

**School of Education**

**Influence of Learners' L1 Arabic and L2 French on the Acquisition  
of L3 English**

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**This thesis is presented for the Degree of  
Doctor of Philosophy - Education  
of  
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## **Declaration**

Declaration To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

## **Human Ethics**

The research presented and reported in this thesis was conducted in accordance with the National Health and Medical Research Council National Statement on Ethical Conduct in Human Research (2007) – updated March 2014. The proposed research study received human research ethics approval from the Curtin University Human Research Ethics Committee (EC00262), Approval Number: HRE2017-0716

Signature:

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## Abstract

The thesis contributes to the understanding of an under investigated phenomenon, namely the relative effects of transfer from a first language (L1/Arabic) and a second language (L2/French) into a third language (L3/English). The unique feature of the study lies in its investigation of lexical and grammatical transfer in their positive and negative forms in Lebanese university students' use of English. Another distinguishing criterion is that the native language is distant to the acquired ones, both of which are typologically similar.

In contrast to most previous studies of transfer in third language acquisition (TLA), the study reported in the thesis investigated participants that had an advanced level of proficiency of the acquired foreign languages. The cross-sectional study included a group of native speakers of English (Group A). It compared transfer effects among two trilingual groups (B vs C). Participants of both groups were third-year university students at the Lebanese American University (LAU). Group B consisted of 35 trilingual students with L1 Arabic, L2 French and L3 English. Group C also comprised 35 trilingual students with L1 Arabic, L2 English and L3 French. All the participants were undertaking their university degree in English.

Six instruments were used to collect data. A Language History Questionnaire provided background information about the participants' linguistic knowledge. A C-Test in English provided a measure of the learners' general English proficiency. A C-Test in French measured learners' general French proficiency. To investigate grammatical transfer in TLA two grammaticality tests were employed, the Elicited Oral Imitation Test incorporating Word Monitoring (OEITM) and the Untimed Grammatical Test (UGJT). To examine lexical transfer in TLA two vocabulary tests were employed; the Yes and No Test (written) and Yes and No Test (aural).

The tests were designed to provide separate measures of implicit linguistic knowledge (ILK) and explicit linguistic knowledge based on Ellis' (2005) distinguishing characteristics of such tests. The UGJT and Yes and No Test (written) were designed to examine language transfer in participants' ELK and the OEITM and the Yes and NO Test (aural) to investigate language transfer in participants' ILK. However, an exploratory factor analysis failed to show that the battery of tests provided separate measures of ILK and ELK. A possible reason for this is that due to logistic reasons the OEITM failed to ensure that the participants' responses were of a level of automaticity required to measure implicit knowledge.

As a result, the study was reframed as an investigation of the differences in the grammatical and lexical transfer of Arabic and English between Group B (L3 English) and Group C (L2 English) and of the factors that contributed to transfer. Group B was divided into two subgroups Group B1 (N=6) and Group B2 (N=29) with Group B2 having a higher level of proficiency than Group B1. In the OEITM, positive and negative grammatical transfer occurred mainly in Group B1 and from both source languages (Arabic and French) but with transfer from Arabic more evident than transfer from French. Only negative transfer from French into English occurred in Group B2. These results indicate that the grammatical forms initially transferred from French were replaced by the target forms as proficiency increased. In the UGJT, negative grammatical transfer from both languages into L3 English was evident in both B1 and B2. However, the amount of transfer from L2 French into L3 English was greater than the amount of transfer from Arabic. The most obvious reason is that French and English are typologically more proximate. Positive grammatical transfer was only evident in B1 and only from L2 French. Negative grammatical transfer from L2 French into L3 English was more evident in Group B1 than in B2, again suggesting that as learners gain in proficiency, the grammatical forms initially transferred from French are replaced by target forms.

This study also found that grammatical transfer (PGT and NGT) from L1 Arabic into L3 English depends on the degree of markedness of the related Arabic grammatical structures. In other words, the unmarked features (basic primitive rules) are transferable into L3, whereas the marked features are not. This study also found that the frequency of use of grammatical features in the source languages affected the occurrence of grammatical transfer (PGT and NGT) in TLA. Transfer from L1 Arabic and L2 French into participants' L3 English was evident for frequently used Arabic and French grammatical structures. The amount of exposure was also found to influence the rate of grammatical transfer in TLA. That is to say, the increase of participants' exposure to certain grammatical rules in the target languages increased the potential grammatical transfer of these rules from the source languages into the target one.

There was no evidence of positive lexical transfer from the source to the target language in Group B in the Yes and No Test (written). The only incidence concerned the item "quintessential". There was evidence of negative lexical transfer in Group B in the Yes and No Test (written). In the Yes and No Test (aural), both positive and negative transfer from both source languages was evident. A possible explanation for the difference in the results for the written and aural versions of this test is that the participants could draw on their L3 lexis when under no time pressure but resorted to source language lexis when more automatic responses were required. This study also found that the frequency of use of Arabic-English and French-English false and true cognate words affected lexical transfer. The more frequently used cognates are more easily transferred from the source languages.

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## Table of Contents

Declaration.....	2
Human Ethics .....	2
Introduction.....	18
1.1 Research gap .....	18
1.2 General purpose of the thesis.....	18
1.3 Personal reasons for choosing the topic .....	19
1.3.1 Being Lebanese I have a responsibility to understand multilingualism - the heritage of the people of LEBANON .....	19
1.3.2 Developing a better understanding of how my knowledge of Arabic and French has influenced my learning and use of English.....	21
1.4 Theoretical background.....	22
1.5 Resolving a problem .....	27
1.6 Thesis organisation.....	28
Chapter 2. Measuring implicit and explicit knowledge of grammar .....	31
2.1 Introduction .....	31
2.1.1 Degree of awareness.....	31
2.1.2 Time availability.....	32
2.1.3 Focus of attention .....	32
2.1.4 Systematicity.....	32
2.1.5 Certainty .....	33
2.1.6 Metalanguage .....	33
2.1.7 Learnability.....	33
2.1.8 Characteristics (components of ILK and ELK).....	34
2.2 Theoretical background.....	35
2.2.1 The Marsden project.....	36
2.3 Replication studies of Ellis' findings .....	44
2.4 Section summary .....	45

2.5 Measures of ILK in SLA reconsidered .....	46
2.5.1 The OEITuctrl vs. the OEITctrl:.....	46
2.5.2 Modality of the TGJT.....	49
2.5.3 The OEITctrl versus the TGJTA.....	50
2.5.4 The OEIT with Built-In Word Monitoring (OEITM).....	52
2.6 Summary of studies investigating Ellis' battery of tests.....	64
2.7 Chapter summary .....	69
Chapter 3. Grammatical transfer in third language acquisition.....	70
3.1 Introduction: .....	70
3.2 Typological proximity.....	71
3.3 Learner's linguistic proficiency.....	84
3.3.1 Level of L1 explicit linguistic knowledge. ....	84
3.3.2 L2 and L3 level of proficiency .....	86
3.4 Individual factors.....	97
3.4.1 Age .....	98
3.4.2 Attention control.....	105
3.5 Psycholinguistic factors .....	109
3.5.1 Psychotypology.....	109
3.6 Other factors.....	112
3.6.1 L2 type and amount of instruction.....	112
3.7 Chapter discussion. ....	114
3.8 Chapter summary. ....	120
Chapter 4. Lexical transfer in third language acquisition (TLA).....	123
4.1 Introduction .....	123
4.2 Definition of technical terms.....	124
4.3 Directionality of lexical transfer in TLA.....	126
4.4 Factors influencing lexical transfer in TLA.....	126
4.4.1 Linguistic Factors.....	127

4.4.2 Individual factors .....	141
4.4.3 Contextual factors.....	143
4.4.4 Psycholinguistic factors.....	145
4.4.5 Other factors.....	149
4.5 Chapter summary .....	152
Chapter 5. Method chapter.....	154
5.1 Research purpose. ....	154
5.2 The Lebanese context.....	156
5.3 Pilot study.....	158
5.3.1 Purpose.....	158
5.3.2 Method. ....	158
5.3.3 Pilot study procedures.....	161
5.3.4 Pilot study results.....	162
5.3.5 Issues encountered in the pilot study and proposed changes. ....	164
5.4 Main study .....	167
5.4.1 Research questions.....	167
5.4.2 Participants.....	167
5.4.3 Design.....	169
5.4.4 Instruments and Procedures.....	171
5.4.5 General procedure .....	198
5.4.6 Analysis.....	199
Chapter 6. Investigating the participants' ILK and ELK of lexis and grammar .....	212
6.1 Introduction: .....	212
6.1.1 Descriptive statistics .....	212
6.2 Reliability .....	214
6.3 Normal distribution of the tests' scores.....	215
6.4 Correlational matrix for the five tests .....	216
6.5 Exploratory factor analyses.....	218

Chapter 7. Grammatical transfer from Arabic and French into English.....	224
7.1 Introduction .....	224
7.2 UGJT .....	225
7.2.1 Tests of normality on scores for UGJT .....	225
7.2.2 Investigating scores on items designed to investigate grammatical transfer rates from Arabic and French into English. ....	227
7.2.3 UGJT .....	227
7.2.4 UGJT grammatical.....	232
7.2.5 UGJT Ungrammatical .....	234
7.2.6 Group scores on the different grammatical structures.....	237
7.3 OEITM.....	240
7.3.1 Tests of normality for OEITM scores.....	241
7.3.2 Investigating scores designed to measure grammatical transfer rates from Arabic and French into English.....	242
7.3.3 OEITM.....	243
7.3.4 OEITM Grammatical.....	247
7.3.5 OEITM ungrammatical.....	249
7.3.6 Group scores on the different grammatical structures.....	252
7.4. Summary of the results.....	256
7.4.1. Investigating grammatical transfer from Arabic and French into English.....	256
7.4.2Examining group differences (B vs C) on the different grammatical structures. ....	259
7.5 Discussion .....	261
7.5.1 Investigating grammatical transfer in this study .....	261
7.5.2 UGJT .....	266
7.5.4 OEITM.....	290
7.6 Chapter summary .....	307
Chapter 8. Lexical transfer from Arabic and French into English.....	309
8.1 Introduction .....	309

8.2 Yes and No Test (written).....	310
8.2.1 Tests of normality on scores for the Yes and No Test (written).....	310
8.2.2 Investigating scores on items designed to investigate Lexical Transfer rates from Arabic and French into English. ....	311
8.3 Yes and No Test (aural).....	317
8.3.1 Tests of normality on scores for the Yes and No Test (aural).....	317
8.3.2 Investigating scores on items designed to investigate lexical transfer rates from Arabic and French into English. ....	318
8.4 Summary.....	323
8.5 Discussion.....	323
8.5.1 The categories of lexical transfer examined in Yes and No Test (written) .....	324
8.5.2 The categories of lexical transfer examined in Yes and No Test (aural) .....	330
8.6 Chapter summary.....	338
Chapter 9. Conclusion.....	340
9.1 Thesis purpose and specific aims.....	340
9.2 Summary of the main findings for each of the research questions.....	342
9.2.1 RQ1) "Do the tests provide separate measures of ILK and ELK?" .....	342
9.2.2 RQ2) "Are there any differences in the grammatical transfer of Arabic and French into English between Group B (L3 English) and Group C (L2 English)?" .....	344
9.2.3 RQ3) "Are there Any differences in the lexical transfer of Arabic and French into English between Group B (L3 English) and Group C (L2 English)?" .....	347
9.3 The theoretical contributions the research has made. ....	348
9.3.1 Theoretical contribution on grammatical transfer in TLA .....	348
9.3.2 Theoretical contributions for lexical transfer in TLA.....	350
9.4 Practical and pedagogical contributions.....	351
9.4.1 Implementation a programme to give support to L3 lexical development.....	351
9.4.2 Implementation of a programme to give support to L3 grammatical development... ..	354
9.5 Limitations.....	356

9.5.1 Technological issues .....	356
9.5.2 The operationalisation of constructs.....	356
9.5.3 Number of items.....	357
9.5.4 Limited number of participants in B1.....	357
9.6 Suggestions for future research.....	357
9.6.1 Language transfer and automatised linguistic knowledge.....	358
9.6.2 Multidirectional transfer.....	358
9.6.3 Understudied factors impacting language transfer in TLA.....	359
References.....	360
Appendices.....	368
Appendix A. The C-Test in English and French .....	368
C-test instructions and five selected paragraphs.....	368
Appendix B. Language History Questionnaire (Version 1.0) .....	372
Appendix C. The Yes and No Test (written) .....	380
Appendix D. The Yes and No Test (aural).....	391
Appendix E. The UGJT.....	391
Items employed in the UGJT and OEITM.....	393
Appendix F. The OEITM.....	397
Appendix G. Statistical results for grammatical transfer in UGJT, UGJT grammatical and UGJT ungrammatical.....	398
Appendix H. Statistical results for grammatical transfer in OEITM, OEITM grammatical and OEITM ungrammatical .....	401
Appendix I. Chi Square tests for grammatical tests.....	403

## List of Tables

Table 2.1: The Components of ILK and ELK....	34
Table 2.2: Test Design Features....	40
Table 2.3: Reliability Measures for the Five Tests....	41
Table 2.4: Results for Tests Measuring ELK....	42
Table 2.5: Results for Tests Measuring ILK....	42
Table 2.6: Mean Scores and Standard Deviations on TGJTW and TGJTA Across two Validity Studies....	50
Table 2.7: Mean Scores and Standard Deviations Across Five Validity Studies....	51
Table 2.8: Correlations between OEIT and GSI of the Whole, Long and Short LOR Groups with SRT....	55
Table 2.9: Correlations between OEIT and GSI, with MKT for the Whole, Long and Short Group Participants....	56
Table 2.10: Correlation Matrix Between Language and Aptitude Test Scores....	59
Table 2.11: Summary of Studies Investigating Ellis' Battery of Tests....	64
Table 3.1: Position of the Relative Clause in English, Russian and Kazakh....	100
Table 4.1: Lexical Transfer of Form....	124
Table 4.2: Lexical Transfer of Meaning....	125
Table 5.1: The Dependant and Independent Variables....	171
Table 5.2: Test Selected to Measure Learners' ILK and ELK of English....	171
Table 5.3: Sentences reflecting on the potential of negative syntactic transfer from Arabic into English....	188
Table 5.4: Sentences reflection on the potential of negative syntactic transfer from French into English....	189
Table 5.5: Sentences Selected for OEITM -Potential Negative Syntactic Transfer from Arabic into English....	191

