferred concepts from the L1 to the L2 and conceptualized shapes in their L2. The description of Shape Six by Participant G-C5-G shows that different words were used in English and German to describe this shape but that they were part of the same strategy. In English, this participant described the shape as a circle and an axe:

{*Holistic geometrical*} 'This thing is like a circle that someone has taken three bites out of it (sic!) ... [h] has taken three huge bites out of it {*Change of strategy: Holistic analogical*} so that it's now like an ax <1> it's like three axis, then (sic!) chopping of the handles of the axis and then joining the three axis together where the handles are broken from (sic!). But each axe has a very pointed end or rather like a mouth <1> and the points of the ends of the (sic!) each axe have a very sharp line, they go down.'

In German, Participant G-C5-G described this shape as a star, an ax, a tomato and a cookie:

{*Holistic analogical*} 'Das ist ein Stern aber (sic!) nicht kreisförmig, also kein Stern, eher wie eine Axt ... also der Kopf einer Axt, drei Köpfe einer Axt zusammengetan ... und da wo sie sich treffen ist keine, keine, wie soll ich das nennen <5> nee, sagen wir du hättest eine Scheibe Tomate, rundes (sic!) und flaches (sic!), und <1> nein, nimm dir einen Keks und beiss dreimal rein, an drei verschiedenen Stellen und da sieht man dann die Form deines Bisses, von deinem Mund.'

(Translation: {*Holistic analogical*} That is a star but not circular shaped, so not a star, more like an axe ... the head of an axe, three heads of an axe put together ... where they meet is no, no, how should I call that <5> no, let's say you have a slice of tomato, round and flat, and <1> no, take a cookie and take three bites at three different spots and then we see the shape of your bite, of your mouth.)

Comparing the three subgroups, there are differences in the use of the other strategies besides the holistic analogical one. In Group C, the second most used strategy at each level of proficiency was either the partitive analogical or the partitive geometrical strategy. In Group G, that was different. At the low and intermediate level of proficiency, the holistic geometrical strategy was used the second most in both languages at 11.7% in English and 11.1% in German by Subgroup GA and at 21.1% in English and 19.3% in German by Subgroup GB. At the high level of proficiency, the partitive analogical strategy was used the second most at 18.5% in English and the partitive geometrical strategy at 20.3% in German by Subgroup GC.

Using more strategies than the other two subgroups, participants of Subgroup GC also made the most strategy changes of the three subgroups. Most changes were made in the E/G categories and the majority of them were non-identical. There are two explanations: One, participants of this subgroup conceptualized shapes in their L2 and needed to make adjustments to their descriptions. Two, they elaborated on their descriptions although it was already described accurately.

Table 5.20 displays the number of strategy changes made by Subgroups GA, GB, and GC.

Table 5.20: Number of strategy changes made by Group G

	E 1	E 2	E 3	G 1	G 2	G 3	E/G 1	E/G 2	E/G 3
GA	2	4	0	1	0	0	1/5	0/0	0/0
GB	4	1	0	9	1	0	3/6	0/0	0/0
GC	8	1	0	5	2	0	7/9	4/7	0/3

Legend: The abbreviations used are E1 (one strategy change made in English but not in German when describing the same shape), E2 (two strategy changes), E3 (three or more strategy changes); G1 (one strategy change made in German but not in English when describing the same shape), G2 (two strategy changes), G3 (three or more strategy changes); E/G1 (one strategy change in English as well as in German when the same shape was described. The number on the left refers to identical changes, e.g. in both languages the change occurred from holistic analogical to partitive analogical. The number on the right refers to non-identical changes), E/G2 (two strategy changes), E/G 3 (three or more strategy changes. The abbreviations GA, GB, GC refer to the three subgroups. For example, the ten participants of Subgroup GA made a total of two strategy changes in the E1 category.

The analysis of participants of Subgroup GA and Subgroup GB showed that they mostly used transfers from the L1 to the L2. Non-identical changes were only made in the E/G 1 category. A difference between Subgroup GA and Subgroup GB is the high number of strategy changes made in German but not in English when describing the same

shape by participants of Subgroup GB. These participants sometimes also conceptualized a shape in their L2. The protocols show that it was difficult for them and that they needed to change strategies to describe shapes accurately.

In summary, while in Group C participants of Subgroup CA and CB often relied on their L1 skills to describe the shapes in German, this was only true of participants of Subgroup GA in Group G. The protocols of these three subgroups show occasional code-switches⁶. Some of these participants mentioned their difficulties solving the task in German in the interviews. Some of the findings for Subgroup CA, GA, and CB also apply to Subgroup GB. However, participants of Subgroup GB also conceptualized some shapes successfully in German as did participants of Subgroup CC and Subgroup GC. Most interesting is the comparison of Subgroup CB with Subgroup GB. In the analysis of Group C, it was said that at a lower level of proficiency, which included participants of Subgroup CB, participants could often not carry out the process of creating a comprehensible message which requires the speaker to replace one semantic-conceptual framework with another (Levelt, 1989). The analysis of Group G confirms this finding for participants of Subgroup GA but not for participants of Subgroup GB. At the intermediate level of proficiency, the contact of speakers with the L2 and target culture often enabled them to solve the referential problems in the L2 more successfully than speakers whose knowledge of the L2 is based on formal instruction. The comparison of Group C with Group G is discussed in more detail in the following section.

⁶ It should be noted that most researchers consider code-switching to be an orderly phenomenon used by all bilingual speakers in bilingual communities. Code-switches serve different linguistic and social functions (Myers-Scotton, 1995, 1997).

5.6 Comparing the German descriptions of Group C with Group G

The comparison of the German descriptions of Group C with Group G is based on the data already collected for Group C and Group G and presented in Sections 5.4 and 5.5. Two types of tables are used to compare the results. One table shows the frequency of the five strategies used, the total number of strategies used, and the number of shapes described accurately in German by the participants of the six subgroups. The other table shows the number of strategy changes made in German and in both languages.

5.6.1 Subgroups CA/GA

Table 5.21 displays the frequency of strategies used by type and the total number of strategies used in German as well as the number of shapes described accurately in German by Subgroups CA and GA. The ten participants of each subgroup are divided into five participants who started the task in English (Participants A1-E to A5-E) and five participants who started the task in German (Participants A1-G to A5-G). The numbers on the left give the results for Subgroup CA and the numbers on the right for Subgroup GA.

Table 5.21: Strategies used in German by Subgroups CA/GA

	HA	HG	PA	PG	L	T	N
A1-E to A5-E	24/25	1/4	2/2	7/1	2/0	36/32	20/22
A1-G to A5-G	24/23	6/3	3/2	7/1	2/2	42/31	22/24

Legend: The abbreviations used are HA (Holistic analogical), HG (Holistic geometrical), PA (Partitive analogical), PG (Partitive geometrical), L (Linear), T (total number of strategies used), and N (number of shapes described accurately). The numbers on the left in each column refer to Subgroup CA and the numbers on the right in each column to Subgroup GA. For example, the five participants who started the task in English (Participants A1-E to A5-E) of Subgroup CA used the holistic analogical strategy (HA) 24 times when describing the shapes in German and the ones of Subgroup GA 25 times.

At the low level of proficiency, there are some differences between the participants of Subgroup CA and the participants of Subgroup GA describing the shapes in German. The participants of Subgroup GA identified more shapes while using less strategies. Participants A1-E to A5-E of Subgroup GA described 22 shapes accurately and used a total of 32 strategies in total while Participants A1-E to A5-E of Subgroup CA described 20 shapes accurately and used a total of 36 strategies in total. Similarly, Participants A1-G to A5-G of Subgroup GA described 24 shapes accurately and used a total of 31 strategies in total and Participants A1-G to A5-G of Subgroup CA described 22 shapes accurately and used 42 strategies in total. These differences are not substantial. The numbers indicate that participants in both subgroups had difficulties solving the task. In both subgroups participants used the holistic analogical strategy to solve the referential problems. For example, Participant C-A3-G described Shape Three in German inaccurately:

{*Holistic analogical*} 'Ein (sic!) kaputte Vase auf dem Tisch oder so.'

(Translation: {*Holistic analogical*} A broken vase on a table or so.)

Participant G-A1-E also described this shape inaccurately in German:

{*Holistic analogical*} '[h] <1> gebrochene (sic!) Tassen.'

(Translation: {*Holistic analogical*} [h] <1> broken cups.)

However, most participants of both subgroups described Shape Three accurately. For example, participant C-A2-E described it as a king's hat transferring the concept of crown from English to German. This participant used the partitive geometrical strategy in addition to the holistic analogical approach to describe the shape in detail:

{*Holistic analogical*} '[h] <4> Der Hutte (sic!) eines Königs {*Change of strategy: Partitive geometrical*} aber die Linksseite (sic!) ist höher als [h] ... die Rechtsseite (sic!) <1> und [h] <5> gibt es (sic!) nur <2> eine (sic!), ein (sic!) anderer (sic!) Punkt [h] <3> in [h] in der Mitte, zwischen [h] zwischen die (sic!) Links (sic!) und Rechtsseite (sic!) <14> und die (sic!) Punkt in der Mitte ist [h] ist am kleinsten <4>.'

(Translation: {*Holistic analogical*} [h] <4> The hat of a king {*Change of strategy: Partitive geometrical*} but the left side is higher than [h] ... the right side <1> and [h] <5> there is only <2> one, one other point [h] <3> in [h] the center, between [h] between the left and the right side <14> and this point in the center [h] is the smallest <4>.)

Participant G-A2-G also described Shape Three as a crown in German using the holistic analogical strategy successfully:

{*Holistic analogical*} <2> Eine Krone. Von eine (sic!) König.'

(Translation: {*Holistic analogical*} <2> A crown. Of a king.)

Participants of Subgroup GA used the holistic analogical strategy more often in German than participants of Subgroup CA who used the partitive geometrical strategy to some degree. Participants A1-E to A5-E of Subgroup CA used the holistic analogical strategy 66.7% of all strategies in German and of Subgroup GA 78.1% of all strategies in German; Participants A1-G to A5-G of Subgroup CA used it 57.1% and of Subgroup GA 74.2%. The second most used strategy for participants of Subgroup CA is the partitive geometrical strategy at 19.4% (Participants A1-E to A5-E) and at 16.7% (Participants A1-G to A5-G); for participants of Subgroup GA it is the holistic analogical strategy at 12.5% (Participants A1-E to A5-E) and the holistic geometrical strategy at 9.7% (Participants A1-G to A5-G).

All twenty participants had difficulties solving the task in German. The analysis of Subgroup CA (see Section 5.4.1) and Subgroup GA (see Section 5.5.1) showed that participants in both subgroups relied on their L1 skills to describe the shapes accurately. The comparison of the two subgroups in the German descriptions shows that participants of Subgroup GA were efficient using the holistic approach describing more shapes accurately than participants of Subgroup CA. Participants of Subgroup CA had to make more adjustments to their descriptions and made more strategy changes than participants

of Subgroup GA. Most of those changes, using the partitive geometrical strategy in addition to the holistic analogical strategy, were identical and non-identical strategy (see Table 5.22). The majority of strategy changes made by participants of Subgroup GA were non-identical, indicating that they relied on their L1 skills less than participants of Subgroup CA. However, differences between the two subgroups are not substantial.

Table 5.22 displays how many strategy changes were made by participants in German or in both languages.

Table 5.22: Number of strategy changes made in German by Subgroups CA/GA

	G 1	G 2	G 3	E/G 1	E/G 2	E/G 3
A1-E to A5-E	2/0	0/0	0/0	3/3 // 1/4	0/0 // 0/0	0/0 // 0/0
A1-G to A5-G	0/1	0/0	0/0	4/5 // 0/1	1/1 // 0/0	0/0 // 0/0

Legend: The abbreviations used are G1 (one strategy change made in German but not in English when describing the same shape), G2 (two strategy changes), G3 (three or more strategy changes); E/G1 (one strategy change in English as well as in German when the same shape was described. The number on the left refers to identical changes, e.g. in both languages the change occurred from holistic analogical to partitive analogical. The number on the right refers to non-identical changes), E/G2 (two strategy changes), E/G 3 (three or more strategy changes). The abbreviations A1-E to A5-E refer to the five participants who started the task in English of Subgroups CA and GA and the abbreviations A1-G to A5-G to five participants who started the task in German of Subgroups CA and GA. For example, the five participants who started the task in English of Subgroup CA made a total of two strategy changes in the G1 category and the ones of Subgroup GA made no strategy changes.

It also has to be noted that all twenty participants made hardly any strategy changes in German. Taking into account the difficulties participants had in solving the referential problems, these numbers support the argument that participants were often not able to use different strategies. Their approach to describe the abstract shapes was limited by conceptualizing the shapes making a holistic analogical reference. The analysis of Subgroup CA (see Section 5.4.1) and Subgroup GA (see Section 5.5.1) showed that

participants also had difficulties solving the task in their L1. In the application of Levelt's model of speech production (1989, 1992) to the L2, De Bot (1992) argues that there are links between the L1 and the L2 at the semantic-syntactic level which is connected to the conceptualizer. The results of this study show that in referential communication using those links causes problems at a low level of proficiency. The process of creating a comprehensible message by conceptualizing abstract shapes was often not carried out successfully.

5.6.2 Subgroups CB/GB

Table 5.23 displays the frequency of strategies used by type, the total number of strategies used, and the number of shapes described accurately in Subgroups CB and GB.

Table 5.23: Strategies used in German by Subgroups CB/GB

	HA	HG	PA	PG	L	T	N
B1-E to B5-E	29/24	3/10	9/3	7/6	3/1	51/44	21/26
B1-G to B5-G	26/28	6/6	11/2	4/1	2/2	49/39	27/27

Legend: The abbreviations used are HA (Holistic analogical), HG (Holistic geometrical), PA (Partitive analogical), PG (Partitive geometrical), L (Linear), T (total number of strategies used), and N (number of shapes described accurately). The numbers on the left in each column refer to the English descriptions and the numbers on the right in each column to the German descriptions. The abbreviations B1-E to B5-E refer to the five participants who started the task in English of Subgroups CB and GB, the abbreviations B1-G to B5-G to the five participants who started the task in German of Subgroups CB and GB. For example, the five participants who started the task in English of Subgroup CB used the holistic analogical strategy (HA) 29 times when describing the shapes in German and the ones of Subgroup GB 24 times.

At the intermediate level of proficiency, differences between the two subgroups are particularly noticeable regarding the number of shapes described accurately by the participants who started the task in English. The number of strategies used is not

substantially different comparing Subgroup CB with Subgroup GB. Participants G-B1-E to G-B5-E described more shapes accurately (26 shapes) than Participants C-B1-E to C-B5-E (21 shapes) while using less strategies in total (Subgroup GB: 44 strategies, Subgroup CB: 51 strategies). Participants who started the task in German described the same number of shapes (27 shapes) accurately while Participants G-B1-G to G-B5-G used less strategies in total (39 strategies) than Participants C-B1-G to C-B5-G (49 strategies). Participants of Subgroup GB used the holistic approach more successfully than participants of Subgroup CB. For example, Participant G-B2-E described Shape Five using both holistic strategies efficiently in German:

{Holistic analogical} 'In dem nächsten Bild <3> was ziemlich monumental wirkt <1> haben wir zwei nach oben ragende Pfeile *{Change of strategy: Holistic geometrical}* die ein umgekehrtes Dreieck betragen (sic!).'

(Translation: *{Holistic analogical}* In the next picture <3> which is quite monumental <1> we have two arrows that point up *{Change of strategy: Holistic geometrical}* to form an upside down triangle.)

In comparison, Participant C-B4-E described this shape inaccurately in German using a code-switch:

'<11> Ich weiss nicht, wie man auf Deutsch ... wie man 'triangle' auf Deutsch sagt *{Linear}* aber es gibt, es gibt <8> es gibt etwas (sic!) elf Linien und <5> und <5> es gibt eine 'I' Punkt zwischendrin <9>.'

(Translation: <11> I don't know how you say in German ... how you say 'triangle' in German {*Linear*} but there are, there are <8> there are eleven lines and <5> and <5> an 'I' point in between.)

Participant C-B4-E wanted to use the holistic geometrical strategy by transferring the concept of a 'triangle' to German. This participant then used the linear strategy but without giving an accurate description. It has to be noted that in the description of this or some of the other five shapes only two of the five participants of Subgroup CB who started the task in English did not use code-switches when describing a shape in German.

All twenty participants used the holistic analogical strategy most often to describe the shapes in German. The other four strategies are used to some degree, in particular the partitive strategies (Subgroup CB) and the holistic geometrical strategy (Subgroup GB). In relation to the total number of strategies used, Participants C-B1-E to C-B5-E used the holistic analogical strategy at 56.9% in German and the partitive analogical strategy the second most at 17.6%; Participants G-B1-E to G-B5-E used the holistic analogical strategy at 54.5% and the holistic geometrical strategy the second most at 22.7%.

The participants of both subgroups who started the task in German described the same number of shapes accurately in German. Participants C-B1-G to C-B5-G used the holistic analogical strategy at 53.1% in German and the partitive analogical strategy at 22.4%; Participants G-B1-G to G-B5-G used the holistic analogical strategy at 71.8% and the holistic geometrical strategy at 15.4%. Participants of Subgroup GB used the holistic analogical strategy efficiently. For example, Participant G-B2-G described Shape Four accurately in German.

'Das vierte Bild <2> erinnert mich an gar nichts (laughs) und <5> {*Holistic analogical*} es könnte der Umriss eines Schmetterlings sein wo der Flügel unten ganz gross ist.'

(Translation: The fourth picture <2> reminds me of nothing (laughs) and <5> {*Holistic analogical*} it could be the shape of a butterfly where one wing below is very large.)

In comparison, participants of Subgroup CB who started the task in German used the partitive analogical strategy in addition to the holistic analogical strategy to describe the shapes accurately in German. For example, Participant C-B4-G described Shape Four as an elephant but then added more details:

{*Holistic analogical*} 'Bild vier sieht au (sic!), aus wie ein Elephant <1> [h] aber nicht genau [h] {*Change of strategy: Partitive analogical*} auf (sic!) linken Seit (sic!) gibt es eine <1> kleine [h] <1> Nase der (sic!) [h] eine (sic!) Elephant (sic!), aber dann <2> ist er oben ein bisschen anders und es sieht aus wie [h] das <2> [h] der (sic!) obere Halbe (sic!) eine (sic!) Herze (sic!) und dann auf (sic!) linken, linken Seit (sic!) [h] kommt der (sic!) Linie innen ein bisschen in einer [h] halb (sic!) <1> [h] <2> Mond und dann geht (sic!) die zwei Linien [h] unter wie (sic!) die (sic!) Hals einer (sic!) Elephant (sic!).'

(Translation: {*Holistic analogical*} Picture four looks like an elephant <1> [h] but not exactly [h] {*Change of strategy: Partitive analogical*} on the left side is a <1> small [h] <1> nose of [h] the elephant but then <2> it is a bit different on top and

it looks like [h] the <2> [h] the top half of a heart and then on the left, left side [h] the lines come on the inside in a [h] half <1> [h] <2> moon and then the two lines [h] go to the neck of the elephant.)

Participants of Subgroup CB had more difficulties solving the task in German than participants of Subgroup GB, in particular if they started the task in English. The quantitative analysis of the word and time measures indicated that participants of Subgroup CB were less efficient in processing lexical items in German than participants of Subgroup GB. The protocols show that the speech of participants of Subgroup CB was often disfluent and grammatically incorrect as provided in the example of participant C-B4-G describing Shape Four in German as an elephant. The analysis of Subgroup GB (see Section 5.5.2) revealed that participants adjusted their descriptions in German to describe the shapes successfully. They changed strategies in German as well as using non-identical changes in the E/G 1 category. Table 5.24 displays how many strategy changes were made by participants in German or in both languages.