Table 5.6: Sentences Selected for OEITM-Potential Negative Syntactic Transfer from French into English....	192
Table 6.1: Descriptive Statistics for The Six Tests....	213
Table 6.2: Reliability Measures on the Six Tests....	214
Table 6.3: Test of Normality....	216
Table 6.4: Correlational Matrix for the Five Tests....	218
Table 6.5: Principal Axis Factoring....	222
Table 6.6: Loadings for Principal Axis Factoring....	223
Table 7.1: Test of Normality for UGJT, UGJT Grammatical and UGJT Ungrammatical for the Four Categories of Scores....	226
Table 7.2: Participants' Scores in UGJT on Items Designed to Investigate Grammatical Transfer....	228
Table 7.3: Participants' Scores in UGJT Grammatical on Items Designed to Investigate Grammatical Transfer....	232
Table 7.4: Participants' Scores in UGJT Ungrammatical on Items Designed to Investigate Grammatical Transfer....	235
Table 7.5: Participants' UGJT, UGJT Ungrammatical, and UGJT Grammatical Scores on the Different Grammatical Structure....	238
Table 7.6: Chi Square Tests....	239
Table 7.7: Test of Normality for OEITM, OEITM Grammatical and OEITM Ungrammatical for the Four Categories of Scores....	242
Table 7.8: Participants' scores in OEITM on items designed to investigate grammatical transfer....	243
Table 7.9: Participants' Scores in OEITM Grammatical on Items Designed to Investigate Grammatical Transfer....	247
Table 7.10: Participants' Scores in OEITM ungrammatical on Items Designed to Investigate Grammatical Transfer....	250

Table 7.11: Participants' Scores on the Grammatical Structures for OEITM, OEITM Ungrammatical, and OEITM Grammatical....	253
Table 7.12: Chi Squared Tests....	254
Table 7.13: Structure Reflecting on the Potential Grammatical Transfer from Arabic or French into English...	262
Table 7.14: Participants' Scores on Selected Items in UGJT Reflecting on PGT from Arabic into English....	269
Table 7.15: Group B1's Scores on Selected Items in UGJT Reflecting on PGT from Arabic into English....	271
Table 7.16: Group B2's Scores on Selected Items in UGJT Reflecting on PGT from Arabic into English....	273
Table 7.17: Participants' Wrong Judgment on Selected Items in UGJT Reflecting on NGT from Arabic into English....	276
Table 7.18: B1's Wrong Judgment on Selected Items in UGJT Reflecting on NGT from Arabic into English....	277
Table 7.19: B2's Scores on Selected Items in UGJT Reflecting on NGT from Arabic into English....	278
Table 7.20: Participants' Scores on Selected Items in UGJT Reflecting on PGT from French into English....	280
Table 7.21: B1's Scores on Selected items in UGJT reflecting on PGT from French into English....	282
Table 7.22: B2' Scores on Selected Items in UGJT Reflecting on PGT from French into English....	283
Table 7.23: Participants' Scores on Selected Items in UGJT Reflecting on NGT from French into English....	286
Table 7.24: B1's Scores on Selected Items in UGJT Reflecting on NGT from French into English....	287
Table 7.25: B2's Wrong Judgments on Selected Items in UGJT Reflecting on NGT from French into English...	289
Table 7.26: B' Scores on Selected Items in OEITM Reflecting on PGT from Arabic into English...	292

Table 7.27: B1' Scores on Selected Items in OEITM Reflecting on PGT from Arabic into English....	293
Table 7.28: B2's Scores in OEITM on Selected items Reflecting on PGT from Arabic into English....	294
Table 7.29: Group B's Wrong Judgment on Selected Items in OEITM Reflecting on NGT from Arabic into English....	296
Table 7.30: B1's Wrong Judgment on Selected Items in OEITM Reflecting on NGT from Arabic into English....	297
Table 7.31: B2's Scores on Selected Items in OEITM Reflecting on NGT from Arabic into English....	298
Table 7.32: B's Scores on Selected Items in OEITM Reflecting on PGT from French into English....	300
Table 7.33: B1's Scores on Selected Items in OEITM Reflecting on PGT from French into English....	301
Table 7.34: B2' Scores on Selected Items in OEITM Reflecting on PGT from French into English....	302
Table 7.35: Participants' Scores on Selected Items in OEITM Reflecting on NGT from French into English....	304
Table 7.36: B1's Scores on Selected Items in OEITM Reflecting on NGT from French into English....	306
Table 7.37: B2's Wrong Judgments on Selected Items in OEITM Reflecting on NGT from French into English....	306
Table 8.1: Test of Normality for Participants' Scores on the Yes and No Test (Written)...	311
Table 8.2: Participants' Scores in the Yes and No Test (written) on Items Designed to Investigate Lexical Transfer....	313
Table 8.3: Test of Normality for Participants' Scores on the Yes and No Test (aural)....	318
Table 8.4: Participants' Scores in the Yes and No Test (aural) on Items Designed to Investigate Lexical Transfer....	319
Table 8.5: Scores on Specific Items of French English True Cognate Words (frequent)....	326
Table 8.6: The Individual Test Items Scores on French-English False Cognate Words....	328
Table 8.7: Scores for Arabic-English True Cognate Words (frequent)....	329
Table 8.8: Scores on Specific Items of French-English True Cognate Words (frequent)....	332
Table 8.9: Scores on Specific Items of French-English False Cognate Words....	335

Table 8.10: List of Arabic-English True Cognate Words.... 337

## Appendices

Table 1: List of Frequent French-English True Cognate Words.... 380

Table 2: List of French-English Infrequent True Cognate Words.... 384

Table 3: List of French-English False Cognate Words.... 387

Table 4: List of Arabic-English True Cognate Words.... 389

Table 5: Sentences Reflecting on the Potential of Negative Syntactic Transfer from Arabic into English.... 393

Table 6: Sentences Reflection on the Potential of Negative Syntactic Transfer from French into English.... 394

Table 7: Results Investigating Participants' Grammatical Transfer for UGJT, UGJT Grammatical and Ungrammatical ... 398

Table 8: Results Investigating Participants' Grammatical Transfer for OEITM, OEITM Grammatical and OEITM Ungrammatical.... 402

Table 9: Chi Square Tests for Grammatical Tests.... 403

## **Introduction**

This chapter presents the reader with the research gap, general purpose of the thesis, personal reasons for choosing the topic, theoretical bases of the research and a statement of the content of each chapter.

### **1.1 Research gap**

This research was initially framed in terms of a gap in the investigation of lexical and grammatical transfer in implicit and explicit linguistic knowledge of students' third language acquisition of English. Because this did not prove possible I was forced to redirect the focus of the thesis. I elected to investigate lexical and grammatical transfer in third language acquisition in a context where students' L1 (i.e., Arabic) is typologically dissimilar from L2 English and L2 French and L3 English are typologically approximate.

### **1.2 General purpose of the thesis**

This thesis aims to contribute to understanding a little investigated phenomenon, namely the relative effects of transfer from a first language (L1/Arabic) and a second language (L2/ L3 French) into a third language (L2/L3English). The unique feature of this thesis lies in its broad scope that covers both positive and negative grammatical and lexical transfer in TLA in cases where the source language (Arabic) is typologically dissimilar to the target languages (French and English) both of which are typologically proximate. Moreover, this thesis examines language transfer in third language acquisition (TLA) in participants whose proficiency level of their target languages (French and English) is high. In this respect it contrasts with the

majority of existing studies on language transfer in TLA which have examined cases where the L2 and L3 proficiency levels were beginner or intermediate, and were mainly undertaken in Europe (see, Najjar, 2020; Najjar, 2021).

Investigating grammatical and lexical transfer in third language acquisition is of importance to various areas of enquiry. Firstly, TLA researchers/instructors are keen to evaluate the role of positive lexical transfer (PLT) and positive grammatical transfer (PGT) in enhancing L3 learning. Secondly, TLA researchers/instructors are also interested in examining negative lexical transfer (NLT) and negative grammatical transfer (NGT) in an attempt to control this phenomenon due to its deteriorative effect on L3 learning. Thirdly, language testers may also wish to know how language transfer affects lexical and grammatical proficiency measurements.

### **1.3 Personal reasons for choosing the topic**

#### ***1.3.1 Being Lebanese I have a responsibility to understand multilingualism - the heritage of the people of LEBANON***

I am Lebanese and one of my goals was to investigate the multilingual make-up of my country. It is my Lebanese multilingual heritage that gives me the motivation and passion necessary to enhance humanity's understanding of multilingualism and led to my decision to investigate language transfer in TLA. Growing up in Lebanon, I received a trilingual education with Arabic and French being the mediums of instruction and English being the second foreign language that I learned, starting from age 12. In Lebanon, we have a trilingual educational system where schools are categorised according to whether French or English is the main medium of instruction in addition to Arabic (French-schools vs English-schools).

Furthermore, learning a second foreign language is compulsory in Lebanese schools; the National Curriculum, issued by the Lebanese Council of Ministers in 1994, made it obligatory for all schools to select and utilise either French or English as their medium of instruction, and then to teach either French or English as the second foreign language from the age of twelve for around three to four sessions (40 to 60 minutes) per week (Kobeissy, 1999). As a trilingual from Lebanon, I wanted to understand language transfer in TLA in order to gain the understanding needed to assist the development of better teaching and learning methods in Lebanon and in other trilingual societies (e.g., the European Union, Switzerland, Tunisia, Morocco etc).

I have always possessed a great affinity with my home country, not because I was born there, but for how I see Lebanon; a trilingual society with a long, rich history; an icon of multilingualism and multiculturalism. My ancestors, the Phoenicians, invented the first alphabet (Rollston, 2020). The field of linguistics, known as “phonetics” finds its etymological origins in these Lebanese ancestors. Lebanon was also a province of the ancient Roman Empire, inclusive of the Roman City of Beirut to its west, where a Roman law school was established in which Lebanese scholars used their highly-developed command of Latin to collaborate in the establishment of the Empire’s civil law (Kassir, 2011). Lebanon is also famous for hosting many languages on its soil as a result of foreign colonisation; these languages include: Aramaic (500 BC), Syriac (100 AD), Arabic (800 AD), Turkish (1600 AD), English (1850 AD) and French (1900 AD) (Bahous et al., 2011). Since the 18th century Arabic has become the native language of Lebanon with French and English widely used foreign languages (Bahous et al., 2011).

Language learning is a bridge across nations and a key to worldwide peace; what one comprehends, one comes to love. This is what I, and most of Lebanon’s new generation, strive to see in their future.

### ***1.3.2 Developing a better understanding of how my knowledge of Arabic and French has influenced my learning and use of English.***

In 2017, I moved to Perth, Western Australia after completing a Master of Arts in Interpreting and Translation at the Western Sydney University. I started working as an interpreter and translator performing mainly community, medical and legal interpreting and translation tasks from Arabic into English and vice versa. As a Lebanese person, who received French education in my childhood, I have always felt that French is evident somehow in my English lexical production, that I was making a conscious effort to avoid negative lexical and grammatical transfer from Arabic and French into English when translating, and that I was unable to avoid negative language transfer when interpreting under the pressure of time (e.g., simultaneous interpreting).

The body of knowledge concerning cross-language influences on TLA did not completely answer all the questions I had. This is because most of the published studies were conducted in Europe, a place where the majority of spoken languages are typologically close. In contrast, the Lebanese context provides a unique opportunity to investigate lexical and grammatical transfer in TLA. This is because the Lebanese people have Arabic as their L1, which is typologically very distant from their two acquired foreign languages (French & English). The two additional languages are typologically approximate, reflective of their common Indo-European origins and incorporation of many Latin and French loan words into the English language. I decided to enrol in the PhD programme at Curtin University and came under the supervision of Professor Rod Ellis, who I knew was a leading figure in the second language acquisition (SLA) field.

## 1.4 Theoretical background

It is worth reminding readers that L3 processing is similar to L2 processing. For instance, language transfer occurs mainly in the early stages of both L2 and L3 learning (Kroll & Stewart, 1994; Talamas et al., 1999). Also the main factor influencing language transfer in both L2 and L3 acquisition is typological proximity. That is, language transfer will occur more across languages that are typologically close (English vs German) and to a lesser degree across languages that are typologically dissimilar (English vs Arabic) (Dussias, 2004; Gibson et al., 1996). However more research needs to be conducted to establish the extent to which the two types of acquisition are similar or dissimilar.

I will first present a brief account of language transfer from a theoretical perspective, highlighting how language transfer (LT) can differ when English is the second or third language, and then consider how the distinction between implicit/ explicit knowledge is relevant to understanding the nature of L3 acquisition.

Language transfer is composed mainly of, but not limited to grammatical transfer and lexical transfer. The impact of language transfer on TLA is undeniable, it can facilitate or impede the acquisition of a new language. This is because language transfer can be positive or negative. Positive language transfer is the correct use of linguistic features from the L1 when using and learning a new language whereas negative lexical transfer is the incorrect use of these linguistic features. Transfer mostly occurs from previously learned language(s) into the newly acquired language (s). This is referred to as direct transfer. Transfer can also occur from the newly acquired language(s) into the previously acquired language(s), a process known as reversal transfer.

In TLA, direct positive grammatical transfer (PGT) is the transfer of grammatical structures across three learned or acquired languages. This transfer results in correct L2/L3 grammar

production. For instance, a French speaker when speaking in English could apply the Subject Verb Object (SVO) word order, borrowing this grammatical rule from French. Negative grammatical transfer (NGT) in TLA results from the incorrect use of a grammatical feature across related languages. An example of this is the use of Verb Subject Object (VSO) word order by an Arabic speaker in their production of English. The VSO word order is grammatically correct in Arabic but incorrect in English.

A substantial number of studies of direct grammatical transfer in TLA have investigated which of the previously acquired languages (L1 vs L2) is the main source of grammatical transfer in TLA and hence has the greater influence on L3 learning processes. Five suggested models try to explain grammatical transfer in TLA. 1) The L1 status factor argues that transfer mainly occurs from L1 into L3. L1 is the core source of grammatical transfer in TLA. This is because the majority of trilingual students are more proficient in L1 than in L2; grammatical transfer occurs from the trilingual students' most proficient language. These studies primarily cover grammatical transfer in TLA in participants' early stages of L3 acquisition (Herms, 2010, 2015; Jin, 2009). 2) The Cumulative Enhanced Model suggests that in TLA, grammatical transfer occurs from both L1 and L2 into L3. This model argues that commonly used grammatical rules between source languages (L1 & L2) and target language (L3) are transferable whereas grammatical rules that are only related to the L3 grammatical system are learned independently from the target grammatical forms of L1 and L2 (Berkes & Flynn, 2012; Flynn et al., 2004; Slabakova, 2017; Westergaard et al., 2017). 3) The Typological Primary Model states that PGT from L1 and L2 into L3 mainly results from learners' awareness of typological similarities across related languages; transfer cannot occur from L1 or L2 into L3 unless there is a threshold of typological similarity (Rothman, 2010, 2011, 2015). 4) The Linguistic Proximity Model (LPM) also claims that grammatical transfer occurs from both the L1 and L2 into the L3. Grammatical transfer in TLA occurs "property-by-property". This is to

say that the small number of grammatical structures that exist between two languages systems that are typologically dissimilar are also transferable. (Westergaard et al., 2017). For instance, a Russian speaker of English will transfer adverb-verb word order from Russian into English. This is because both Russian and English use the same adverb-verb word order. PGT occurs despite Russian and English being typologically distant. This model also suggests that grammatical dissimilarities are also sources of NGT from both previously learned languages in all learning stages (Westergaard et al., 2017). 5). The Scalpel Model of L3 argues against “wholesale transfer at the initial stages and against transfer being facilitative” (Slabakova, 2017, p. 12). It also identifies many factors that contribute to the occurrence of grammatical transfer in TLA. Perceived structural typology is undoubtedly a factor affecting grammatical transfer in TLA. Moreover, misleading input can also impact the process (Slabakova, 2017).