Table 5.24: Number of strategy changes made in German by Subgroups CB/GB

	G 1	G 2	G 3	E/G 1	E/G 2	E/G 3
B1-E to B5-E	2/7	0/1	0/0	8/3 // 1/3	2/2 // 0/0	0/0 // 0/0
B1-G to B5-G	1/2	0/0	0/0	4/1 // 2/3	2/2 // 0/0	0/0 // 0/0

Legend: The abbreviations used are G1 (one strategy change made in German but not in English when describing the same shape), G2 (two strategy changes), G3 (three or more strategy changes); E/G1 (one strategy change in English as well as in German when the same shape was described. The number on the left refers to identical changes, e.g. in both languages the change occurred from holistic analogical to partitive analogical. The number on the right refers to non-identical changes), E/G2 (two strategy changes), E/G 3 (three or more strategy changes). The abbreviations B1-E to B5-E refer to the five participants who started the task in English of Subgroups CB and GB and the abbreviations B1-G to B5-G to five participants who started the task in German of Subgroups CB and GB. For example, the five participants who started the task in English of Subgroup CB made a total of two strategy changes in the G1 category and the ones of Subgroup GB made seven strategy changes.

In comparison, participants of Subgroup CB did not make many strategy changes in German and most strategy changes in the E/G 1 category are identical, in particular if they started the task in English. The analysis of Subgroup CB revealed that participants relied on their L1 skills. They used transfers from the L1 to the L2 to solve the referential problems in their L2 (see Section 5.4.2). In particular the participants who started the task in English translated these concepts which resulted in the use of code-switches when a translation was not successful. Participants of Subgroup GB also used transfers from their L1 to their L2 but were more flexible in using them. In addition, they conceptualized some shapes in their L2 (see Section 5.5.2).

In conclusion, at the intermediate level of proficiency speakers use the links that exist at the semantic-syntactic level that is connected to the conceptualizer between the L1 and the L2 (De Bot, 1992). However, they use them differently depending on the L2 environment. De Bot (1992) argues that there is a network of subsets of these links.

Results of this study indicate that participants of Subgroup GB make more use of that

network than participants of Subgroup CB. In addition, some participants of Subgroup GB start to use the conceptual-semantic framework they developed in the L2, thereby avoiding interference with the L1 framework. In contrast, some participants of Subgroup CB are restricted to a one-dimensional use of the network translating from the L1 to the L2.

5.6.3 Subgroups CC/GC

Table 5.25 displays the frequency of strategies used by type, the total number of strategies used, and the number of shapes described accurately in Subgroups CC and GC in German.

Table 5.25: Strategies used in German by Subgroups CC/GC

	HA	HG	PA	PG	L	T	N
C1-E to C5-E	29/31	7/8	20/7	7/15	2/11	65/72	27/29
C1-G to C5-G	33/30	5/8	21/14	24/14	3/5	86/71	27/29

Legend: The abbreviations used are HA (Holistic analogical), HG (Holistic geometrical), PA (Partitive analogical), PG (Partitive geometrical), L (Linear), T (total number of strategies used), and N (number of shapes described accurately). The numbers on the left in each column refer to the English descriptions and the numbers on the right in each column to the German descriptions. The abbreviations C1-E to C5-E refer to the five participants who started the task in English of Subgroups CC and GC, the abbreviations C1-G to C5-G to the five participants who started the task in German of Subgroups CC and GC. For example, the five participants who started the task in English of Subgroup CC used the holistic analogical strategy (HA) 29 times when describing the shapes in German and the ones of Subgroup GC 31 times.

At the high level of proficiency, there are minor differences in the use of strategies comparing Subgroups CC and GC. All ten participants of Subgroup CC accurately described 27 shapes each when either starting the task in English or German

and of Subgroup GC all ten participants accurately described 29 shapes each. In Subgroup CC, participants who started the task in English used 65 strategies and in Subgroup GC they used 72 strategies whereas for participants who started the task in German the direction of the results were reverse: Participants C-C1-G to C-C5-G used 86 strategies and Participants G-C1-G to G-C5-G used 71 strategies. Differences exist between the participants who started the task in English and the ones who started the task in German of Subgroup CC. The latter used more strategies, in particular the partitive geometrical strategy in addition to the holistic analogical strategy, to describe the same number of shapes accurately than the former. The analysis (see Section 5.4.3) showed that participants of Subgroup CC had to adjust their descriptions in German but Participants C-C1-G to C-C5-G had to adjust them more often than Participants C-C1-E to C-C5-E.

Participants C-C1-G to C-C5-G also had to adjust the German descriptions more than participants of Subgroup GC. All twenty participants used the holistic analogical strategy the most to describe the shapes in German. In relation to the total number of strategies used, Participants C-C1-E to C-C5-E used the holistic analogical strategy 44.6% and Participants C-C1-G to C-C5-G used it 38.4% in German while Participants G-C1-E to G-C5-E used the holistic analogical strategy 43.1% and Participants G-C1-G to G-C5-G used it 42.3% in German.

All twenty participants also used the other four strategies to describe the shapes accurately in German. For example, Participant C-C3-E described Shape Three using three different strategies:

{*Holistic analogical*} 'Es schaut wie eine <1> Vase aus oder wie eine Krone und <3> {*Change of strategy: Partitive analogical*} auf der Oberseite schaut es aus wie ein Kranz, oder zwei <4> Bindungen, die aneinander gebunden sind.

{*Change of strategy: Partitive geometrical*} Die Oberseite der Figur ist eine Linie, die ein bisschen weiter ist.'

(Translation: {*Holistic analogical*} It looks like a <1> vase or a crown and <3> {*Change of strategy: Partitive analogical*} on top it looks like a wreath or two <4> bindings who are connected to each other. {*Change of strategy: Partitive geometrical*} The top of the shape is a line that goes a bit further.)

Participant G-C2-E described Shape Three in German using two different strategies:

{*Holistic analogical*} 'In diesem ersten Bild, in diesem Bild das ich sehe, sieht es ein bisschen aus wie eine Obstschale [h] ... {*Change of strategy: Linear*} die Form hat einen flachen Boden und ist auf der linken Seite [h] geht es spitz hoch und dann im Bogen wieder runter. In der Mitte füllt sich das nochmal, dann geht es runter wieder ein bisschen ... es geht hoch und der Strich geht dann wieder bis auf den Boden runter >> {*Change of strategy: Holistic analogical*} also eigentlich sieht es aus so ein bisschen wie eine Königskrone, vielleicht auch eine Obstschale.'

(Translation: {*Holistic analogical*} In this picture, in this picture I look at, it looks like a fruit bowl [h] ... {*Change of strategy: Linear*} the shape has a flat bottom

and on the left [h] it goes up and then down again in a curve. In the middle it fills sort of, then continues down again for a bit ... then up and the line then goes down again until it reaches the bottom >> {*Change of strategy: Holistic analogical*} so actually it looks like a crown a bit, maybe a fruit bowl.)

These examples show that participants changed strategies although the shape was already described accurately by using the holistic analogical strategy. The protocols show that some participants, in particular of Subgroup CC, also changed strategies so the description would be accurate. A difference between Subgroup CC and Subgroup GC is that some participants of Subgroup GC described the shapes accurately by starting the description with a different strategy than the holistic approach. For example, Participant G-C2-G described Shape Six using the partitive analogical strategy:

{*Partitive analogical*} 'Wie ein (sic!) Zitrone oben <1> mit Rundungen und zwei Spitzen links und rechts. Auf der linken Seite geht ein Strich schräg ganz nach unten, kommt wieder hoch und hat zwei Zacken wie ein Schlüssel ungefähr und trifft quasi die Zitrone ungefähr in der Mitte.'

(Translation: {*Partitive analogical*} Like a lemon at the top <1> with round forms and two points left and right. On the left side, a line goes diagonally to the very bottom, comes back up and has two peaks like a key and meets quasi the lemon in the center.)

In rare cases, participants of Subgroup CC also started a description with a

different approach than the holistic analogical strategy.

The analysis of Subgroup GC (see Section 5.5.3) revealed that participants were proficient enough to choose any of the five strategies they found most suitable to describe a shape accurately. Although participants of Subgroup CC also successfully solved the referential problems, they often had to adjust their descriptions. For example, Participant C-C4-G described Shape Six by using the holistic analogical and partitive analogical strategies. Using the partitive analogical strategy, the shape is described accurately:

{*Holistic analogical*} 'Und [h] diese Form ist wie ein ... eine Zitrone [h] <4> [h] nicht [h] <5> die Zitrone ist auf <1> ihre (sic!) [h] <1> lange (sic!) Seite [h] ... und um End (sic!), beide Ende (sic!), die Zitrone hat es (sic!) lange [h] Punkte. Sie sind nicht scharf (sic!), aber [h] <1.5> hat (sic!) zwei Kurve (sic!) [h] <1> {*Change of strategy: Partitive analogical*} um (sic!) Oberteil, es ist [h] <3> es geht [h] <2> 'oh, okay' >> die zwei Kurve (sic!) geht (sic!) dünner << [h] denn <1> wann (sic!) die weiter recht (sic!) oder weiter links gehen=, aber am Ende es (sic!) ist [h] nur ein [h] <2> [h] <4> senkrecht (sic!) Linie ... aber sehr klein [h] <3> dann [h] links (sic!) Seit (sic!) gibt es (sic!) Seite, gibt es <1> [h] <11> eine (sic!) Schraubenschlüssel, das ist verkehrtrum [h] und [h] <2> die zwei [h] Punkte sind nicht [h] <3> [h] <9> sie sind nicht glatt, aber sehr [h] scharf (sic!) und sie gehen [h] <1> wie ein, wie zwei Zähne [h] <2> das ist alles, ich (sic!) denke.'

(Translation: {*Holistic analogical*} This [h] shape is like a ... lemon [h] <4> [h] not [h] <5> the lemmon is on <1> its [h] <1> long side [h] ... and around the end,

both ends, the lemon has long [h] points. They are not sharp but [h] <1.5> have two curves [h] <1> {*Change of strategy: Partitive analogical*} on top, it is [h] <3> it becomes [h] <2> 'oh, okay' >> the two curves become thinner << [h] then <1> when to the right or the left they continue=, b=ut at the end is is [h] only one [h] <2> [h] <4> vertical [h] line ... but very small [h] <3> then [h] on the left side, side, is a <1> [h] <11> wrench, that is [h] upside down [h] and [h] <2> the two [h] <1> points are not [h] <3> [h] <9> they are not smooth but very [h] sharp and they go [h] <1> like one, like two teeth [h] <2> that is all, I think.)

This example shows disfluent speech which happened in the descriptions of participants of Subgroup CC. The quantitative analysis of the word and time measures comparing Subgroup CC with Subgroup GC revealed that participants of Subgroup CC were less efficient processing lexical items in German than participants of Subgroup GC. The example also shows an incorrect translation of the English word 'sharp' into German 'scharf' when talking about 'sharp points'. A correct translation would be 'spitz.'

Participants of Subgroup CC often used transfers from their L1 to their L2 although they also conceptualized some shapes in German (see Section 5.4.3) as did participants of Subgroup GC (see Section 5.5.3). However, participants of Subgroup GC were more flexible in the use of all five strategies. The partitive strategies were used second most by all twenty participants. Participants C-C1-E to C-C5-E used the partitive analogical 30.8% of the time and Participants C-C1-G to C-C5-G the partitive geometrical 27.9% of the time. In Subgroup GC, these strategies were used less indicating that the fifth strategy, linear, was used more often. Participants G-C1-E to G-C5-E used the partitive

geometrical 20.8% of the time and Participants G-C1-G to G-C5-G both partitive strategies 19.7% of the time.

Interestingly, participants of Subgroup GC made fewer strategy changes than participants of Subgroup CC. Both subgroups made most changes in the E/G categories and the majority of those changes was non-identical (see Table 5.26). In German, most strategy changes were made by participants of Subgroup CC who started the task in German supporting the results showing that they adjusted their descriptions in order to be accurate.

Table 5.26 displays the number of strategy changes made by participants in German or in both languages by Subgroups CB and GB.

Table 5.26: Number of strategy changes made in German by Subgroups CC/GC

	G 1	G 2	G 3	E/G 1	E/G 2	E/G 3
C1-E to C5-E	1/2	0/1	0/0	4/8 // 3/4	1/2 // 1/3	0/2 // 0/2
C1-G to C5-G	6/3	1/1	0/0	3/3 // 4/5	3/6 // 3/4	0/2 // 0/1

Legend: The abbreviations used are G1 (one strategy change made in German but not in English when describing the same shape), G2 (two strategy changes), G3 (three or more strategy changes); E/G1 (one strategy change in English as well as in German when the same shape was described. The number on the left refers to identical changes, e.g. in both languages the change occurred from holistic analogical to partitive analogical. The number on the right refers to non-identical changes), E/G2 (two strategy changes), E/G 3 (three or more strategy changes). The abbreviations C1-E to C5-E refer to the five participants who started the task in English of Subgroups CC and GC and the abbreviations C1-G to C5-G to five participants who started the task in German of Subgroups CC and GC. For example, the five participants who started the task in English of Subgroup CC made a total of one strategy change in the G1 category and the ones of Subgroup GC made two strategy changes.

In conclusion, as provided in the example of Participant G-C2-G describing Shape Six, participants of Subgroup GC sometimes described shapes accurately starting with a different strategy than the holistic analogical one, whereas participants of Subgroup CC

rarely demonstrated this kind of flexible use of strategies. Consequently, participants of Subgroup GC used less strategy changes. At this level of proficiency, participants of both subgroups solved the referential problems. In addition to using the links between the L1 and the L2 at the semantic-syntactic level that are connected to the conceptualizer (De Bot, 1992), these participants also used the L2 semantic-conceptual framework successfully. Participants of Subgroup GC demonstrated more flexibility when processing a comprehensible message in referential communication than participants of Subgroup CC.

5.6.4 Comparing the subgroups

Comparing the German descriptions of Group C and G, there are differences in the performances of the six subgroups. Table 5.27 displays the frequency of strategies used by type, the total number of strategies used and the number of shapes described accurately by all six subgroups. At each level of proficiency, the total number of strategies used by each subgroup of Group C is higher than the total number of strategies used by each subgroup of Group G although these differences are not substantial. The holistic analogical strategy is used most often by participants at all three levels of proficiency in both groups.

Table 5.27: Strategies used in German (Group C/Group G)

	HA	HG	PA	PG	L	T	N
A	48/48	7/7	5/4	14/2	4/2	78/63	42/46
B	55/52	9/16	20/5	11/7	5/3	100/83	48/53
C	62/61	12/16	41/21	31/29	5/16	151/143	54/58

Legend: The abbreviations used are HA (Holistic analogical), HG (Holistic geometrical), PA (Partitive analogical), PG (Partitive geometrical), L (Linear), T (total number of strategies used), and N (number of shapes described accurately). The numbers on the left in each column refer to the German descriptions of Group C and the numbers on the right in each column to the German descriptions of Group G. The abbreviations A, B, C refer to the three levels of proficiency. For example, the ten participants of Subgroup CA used the holistic analogical strategy (HA) 48 times when describing the shapes in German and the ten participants of Subgroup GA used it also 48 times when describing the shapes in German.

At the low level of proficiency, there are differences between the two subgroups in their German descriptions. The total number of strategies used by Subgroup GA is 19.2% less compared to Subgroup CA. At the same time, the holistic analogical strategy is used more dominantly at 76.2% by Subgroup GA compared to 61.5% by Subgroup CA. The second most used strategy was the holistic geometrical strategy at 11.1% by Subgroup GA and the partitive geometrical strategy at 17.9% by Subgroup CA. The analysis of these two subgroups (see Section 5.6.1) showed that participants of both subgroups had problems solving the task in German. However, participants of Subgroup GA were more accurate in their approach describing more shapes (46 shapes) accurately by using the holistic analogical strategy than participants of Subgroup CA (42 shapes) who used the partitive geometrical strategy in addition to the holistic analogical one to adjust their descriptions.

At the intermediate level of proficiency, there are also differences between the two subgroups in their German descriptions similar to the low level of proficiency. The total number of strategies used by Subgroup GB is 17% less compared to Subgroup CB while the holistic analogical strategy is used more dominantly representing 62.7% of all strategies used by Subgroup GB compared to 55% of all strategies used by Subgroup CB. The analysis of the two subgroups (see Section 5.6.2) showed that participants of Subgroup GB had less problems solving the task using both holistic strategies describing 53 shapes accurately than participants of Subgroup CB who described only 48 shapes accurately by using the holistic analogical and the partitive analogical strategy. Participants of Subgroup GB used the holistic geometrical strategy 19.3% of the time and participants of Subgroup CB the partitive analogical strategy 20% of the time.

The analysis of Group C and Group G showed that differences between the subgroups are most interesting at the intermediate level of proficiency. Participants of Subgroup CB and of Subgroup GB used transfers from their L1 to their L2 to solve the referential problems in the L2 by sometimes translating concepts.

For example, Participant C-B4-E described Shape Two in German translating the English word 'hour-glass' into 'Stundenglas', which is a word that does not exist in German. The equivalent of 'hour-glass' in German is 'Sanduhr' which translated literally would be 'sand-clock.' Participant G-B1-G used the same kind of transfer to describe Shape Five (see Section 5.5.2). However, there are three differences comparing the description of Participant C-B4-E to the one of G-B1-G. One, Shape Five does have a resemblance to an hour-glass whereas Shape Two does not. A reference to an hour-glass in the description of Shape Two is only accurate if it is mentioned that the bottom half of

the hour-glass is missing. The description of Participant C-B4-E is inaccurate. This participant used the holistic analogical strategy to describe the shape:

{*Holistic analogical*} '<4> Es sieht aus wie [h] eine (sic!) [h] Glas [h] wie eine (sic!) Glas <5> eine (sic!) Stundenglas.'

(Translation: {*Holistic analogical*} It looks like [h] a [h] glass [h] like a glass <5> an hour-glass.)

Two, there is only one reference in the description of this shape whereas Participant G-B1-G description included a second reference to two antennas that made it accurate:

{*Holistic analogical*} '[h] <4> das sieht wie eine (sic!) Stundenglas (sic!) aus mit [h] ... zwei Antennen ... Antenne (sic!), ja.'

(Translation: {*Holistic analogical*} [h] <4> it looks like an hour-glass with [h] ... two antennas ... antenna, yes.)

Three, there are fewer pauses in the description of Participant G-B1-G compared to the description of Participant C-B4-E. The analysis (see Section 5.6.2) revealed that translating concepts literally occurred more often in Subgroup CB than in Subgroup GB.

Another difference between participants of Subgroup CB and participants of Subgroup GB is that participants of Subgroup GB also conceptualized some shapes in

their L2. For example, Participant G-B3-E described Shape One as a circle in German and as a weapon in English:

{*Holistic geometrical*} 'Das sieht ... aus, im Prinzip, wie ein Kreis für mich, aber es hat (sic!) ... Löcher drin, drei Löcher sind drin, das heisst <1> das (sic!) Kreis ist nicht ganz ... rund, aber es gibt drei ... Einschnitte.'

(Translation: {*Holistic geometrical*} It looks ... like, in principle, like a circle to me, but there are ... holes in it, three holes are in it, so the <1> circle is not exactly ... round, but there are three ... cuts.)

In English, Participant G-B3-E used the holistic analogical strategy instead of the holistic geometrical strategy to describe this shape:

{*Holistic analogical*} 'The next shape is ... >> it looks a little bit like a disc, maybe something like a (sic!) an Asian ... weapon, a disc with three ... [h] indentations in it and the edges look sharp where the disc is held.'

Comparing Group C with Group G in the number of strategy changes made, most differences are at the intermediate level of proficiency (see Table 5.28). In German, participants of Subgroup GB made more strategy changes than any other subgroup. Participants of Subgroup GB adjusted their descriptions in German in order to describe them successfully whereas participants of Subgroup CB did not. Instead, participants of Subgroup CB used more identical strategy changes than any other subgroup. This

supports the argument that they relied on their L1 skills to solve the referential problems in their L2. In contrast, participants of Subgroup GB made more non-identical changes than identical ones. Comparing the number of strategy changes made also shows that at the low level of proficiency, participants of Subgroup GA made more non-identical changes than identical ones whereas for participants of Subgroup CA the numbers are almost even. At the high level of proficiency, participants of both subgroups made more non-identical than identical changes.

Table 5.28 displays the number of strategy changes made in German at each level of proficiency comparing the six subgroups.