Research concerning grammatical transfer in TLA has identified a number of influential factors (a summary on these factors are presented in Najjar, 2021): linguistic (e.g., typology); individual (e.g., student’s attention control and age); psycho-linguistic relating to psychotypology and learners’ awareness of common grammatical structures across related languages and other factors (such as L2 type and amount of instruction). NGT from the source languages (L1 & L2) is evident when a) target languages and the source language are typologically distant (Garcia Mayo & Slabakova, 2015; Rothman, 2010), b) students possess moderate attention ability (Sánchez & Bardel, 2016), and c) students have extensive exposure to L2 grammar input (Stadt et al., 2018) and a high level of L2 proficiency (Falk & Bardel, 2011) but a low level of L3 proficiency (Hermas, 2015). Transversely, PGT from the source languages (L1& L2) arises when a) source languages and the target language are typologically approximated and students perceive grammatical similarities between source languages and the L3 (Rothman, 2010) b) the level of proficiency of the source languages is high and that of the target languages is low (Falk & Bardel, 2011; Rothman, 2010). Furthermore, the students’

age was found to determine which language, among the source languages (L1 vs L2), was the main source of transfer. It was reported L3 adult learners may depend more on their L2 as a source of PGT whereas L1 is the main source of grammatical transfer among children (Flynn et al., 2004; Pfenninger & Singleton, 2016). Finally, it was found that when L1, L2, and L3 are equally proximate, it is the L2 that has the main influence on PGT and NGT in TLA (Bardel & Falk, 2007).

In TLA, direct positive lexical transfer (PLT) occurs when participants' use true-cognate words from the lexis of their source language(s) in their production of L3 lexis. For instance, the French speaker uses the French-English true cognate word “construction” to refer to the English word, “building”. In contrast, negative lexical transfer is the wrong use of words from the previously learned language in the newly acquired one. NGT mainly manifests itself through the transfer of false cognate words across related languages. A French speaker of English may think that the word “envy” means desire, or the wish to have something, because its counterpart in French, the word “envie”, means to desire something.

Research on lexical transfer in additional language acquisition draws on two main models, 1) The Asymmetric Model of Lexical Representation and 2) The Parasitic Model of Vocabulary Development. The Asymmetric Model postulates that learners who have limited L2/ L3 lexical knowledge are more affected by lexical transfer than learners with greater L2/L3 lexical knowledge. In the initial stage of L3 vocabulary learning, participants are uncertain about their lexical choices and, therefore, rely extensively on lexical transfer from previously learned language/s in their L3 lexical production. In contrast, with the increase of L3 lexical proficiency and fluency, learners tend to rely more on their L3 lexis. Accordingly, the lexical transfer is a periodic phenomenon occurring mainly in the early stages of L2/L3 vocabulary learning (Kroll & Stewart, 1994; Talamas et al., 1999). The Parasitic Model strongly advocates that true and false cognate words across related languages depend on their orthographic similarities and are

automatically detected and exploited in the establishment of L2/L3 lexis knowledge. This model considers lexical transfer from previously learned languages into the newly acquired one as the principal motor which drives early word learning. Lexical transfer from L1 and L2 into L3 occurs also among students with a high level of lexical proficiency. However, with the improvement of participants' L3 lexis proficiency, their use of lexical transfer from L1 and L2 in the production of L3 lexis becomes a planned and intentional linguistic behaviour as opposed to an automatised one (Ecke & Hall, 2014; Ringbom, 2006).

Research on language transfer in TLA has pointed to several factors influencing language transfer in TLA as follows: linguistic (e.g., typology), contextual (naturalistic learning vs. formal learning), psycho-linguistic (i.e., psychotypology and students' awareness of cognates), individual (e.g., learners' age) and other factors (such as L2/L3 proficiency level) (Najjar, 2020). Studies showed that NLT from L1 and L2 into L3 occurs (a) in naturalistic contexts (Dewaele, 2001), (b) when source languages (L1 & L2) and target language (L3) are typologically approximate (Odlin & Jarvis, 2004; Perić & Mijić, 2017; Ringbom, 2001b), (c) when students perceive typological similarities across related language (Bardel & Lindqvist, 2007) and (d) when proficiency levels of L2 are advanced (Tremblay, 2006) and L3 proficiency is low (Hammarberg, 2001; Perić & Mijić, 2017). Moreover, students' age plays an essential role in determining the relative weight of lexical transfer in TLA as follows : NLT from the L1 and L2 increase more before the critical age (Cenoz, 2001). In contrast, PLT in TLA is evident (a) in formal settings such as instructional learning, (b) when learners perceive lexical similarities between source language(s) and target language, (c) when learners' awareness of true cognates is high, and (d) when both L2 and L3 proficiency levels are high. Finally, it was found that when L1, L2, and L3 are equally proximate, it is the L1 that has the primary influence on lexical transfer in TLA.

After establishing the conceptual basis and considering the main theories relating to grammatical and lexical transfer in TLA, I recognized the importance of investigating this phenomenon in Beirut. This study examines lexical and grammatical transfer in TLA where participants have a high level of proficiency in all their three languages and where L1 is typologically dissimilar from L2 and L3 which are typologically close.

### **1.5 Resolving a problem**

My intention was to examine lexical and grammatical transfer in L3 ILK and ELK. This required designing a battery of tests to provide relatively distinct measurements of ILK and ELK. The tests that I designed were submitted to a factor-analysis scores to confirm whether scores from the tests loaded on distinctive factors that could be labelled ILK and ELK. It is worth noting that R. Ellis (2005) was successful in designing tests that did measure ILK and ELK and that the results of his study were replicated in a number of other studies (Bowles, 2011; R. Ellis, 2005; Erlam, 2006; Gutiérrez, 2013; Kim & Nam, 2017; Zhang, 2015). In fact, in the end, it was necessary to shift the focus of my study from the investigation of grammatical and lexical transfer in the participants' ILK and ELK to just examining grammatical and lexical transfer in TLA in general.

Due to the Covid-19 pandemic, the data collection was conducted online and an information technologist (IT) was onsite to supervise the administration of the tests. Data collection took place between 1/9/2019 and 15/6/2020. During testing, and even at the time of writing this study, Lebanon was suffering from a political, economic and social crisis which affected the availability of basic utilities (internet, electricity and gas). During the data collection, and continuing to the time of this writing, the bandwidths accessible in Lebanon were mainly 2 Mbps; with 8 Mbps being the minimum internet speed required for the test

intended to measure ILK. The test did not run smoothly and I suspect that the test ended up measuring careful rather than spontaneous language use. Thus, this test did not function as intended. This can explain why the results on Exploratory Factor Analysis (EFA) failed to demonstrate distinct ILK and ELK constructs. I therefore investigated what the separate tests for grammar revealed about grammatical and lexical transfer in TLA and made no claims about what kind of knowledge the tests were measuring.

## **1.6 Thesis organisation**

This thesis comprises nine chapters inclusive of the Introduction; the following is a brief summary of the content of these chapters.

There are three literature review chapters namely, chapters 2, 3 and 4. Chapter 2 reviews studies evaluating the instruments designed to measure ILK and ELK. Chapter 3 reviews studies that investigated grammatical transfer in TLA and identified factors that influence grammatical transfer in TLA: linguistic (e.g., typology); individual (e.g., learners' attention control and age); psycho-linguistic (e.g., psychotypology and the learners' awareness on common grammatical rules among related languages); and other factors (e.g., L2 type and amount of grammatical instruction). Chapter 4 considers the factors influencing direct lexical transfer from L1 and L2 into L3. This was established by examining studies devoted to lexical transfer in TLA mainly conducted in Europe. These factors were classified into the following five categories 1) linguistic (e.g., typology) 2) contextual (e.g., formal instruction vs naturalistic learning 3) psycholinguistic (e.g., students' awareness of cognate words) 4) individual (e.g., learners' age) 5) other factors (e.g., L2/L3 Level of proficiency).

Chapter 5 discusses the methodology used in this study. This descriptive research utilised a quantitative cross-sectional based design comprising two subgroups (B vs C). It compared the difference in scores between Group B and Group C on the related tests in order

to examine the difference in transfer effects from Arabic and French for these two groups. Group B (N=35) and Group C (N=35) were Lebanese students with L1 Arabic who were recruited from the Lebanese American University (LAU). Group B's participants had L2 French and L3 English, and Group C's participants had L2 English and L3 French. A third Group (i.e., Group A) was also recruited and was composed of 3rd year students (N=10) at Curtin University, Australia. Group A provided a baseline against which the results of other participants could be compared. The study employed a battery of tests attempting to provide a distinguishing measurement of participants' ILK and ELK of English. Two tests were employed to measure participants' ELK of grammar and lexis; the Untimed Grammaticality Judgment Test (UGJT) for grammar, and the Yes and No Test (written) for vocabulary. Another two tests were employed to measure participants' ILK of grammar and lexis, namely, the Oral Elicit Imitation and Word Monitoring (OEITM) for grammar and the Yes and No Test (aural) for lexis. The main distinguishing characteristics between the tests intended to measure ILK and ELK is that tests of ILK allow the relatively spontaneous use of English while tests of ELK involve more careful use of English.

Chapter 6 presents the results for Research Question 1 (RQ1) namely; "Do the selected tests provide a separate measure of ILK and ELK?" In addition to the related statistical measurements (e.g., descriptive statistics, test reliability, test of normality etc.) an Exploratory Factor Analysis (EFA) was undertaken to investigate whether the tests afforded separate measures of ILK vs ELK.

Chapter 7 addresses RQ2, namely: "Are there any differences in the grammatical transfer of Arabic and French into English between Group B (L3 English) and Group C (L2 English)?" This chapter investigates and discusses what the separate grammaticality tests

(UGJT vs OEIT) reveal about grammatical transfer from L1 Arabic and L2 French into L3 English.

Chapter 8 addresses RQ3, namely: “Are there any differences in the lexical transfer of Arabic and French into English between Group B (L3 English) and Group C (L2 English)?” This chapter investigates and discusses what the separate vocabulary tests, namely, the Yes and No (aural) and the Yes and No (written), reveal about lexical transfer from L1 Arabic and L2 French into L3 English.

Chapter 9 is the conclusion chapter and provides a comprehensive summary of the main findings for each of the research questions, discussing the theoretical and practical contributions of the study’s findings, its limitations and making suggestions for future research.

## Chapter 2. Measuring implicit and explicit knowledge of grammar

### 2.1 Introduction

In order to develop tests to examine Implicit Linguistic Knowledge (ILK) and Explicit Linguistic Knowledge (ELK), it is crucial to operationalise these two types of knowledge. In other words, the following is required a) define a set of characteristics through which we can differentiate ILK and ELK and b) subsequently create a psychometric set of tests that distinguishes them. R. Ellis (2005) has operationalised these two theoretical types of knowledge (ELK, ILK). As a theoretical cornerstone that has to be built upon, he suggested that ELK is “analysed structural knowledge of which learners are consciously aware” (Ellis et al., 2009, p. 38). ILK, on the other hand, is “sub-symbolic, procedural and unconscious” (Ellis et al., 2009, p. 38). Ellis et al.’s (2009) approach was based on seven main criteria described below. According to Ellis et al. (2009), the seven criteria distinguishing ILK from ELK are as follows:

#### *2.1.1 Degree of awareness*

ILK manifests itself without learners’ awareness of their own linguistic knowledge. The degree of awareness can be measured simply by asking whether participants’ decisions were made based on a “feeling” or a “rule” of which they are certain. If participants indicate an answer was based on feeling, this suggests that they were drawing on their ILK, while if they say that their answer was based on a rule, their answer may have stemmed from their use of ELK.

### ***2.1.2 Time availability***

In this context, time availability involves time pressure. Tasks that restrict the response time (RT) of participants, forcing them to answer quickly, induce the use of ILK. Giving participants adequate time, or unlimited time, to answer and to draw on their second language (L2) knowledge more likely affords a measure of ELK.

### ***2.1.3 Focus of attention***

This characteristic considers whether the focus of the speakers' attention is on meaning or on form. The crucial distinction is that speakers are more likely to draw on ILK when they focus on meaning, and ELK when they focus on choice of linguistic form. Ellis stated "tests that require learners to focus on meaning will elicit implicit knowledge, whereas tests that encourage learners to focus on form will elicit explicit knowledge" (R. Ellis, 2005, p. 163).

### ***2.1.4 Systematicity***

This component refers to whether participants are consistent or inconsistent in their given answers. Grammar by nature is systematic. When participants undertake tasks that tap into ILK, they are likely to show more consistency in their answers than when they tap into ELK. In other words, ILK has a higher tendency to exhibit language systematicity.

### ***2.1.5 Certainty***

This component considers to what degree participants are confident that their answers “conform to target language norms” (R. Ellis, 2005, p. 152). It is predicted that when using their ELK, participants have less confidence in their responses to tasks, while ILK will foster greater confidence. However, in certain conditions, learners may “place considerable confidence in their explicit rules” (R. Ellis, 2005, p. 152), and therefore, this needs to be approached with circumspection.

### ***2.1.6 Metalanguage***

A feature of ELK is that it incorporates metalanguage, and learners may make use of this to enhance the accuracy of their production by monitoring their language use. When drawing on their ILK, speakers do not make use of metalanguage. In other words, “Learners knowledge of metalingual terms will be related to their explicit analysed knowledge but not to their implicit knowledge” (R. Ellis, 2005, p. 152).

### ***2.1.7 Learnability***

This characteristic refers to the capabilities of ILK and ELK in participants of different age groups. For instance, “explicit knowledge is learnable at any age, whereas implicit knowledge is not.” (R. Ellis, 2005, p. 150). L2 learners are more likely to display a high level of ILK if they start learning a new language as a child. Learners who start learning through instructed learning as adolescents are more likely to display a high level of ELK (Ellis et al., 2009). In this context, language can be learned at any stage; however, it manifests itself

differently depending on the age at which learners start to learn. According to R. Ellis (2005, p. 150) “learners whose first languages lack morphological markers of key grammatical functions (such as articles) will find these difficult to acquire as implicit knowledge past a certain sensitive age although they may well be able to develop explicit knowledge of them.”. Though Ellis et al. (2009) mentioned this as the general rule, we cannot completely deny the role of ILK in late learning, nor ELK in early learning, as both have the potential to appear at either age according to Ullman and Lovelett (2018).

### ***2.1.8 Characteristics (components of ILK and ELK)***

Table 2.1 presents the characteristic components of ILK and ELK

**Table 2.1**

*The Components of ILK and ELK (See Table 2.1 in Ellis et al., 2009).*

Component of ILK, ELK.	Answers given through ILK task	Answers given through ELK task
Degree of awareness	Feel	Rule
Time availability	Time-pressure	No time pressure (e.g., untimed tasks)
Focus of attention	Focus on meaning	Focus on form
Systematicity	Consistent	Inconsistent
Certainty	More certain	Less certain

Metalinguistic Knowledge	Does not draw on metalinguistic knowledge	More likely to draw on metalinguistic knowledge
Learnability	Favours learners who start learning as children	Favours learners who receive form-focussed instruction; mainly adult learners

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The following sections will illustrate what was the best test for ILK and for ELK in R. Ellis' (2005) Marsden project. Moreover, this chapter will analyse the majority of studies that replicated Ellis' findings or suggested better measurements. Furthermore, this chapter will also shed light on automatic explicit linguistic knowledge and the instrument that can measure this type of expertise. It contains a table summarising all the findings and suggestions of the majority of the related studies. Finally, a conclusion for this Chapter is provided.