Table 5.28: Number of strategy changes made in German (Group C/Group G)

	G 1	G 2	G 3	E/G 1	E/G 2	E/G 3
A	2/1	0/0	0/0	7/8 // 1/5	1/1 // 0/0	0/0 // 0/0
B	3/9	0/1	0/0	12/4 // 3/6	4/4 // 0/0	0/0 // 0/0
C	7/5	1/2	0/0	7/11 // 7/9	4/8 // 4/7	0/4 // 0/3

Legend: The abbreviations used are G1 (one strategy change made in German but not in English when describing the same shape), G2 (two strategy changes), G3 (three or more strategy changes); E/G1 (one strategy change in English as well as in German when the same shape was described. The number on the left refers to identical changes, e.g. in both languages the change occurred from holistic analogical to partitive analogical. The number on the right refers to non-identical changes), E/G2 (two strategy changes), E/G 3 (three or more strategy changes). The abbreviations A, B, C refer to the three levels of proficiency. For example, the ten participants of Subgroup CA made two strategy changes in the G1 category and the ten participants of Subgroup GA made one strategy change in the G1 category.

At the highest level of proficiency there are some differences between the two subgroups in their German descriptions. The total number of strategies used by subgroup GC is 5.3% less compared to subgroup CC and the holistic analogical strategy is used

42.7% by subgroup GC and 41.1% by subgroup CC. The analysis of these two subgroups (see Section 5.6.3) showed that participants of both subgroups solved the task in German. However, participants of subgroup GC described more shapes (58 shapes) accurately than participants of Subgroup CC (54 shapes). The second most used strategy by participants of Subgroup GC was the partitive geometrical strategy at 20.3% and in Subgroup CC the partitive analogical strategy at 27.2%. Participants of Subgroup GC demonstrated more flexibility using the five strategies than participants of Subgroup CC, e.g. when starting a description with a different strategy than the holistic analogical approach (see Section 5.6.3).

In summary, at the low level of proficiency participants of both subgroups relied on the semantic-conceptual framework of their L1 to solve the referential problems. The analysis of Subgroup CA (see Section 5.4.1) revealed that participants had some difficulties describing the abstract shapes accurately. It supports the underlying hypothesis of this dissertation arguing that direct contact with the L2 and target culture might be beneficial in understanding and expressing L2 concepts (Kramsch, 1993; DeGroot 2000). The analysis of Subgroup GA (see Section 5.5.1) showed that five out of the ten participants also had difficulties carrying out this task. One possible explanation is that they were not familiar with this type of exercise. These participants only had little formal instruction in the L2. Classroom instruction can be helpful in trying to solve L2 referential problems (Bialystok, 1990; Cohen, 1998). Comparing the two subgroups, participants of Subgroup GA were slightly more successful solving the task than participants of Subgroup CA were. In conclusion, participants at this level of proficiency

have difficulties processing a comprehensible message in referential communication regardless of differences in the environment in which the target language is acquired.

At the intermediate level of proficiency speakers of Subgroup GB solved the referential problems differently than speakers of Subgroup CB. Participants of Subgroup GB used transfers from their L1 to their L2 flexibly and conceptualized shapes in their L2. One reason that might have contributed to their success of solving the referential problems is the development of cultural awareness and cultural experience (Byram, 1991) which is part of the building material of concepts (DeGroot, 2000, Appel, 2000). Participants of Subgroup CB were restricted in their expressions. Despite approximately 364 to 442 hours of formal instruction, L2 concepts were sometimes not expressed accurately. This indicates that at this level of proficiency a direct contact with the L2 and target culture is beneficial for speakers to successfully process a comprehensible message in referential communication.

At the high level of proficiency participants of both subgroups successfully transferred concepts from their L1 to their L2 and also used L2 concepts. However, participants of Subgroup GC demonstrated more flexibility when processing a comprehensible message in referential communication than participants of Subgroup CC. At this level of proficiency, differences in the L2 environment have an effect on the L2 speakers regarding their understanding of culture. Gumperz (1993) points out that culture constantly changes and understanding culture is a dynamic process of human interaction with the environment. Kramsch (1993) supports this view and applies it to L2 acquisition. The results of this study support an SLA application of Gumperz' theory in that they show that the daily and direct interaction participants of Subgroup GC had with the L2

and target culture over a number of years might have allowed them to understand and apply multiple layers of culture. Participants of Subgroup CC who demonstrated a high proficiency of German based on formal instruction did not have this understanding of culture or were not able to apply it in referential communication.

CHAPTER SIX

CONCLUSION

6.1 Summary and interpretation of significant findings

This dissertation has researched referential communication strategies in the speech production of English-speaking second language learners of German. Two groups of thirty participants each carried out the task of describing abstract shapes in English and German. One group consisted of second language learners of German with a low amount of contact with German language and culture (Group C), the other group, living in Germany, had a high amount of contact with German language and culture (Group G).

The main research question was if and in what ways the environment in which the L2 is acquired has an impact on how L2 speakers process messages in referential communication in German compared to English. Participants had to employ referential communication strategies to describe abstract shapes. Research has shown that abstract concepts are specific to a particular language and culture (Bowerman, 1996; Bowerman & Choi, 2001; Brown, 2001; de León, 2001; Levinson, 1996, 2001; Lucy, 1996; Ratner, 1991; Slobin, 1996). In its application to L2 learning, it has been argued that there is a connection between the activation of a concept and the environment in which the L2 is acquired (Byram, 1989, 1997; Byram & Buttjes, 1991; Müller, 1992; Appel, 2000; DeGroot, 2000). The underlying hypothesis of this dissertation was that speakers who learn a L2 in the target culture will be more successful in solving referential problems in their L2 than those who learn a L2 in a L1 environment.

A quantitative and qualitative analysis was carried out to analyze the collected data. The quantitative analysis measured the number of words participants used, the amount of time participants needed to describe the shapes, and then calculated the word to time ratio. It determined whether speakers were able to access and/or process lexical concepts in the L2 and bind them to syntactic nodes so they could be further processed for articulation. The theoretical framework was based on Levelt's model of speech production (Levelt, 1989, 1992; Levelt, Roelofs, & Meyer, 1999) and its application to L2 (de Bot, 1992; de Bot & Schreuder, 1993; de Bot, Cox, Ralston, Schaufeli, & Weltens, 1995). The qualitative analysis determined the frequencies of strategies by types, how many strategies were used in total, how many shapes were described accurately, and how many strategy changes were made by participants when describing the shapes in English and in German. It investigated with what degree of success speakers transferred concepts from their L1 to their L2 in order to access and process L2 lexical items or if they were able to access L2 concepts directly.

The two groups, Group C and Group G, were divided into three subgroups each according to their level of proficiency. The qualitative and quantitative analysis compared the English with the German descriptions of each subgroup and the German descriptions of each subgroup of Group C with the German descriptions of each subgroup of Group G. The quantitative analysis reported the mean, the standard deviation, and the t-value with its level of statistical significance. The qualitative analysis reported the strategies used and the number of strategy changes made to describe the shapes. In addition, the interviews that were carried out to determine how participants solved the task were used

to interpret the results. The quantitative analysis of the word and time measures and the qualitative analysis of the strategies used produced results that complement each other.

In Group C, participants at the low level of proficiency had difficulties solving the referential problems in English as well as in German; at the intermediate level of proficiency they had difficulties in German and at the high level of proficiency they solved the task in both languages. Results showed that the L2 had an impact on the L1. In particular at the low and intermediate levels of proficiency some descriptions in the L1 were inaccurate.

In Group C, at each level of proficiency, participants used fewer words in German compared to English but a similar amount of time when solving the task. Differences in the word analysis were statistically significant as measured by the paired samples t-test, whereas in the time analysis they were not. In the German descriptions some participants at the lower proficiency level gave up describing the shapes. At each level of proficiency, participants were less efficient in German than English. Levelt, Roelofs, and Meyer (1999) argue that the process of binding lexical concepts to syntactic nodes in the L1 is time consuming and places high demands on the cognitive system. The present study shows that the demands on the cognitive system are even higher when speaking a L2. At each level of proficiency, the holistic analogical strategy was used the most in both languages. All three subgroups used it more dominantly in German than in English. At the low and intermediate levels of proficiency, participants relied on transfers from their L1 to their L2 and had difficulties solving the task in German. At the high level of proficiency, participants managed to describe the shapes accurately in German. Apart from using transfers, they also conceptualized some shapes in German. The analysis

showed that not relying on the holistic analogical strategy but using all strategies is beneficial. Only in Subgroup CC were all strategies used successfully in the L2 to create a comprehensible message, a process that requires the speaker to replace one semantic-conceptual framework with another (Levelt, 1989). The results show that at a lower level of proficiency participants were frequently not able to carry out this process. It indicates that the difficult task of processing and expressing abstract concepts might require contact of the speaker with the target culture¹.

In Group G, participants at the low level of proficiency had problems solving the referential problems in English as well as in German while at the intermediate and high levels of proficiency they did solve the problems in both languages. As in Group C, the L2 had an impact on the L1. Participants in Group G might not have been familiar with a type of exercise that requires problem solving in the L1 or the L2. A combination of these factors caused problems for participants at the low level of proficiency when solving the task in their L1. In Group G, the lower the level of proficiency in their L2, the less efficiently participants described the shapes in their L1.

In Group G, at each level of proficiency the number of words used to describe the shapes in English and German was similar, whereas participants at the intermediate and high levels of proficiency used significantly more time in German than in English as measured by the paired samples t-test. At the low level of proficiency, some participants gave up on the task in their L1 as well as in their L2. Consequently, there were no significant differences between the English and German descriptions. At all three levels

¹In addition, frequent contact with the target language means high input and is equally beneficial (see Section 5.4.1)

of proficiency, participants were less efficient processing L2 lexical items compared to L1 lexical items. It was expected that in particular at the high level of proficiency participants would not need more time in German than English to describe the shapes with a similar number of words. However, participants of subgroup GC started playing with the language using several accurate descriptions to describe the same shape. They had all five strategies at their disposal and chose whatever strategy they thought was most appropriate to describe a shape. At each level of proficiency, the holistic analogical strategy was used the most of all five strategies in both languages. Differences in the use of this strategy comparing English and German were minor. While in Group C participants of Subgroup CA and CB often relied on their L1 skills to describe the shapes in German, in Group G this was only done by participants of Subgroup GA. The protocols of these three subgroups sometimes show the use of code-switches. Some of these participants mentioned their difficulties solving the task in German in the interviews. Some of the findings for Subgroups CA, GA, and CB also apply to Subgroup GB. However, participants of Subgroup GB also conceptualized some shapes successfully in their L2 as did participants of Subgroup CC and Subgroup GC. In conclusion, at the intermediate and high levels of proficiency in Group G, participants met the high demands that the processing of semantic-conceptual information places on the cognitive system (Green & Capella, 1986; Levelt, 1989) in their L1 as well as in their L2.

Comparing the German descriptions of Group C with Group G, at the intermediate and high levels of proficiency participants of Group G were more successful

and more efficient in solving the referential problems. Their contact with the target language and culture might have helped them to use L2 lexical items by either transferring concepts from their L1 to their L2 or by conceptualizing the shapes in the L2. At the low level of proficiency, participants of Group C and Group G were both inefficient at describing and thus conceptualizing the shapes in their L2.

The holistic analogical strategy was used the most by all participants of Group C and Group G. At the low level of proficiency, participants of both subgroups relied on the semantic-conceptual framework of their L1 to solve the referential problems. Participants of Subgroup GA used the holistic analogical strategy more frequently than participants of Subgroup CA and were slightly more successful in solving the task. At the intermediate level of proficiency, participants of Subgroup GB used transfers from the L1 to the L2 flexibly, conceptualized shapes in their L2 and were efficient in processing L2 lexical items. Participants of Subgroup CB were restricted in their expressions. Despite approximately 364 to 442 hours of formal instruction, L2 concepts were sometimes not expressed accurately. At the high level of proficiency, participants of both subgroups successfully transferred concepts from their L1 to their L2 and also used L2 concepts. However, the descriptions of participants of Subgroup GC were more accurate and they demonstrated more flexibility and efficiency when processing a comprehensible message in referential communication than participants of Subgroup CC.

In summary, participants used different methods to solve the task. The holistic approach was favoured but there were differences if participants attempted to use other strategies and if they were successful. This had an impact on how many words and how much time was used. Overall, comparing each level of proficiency, the speech to describe

the abstract shapes is more accurate and fluent by participants of Group G than by participants of Group C. The underlying hypothesis is confirmed. In some cases, participants solved the task differently than expected. Table 6.1 provides an overview of the hypotheses and their evaluation.

Table 6.1: Overview of hypotheses and their evaluation

No.	Hypothesis	Evaluation
1.1	a) Speakers in the Canadian group (Group C) use the holistic strategies less often in German than in English. The lower the level of proficiency, the less the holistic strategy is used in German.	Supported
	b) Speakers of the German group (Group G) use the holistic strategies in the same manner in German and English, though speakers of a lower proficiency level use the holistic strategy less in German than speakers of a higher proficiency level.	Supported
	c) Speakers of Group C use fewer holistic strategies in German than speakers of Group G.	Refuted
1.2	a) Speakers of the Canadian group (Group C) need significantly more time to describe the abstract shapes in German than in English. The lower the level of proficiency, the more time is used in German.	Refuted
	b) Speakers of the German group (Group G) do not need significantly more time to describe the abstract shapes in German than in English, though speakers of a lower proficiency level use	Refuted

	more time in German than speakers of a higher proficiency level.	
	c) Speakers of Group C need significantly more time to describe the abstract shapes in German than speakers of Group G.	Supported
1.3	a) Speakers in the Canadian group (Group C) use significantly fewer words to describe the abstract shapes in German than in English. The lower the level of proficiency, the fewer words are used in German.	Supported
	b) Speakers in the German group (Group G) do not use significantly fewer words to describe the abstract shapes in German than in English, though speakers of a lower proficiency level use fewer words in German than speakers of a higher proficiency level.	Supported
	c) Speakers in Group C use significantly fewer words to describe the abstract shapes in German than speakers in Group G.	Refuted

The starting point of this study was Levelt's model of speech production (1989, 1992) with a focus on the semantic-conceptual framework (Levelt, Roelofs, Meyer, 1999) of lexical items. In the application of this framework to L2, de Bot (1992) argues for a link between L1 and L2 lexical items by way of their conceptual representation. An important question is on what factors the activation of those links depends. The results of this study show that cultural experience is one of those factors. It confirms Byram's (Byram & Buttjes, 1991; Byram, 1997) view that cultural experience is one of four key elements in the process of 'tertiary socialization' as well as DeGroot's (2000) and

Appel's (2000) argument that cultural experience is part of the building material of concepts. However, the results of this study also show that contact with the target culture does not automatically lead speakers to use the links between the L1 and the L2 successfully. The cultural experience might activate those links, however, using those links in referential communication successfully also requires a sufficient level of language proficiency. Applying Levelt's model, Kasper (2001) argues that inaccurate L2 speech is the result of linguistic material not being available to the speaker. This dissertation shows that a speaker's difficulties to process conceptual-semantic information in L2 referential communication is a result of an insufficient cultural experience as well as an insufficient language proficiency.

6.2 Limitations of the study

The methodology used in this study has limitations in all of the four areas outlined in Chapter Three: selection of participants, task at hand, data collection, and analysis.

The participants selected for the two groups had to be sufficiently distinctive in their language learning. Participants of Group C learned German as a L2 in a formal classroom setting whereas participants of Group G acquired German as a L2 mainly while living in Germany. For this purpose, a detailed questionnaire asking each participant about their language background was filed and participants were selected based on that information. However, there are other factors that contribute to a L2 learner's language socialization including attitudes, motivation and anxiety (Yashima, 2002).

As Kasper (2001) points out, a key observation of recent research has been that L2 pragmatic development is strongly interrelated to input. Van Patten (1996) clarifies that input does not equal intake arguing that not all information available to the L2 learner is processed. In view of this study, L2 instruction in a formal setting provides the L2 learner with a different input than learning the L2 at a workplace. L2 learners in Germany have a different motivation because they need to learn the L2 in order to communicate on a daily basis. These factors distinguished the two groups compared. Motivation is closely related to the social context in which language learning takes place (Gardner, 1985). Research on L2 motivation argues to evaluate situational differences in regard to foreign and second language settings (Dörnyei, 1990; Oxford, 1994; Hotho, 1999). It would have been helpful to find out more about the individual motivation of each participant to determine if there were clear differences between participants in Canada and participants in Germany. For example, it is possible that a participant in Germany is tired of speaking German and not willing to communicate. It is also possible that a student in Canada is highly motivated and does research on the internet that provides a limited form of direct contact with the target language and culture. In order to maintain a clear distinction between Group C and Group G, participants were asked about their social habits, for example, whether they have contact with the Goethe Institut in Vancouver. However, direct questions about their motivation were not included. In addition, differences within the two groups could not be determined. Besides different motivational factors, student-teacher and peer interaction play a major role in the L2 pragmatic development (Kasper, 2001). Participants in Group C came from different language courses with different instructors and classmates and therefore their language

background varied, which was, however, not measured. The cloze-test was in a written format whereas the task of the study was in an oral format. Some participants might have been used to speaking German more than others depending on the type of instruction. The same applies to participants in Group G who worked for different companies that required them to speak more or less German depending on their kind of work.

In regards to language learning, the investigator assumed that all participants were equally proficient in English. The assumption was based on the educational background showing that all participants went to college or university. However, the proficiency in their L1 was not measured. The focus of the study was on the L2. As the analysis showed, participants showed differences in the use of the L1 when solving the task. A measurement of their L1 proficiency could have been used to interpret those results.

The task at hand required the participants to solve referential problems. It is possible that participants of Group C were used to carry out a task like that in either their L1 or their L2 through their L2 classroom instructions whereas participants of Group G were not. This might have effected the results produced by Group G who were less efficient in their L1 the lower the proficiency level of their L2 was. A pre-exercise similar to the one carried out in the study could have avoided this problem. However, an exercise like that bears the potential of repetition effects (see below).

The design of the study had participants carry out the same task twice. This bears the potential of repetition effects when participants memorized the manner they approached the task the first time and then simply repeat that approach the second time they undertake the task. Two measures were employed to minimize such an effect: a two week interval between the descriptions was implemented and the study was counter-

balanced having half of the participants starting in English and half in German. However, a repetition effect was evident in some descriptions by participants of both groups. It did not necessarily effect the choice of strategy. Even if participants remembered the strategy they used when describing the shape in English, they still had to be able to use that strategy in German. However, this might have made it difficult to choose another strategy than the one that was used first.

The data collection was limited in two ways. Both limitations are of interest when applied to a communicative situation. First, only two types of data were collected. The description of the shapes was audio-taped and participants were interviewed. As Lazaraton (2002) points out, it is helpful to collect different types of data. In view of this study, the use of video could have been helpful. Although communication is based on the interaction between speaker and hearer, the design of this study did not provide the participant with a communication partner which is common for research carried out using a psycholinguistic approach. Instead, the participant had to imagine a hearer when describing the abstract shapes. The analysis determined what kind of strategies participants used based on transcription protocols of the recorded data. The choice of strategy depended on the level of difficulty solving the task. However, participants might have experienced difficulties solving the task because of the absence of a communication partner. The use of video could have helped to determine such cases in identifying non-verbal communication, such as mimic, or in explaining hesitation pauses that led to a change of strategy.

The second limitation in the data collection is linked to the methods employed for the analysis. This study used quantitative and qualitative methods. However, the methods

of the qualitative analysis were not entirely qualitative by definition. The analysis of the communication strategies researched in this study was based on the use of elicited speech by the participants. In Larsen-Freeman's and Long's (1991) overview of research methods in second language acquisition, analyzing elicited speech is a method employed by quantitative research as opposed to analyzing naturalistic speech that is part of qualitative research. While naturalistic speech produces a variety of data, the analysis of elicited speech allows studying one particular phenomenon of language (Larsen-Freeman & Long, 1991). A clear distinction of those methods is not always possible. In this study, the analysis of naturalistic speech that produces a variety of linguistic utterances would have made it difficult to determine what referential communication strategies were used by speakers because these strategies refer to processes that are behind a linguistic utterance. The taxonomy used could only be applied by analyzing elicited speech. In that sense, the qualitative methods employed for the analysis of this study were not qualitative by definition. Furthermore, as Lazaraton (2002) points out, qualitative research analyzes original data. All data analyzed in this study was based on the recordings and the transcription protocols. The analysis investigated the speech of participants. However, one part of the analysis determined the type and number of strategies used which were then summarized in tables and compared between the different subgroups. In that sense, that part of the analysis was not qualitative.