## **2.2 Theoretical background**

The Marsden Project is one of the pioneering research projects that investigated ILK and ELK in SLA as two separate forms of linguistic knowledge (R. Ellis, 2005). In order to measure ILK and ELK separately in SLA, R. Ellis (2005) developed a battery of tests, designed in accordance with the aforementioned distinguishing features of the two types of knowledge (R. Ellis, 2005; Ellis & Loewen, 2007; Ellis et al., 2009). The following sections of this chapter describe these tests.

### ***2.2.1 The Marsden project***

R. Ellis (2005) acknowledged the difficulty in measuring ILK and ELK separately in SLA due to the interconnected nature of these two systems in the course of language performance. Ellis was also fully aware that in SLA, learners may always use any linguistic knowledge at their disposal irrespective of the purpose of the test. However, in the Marsden project, Ellis succeeded in developing a series of tests which allowed for separate measurements of ILK and ELK which can be used as a starting point in my study. This is especially so, given that the purpose of the study is to construct a battery of tests to help measure ILK and ELK separately in TLA.

**Participants in the marsden project.** The Marsden Study consisted of 111 participants: 20 (13M, 7F) native English speakers and 91 (35M, 58F) L2 learners of English. The majority of L2 learners came from China (70.5%). The English language proficiency amongst the L2 learners varied. Twenty-one of them were enrolled in a low-level English course in the university's language department. Thirty were enrolled in an advanced level English language course (e.g., ESOL course) that was undertaken as a part of an undergraduate degree. Forty had an English language proficiency equal to an IELTS score of 6.24/9. On average, these English L2 learners had been studying English for 10 years, with 1.9 years of this time in an English-speaking country. The majority of the L2 participants were Chinese (70.5%).

**The design of the project.** The project was designed to measure and examine the grammaticality of ELK and ILK in SLA, specifically participants' knowledge of seventeen grammatical English structures (e.g., regular past tense, verb complements and modal verbs). The choice of these structures took four major points into consideration. First and foremost,

the target grammatical features presented a recognised problem for all learners, regardless of the background and nature of their L1. Secondly, the grammatical features of the test were established in accordance with what is known about the developmental nature of grammatical features (see., Pienemann, 1989). The linguistic target features were selected to represent the early and late grammatical rules acquired. According to this hypothesis, some simple grammatical rules (e.g., nouns) are acquired early, while the more complex grammatical rules (e.g., modal and conditional verbs) are acquired at a later stage. Thirdly, the target structures figured in course books for beginner, intermediate, upper-intermediate and advanced level learners. Finally, the target structures included both morphological and grammatical features (see Table 2.2 in Ellis et al., 2009, pp. 43-44). The battery of tests in the Marsden project are outlined below.

**Elicited Oral Imitation Test (OEIT).** This test consisted of 34 sentences out of the 68 that were utilised in the pilot test. These sentences targeted specific grammatical and morphological linguistic features (see Appendix B in Ellis et al., 2009, p. 355). An important design feature of this test was the incorporation of both grammatical and non-grammatical sentences. As an attempt to measure ILK, a phrase known as “the belief statement” was also included. Participants were asked to respond to each statement by saying whether they agreed or disagreed with it within a time limit of 3 seconds. The purpose of the belief statement was to draw participants’ attention to meaning, rather than form. Whether they “agreed with”, “disagreed with” or were “unsure” about the meanings of the sentences was considered when scoring the test. Afterwards, they had to repeat orally what they believed to be the grammatically correct version of the sentence. Their answers were audio-recorded, and analysed in relation to the correct use of the target forms. A participant’s response was considered correct if the grammatical structure of the sentence was correct.

**Oral Native Test (ONT).** This productive test involved participants reading a story three times. They were then required to reproduce the story orally (retell it) in three minutes. The oral reproduction of the story was recorded in order to produce a transcript, which was then examined for the correct use of a selection of the 17 target forms. The percentage of grammatically correct statements was calculated using obligatory occasion analysis (see Appendix C in Ellis et al., 2009, p. 356).

**Timed Grammaticality Judgment Test (TGJT).** In this computerised test, the 17 linguistic targets were each represented four times (i.e., there was a total of 68 sentences, both grammatical and ungrammatical). Participants were asked to read each sentence and judge its grammatical correctness by clicking on the designated button within a certain time limit. “The time limit for each sentence was established on the basis of native speakers’ (NSs’) average response time for each sentence in a pilot study, to which was added an additional 20% of the time taken for each sentence to allow for the slower processing speed of L2 learners” (R. Ellis, 2005, p. 156). The time limits were between 1.8 and 6.24 seconds. The percentage of correct judgements was calculated for each participant, with separate scores for total sentences, grammatical sentences and ungrammatical sentences. The sentences used in this test can be found in Appendix D (R. Ellis, 2005, p. 356).

**Untimed Grammaticality Judgment Test (UGJT).** This computerised test consists of the same 68 sentences as in the TGJT. Participants first indicated whether each presented item was grammatically correct or incorrect. They then had to indicate the degree of certainty of their answer. The participant entered his/her certainty in a box, rating it between 0% to 100%: 0% is complete uncertainty and 100% is complete certainty. Then the student had to

state whether their judgment was based on feeling (feel) or grammatical knowledge (rule). The test was scored as the percentage of correct judgements.

**Metalinguistic Knowledge Test (MKT).** R. Ellis' (2005) version of this test was a modification of the metalanguage test developed by Alderson et al. (1997). In the first part of Ellis' test, 17 ungrammatical sentences, representing the 17 grammatical targets, were presented to participants. The part of the sentence having the error was underlined. For each sentence, participants were asked to explain in English why the sentence was ungrammatical if they could. If they did not know why it was ungrammatical, then they were instructed to leave the space provided for answers blank, and then move on to the next sentence (see Appendix E in., R. Ellis, 2005, p. 364). In the second part, there were two sub-parts. In the first sub-part, subjects were required to read a short passage and then to detect examples of 21 definitive grammatical structures from the text (R. Ellis, 2005) (e.g. relative pronoun, and countable noun; (for more details see R. Ellis, 2005, pp. 362-363). In the second sub-part, four sentences were presented, and the participants were asked to underline the item that was requested in brackets. (e.g., Poor little Markus returning home in the rain. [Subject]) (see Appendix E in R. Ellis, 2005, pp. 363-364).

**Summary.** R. Ellis (2005) designed the battery tests to provide separate measurements of participants' ILK and ELK. The design of the tests was based on the aforementioned criteria for distinguishing between these two types of knowledge. Ellis and his colleagues asserted that the oral imitation and oral native measures in ILK primarily rely on feeling, are not time pressured and make participants focus on meaning; it is likely that participants do not access their metalinguistic knowledge (R. Ellis, 2005; Ellis & Loewen, 2007; Ellis et al., 2009). In contrast, the metalinguistic knowledge test is constructed to measure ELK. It is designed to

cause participants to recall grammatical rules, to stimulate an analytical understanding of those rules and to test for the full awareness of the conditions under which these rules apply. This test is not given under time pressure but focuses on form rather than on meaning. The TGJT and the UGJT both place emphasis on judgment of form, which is itself a criterion of ELK. However, the UGJT is an unpressured test, requiring participants to base their answers on grammatical rules, thus likely involving metalinguistic knowledge. On the other hand, TGJT is time-limited and thus is more likely to involve intuitive knowledge of what is grammatical and ungrammatical. Table 2.2 illustrates the design features of the tests.

**Table 2.2**

*Test Design Features*

Test for ILK/ criterion	Degree of awareness	Time availability	Focus of attention	Use of MLK	Number of items	Number of non-native participants	Number of native speakers
Elicited Oral Imitation Test	Feel	Pressured	Meaning	Inapplicable	44	91	20
Oral Native Test	Feel	Pressured	Meaning	Inapplicable	Variable obligatory occasion	83	15
TGJT	Feel	Pressured	Form	Inapplicable	68	91	18
<u>Test For ELK/ Criterion</u>							
UGJT	Rule	Unpressured	Form	Applicable	68	91	19
MKT	Rule	Unpressured	Form	Applicable	41	91	20

Note. The data in Table 2.2 are from Table 2.3 in Ellis et al. (2009, p. 47).

**Results.** The reliability measures (using Cronbach's Alpha) showed that all the tests were reliable, especially the MKT, which scored 0.9. The minimum score was the TGJT: 0.81. Table 2.3 shows the results.

**Table 2.3**

*Reliability Measures for the Five Tests*

Test	Reliability/Cronbach's Alpha
MKT	$\alpha = 0.90$
Elicited Oral Imitation Test	$\alpha = 0.88$
Oral Narrative Test	$\alpha = 0.85$
UGJT	$\alpha = 0.83$
TGJT	$\alpha = 0.81$

Note. The data in Table 2.3 are from Table 2.4 in Ellis et al. (2009, p. 49).

The mean and standard deviation were calculated for each of the five tasks for native speakers and English learners separately. The native speakers scored between 80-99% on all tasks designed to measure ILK. They scored nearly 100% in the oral narrative test ( $\bar{x} = 0.99$ ). The L2 learners' scores were lower than the native speakers' scores on each of the ILK tests (i.e., between 11% and 72%). However, the L2 learners performed well on the UGJT (82%) and the oral narrative test (72%). It is worth mentioning that the scores on the MKT for both groups were quite close – 53% for L2 learners and 57% for native speakers (see Tables 2.4 and 2.5). Furthermore, the L2 learners scored very highly on the UGJT ( $\bar{x} = 82$ ,  $SD = 10.50$ ).

**Table 2.4***Results for Tests Measuring ELK*

	Native speakers		L2 learners	
	Percentage	SD	Percentage	SD
UGJT	96%	1.55	82%	10.55
MKT	57%	7.37	53%	20.73

Note. The data in Table 2.4 are from Table 2.5 in Ellis et al. (2009, p. 47).

**Table 2.5***Results for Tests Measuring ILK*

	Native speakers		L2 learners	
	Percentage	SD	Percentage	SD
EOIT	94%	4.1	51%	17.20
ONT	99%	2.1	72%	14.25
TGJT	80%	10.02	11%	11.80

Note. The data in Table 2.5 are from Table 2.5 in Ellis et al. (2009, p. 49).

A correlation matrix was calculated. The results were statistically significant with the correlations between all the pairs of test scores significant at  $p \leq .05$ . The MKT was less strongly correlated with the other measures.

Participants responded differently to the grammatical and ungrammatical sentences in the UGJT. Grammatical sentence scores correlated more strongly with the TGJT ( $r = 0.62$ ), OEIT ( $r = 0.58$ ) and oral narrative scores ( $0.37$ ) than with the MKT ( $r = 0.27$ ). In contrast, the ungrammatical sentences in the UGJT correlated more strongly with the MKT ( $r = 0.67$ ) task than the rest of the tests (OEIT ( $r = 0.38$ ), TGJT ( $r = 0.33$ )), and were weakly correlated with the oral narrative test ( $r=0.26$ ). In order to examine the validity of the tests measuring ILK and ELK, R. Ellis (2005) first used Principal Component Factor Analysis (SPSS version 11.5), concluding that the OET, ONT and TGJT load on one factor (ILK), and the UGJT and the MKT load on the other factor (ELK) (R. Ellis, 2005). For more information see

Isemonger (2007) criticised Ellis' (2005) use of Principal Component Analysis, asserting that a confirmatory factor analysis should have been used in Ellis' study. In response to this criticism, Ellis and Loewen (2007) used confirmatory factor analyses (MOS 5.0) (See., Arbuckle & Wothke, 2004). The analysis showed that the ungrammatical sentences in the UGJT (UGJTUG) loaded strongly on the ELK factor (CFA=0.91) and more strongly in fact than the MKT which had a loading of 0.73. Thus, UGJTUG served as a better measure of ELK than the UGJT total scores and, arguably as a better measure than the MKT. In fact, the confirmatory factor analysis duplicated the findings of the principal component analysis. The OEIT, the ONT and the UGJT loaded on the ILK factor, while the Untimed Grammatical Judgement Test with Ungrammatical Sentences (UGJTUG) and the MKT loaded on the ELK factor (Ellis et al., 2009).

### **Summary of Ellis' findings.**

- The Marsden study showed that it was possible to develop tests that distinguished ILK and ELK.

- The OEIT, ONT, TGJT were found to load on the factor that Ellis labelled ILK and the, UGJTUG and MKT on an ELK factor.
- UGJTUG (CFA=0.91) loaded most strongly on the ELK factor suggesting that it was a more valid measure of ELK than the MKT.
- The TGJT, OEIT, and ONT all loaded on the ILK factor. However, the OEIT had the strongest loading (CFA=0.87) suggesting that it was the best measure of ILK.

### **2.3 Replication studies of Ellis' findings**

Many researchers have been influenced by R. Ellis (2005) psycholinguistic research and his battery of tests that were designed to measure ILK and ELK in SLA (Bowles, 2011; Erlam, 2006; Gutiérrez, 2013; Spada et al., 2015; Zhang, 2015). All of their studies confirm Ellis' findings that the OEIT and TGJT are valid ways to measure ILK, and that the MKT and UGJT provide valid measures of ELK. In general, they support the construct validity of the testing done by R. Ellis (2005) by obtaining consistent results using different statistical methods.

R. Ellis (2005) findings have been duplicated in numerous studies in various L2s (e.g., Spanish in Gutiérrez, 2013), in the context of English as a foreign language (L2) (e.g., Zhang, 2015) and with dissimilar learners (instructed vs heritage learning) (e.g., Bowles, 2011). For instance, Bowles (2011) investigated a heritage learner (HL) group postulating that their performance will rely on ILK, while L2 learners would rely more on ELK, since the first group developed linguistic knowledge unintentionally and implicitly and the second group developed their knowledge through explicit unstructured learning. Her prediction was correct: HL

performed better on TGJT, ONT and OEIT, and L2 learners performed better on the UGJT and MKT.

Gutiérrez (2013) conducted a study with 49 participants, (L1 English, L2 Spanish) using only three of the tests – TGJT, UGJT and MKT. She discovered that the ungrammatical sentences in the UGJT loaded more strongly on ELK (CFA=1.19) than the grammatical sentences in the same test (CFA = 0.48.) Similar results were obtained in other studies (e.g., Erlam, 2006; Bowles, 2011). On the other hand, Gutiérrez (2013) found that the ungrammatical sentences in the TGJT loaded more strongly on ILK (CFA=1.014) than the grammatical sentences in this test (CFA=0.95). Therefore, she argued that ungrammatical sentences in TGJT provided a better measure of ILK. Kim and Nam (2017) reported a similar result.