Finally, there is a limitation in the analysis as such. The quantitative analysis measured the number of words and the amount of time used to describe the shapes. It used inferential statistics. The reliability of a test increases with the size of the sample group. Each group that was analyzed consisted of ten participants only which is a small

number in statistical terms. It has to be noted that the results produced by paired samples t-test are tentative and cannot be generalized.

Apart from these limitations, this study was unique in comparing two groups of participants whose L2 acquisition process was distinctively different. In regards to the qualitative analysis, analyzing the speech of sixty participants is a large sample and the recordings and their transcriptions provided rich data. The methods employed for the study proved to be reliable. Results of the word and time analyses on the one hand and the analysis of strategies used and strategy changes on the other hand complemented each other.

6.3 Implications for the second language classroom

Reviewing fifteen years of second language research, Lightbown (2000) argues that despite the fact that research in this area is designed to answer pedagogical questions, it cannot and should not tell teachers what to do in class. Teachers might be inspired by this research, however, and they might try recommendations made by researchers.

A connection between referential communication strategies and the second language classroom is not easily made. Dörnyei (1995) points out that over the last decade a controversy has emerged regarding the teachability of communication strategies. This controversy arose through the different approaches used for researching communication strategies.

Based on a psycholinguistic approach, both, Bialystok (1990) and Kellerman (1991) argue that there is no need to teach communication strategies because the underlying psychological processes of these strategies are the same in the L1 and the L2,

and the L1 competence of communication strategies can be transferred to the L2.

However, one has to be careful to draw such a conclusion. Neither Bialystok (1990) nor Kellerman (1991) carried out classroom studies. An empirical study on self-repair strategies conducted by Rieger (2000) showed that it cannot be assumed that communication strategies are automatically transferred from the L1 to the L2.

Other empirical studies come from Faerch and Kasper (1986) and Tarone and Yule (1989) who incorporated strategy training into foreign language instruction. They reported that such training improves the learner's ability to use the interactional communication strategies taught more often and more successfully than before. However, as Dörnyei (1995) concluded, these studies were very narrow in scope because of the size of the sample groups, the lack of a pre- and post-test, and the limited number of strategies taught.

Dörnyei carried out his own study (1995) with a large sample group of 109 learners (L1 Hungarian) of English (L2) in Hungary. He tested three strategies using pre- and post-tests. The strategies tested were 'topic avoidance and replacement', 'circumlocution', and 'use of fillers and hesitation devices'. He reached the same conclusion as Faerch and Kasper (1986) and Tarone and Yule (1989).

A general problem of applying communication strategies to the second language classroom lies in the definition of the strategies. A psycholinguistic approach does not consider strategies used in an interactional approach such as circumlocution.

Consequently, different views on the teachability of communication strategies remain.

This dissertation did not solve that conflict nor did it set out to do so. However, results indicated that L2 learners with a high amount of contact with the L2 and target culture

use referential communication strategies efficiently and successfully, which suggests that creating a classroom that gives learners the opportunity to have direct contact with the target language and culture using a variety of media is beneficial.

In their attempt to re-imagine the second language learning environment, Müller-Hartmann and Legutke (2001) regard the internet as a factor in redesigning the second language classroom. Their argumentation to engage L2 learners in cyber-communication is practical. First, the professional and personal lives of people today does involve this type of communication. Second, while L2 learners develop their proficiency in the target language, they simultaneously learn about communication and culture of that language.

This dissertation brings a third argument in favor of this approach to the discussion. A high amount of direct contact with the target culture allows L2 learners to communicate about abstract concepts successfully depending on their level of proficiency. Learning material used in the foreign or second language classroom is grouped around topics of concrete or abstract nature. For example, in either first or second year, L2 learners encounter textbook units about personal and geographical space. The understanding of an abstract concept such as space varies across cultures (Bowerman, 1996; Bowerman & Choi, 2001; Levinson, 1996, 2001). L2 learners go through a process when acquiring such a concept in the target language and culture that depends on their degree of acculturation (Appel, 2000; Byram, 1997; Byram & Buttjes, 1991; Pavlenko, 1997; see Section 2.4.2). Using the internet that transmits culture-specific codes embodied in visual and audio media can help facilitate this process.

Legutke (2001) gives an example of a project where students of German (L2) at Penn State University communicated to students of English (L2) at the

Gesamthochschule Giessen by creating their own web-pages. Students had to carry out the same assignments - for example, viewing a movie, - and then engage in a discussion about it. Web-page design allows for the use of audio-visual material that contains more cultural information than plain text. The assignments were discussed in the respective target language. Consequently, L2 learners experienced a higher amount of contact with the target language and culture than in textbook-based classroom instruction. This may foster their ability to conceptualize foreign or unknown abstract concepts and enhance their communication skills.

Carey describes (Carey, 1999; Carey & Crittendon, 2000; Carey, Cho, & Basharina, 2002) an integrated approach of using web-based technology to create a classroom in which students from Russia, Japan and Canada communicate with each other. Some of the students were L2 English learners, some were native speakers. One observation was that students improved their communication skills. For example, students from Japan talked about topics more openly as the course progressed. A similar result is reported by Butler and Fawkes (1999) when using videoconferencing in class. If a course like this is grouped around topics like 'geographical space', for instance, it might help L2 students understand the concepts native speakers associate with such a term. The results of this study encourage the development of L2 classes following the examples given by Carey and Müller-Hartmann and Legutke.

6.4 Future research

The two languages investigated in the study of this dissertation were English (L1) and German (L2). Being Western Germanic languages, they are both closely related. The

languages investigated in the Nijmegen project were English (L2) and Dutch (L1) which are also closely related. The present research reveals differences in the use of referential communication strategies of closely related languages in relation to the environment in which the L2 was acquired.

The question arises what learners of languages and cultures that are not closely related do when solving referential problems. In such cases, there is only little overlap in the culture-specific conceptual representations of their L1 and their L2. Accessing concepts in L2 directly or transferring them successfully from the L1 to the L2 is difficult. A study in the context of ESL (English as a Second Language) could be conducted to test this relation. For example this study could be replicated with Chinese (L1) learners of English (L2).

Another question is how multilingual speakers solve referential problems. In their research on multilingualism, Herdina and Jessner (2002) found that multilingual speakers are influenced by their linguistic environment. Research in third language acquisition has shown the transfers of the L2 to the L3 at the semantic, syntactic and the morphological level (Cenoz, Hufeisen, Jessner, 2001). Frequently, these studies investigate one population of learners. A comparative study of two populations of learners who have the same L1, L2, and L3 but differ in the acquisition process of those languages would further contribute to our knowledge of the links between language acquisition and learning environment.

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Appendix A.1

Background Information

Type One

Name:

Age:

1. Please indicate for all languages you learned the following information:
 Age (how old you were when you started learning it, e.g. L1: birth)
 Number of years learned
 Name and Number of courses taken/Number of hours per week per course (L2/L3 only)
 Country you learned it (e.g. L2: German. Learned in Canada)
 How you learned it (at home, high-school, university)

L1 (English):

L2 (German or other language):

L3 (German or other language):

2. Please indicate in what language(s) you are able to communicate at this moment:
 (A) with great difficulties (B) with difficulties (C) with minor difficulties
 (D) with fluent, near native ability (E) with native proficiency

L1 (English):

L2 (German or other language):

L3 (German or other language):

3. Please indicate where you speak L1, L2, L3 now (at home/going out in the city/doing leisure activities, e.g. sport/at the university/nowhere) and with whom you speak L1, L2, L3 (parents/other family/friends/other people/not at all).
 Please also indicate your contact with German institutions in Vancouver, e.g. German stores, church service, Goethe-Institut, etc.

L1 (English):

L2 (German or other language):

L3 (German or other language):

Appendix A.2

Background Information

Type Two

Name:

Age:

1. Please indicate for all languages you learned the following information:
 - Age (how old you were when you started learning it, e.g. L1: birth)
 - Number of years learned
 - Name and Number of courses taken/Number of hours per week per course (L2/L3 only)
 - Country you learned it (e.g. L2: German. Learned in Germany)
 - How you learned it (at home, high-school, university, living in Germany)

L1 (English):

L2 (German or other language):

L3 (German or other language):
2. Please indicate where, when and how you started learning German.
3. Please indicate in what language(s) you are able to communicate at this moment:
 - (A) with great difficulties (B) with difficulties (C) with minor difficulties
 - (D) with fluent, near native ability (E) with native proficiency

L1 (English):

L2 (German or other language):

L3 (German or other language):
4. Please indicate where you speak L1, L2, L3 now (at home/going out in the city/doing leisure activities, e.g. sport/at the university/nowhere) and with whom you speak L1, L2, L3 (parents/other family/friends/other people/not at all).

L1 (English):

L2 (German or other language):

L3 (German or other language):

Appendix B

Übung

In den folgenden 4 Textpassagen sind Wörter ausgelassen worden. Ergänze die Lücken sinngemäß! In jede Lücke gehört genau ein Wort. Achte auch auf die grammatische Form jedes Wortes!

1. Immer mehr _____ setzen sich für den Schutz der Wale ein. Es gibt viele _____ Wale. Sie schwimmen unter _____. Sie _____ eine Stunde unter (3) bleiben. Wenn sie an der Oberfläche sind, werden sie gejagt. Dabei sind es so _____ Tiere. Ihr Schutz ist wichtig. Alle (1) sollten das respektieren.

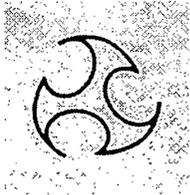
2. Viele wissen nicht, daß Pizza aus Italien kommt. Heute kann man in jedem _____ Pizza essen. Meistens hat Pizza eine _____ Form. Manchmal ist sie auch _____. Man kann sie auch in _____ schneiden. Ein (4) kann man auf der Hand essen. Man muß dabei _____, daß nichts herunterfällt. Wenn man nicht (5), landet die Pizza auf dem Boden.