A further study by Zhang (2015) investigated 100 Chinese students learning English as a foreign language. Participants undertook four tasks (OEIT, TGJT, MKT, and UGJT). The results of a confirmatory factor analysis showed that the OEIT loaded on ILK with a CFA=0.73, and the Untimed Judgement Test with grammatical sentences (UGJTG) loaded with a CFA=0.66. She interpreted this result as showing that the grammatical sentences used in the UGJT constituted a valid test of ILK even though the test was designed to measure ELK. It is important to note that Zhang's findings were not duplicated in further studies.

## **2.4 Section summary**

There is considerable support for the construct validity of the extensive testing constructed by R. Ellis (2005) and for his psycholinguistic paradigm that is used to separately measure ILK and ELK in SLA. The ungrammatical sentences in the UGJT have been shown to be a valid measure of ELK. However, there is a need to further consider what constitutes adequate measures of ILK. The following section illustrates the four main questions in relation

to measuring ILK. First, do the Oral Elicited Imitation Task uncontrolled (OEITuctrl) (no time pressure) and Oral Elicited Imitation Task controlled (OEITctrl) (with time pressure) load on ILK with differing strengths? Second, do the Timed Grammatical Judgment Test with auditory stimuli (TGJTA) and Timed Grammatical Judgment Test with written stimuli (TGJTW) load on implicit knowledge with differing strengths? Third, does the OEIT (OEITctrl vs. OEITuctrl) or the TGJT (TGJTW vs. TGJTA) load more strongly on ILK? Finally, do the OEIT and the Oral Elicited Imitation Task plus Word Monitoring (OEITM) measure different levels of ILK?

## **2.5 Measures of ILK in SLA reconsidered**

The purpose of this section is to review literature which investigates which test provides the better measure of ILK – the OEIT or the TGJT. The design of the OEIT makes it, by nature, a production task. The TGJT relies on comprehension (Kim & Nam, 2017). This section will also examine and compare the two modalities of the TGJT (TGJTA vs. TGJTW) and the OEIT (OEITctrl vs. OEITuctrl).

### ***2.5.1 The OEITuctrl vs. the OEITctrl:***

The construct validity of the OEIT as an instrument to measure ILK has been demonstrated by many studies (Bowles, 2011; R. Ellis, 2005; Erlam, 2006; Spada et al., 2015). Furthermore, many researchers have indicated that several factors may influence the performance of participants, causing tasks to rely more heavily on ILK (Erlam, 2006; Graham et al., 2010; Kim & Nam, 2017; Vinther, 2002). These factors include, but are not limited to, the following: time pressure; length of the sentences used in the test; and difficulty of the vocabulary in the composition of the sentences (e.g., lexical difficulty) (Erlam, 2006; Graham

et al., 2010; Vinther, 2002). Ellis suggested directing the learners' attention to meaning by asking them to agree or disagree with a set of belief statements, including time pressure (as mentioned earlier in this chapter) and to use familiar vocabulary to ensure that this task functioned as a way of measuring ILK. The assumption was that the time pressure element would impede monitoring and/or planned answers and, therefore, would better target ILK (R. Ellis, 2005; Krashen, 1985).

The importance of time pressure in the OEIT can be deduced from studies that have examined the relationship between L2 accuracy and on-line planning (Kim & Nam, 2017). On-line planning is "the process by which speakers attend carefully to the formulation stage during speech planning and engage in preproduction monitoring of their speech acts" (Yuan & Ellis, 2003, p. 6). Drawing on Baddeley's model of working memory (Baddeley & Hitch, 1974; Baddeley & Logie, 1999), Yuan and Ellis (2003) stated that once there is time to plan, learners' central executive (working) memory operates in a way that enables access to syntactic information in long-term memory. This enables the participant to focus on form, resulting in greater accuracy of language. They found that learners with no time pressure (on-line planning) showed superior syntactic accuracy as compared to learners given no time to plan and therefore greater time pressure. Yuan and Ellis' findings were previously established by Hulstijn and Hulstijn (1984). They discovered that when learners are not pressured by time, they generate more accurate L2 oral narratives than when they are pressured by time. These results demonstrate that time pressure may constrain L2 learners from retrieving explicit grammatical knowledge and monitoring their output during production. Consequently, administering time pressure in a test measuring learners' production can increase test validity. Drawing on this rationale, an OEITctrl (with time pressure) is a better test to measure ILK than the Oral Elicited Imitation Test uncontrolled version, without time pressure (OEITuctrl). Kim and Nam (2017) discovered that the OEITuctrl loaded more on ILK than the Oral Elicited Imitation Test

controlled version, with time pressure (OEITctrl) ( $0.83 > 0.79$ ) (CFA). These results were mainly due to the grammatical sentences included in the test rather than the influence of the time pressure factor, however. When repeating the statistical analysis, they found that the OEITctrl UG loaded more on ILK than the Oral Elicited Imitation Test uncontrolled with ungrammatical sentences (OEITuctrl UG) ( $0.90 > 0.64$ ). This caused them to favour the OEITctrl over the OEITuctrl as a way to measure ILK.

Researchers acknowledge the significance of time pressure in eliciting learners' ILK. However, no general agreement exists on the methods to calculate adequate time constraints in the OEIT (Kim & Nam, 2017). Time pressure in OEIT is the time allowed for a participant to imitate each sentence. Spada et al. (2015) imposed a time limit of 8 seconds, but they did not provide a rationale for this time limitation. Graham et al. (2010) included a time limit based on the number of syllables in each sentence – six seconds for sentences with four to six syllables and 12 seconds for sentences with 12 to 14 syllables. A time pressure equal to native speakers' (NSs') average response time for each sentence plus 20% could be considered adequate, as it compensates for the slower processing speed of an L2 learner, and ensures this test loads more on ILK. The added 20% is a standard which has been applied by R. Ellis (2005) to operationalise time pressure in TGJT. However, subjecting participants to greater time pressure could make the OEIT extremely hard.

Furthermore, there is no general agreement among researchers on how to operationalise the speed of the auditory stimulus sentence in OEIT (Kim & Nam, 2017). The speed of the auditory stimulus sentence is the speech rate of the presented sentence in OEIT. This is an important element to consider as it affects the construct validity of the OEIT (Kim & Nam, 2017). For L2 Japanese learners, Suzuki and DeKeyser (2015) rationalised the mean sentence speed in relation to its length. Considering that the speed of the audio recording should be very similar to that of a Japanese newscaster – 449 morae per minute (morae is the unit of speech

speed/length), they deduced that the shortest recorded sentence speed must be 2.04 seconds, exceeding the average time needed for the short term memory to record and recall a sentence of 1.75 seconds (Baddeley et al., 1975). One could suggest that the speech rate of the audio recording in OEIT should be 150 words per minutes (w/m). This is the average speech rate of a native English speaker, and this strategy may help to avoid slow audio recording.

### ***2.5.2 Modality of the TGJT***

In SLA, the TGJT is one of the most universally used tests to measure participants' L2 ILK (Kim & Nam, 2017). However, there is no general agreement on which modality (TGJTW vs. TGJTA) loads more on ILK. Nonetheless, there is a broad consensus across the field of cognitive psychology that listening demands great cognitive effort and makes the listener focus on meaning rather than form to comprehend the aural passage (Brown, 1990; Kim & Nam, 2017). Aural processing obliges listeners to segment and comprehend verbal speech continuously whilst perceiving new verbal material. Listening is a continuous process, leaving participants without recourse to strategies to slow down the input. This makes it harder for listeners to comprehend verbal communication. In contrast, many strategies enhance comprehension during reading – skimming, scanning, predicting, backtracking, (Anderson, 1985; Anderson & Pearson, 1984; Danks, 1980; Rost, 2013; Treiman et al., 2003). The lack of control over linguistic input in TGJTA results in students focusing more on meaning than form thus loading more on ILK.

For the reasons aforementioned, TGJTA could be a more valid measure of ILK than TGJTW (Kim & Nam, 2017). Spada et al. (2015) also found that the TGJTA and TGJTW loaded on what they labelled ILK factors. TGJTA demonstrated the strongest loading by Varimax Rotation Factor Analysis (VRFA=0.7> 0.59). Similarly, Kim and Nam (2017)

reported that TGJTA loaded more on ILK factors (CFA = 0.85) than the TGJTW (CFA = 0.61). Additionally, as illustrated in Table 2.6 , both studies (Kim & Nam, 2017; Spada et al., 2015) found that L2 learners tended to score better on TGJTW than TGJTA. Kim and Nam (2017) suggested that this could be another indicator that the TGJTA loads more on ILK.

**Table 2.6**

*Mean Scores and Standard Deviations on TGJTW and TGJTA Across two Validity Studies.*

*(see Table 1 in Kim & Nam, 2017, p. 434 )*

	Spada et al. (2015)		Kim and Nam (2017)	
	TGJTW	TGJTA	TGJTW	TGJTA
NSs	.96	.98	.96	.94
(M/SD)	.03	.04	.05	.03
L2ers	.72	.52	.61	.56
(M/SD)	.14	.15	.16	.14

### **2.5.3 The OEITctrl versus the TGJTA**

As shown in Table 2.7, previous researchers have demonstrated that native speakers and L2 learners score higher on the TGJT than on the OEIT. This pattern was found regardless of TGJT modality (Bowles, 2011; R. Ellis, 2005; Kim & Nam, 2017; Spada et al., 2015; Zhang, 2015). In contrast, native speakers and HLs (heritage learners) performed similarly on TGJTW and OEIT (Bowles, 2011).

**Table 2.7**

*Mean Scores and Standard Deviations Across Five Validity Studies. (see Table 1 in Kim & Nam, 2017, p. 434)*

	R. Ellis (2005)		Bowles (2011)		Zhang (2015)		Spada et al. (2015)			Kim & Nam (2017)			
	TGJTW	OEIT	TGJT W	OEITctrl	TGJT W	OEITctrl	TGJT W	TGJTA	OEITctrl	TGJT W	TGJTA	OEITctrl	OEITuctrl
NSs	.96	.94	.99	.96	-----	-----	.96	.98	.94	.96/	.94	.95	.92
(M/SD)	.02	.04	.01	.03			.03	.04	.06	.05	.03	.02	.05
L2ers	.82	.51	.67	.46	.86	.44	.72	.52	.15	.61	.56	.44	.64
(M/SD)	.11	.17	.10	.10	.08	.12	.14	.15	.16	.16	.14	.20	.15
Hi s	-----	-----	.81	.79	-----	-----	-----	-----	-----	-----	-----	-----	-----
(M/SD)			.11	.15									

Kim and Nam (2017) suggested that “L2 learners’ different performance on the OEITctrl and TGJTA might be attributed to the different types of processing involved in the two tests: a receptive process (reading/listening) in the TGJT versus a productive process (speaking) in the OEIT” (p. 434). They further argued that the OEIT calls for “L2 conceptual processing” (p. 436) at a deeper level than the TGJT’s lighter, perceptual level, requiring learners to make a greater cognitive effort. According to Kim and Nam (2017) “If the strength of implicit knowledge is what allows it to remain intact even during deeper processing that requires more cognitive effort, the OEIT could be better at tapping into stronger implicit knowledge than the TGJT” (p. 436). Kim and Nam (2017) failed to acknowledge that the OEIT requires not only the productive phase (imitation) but also the receptive phase (listening), however. Therefore, OEIT could require even greater cognitive effort, possibly resulting in a

greater load on ILK. Drawing on this argument, and because of the different natures of the TGJTA and OEIT (the first being receptive/comprehensive and the second being receptive and productive), the TGJTA requires grammatical decoding and the OEIT requires grammatical decoding, grammatical encoding and oral production (Kim & Nam, 2017). Therefore, the OEIT will load more on ILK and is thus considered a more valid measure of ILK. Kim and Nam (2017) also found that the OEITctrl with ungrammatical sentences (OEITctrlUG) loads more on ILK (CFA=0.9) than the Timed Grammatical Judgement Test with Aural Stimuli with ungrammatical sentences (TGJTAUG) (CFA=0.86).

In summary, the studies included in this section confirmed R. Ellis' (2005) findings that both the OEIT and the TGJT are reliable and valid measures of ILK. It also adds weight to the argument that the OEITctrl (with time pressure) loads more ILK than the OEITuctrl (without time pressure) and that TGJTA loads more on ILK than TGJTW. Nonetheless, among the four tests, the OEITctrl has been observed to load most strongly on ILK, especially ungrammatical sentences in OEITctrl. Nonetheless, Suzuki and DeKeyser (2015) claimed that OEIT measures automatized ELK rather than ILK. This will be discussed further in the following section.

#### ***2.5.4 The OEIT with Built-In Word Monitoring (OEITM).***

**OEITM Procedures.** Suzuki and DeKeyser (2015) aimed to challenge the validity of OEIT as a measure for ILK by examining how online error detection and subsequent sentence repetition counts on participants' use of ILK. To measure online detection in listening, a word monitoring component was introduced into the OEIT task (Suzuki & DeKeyser, 2015). The OEITM procedure involves the following: (a) processing of an auditory stimulus sentence; (b) a belief statement; and c) imitation of the sentence. First, the word stimuli of each sentence is shown in the middle of the screen and subjects are asked to click a designated keyboard button

as quickly as possible when they hear the word in a sentence. The sentence will be presented aurally for two seconds after the appearance of the stimulus word, giving the subject adequate time to read the word. Then, immediately after hearing the sentence, a question appears in the middle of the screen asking, “Do you agree?” This phase is known as the “comprehension statement” because students have to judge the factuality of the sentence (half of the sentences are factually incorrect, and half are factually correct). After the comprehension statement is presented, pictures of a happy face and a sad face appear on the screen and participants indicate whether they agree or disagree by clicking on the respective face. The participants are given three seconds to reach a decision. A countdown from three to one appears in the centre of the screen. Then, participants are asked to repeat the sentence as correctly as possible. They are given eight seconds (exerting time pressure) to repeat a sentence. The test comprises 80 sentences, 40 of which are grammatically incorrect and the rest are grammatically correct. The study used 5 target structures known to be difficult for Chinese students learning L2 Japanese (e.g., relative clauses, transitive verbs).

**Participants.** Chinese students (n=63) with an Intermediate L2 Japanese participated in the study. Suzuki and DeKeyser (2015) divided their participants into two groups based on their length of residence (LOR), (long LOR vs. Short LOR). This resulted in the formation of two groups: the long LOR (LOR  $\geq$  1.6667 year, n = 19) and the short LOR group (LOR  $<$  1.6667 year, n = 42) (Suzuki & DeKeyser, 2015).

**Word Monitoring Task.** The Word Monitoring task “targeted auditory sentence processing to measure language users’ ability to register grammatical errors during the processing component of the OEIT” (Suzuki & DeKeyser, 2015, p. 866). The rationale for this task was that participants’ response time (RT) would be slower for ungrammatical sentences

than grammatical sentences. Suzuki and DeKeyser (2015) then calculated the Grammar Sensitivity Index (GSI) from the word monitoring component by, deducting the mean RT (response time) for grammatical sentences from the mean RT for ungrammatical sentences. Suzuki and DeKeyser (2015) reported that GSI among native speakers ( $M = 101$  millisecond (ms),  $SD = 52$ ) was higher than the GSI amongst L2 learners ( $M = 16$  ms,  $SD = 54$ ). They believed that participants scored highly on the GSI because they responded more slowly to the target word in ungrammatical sentences than in grammatical sentences. The GSI therefore could show the error-detecting ability of a participant and may indicate the robustness of participants' ILK (Suzuki & DeKeyser, 2015).

**OEIT and Word Monitoring (GSI) correlation with SRT.** Suzuki and DeKeyser (2015) calculated the correlations of OEIT scores and GSI scores with participants' scores on the Serial Reactive Time Test (SRT). The SRT was used to “measure aptitude for domain-general implicit sequence learning” (Suzuki & DeKeyser, 2015, p. 873). They predicted that tests which load the most on ILK will have the highest correlation with SRT. They examined the relationship between the SRT GSI, and OEIT scores for the groups. Suzuki and DeKeyser (2015) reported “a moderate positive relationship emerged only in the long LOR group ( $r = .43$ ,  $p = .065$ )” (p. 882). Table 2.8 displays this data.

**Table 2.8**

*Correlations between OEIT and GSI of the Whole, Long and Short LOR Groups with SRT*

*(see., Suzuki & DeKeyser, 2015, p. 882)*

Whole group (n = 63)		Long LOR participants (n = 19)		Short LOR participants (n = 42)	
OEIT	GSI	OEIT	GSI	OEIT	GSI
r = .08, p = .554	r = .04, p = .780	r = .02, p = .928	r = .43, p = .065	r = .13, p = .421	r = -.19, p = .218

**OEIT and Word Monitoring (GSI) correlation with MKT.** On the basis that much research has shown that the MKT loads significantly on ELK (e.g., Bowles, 2011; R. Ellis, 2005; Gutiérrez, 2013; Spada et al., 2015; Zhang, 2015), Suzuki and DeKeyser (2015) assumed that the test that correlates the most strongly with MKT would be the test that loads the most on ILK. Suzuki and DeKeyser (2015) calculated the correlation between OEIT and the GSI scores with MKT score for all groups (see Table 2.9). Results showed an insignificant correlation between the MKT and the GSI for the whole group and among the long and short LOR participants. In contrast, the OEIT scores were significantly correlated with the MKT for the whole group and had a higher correlation, especially among the long LOR group (see Table 2.9).

**Table 2.9**

*Correlations between OEIT and GSI, with MKT for the Whole, Long and Short Group*

*Participants (see., Suzuki & DeKeyser, 2015, p. 884)*

Whole group (n = 63)		Long LOR participants (n = 19)		Short LOR participants (n = 42)	
OEIT	GSI	OEIT	GSI	OEIT	GSI
r = .46;	r = .15;	r = .33;	r = .06;	r = .33,	r = .17
p < .001	p = .239	p = .001	p = .815	p = .032	p = .281

**Suzuki and DeKeyser (2015)- interpretation of the results.** Suzuki and DeKeyser (2015, p. 889) stated “the OEIT, while certainly better than UGJTs and possibly a good alternative to TGJTs or oral narratives depending on the research purposes, is nevertheless too coarse a measure for implicit knowledge, which cannot completely shut off access to automatized explicit knowledge”. Accessing automatized ELK requires awareness of linguistic forms even though the access is rapid or automatic, while accessing ILK requires no awareness. They argued that OEIT measures “automatized ELK” rather than ILK (Suzuki & DeKeyser, 2015, p. 889). Moreover, they noted that the GSI component of the Word Monitoring test showed greater creditability as a measure of ILK. They declared that “These divergent results for the GSIs and EI [OEIT] scores suggest that word monitoring draws on knowledge that was acquired partly through implicit learning mechanisms, while the OEIT might be drawing on different sources of knowledge” (Suzuki & DeKeyser, 2015, p. 882).

**Limitation of Suzuki and DeKeyser (2015) study.** One of the potential flaws in their methodology concerns the use of SRT as a valid measurement of implicit aptitude as there is no general agreement in the field of Psychology that the SRT measures implicit aptitude. Some

believe that it measures unintentional recall (short-term memory) (Wilkinson & Shanks, 2004), Furthermore, Suzuki and DeKeyser (2015) acknowledged an oversight in the design of OEIT, namely that some monitoring words were the examined target grammatical structure. “Particularly, in the transitive/intransitive sentences and the ni/de locatives, the target word was a transitive or an intransitive verb” (p. 888). However, they believed that this error may result in participants’ focus being drawn onto form rather than meaning. This study is also problematic in terms of operationalising the time pressure estimation. In the imitation phase L2 participants have to recite the presented sentences within eight seconds, and the average length of the sentences is 24.1 morae. In fact, the average speech rate of modern Japanese is “7.48 morae per second (Fukumori, 2008) so eight seconds represents a 270% increase of the normal time for NSs.” (Suzuki & DeKeyser, 2015, p. 450). This may explain why the OEIT correlated with the MKT in their study.

2.5.5 Visual Word Task (Eye Tracking) vs. Word Monitoring Task (GSI) vs. Self-Paced Reading Task (GSI).

In their recent study, Suzuki and DeKeyser (2017) used three tests to measure ILK (a visual-world task, a word-monitoring task, and a self-paced reading task). Three other tests were employed to measure automatic ELK (TGJTA, TGJTW, and a time-pressured “fill-in-the-blank” test). Two cognitive aptitude tests were also administered. The SRT was used to measure implicit learning aptitude. LLAMA F was used to measure “Explicit learning aptitude” (p. 755). Three Japanese linguistic structures were examined: (Transitive–Intransitive Verb Pairs, Classifiers).

One hundred Chinese participants with L2 Japanese (29 M, 71F) were recruited. Participants had intermediate to advanced L2 Japanese. The average period of L2 Japanese instruction was 3.42 years. Participants were residents in Japan with a mean length of residency equal to 3.95 years.

Suzuki and DeKeyser (2017) calculated the correlations of all test scores with participants' scores on SRT and LLAMAF. They predicted that tests which load the most on ILK will have the highest correlation with SRT, and that tests which load the most on automatic ELK will have the highest correlation with LLAMAF.

Among tests measuring ILK, the Visual Word Task (eye tracking) scores had the highest correlation with SRT. However, the scores on Visual Word Task (eye tracking) were only weakly correlated with SRT scores ( $r=.20$ ,  $p=.0.05$ ). Among tests measuring ELK, LLAMAF scores were most strongly correlated with TGJTA. However, scores on the TGJTA were only weakly correlated with LLAMAF scores ( $r=.20$ ,  $p=.0.05$ ) (see Table 2.10). Despite these results, Suzuki and DeKeyser (2017) suggested that the Visual Word Task (eye tracking) was the most valid task for measuring ILK. They further suggested that the TGJTA was the most valid test for measuring automatized ELK.

**Table 2.10**

*Correlation Matrix Between Language and Aptitude Test Scores (see Table 5 in., Suzuki & DeKeyser, 2017, p. 774)*

<b>Tests measuring ILK</b>	<b>Aptitudes</b>	
	<b>SRTT</b>	<b>LLAMAF</b>
Visual Word Task (eye tracking)	.20	-.09
Word Monitoring Task (GSI)	.07	.10
Self-Paced Reading Task (GSI)	.05	.06
<b>Test measuring automatic ELK</b>		
TGJTA	.09	.2
TGJTW	.15	.19
Timed Fill-In-The-Blank Task	.11	.024

The next sections of the thesis provide a description of The Self-Paced Reading Task (GSI) and Visual Word Task (eye tracking) and The Timed Fill-In-The-Blank Task.

**Timed Fill-In-The-Blank Task.** In this test sentences were presented sequentially on the computer screen. All sentences were incomplete. Participants were asked to fill in the blank by typing the answer on a designated place. Once finished, they had to press a computer button

to move on to the next item within one and half minutes. 48 sentences were presented, of which 16 were ungrammatical.

**Self-Paced Reading Task (GSI).** In the self-paced reading task, sentences were presented in a word-by-word sequence. Participants were asked to read every word as quickly as possible and to click on a designated button to continue to the next one. The words appeared sequentially from the left side to the right side of the screen. Every word appeared alone on the screen and disappeared after participants continued to the next word. The rationale of this task is that participants' response time (RT) will be slower if the sentence has a grammatical error. Suzuki and DeKeyser (2017) then calculated the Self-Paced Reading Task (GSI) by subtracting the mean RT (response time) for grammatical sentences from the mean RT for ungrammatical sentences. The RT is the amount of time it takes to read from the first word to the critical word (the grammar error). "The region of interest where RTs were compared between grammatical and ungrammatical sentences was at the critical word where the error occurred in the ungrammatical sentences. This word was located in the same position as that in the word-monitoring task so that the effects could be compared fairly between the word-monitoring task and the self-paced reading task" (Suzuki & DeKeyser, 2017, p. 766). Half of the sentences presented were correct and the other half were incorrect 80 sentences were presented. Half of them were grammatical and the rest were ungrammatical. Every grammatical sentence had an ungrammatical pair and sentences were presented randomly.

Example 1)

"I /want/ to/ be/ a/ teacher/ when/ I/ grow/ up".

VS

"I /want /to /be /a /teacher / when /I /grows/ up".

**Visual Word Task (eye tracking).** This is a computerized test of 68 scenes. Each scene consists of four pictures. The scenes were presented sequentially on-screen in a semi randomized order for 5.5 seconds each. When the scene was presented, participants listened to a short two-sentence story describing the scene. The first sentence was grammatical and the second was ungrammatical. 16 scenes were accompanied with only grammatical sentences. They served to divert the participants' attention from form, and increased participant's attention to meaning. Every short story was followed by a screened "yes" or "no" comprehension question in which students had to indicate if they understood the story or not. During the listening phase, participants' eye movements were tracked "using an EyeLink II system (2004) with a sampling rate of 500 Hz" (Suzuki & DeKeyser, 2017, p. 762). As illustrated below in Figure 1, "every display comprised four categories: "Person" (e.g. the father ), "Contrast Object" (e.g. the table), "Theme" (e.g. a broken television ), and an unrelated picture or a "Distractor"(e.g. spaceship)" (Suzuki & DeKeyser, 2017, p. 763). Their location was rotated across the displays. There were two forms of displays: the "target trials" when the target object (person) was mentioned in the ungrammatical sentence and it is the first sentence of the story, and the "competitor displays" when the competitor object (contrast object) was mentioned in the grammatical one and is the second sentence of the story. The target trials and competitor trials followed a specific sequence. For the target trial the sequence was "person", "intransitive verb", "them" (see Example 1). For the competitor trial the sequence was "them", "transitive verb", "person" (see Example 1). In the target trials, the contrast object category (e.g., Table) was always preceded by the definite article "the", forming a noun phrase (NP) following the specific sequence previously described. Therefore, the same NP was located at the beginning of the competitor trials (see Example 2). "NP served as disambiguation information for the referent, and the analysis of predictive processing focused on the time regions prior to the disambiguation point" (Suzuki & DeKeyser, 2017, p. 754). A similar design for the other two

structures was constructed (see Appendix S1 in., Suzuki & DeKeyser, 2017, p. 790). The eye movements were analysed with the rationale that “if participants were sensitive to the transitivity of the verb, then looks to the target (e.g., Father) would be greater in the target trials than in the competitor trials (e.g., Table). “The sensitivity index was computed as the target advantage difference score, that is, target advantage in the target trials minus target advantage in the competitor trials. A higher sensitivity score indicated more developed linguistic knowledge” (Suzuki & DeKeyser, 2017, p. 764).

Figure 1)

### Target



Person

### Competitor



Contrast Object



Theme



The distractor

## Example 1)

## Target Trial:

- First sentence: “It is the father that is breaking the television”.
- Sentence sequence: “It is the (person) that (intransitive Verb) the (theme)”.

## Competition Trial:

- Second sentence: “The television is broken because it fell off the table”.
- Sentence sequence: “The (theme) is (transitive Verb) because it fell of the (construct object)”.

## Example 2)

- Target trial: “It is father that that is breaking [the television (NP)]”.
- Competitor Trial: “[The television (NP)] is broken because it fell off the table”.

## 2.6 Summary of studies investigating Ellis' battery of tests

Table 2.11 presents a summary of the studies that examined Ellis' battery of tests.

**Table 2.11**

*Summary of Studies Investigating Ellis' Battery of Tests*

Study	P	NSs	L2 Lrs.	HLs	Tests Included	Results
R. Ellis (2005)	111	20 (L1: English)	91 Mixed L1 (Mandarin)	0	OEIT ONT TGJT UGJT MKT	<ul style="list-style-type: none"> <li>The Marsden study showed that it was possible to develop tests that distinguished ILK and ELK.</li> <li>The OEIT, ONT, TGJT were found to load on the same factor that Ellis labelled ILK and the, UGJTUG and MKT on an ELK factor.</li> <li>UGJTUG loaded most strongly on the ELK factor suggesting that it was a more valid measure of ELK than the MKT.</li> <li>The TGJT, OEIT, and ONT all loaded on the ILK factor. However, the OEIT has the strongest loading suggesting that it was the best measure of ILK</li> </ul>
Erlam (2006)	110	20 (L1: English)	90 (L1: Mandarin; L2: English)	0	OEIT ONT	<ul style="list-style-type: none"> <li>The OEIT and the ONT were shown to be reliable and to provide valid measures of ILK</li> <li>OEIT, and ONT both loaded on the ILK factor. However, the OEIT has the strongest loading.</li> <li>OEIT with Ungrammatical sentences loaded the most on ILK.</li> </ul>
Bowles (2011)	30	10 (L1: Spanish)	10 (L1: English; L2: Spanish)	10 HI2 Spanish and L1 English	OEIT ONT TGJTW UGJTW MKT	<ul style="list-style-type: none"> <li>This study supported the construct validity of the battery of tests constructed by Ellis (2005)</li> <li>The OEIT is a better way to measure t ILK as compared to the TGJT.</li> <li>The UGJT loaded more strongly on the ELK factor suggesting that it was a more valid measure of ELK than the MKT.</li> </ul>
Gutiérrez (2013)	49	0	49 (L1: English; L2: Spanish)	0	TGJTG TGJTUG UTGJTG	<ul style="list-style-type: none"> <li>This study supported the construct validity of the battery of tests constructed by Ellis (2005)</li> <li>The TGJT were shown to be reliable and to provide valid measures of ILK.</li> <li>The UGJT were shown to be reliable and to provide valid measures of ELK.</li> </ul>