3. Gaby und Anne gehen in die Stadt. Sie wollen _____. Gaby braucht ein paar neue Schuhe zum _____. Sie dürfen nicht zu _____ Absätze haben, da sie sonst beim (2) umknicken kann. (3) Absätze können abbrechen. Die Schuhe dürfen auch nicht zu glatt sein, damit man nicht _____. Bei einem _____ kann man sich schnell den Fuß brechen.

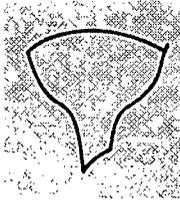
4. _____ wird immer besser. Zum einen ist es billiger geworden. Es gibt so viele Firmen, daß die Konkurrenz groß ist. Wer in das Ausland (1), _____ weniger als 1 DM pro Minute. Zum anderen hat sich die _____ verbessert. Der _____ beim (1) ist besser. Früher war da häufig ein Brummen, jetzt ist es _____.

Appendix C

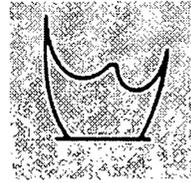
The six shapes used in the task



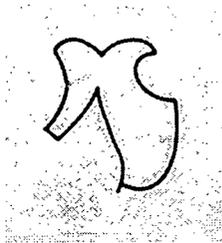
Shape One



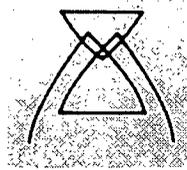
Shape Two



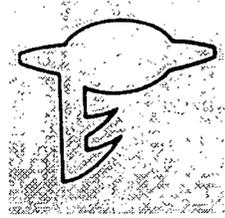
Shape Three



Shape Four



Shape Five



Shape Six

Appendix D

Instructions English

In a minute you will be given six sheets of paper. On each sheet of paper you see a figure. Please describe that figure in English. The idea is that another person who speaks English also and only English will listen to your recordings afterwards. That person looks at twelve figures on twelve sheets of paper. S/he has to identify which of the twelve figures you were describing.

Whenever you think this person has heard enough to recognize a figure, you can continue with the next one.

As soon as you are ready, I will start the tape recorder. I won't stop the tape recorder until you have finished the exercise. As soon as I start the tape recorder, you can no longer ask me anything, and I can no longer say anything to you.

You can work at your own pace.

Anweisungen auf Deutsch

Gleich bekommst du von mir sechs Blätter. Auf jedem Blatt wirst du eine Figur sehen. Bitte beschreibe jede Figur auf Deutsch. Im Anschluss daran wird eine andere Person, ein Deutscher, der nur Deutsch versteht, sich die Kassettenaufnahme anhören. Diese Person betrachtet dabei zwölf Figuren auf zwölf Blättern. Sie muss herausfinden welche dieser zwölf Figuren du beschrieben hast.

Wenn du der Meinung bist, dass du genug gesagt hast, damit diese Person eine Figur identifizieren kann, kannst du zu der nächsten Figur übergehen.

Wenn du bereit bist, schalte ich gleich den Kassettenrekorder ein. Der Rekorder bleibt so lange eingeschaltet bis die Übung zu Ende ist. In dem Moment, wo ich den Rekorder einschalte, kannst du mir keine Fragen mehr stellen und ich darf dir keine Hilfen geben.

Du kannst das Tempo, mit dem du in der Übung vorangehst, selbst bestimmen.

Appendix E

Interview

Transfer English to German:

1. Did you think about English while doing this exercise?
2. Did you think about German while doing this exercise?
3. Did you transfer concepts from English to German doing the exercise?

Perceptions:

4. Would you find it helpful to transfer concepts from English to German in this exercise? Why? Why not?
5. On what occasions do you transfer knowledge of English to German?
6. Did you learn how to use transfers when you were taught/acquired German?

Repetition effects:

7. Did you have to describe the same figures as last time or did you describe merely similar figures?
8. How much did you remember from last time you did this exercise? What precisely?
9. Did you think of the way you did this exercise last time when you did it this time? In what way?

Appendix FTranscription Code

[h]	hesitation such as eh, ehm, mm
...	audible pause shorter than one second
=	prolongation or lengthening of sounds
(laughs)	laughter
<3>	pause, in brackets exact number of seconds
'...'	word said in English in German part of the exercise or vice versa
>>	speeding up
<<	slowing down
()	introductory/concluding remarks
./.	no words said

Appendix G.1: Data Group C

1. Number of words used in English and German

	Subgroup CA		Subgroup CB		Subgroup CC	
1	113.2	29.8	16.0	19.3	17.7	13.0
2	158.3	22.5	76.5	58.3	122.2	33.7
3	16.2	12.8	19.0	16.7	136.0	104.8
4	56.3	32.5	44.5	19.0	33.8	14.8
5	102.7	29.3	51.7	40.0	128.8	25.8
6	44.0	23.3	62.5	32.7	45.2	47.2
7	19.2	13.2	99.7	46.3	41.3	32.3
8	17.0	12.3	14.8	25.5	22.3	53.3
9	102.2	21.2	78.2	55.7	108.0	99.2
10	60.5	28.7	45.0	30.7	47.8	87.2

The numbers 1 to 10 refer to the ten participants in each subgroup. Numbers 1 to 5 started the task in English and numbers 6 to 10 in German. In the subgroup columns, the numbers on the left refer to the number of words used in English and the numbers on the right to the number of words used in German.

2. Amount of time used in English and German

	Subgroup CA		Subgroup CB		Subgroup CC	
1	69.8	61.3	14.0	26.3	10.7	18.3
2	98.7	30.0	55.3	49.0	55.7	29.7
3	19.3	22.0	13.8	23.3	152.0	145.5
4	27.0	69.7	46.7	42.0	29.8	19.2
5	42.2	26.5	35.2	36.7	63.3	26.0
6	54.2	64.2	25.7	52.7	23.2	62.0
7	15.2	12.2	109.2	67.3	23.0	41.0
8	12.7	31.3	15.2	37.8	18.5	44.2
9	83.8	42.7	38.2	71.8	84.0	101.2
10	30.0	22.2	26.7	39.7	55.8	107.2

The numbers 1 to 10 refer to the ten participants in each subgroup. Numbers 1 to 5 started the task in English and numbers 6 to 10 in German. In the subgroup columns, the numbers on the left refer to the amount of time used in English and the numbers on the right to the amount of time used in German.

3. Word to time ratio in English and German

	Subgroup CA		Subgroup CB		Subgroup CC	
1	1.6	0.5	1.1	0.7	1.7	0.7
2	1.6	0.8	1.4	1.2	2.2	1.1
3	0.8	0.6	1.4	0.7	0.9	0.7
4	2.1	0.5	1.0	0.5	1.1	0.8
5	2.1	1.1	1.5	1.1	2.0	1.0
6	0.8	0.4	2.4	0.6	1.9	0.8
7	1.7	1.1	0.9	0.7	1.8	0.8
8	1.3	0.4	1.0	0.7	1.2	1.2
9	1.2	0.5	2.1	0.8	1.3	1.0
10	2.0	1.3	1.7	0.8	0.9	0.8

The numbers 1 to 10 refer to the ten participants in each subgroup. Numbers 1 to 5 started the task in English and numbers 6 to 10 in German. In the subgroup columns, the numbers on the left refer to the word to time ratio in English and the numbers on the right to the word to time ratio in German.

Appendix G.2: Data Group G

1. Number of words used in English and German

	Subgroup GA		Subgroup GB		Subgroup GC	
1	6.0	7.0	14.0	22.0	28.8	19.0
2	23.8	28.0	12.7	17.0	47.2	55.5
3	37.2	22.0	41.7	29.7	52.2	36.7
4	66.3	36.8	31.5	27.2	82.7	94.0
5	11.2	8.3	80.3	48.7	105.8	149.7
6	6.0	11.8	28.3	22.8	95.3	65.8
7	10.5	10.3	36.2	31.5	30.0	38.8
8	9.3	13.7	43.8	35.0	38.0	72.5
9	9.2	10.5	29.8	28.8	74.7	60.8
10	18.8	16.8	28.5	30.7	60.7	79.8

The numbers 1 to 10 refer to the ten participants in each subgroup. Numbers 1 to 5 started the task in English and numbers 6 to 10 in German. In the subgroup columns, the numbers on the left refer to the number of words used in English and the numbers on the right to the number of words used in German.

2. Amount of time used in English and German

	Subgroup GA		Subgroup GB		Subgroup GC	
1	7.7	8.3	11.5	20.0	15.7	17.7
2	19.5	34.0	12.5	19.5	37.2	44.3
3	30.7	27.0	27.5	34.2	34.8	31.5
4	37.0	34.3	21.2	18.7	41.2	76.5
5	6.3	7.5	31.3	22.0	58.8	103.5
6	6.2	23.2	16.2	18.8	44.2	50.5
7	9.3	12.5	27.2	36.7	19.3	38.5
8	8.3	16.2	31.0	46.8	21.5	56.7
9	7.5	10.2	22.2	30.3	34.7	37.2
10	13.0	21.8	20.0	27.2	40.7	63.3

The numbers 1 to 10 refer to the ten participants in each subgroup. Numbers 1 to 5 started the task in English and numbers 6 to 10 in German. In the subgroup columns, the numbers on the left refer to the amount of time used in English and the numbers on the right to the amount of time used in German.

3. Word to time ratio in English and German

	Subgroup GA		Subgroup GB		Subgroup GC	
1	0.8	0.8	1.2	1.0	1.8	1.1
2	1.2	0.8	1.0	0.9	1.3	1.3
3	1.2	0.8	1.5	0.9	1.5	1.2
4	1.8	1.1	1.5	1.5	2.0	1.2
5	1.0	1.1	2.5	2.2	1.8	1.4
6	1.0	0.5	1.7	1.2	2.2	1.3
7	1.1	0.8	1.3	0.9	1.6	1.0
8	1.1	0.8	1.4	0.7	1.8	1.3
9	1.2	1.0	1.3	1.0	2.2	1.6
10	1.4	0.8	1.4	1.1	1.5	1.3

The numbers 1 to 10 refer to the ten participants in each subgroup. Numbers 1 to 5 started the task in English and numbers 6 to 10 in German. In the subgroup columns, the numbers on the left refer to the word to time ratio in English and the numbers on the right to the word to time ratio in German.