					UTGJTUG MKT	<ul style="list-style-type: none"> <li>• UGJTUG loaded most strongly on the ELK factor suggesting that it was a more valid measure of ELK than the MKT.</li> <li>• The TGJTUG loaded the most strongly on the ILK factor suggesting it was a more valid measure of ILK than TGJTG.</li> </ul>
Spada et al. (2015)	73	38 (OEIT) 20 (TGJTA) 19 (TGJTW)	73 (L1: Mandarin; L2: English)	0	OEIT TGJTA TGJTW. TGJTAUG TGJTAG	<ul style="list-style-type: none"> <li>• This study supports the construct validity of the battery of tests constructed by Ellis (2005)</li> <li>• The OEIT loaded the most strongly on the ILK factor suggesting it was more valid measure to ILK than both TGJTA and TGJTW.</li> <li>• The TGJTA loaded more strongly on the ILK factor than TGJTW suggesting it was more valid measure to ILK.</li> <li>• The TGJTAUG loaded more strongly of the ILK factor than the TGJTAG suggesting it was more valid measure to ILK.</li> </ul>
Zhang (2015)	150	0	100 (L1: Mandarin; L2: English)	NO	ONT TGJTWG TGJTWUG UGJTWG UGJTWUG MKT	<ul style="list-style-type: none"> <li>• This study supported the construct validity of the battery of tests constructed by Ellis (2005).</li> <li>• The ungrammatical sentences in both tests (TGJT and UGJT) measure ELK, whereas the grammatical sentences in both TGJT and UGJT measure ILK (this finding contradicts Ellis (2005) finding).</li> <li>• The OEIT loaded most strongly on the ILK factor than TGJT in all modalities suggesting it was the most valid measure to ILK.</li> <li>• The MKT loaded the most strongly on the ELK factor that UGJT in all modalities suggesting it was the most valid measure to ELK.</li> </ul>
Suzuki and DeKeyser (2015)	81	18 (L1: Japanese)	63 (L1: Chinese; L2: Japanese)	0	Word Monitoring (GSI) MKT OEIT SRT	<ul style="list-style-type: none"> <li>• The Word Monitoring (GSI) correlated more strongly with SRT than OEIT suggesting it was the most valid measure to ILK.</li> <li>• OEIT correlated most strongly with MKT than Word Monitoring (GSI) suggesting it was the most valid measure for automatic ELK</li> </ul>

Suzuki and DeKeyser (2017)					<p>Word Monitoring (GSI)</p> <p>Visual Word Task (eye tracking)</p> <p>Self-Paced Reading Task (GSI)</p> <p>TGJTA</p> <p>TGJTW</p> <p>Time-pressure fill-in-the-blanks test</p> <p>SRT</p> <p>LLAMA F</p>	<ul style="list-style-type: none"> <li>• The Visual Word Task (eye tracking) correlated most strongly with SRT than Word Monitoring (GSI) and Self-Paced Reading Task (GSI) suggesting it was the most valid measure to ILK</li> <li>• Timed Fill-In-The-Blank Task correlated most strongly with LLAMA F than TGJTA and TGJTW suggesting it was the most valid measure to ILK</li> </ul>
Kim and Nam (2017)	75	9 (L1: English)	66 (L1: Korean; L2: English)	0	<p>OEITctrl</p> <p>OEITuctrl</p> <p>TGJTA</p> <p>UGJTW</p> <p>MKT</p> <p>OEIT</p>	<ul style="list-style-type: none"> <li>• This study supported the construct validity of Ellis' (2005) battery of tests.</li> <li>• The ungrammatical sentences in both tests (TGJT and OEIT) loaded in ILK factor.</li> <li>• The OEITctrl loaded most strongly on the ILK factor than OEITuctrl suggesting it was more valid measure to ILK.</li> <li>• The TGJTA more strongly on the ILK factor than TGJTW suggesting it was the most valid measure to ELK.</li> <li>• The OEITctrl with ungrammatical sentences loaded the most strongly on the ILK factor than all other tests suggesting it was the most valid measure to ILK</li> </ul>

### List of Acronyms

GSI: Grammar Sensitivity Index

HLS: Heritage Learners

L2 Lrs: L2 Learners

P: Participants

SRT: Serial Reaction Time

OEIT: Oral Elicited Imitation Test

OEITctrl: Oral Elicited Imitation Test controlled version (time pressured)

OEITuctrl: Oral Elicited Imitation Test uncontrolled version (no time pressured)

ONT: Oral Native Test

TGJT: Timed Grammaticality Judgment Test

UGJT: Untimed Grammaticality Judgment Test

MKT: Metalinguistic Knowledge Test

TGJTW: Timed Grammaticality Judgment Test with written stimuli

TGJTA: Timed Grammaticality Judgment Test with auditory stimuli

UGJTW: Untimed Grammaticality Judgment Test with written stimuli

UGJTA: Untimed Grammaticality Judgment Test with aural stimuli

TGJTG: Timed Grammatical Judgment Test with grammatical sentences

TGJTUG: Timed Grammatical Judgment Test with ungrammatical sentences

UTGJTG: Untimed Grammatical Judgment Test with grammatical sentences

UTGJTUG: Untimed Grammatical Judgment Test with ungrammatical sentences

TGJTAUG: Timed Grammatical Judgment Test with auditory stimuli with grammatical sentences

TGJTAG: Timed Grammatical Judgment Test with auditory stimuli with grammatical sentences

TGJTWG: Timed Grammatical Judgment Test with written stimuli with grammatical sentences

TGJTWUG: Timed Grammatical Judgment Test with written stimuli with ungrammatical sentences

UGJTWG: Untimed Grammatical Judgment Test with written stimuli with grammatical sentences

UGJTWUG: Untimed Grammatical Judgment Test with written stimuli ungrammatical sentences

SRT: Serial Reactive Time Test

## 2.7 Chapter summary

This chapter investigated and assessed the literature pertaining to tasks that measure ILK and ELK (Bowles, 2011; R. Ellis, 2005; Erlam, 2006; Gutiérrez, 2013; Kim & Nam, 2017; Suzuki & DeKeyser, 2015, 2017; Zhang, 2015). The body of literature on the topic thoroughly examined the validity of Ellis' (2005) test battery, measuring ILK and ELK (Bowles, 2011; R. Ellis, 2005; Erlam, 2006; Gutiérrez, 2013; Kim & Nam, 2017; Zhang, 2015). There is supporting evidence that UGJT load more on ELK than MKT (Bowles, 2011; R. Ellis, 2005; Kim & Nam, 2017). However, ungrammatical sentences added into UGJT have increased its validity in measuring ELK and increased its loading on ELK (e.g., R. Ellis, 2005; Gutiérrez, 2013). Furthermore, TGJT with auditory stimuli loaded more on ILK than TGJT with written stimuli (e.g., Kim & Nam, 2017; Spada et al., 2015). Moreover, OEIT with time pressure loaded more on ILK than TGJT in both modalities (TGJTW, TGJTA) (Bowles, 2011; Kim & Nam, 2017; Spada et al., 2015; Zhang, 2015). The use of OEIT with ungrammatical sentences may increase its validity in measuring ILK (e.g., Kim & Nam, 2017). Suzuki and DeKeyser (2015) recommended considering three types of linguistic knowledge: ELK, automatized ELK, and ILK. Accessing automatized ELK requires consciousness about linguistic forms even though the access is rapid or automatic, while using ILK requires no awareness. They suggested that OEIT measures automatized ELK rather than ILK. Suzuki and DeKeyser (2015) suggested two new time-pressure tests to measure ILK: The Word Monitoring (GSI) (Suzuki & DeKeyser, 2015) and Visual Word Task (eye tracking) (Suzuki & DeKeyser, 2017). However, unlike Ellis' (2005) test battery, the validity of these two tests has not been thoroughly examined.

## Chapter 3. Grammatical transfer in third language acquisition

### 3.1 Introduction:

Grammatical transfer in TLA is the transfer of grammatical features across three languages. Grammatical transfers mainly include - but are not limited to - syntactic transfers. Syntax is the set of rules that determine and govern the structure of sentences in a given language; this mainly concerns word order. Ellis et al. (2009) identified the factors that influence grammatical transfer from L1 to L2. This chapter applies Ellis et al.'s (2009). This chapter applies Ellis et al.'s (2009) framework to show the factors that influence grammatical transfer in TLA in cases of transfer from L1 and L2 into L3. This chapter argues that grammatical transfer in TLA is influenced by the following five factors: linguistic, psycholinguistic, contextual, learner's proficiency of their three languages, developmental and individual differences. Some of the studies investigated in this chapter demonstrate the transfer effect of both L1 and L2 into L3 (Garcia Mayo & Slabakova, 2015; Rothman, 2010). Other studies sought to investigate the relative transfer effect of L1 and L2 under different conditions (Bardel & Falk, 2007; Berns et al., 2018; Falk & Bardel, 2011; Flynn et al., 2004; Hermas, 2015; Peric & Novak Mijic, 2017; Pfenninger & Singleton, 2016; Rothman & Cabrelli Amaro, 2010; Sánchez & Bardel, 2016). This chapter will focus entirely on forward grammatical transfer. This phenomenon occurs when grammatical features from previously learned languages are transferred into a newly learned language. A discussion on backward grammatical transfer is not included in this chapter. More emphasis is placed on forward grammatical Transfer due to its potential to assist in learning a new language by making use of a learner's existing L1 and L2 syntax to assist with the development of their L3 syntax. Forward grammatical transfer is from (L1) or (L2) into participants' (L3) grammatical production. This

chapter explores studies in which there are either differences or similarities between participants' L1 and L2 syntax and their L3 syntax. The differences that this chapter identifies create a potential for negative grammatical transfer. However, as is now well documented in the transfer literature, similarities in grammatical rules across related languages do not always lead to positive grammatical transfer nor do dissimilarities in syntax across related languages always lead to negative grammatical transfer. Positive and negative grammatical transfer can be a product of learning instruction. Therefore, this chapter will critique the applicability of the methodology utilised by the studies investigating grammatical transfer in TLA. In conclusion, this chapter will suggest a more valid approach to investigate grammatical transfer in TLA, and reiterates the impact of the aforementioned factors on grammatical transfer on TLA.

### **3.2 Typological proximity**

Grammatical transfer from L1 and L2 into L3 has been found to be influenced by the typological proximity between these languages. This section investigates the influence of this factor.

Garcia Mayo and Slabakova (2015) investigated the influence of typological dissimilarity of L1 and L2 with L3 in the grammatical production of L3. In their study three groups were recruited.

Group A (n=23) comprised L1 Basque, L2 Spanish and L3 English.

Group B (n=25) included L1 Spanish, L2 Basque and L3 English.

Group C (n= 47) consisted of L1 Spanish and L2 English learners.

The critical issue affecting transfer from L1 or L2 into L3 is the difference between the manner in which Spanish and Basque treat the grammatical feature of dropping the clitic in response to questions with indirect unspecific objects. In the Basque language, when a question contains an indirect unspecific object, answers to this question are considered grammatically correct whether or not they contain a clitic. In contrast, English grammar does not follow this rule and answers for questions containing indirect unspecific objects must always contain a clitic. Consequently negative grammatical transfer by English learners with a previous knowledge of Basque can occur (Garcia Mayo & Slabakova, 2015). The example below illustrates this point.

In questions 1 and 2 below, the object (coffee) is indirect and unspecific. Only answer (a) is grammatically correct in English. By contrast, both the answer with the clitic (c) and the one with the dropped clitic (d) are grammatically correct in Basque.

- 1) Question in English: “Did they bring coffee for dinner?” (coffee: indirect unspecific object).

Answer a) English language: “Yes, they bought some” (some: clitic).

Grammaticality of the answer in English: Grammatically correct.

Answer b) English Language: “Yes, they bought Ø” (dropped clitic).

Grammaticality of the answer in English: Grammatically incorrect.

- 2) Question in Basque: “Kafea ekarri zuten afaltzeko?”

English word for word translation: “Did they bring coffee for dinner?”

Answer c) Basque language: “Bai, batzuk ekarri dituzte.)” (batzuk: clitic).

English word for word translation: “Yes, they bought some”.

Grammaticality of the answer in Basque: Grammatically correct.

Answer d) Basque language: “Bai Ø ekarri zuten)” (dropped clitic).

English word for word translation: “Yes, they bought”.

Grammaticality of the answer in Basque: Grammatically correct.

In Spanish, it is only considered grammatically correct to drop the clitic if a question contains an indirect unspecific object. As English grammar does not allow this Spanish grammatical rule, English learners with previous knowledge of Spanish can transfer this grammatical feature into English. Consequently, negative grammatical transfer by English learners with a previous knowledge of Spanish can occur. The examples below illustrate this point. In questions 3 and 4 below, the object “coffee” is indirect and unspecific. Only answer (a) which includes a clitic is grammatically correct in English. By contrast, both the answer with the clitic (c) and the one with the dropped clitic (d) are grammatically correct in Spanish.

- 3) Question in English: “Did they buy coffee for dinner?” (coffee: indirect unspecific object).

Answer a) English language: “Yes, they bought some” (some: clitic).

Grammaticality of the answer in English: Grammatically correct.

Answer b) English Language: “Yes, they bought Ø” (dropped clitic).

Grammaticality of the answer in English: Grammatically incorrect.

- 4) Question in Spanish: “Compraron café para la cena?”

English word for word translation: “Did they buy coffee for dinner?”

Answer c) Spanish language: “Si ellos compraron algunos” (algunos: clitic).

English word for word translation: “Yes, they bought some”.

Grammaticality of the answer in Spanish: Grammatically correct.

Answer d) Spanish language: “Si ellos compraron Ø” (dropped clitic).

English word for word translation: “Yes, they bought”.

### Grammaticality of the answer in Spanish: Grammatically correct.

Participants were presented with twelve questions in English of which six questions contained indirect unspecific objects. Two answers are supplied with each question, only one of which is correct (the sentence incorporating the clitic). Participants were asked to choose the correct answer. Participants in all three groups had an advanced level of L2 proficiency in either Spanish or Basque and an intermediate level of L3 English. Participants were exposed to Spanish and English through the school system. Participants were exposed to English at a mean age of 8.18 years (SD 2.98, range 4–18).

The rate of acceptance of dropping the clitic for questions with indirect unspecific objects among the bilingual participants in Group C ( $M = 52, 3\%$ ) was less than that of the trilingual participants in Group A ( $M = 57, 3\%$ ) and Group B ( $M = 58\%$ ). Results showed a higher rate of negative grammatical transfer in group A and B than in Group C. The researchers argued the results provided evidence of cumulative negative grammatical transfer among participants with two non-English languages. One of the limitations of this study, however, resides in its method of evaluating L3 level of proficiency. The number of years of exposure to a foreign language does not fully determine the level of proficiency of a given language.

In summary this study suggested that, in TLA, negative grammatical transfer from a previously learned language into L3 occurs when these languages are typologically dissimilar.

Rothman (2010) investigated the impact of typological similarity and dissimilarity across related languages on grammatical transfer in TLA. In his study participants formed two groups, both of which had advanced L2 level of proficiency. Group A ( $n=15$ ) had L1 Spanish, L2 English and L3 Brazilian-Portuguese. Group B ( $n=16$ ) had L1 English L2 Spanish and L3 Brazilian-Portuguese. Prior to commencement of the study, all participants were enrolled for four weeks in a Brazilian-Portuguese language course. Learners were tested after

approximately fifty-five to seventy-five hours of classroom instruction in L3 Brazilian Portuguese. Prior to the commencement of the study all students lived with Brazilian families. Participants had approximately two hundred hours of exposure to authentic Brazilian Portuguese language. The researcher postulated that participants' L3 level of proficiency was elementary due to the limited amount of L3 instruction and exposure.

The critical issue affecting transfer from L1 or L2 into L3 is the difference between the way in which Spanish and English treat the verb-second (V2) word order in cases where the verbs belong to the following three categories 1) transitive verbs, 2) intransitive verbs, 3) accusative verbs. The following paragraphs will illustrate the case.

English and Brazilian Portuguese both follow the V2 rule in the construction of a declarative sentence with transitive verb. Transitive verbs are verbs that allow one or more objects as in the sentence "I admire your courage and honesty". In contrast, in Spanish declarative sentences with transitive verbs are considered grammatically correct whether or not their word order construction follows the (V2) rule. The study described here constituted a potential case of negative grammatical transfer from Spanish to Brazilian Portuguese. The examples below illustrate the case.

Example of an English sentence with a transitive verb:

"I (subject) admire (transitive verb) your knowledge (object)".

a) First correct translation in Spanish:

"Yo (I: subject), admiro (admire: transitive verb) tu conocimiento (your knowledge: object)".

b) Second correct translation in Spanish:

"Tu conocimiento (your knowledge: Object) yo (I: subject) Admiro (Admire: transitive verb)".

c) Correct translation in Brazilian-Portuguese:

“Eu (Subject: I) admiro (transitive verb: admire) seu conhecimento (object: your knowledge)”.

d) Incorrect translation in Brazilian-Portuguese:

“Seu conhecimento (object: your knowledge) eu (subject: I) admiro (admire: transitive verb)”.

English and Brazilian Portuguese both follow the V2 rule in the construction of a declarative sentence with an intransitive verb. Intransitive verbs are verbs that do not permit a direct object, as in the sentence “The kid smiles”. By contrast, in Spanish declarative sentences with intransitive verbs, sentences are considered grammatically correct whether or not their word order construction follows the (V2) rule. Rothman’s (2010) study showed a potential case of negative grammatical transfer from Spanish into Brazilian Portuguese. The examples below illustrate the case.

Example of a correctly structured English sentence with an intransitive verb:

“The kid (subject) smiles (verb)”.

a) The first correct translation in Spanish:

“El niño (kid: Subject) sonríe (smiles: Verb)”.

b) The second correct translation in Spanish:

“Sonríe (smiles: verb) el niño (the kid: subject)”.

c) The only correct translation in Brazilian-Portuguese:

“As crianças (the kid) sorriem (smiles: verb)”.

d) Incorrect translation in Brazilian-Portuguese:

“Sorriem (smiles: verb) as crianças (the kid)”.

In Spanish and Brazilian-Portuguese, the construction of a declarative sentence with an unaccusative verb does not follow the V2 rule. An unaccusative verb is a verb that does not initiate or is not actively responsible for the act of the subject as in the sentence “My friend died one year ago”. The sentences are only considered grammatically correct if they do not follow the (V2) rule. By contrast, declarative sentences in English with unaccusative verbs always follow the (V2) rule. This selected grammatical feature was considered to be a case of negative grammatical transfer from English into Brazilian-Portuguese in Rothman’s study. The examples below illustrate this case.

- Correct sentence in English: “My friend (subject) died (verb) one year ago (object)”.
- Incorrect sentence in English: “Died (verb) my friend (subject) one year ago (object)”.
- Correct translation in Spanish: “Murió (died: verb) mi amigo (my friend: subject) hace un año (one year ago: object)”.
- Incorrect translation in Spanish: “Mi amigo (my friend: subject) Murió (died: verb) hace un año (one year ago: object)”.
- Correct translation in Brazilian-Portuguese: “Morreu (died: verb) meu amigo (my friend: subject) há um ano (one year ago: Object)”.
- Incorrect translation in Brazilian-Portuguese: “Meu amigo (my friend: subject) morreu (died: verb) há um ano (one year ago: object)”.

One of the two main tasks in Rothman’s (2010) study was the Grammaticality Judgment Test. This task examined participants’ grammatical knowledge of word order in the composition of Brazilian-Portuguese declarative and interrogative sentences. In this task a number of selected sentences were presented in a written form, some of which were

grammatically correct and others grammatically incorrect. Participants were asked to judge the grammaticality of each presented sentence. Participants were also asked to correct sentences they believed were incorrect. The task included one hundred sentences of which forty were grammatically incorrect (the target features), twenty were grammatically correct and also included 40 fillers.

Results showed that the amount of negative grammatical transfer from Spanish into Brazilian-Portuguese (transitive, intransitive verbs) was very similar between Group A ( $M = 29, 5\%$ ) and Group B ( $M = 29\%$ ). The same amount of negative grammatical transfer occurred from Spanish into Brazilian-Portuguese whether Spanish was participants' L1 or L2. The main cause of the negative grammatical transfer was the typological dissimilarity between these two languages.

Results also demonstrated the amount of negative grammatical transfer from English into Brazilian-Portuguese (unaccusative verbs) was very similar between Group A ( $M = 32\%$ ) and Group B ( $M = 30\%$ ). The same amount of negative grammatical transfer occurred from English into Brazilian-Portuguese, whether English was participants' L1 or L2. In this case the main cause of the negative grammatical transfer was the typological dissimilarity between these two languages.

Puig-Mayenco et al. (2020) investigated seventy-one different studies examining grammatical transfer in TLA and found that typological proximity was the most influential factor on grammatical transfer in TLA. They reported that 60.5 % of these studies found that topological dissimilarities across related languages accounted for grammatical transfer in TLA.

Kolb et al. (2022) investigated the effect of typological similarities on grammatical transfer in TLA. In their study, they recruited 125 school students forming three groups. Group A consisted of 66 participants with L1 Russian L2 German and L3 English. Group A had L2 Russian because it is their heritage language. Group A's participants were Germans from

Russian parents. Group B consisted of 26 participants with L1 German and L2 English. Group A's and Group B's participants were students in German schooling. Group C participants consisted of 33 participants with L1 Russian and L2 English. Group C's participants (n=33) were students in Russian schooling.

In their study, two grammatical features were selected to investigate positive grammatical transfer (PGT) from Russian into English: 1) adverb placement, and 2) non-subject initial declarative.

#### 1) Adverb placement

In English and Russian, the adverb is located before the verb in subject-initial declaratives leading to the following word order, Subject-Adverb-Verb (S-A-V). In contrast, in German the adverb is located after the verb in subject-initial declaratives resulting in the following word order, Subject-Verb -Adverb (S-V-A). The following examples illustrate the case:

- The English sentence: “Nicole (subject) often (adverb) drinks (verb) Coca- Cola”.
  - The equivalent sentence in Russian: “Николя часто пьет кока-колу”.
- English word for word translation: “Nicole often drinks Coca-Cola” (S-A-V).
- The equivalent sentence in German: “Nicole trinkt oft Coca-Cola”.
- English word for word translation: “Nicole drinks often Coca-Cola” (S-V-A).

#### 2) Non-subject-initial declaratives (topicalization)

In English and Russian, the subject (S) is located before the verb (V), with the non-subject-initial declaratives (referred to by X) resulting in the following word order (X-S-V). In contrast, in German, the subject is located after the verb with the non-subject-initial

declaratives resulting in the following word order (X-V-S). The following examples illustrate the case:

- The English sentence: “Last day (X) the dog (S) slept (V) on the sofa” (X-S-V).
- The equivalent sentence in Russian: “Последний день собака на диване”.  
English word for word translation: “Last day the dog slept on the sofa” (X-S-V).
- The equivalent sentence in German: “Letzten Tag hat der Hund auf der Couch geschlafen”.  
English word for word translation: “Last day slept the dog on the sofa” (X-S-V).

Two grammatical features were selected to investigate PGT from German into English:

1) subject-auxiliary inversion in wh-questions, and 2) determiner use.

1) subject-auxiliary inversion in wh-questions

The wh-question is a question that is introduced by a wh-word (e.g., why, what, where) and entails information when responding to it rather than only a yes or no answer. In English and German, subjects and auxiliaries are inverted with wh-questions. In contrast, in Russian, the auxiliary and verb are adjacent to each other. The following examples illustrate the case

- The English sentence: “What (wh-question) will (auxiliary) the small girl (subject) eat (Verb)?” The word order is (Wh- A -S-V).
- The equivalent sentence in German: “Was wird das kleine Mädchen essen?”  
English word for word translation: “What will the small girl eat” (Wh-A-S-V).
- The equivalent sentence in Russian: “Что будет есть маленькая девочка?”  
English word for word translation: “What the small girl will eat?” (Wh-S-aux-V).

In English and German, an overt article is compulsory with singular count nouns in a specific context. The definite articles, for instance, are used before a noun to describe it as something precise (e.g., the tree that you are watering is big). The indefinite article (a, an) is used before a noun that is general (e.g., give me an apple to eat). In contrast, definite and indefinite articles are not used in the Russian language.

## 2) Determiner use

- The English sentence: The new player is excited
- The equivalent sentence in German: Der neue Spieler ist begeistert  
English word for word translation: The new player is excited
- The equivalent sentence in Russian: Новый игрок в восторге  
English word for word translation: Ø new player is excited

In Kolb et al. (2022), three types of instruments were used: 1) an acceptability judgment task (AJT) in English to investigate positive grammatical transfer (PGT) of German and Russian in participants' TLA of English. A mini-AJT was also conducted in both Russian and German to assess if the grammatical features tested in L3 English had been taught adequately in participants native languages Russian or German. Hence, only participants who scored 80% above on the AJT in German and Russian were selected. 2) a receptive vocabulary test to examine participants' English proficiency level; only participants who scored above 50% on this test were selected for the study. 3) a language background questionnaire; a tool used for assessing the linguistic background of participants in all of their spoken languages (L1, L2 and L3).

The AJT in English was composed of six grammatical and six ungrammatical items per grammatical structure. A total of 48 (12 \*4) items were used. These sentences reflect on the

four selected grammatical features. Half of these sentences (n=24) were grammatically correct and the remainders (n=24) were grammatically incorrect. In the AJT test, the 48 sentences were sequentially and randomly presented in audio and visual format (screen). The orthographical (written) representation for each sentence on the screen lasted for 9 seconds. Participants were provided with an answer paper wherein test items (n=48) were referred to by numbers 1 to 48 with an empty space next to each number. On this paper participants were asked to judge the grammatical correctness of each item presented. Answers were given by writing down “good” when judging correct sentences and “bad” for the incorrect sentences. The main test was preceded by two examples in a preparation session.

To remind the reader, Group A had L1 Russian, L2 German and L3 English, while Group B had L1 Russian and L2 English, and Group C had L1 German and L2 English. All of the Groups had relatively similar levels of English proficiency (intermediate). PGT from Russian into English would be evident if Group A and Group B scored more than Group C in the AJT on items reflective of grammatical features that permit the occurrence of PGT from Russian into English (e.g., adverb placement, non-subject-initial declaratives-topicalisation). PGT from German into English would be evident if Group C scored more than Group A and Group B in the AJT on the items reflective of grammatical features that were employed to permit PGT from German into English (e.g., subject-auxiliary inversion in wh-questions, determiner use).

Results showed that all groups scored nearly the same on the items reflective of the grammatical structures intended to measure PGT from German into English (i.e., subject auxiliary inversion). Participants’ scores on these items were; Group A (M=62%), Group B (M=64%) and Group C (M=63%). Results showed a non-occurrence of PGT for group C with L2 German. Only if Group C, with L1 German and Group A with L2 German, had scored

significantly higher than Group B would one suggest an occurrence of PGT from German into English in Group A's and Group B's answers.

Results showed that Group C scored the highest (M=94%) among all groups on the items reflective of the grammatical features which were employed to measure PGT from German into English (i.e., determiner user) followed by Group A (M=78%) then by Group B (62%). Accordingly, it was suggested that PGT from German into English occurred in Group C's answers, more than it occurred in Group A's answers. PGT from German into English occurred more when German was the participants' L1 (Group C) than when German was participants' L2 (Group A).

Results showed that Group B scored the highest (M=93%) among all groups on items reflective of the grammatical features which were employed to measure PGT from Russian into English (i.e., Adverb placement) followed by Group A (M=66%) then by Group C (M=56%). Results showed that PGT from Russian into English occurred more in the bilingual group (Group B) with L1 German than the trilingual group (Group A) with L2 German. In other words, PGT from Russian into English occurred more when Russian was the participants' L1 (Group B) than when Russian was the participants' L2 (Group A).

Results showed that Group B scored the highest (M=82%) among all groups on the items reflective of grammatical features which were employed to measure PGT from Russian into English (i.e., topicalization) followed by Group A (M=66%) then by Group C (M=58%). PGT from German into English occurred more in the bilingual group (B) with L1 German than in the trilingual Group (A) with L2 German. This is because Group B scored higher than Group A on the related items. In other words, PGT from German into English occurred more when Russian was the participants' L1 than when Russian was their L2

Results showed that structural similarities across related languages leads to PGT from L1 into L2 more than from L2 into L3. The more languages are typologically similar they share more structural similarities.

In summary, this section reported that in TLA the typological dissimilarity between languages is the main factor causing negative grammatical transfer from L1 and L2 into L3. This section reported that in TLA the typological similarity between languages is the main factor causing positive grammatical transfer from L1 and L2 into L3. This occurred in cases where participants' L3 level of proficiency was intermediate.

### **3.3 Learner's linguistic proficiency.**

This factor relates to the learners' linguistic proficiency of their native and target languages. Learners' linguistic proficiency of a given language is equal to the sum of their implicit linguistic knowledge (ILK) and explicit linguistic knowledge (ELK).

#### ***3.3.1 Level of L1 explicit linguistic knowledge.***

This section investigates the impact of a learner's L1 ELK on grammatical transfer in TLA. Peric and Novak Mijic (2017) investigated the relationship between L1 ELK and grammatical transfer in TLA. They defined grammatical transfer as an explicit phenomenon wherein L3 learners consciously select a grammatical feature, from L1 or L2, for transfer into L3. They suggested that grammatical transfer primarily occurs from L2 into L3, rather than from L1, since L2 is learned explicitly. However, when L3 learners have an advanced L1 ELK, language transfers primarily occur from L1 to L3. In this case L1 becomes the main source of the grammatical transfer. Their study was designed to test their hypothesis as explained below.

To investigate the impact of the L1 ELK on grammatical transfer in TLA, Peric and Novak Mijic (2017) recruited 45 participants. All participants had L1 Swedish and an L2 belonging to the Romance language family (Austrian, Portuguese, or Spanish). Participants with L2 belonging to the Germanic language family were excluded. Participants had L3 Dutch at an elementary level. Before the study commenced, participants were enrolled in a Dutch language course at Stockholm University. Participants completed the Metalinguistic Knowledge Test (MKT) which was designed to measure the ELK of their L1 Swedish. This test comprised sentences with a deliberate grammatical error. Participants had to provide a written description of the rule that the error was violating. They were divided into two groups. Group A (n=16) had a low level of ELK in their L1 Swedish. Participants scored low on the “Metalinguistic Knowledge Test” (MKT) in L1 Swedish (M<60%). Group B (n=24) had high ELK in L1 Swedish and scored high on the MKT (M>70%). Participants of both groups were proficient in their L2; they had high L2 ELK. Participants also sat the MKT in their L2 and all scored above 70%. In summary, the only variable distinguishing the two groups was L1 ELK. Group A had a higher level of L1 ELK than Group B.

In Peric and Novak Mijic’s (2017) the grammatical target features selected to be investigated are described as follows. When constructing sentences in a Romance language the colour adjective usually follows the noun, as in the French sentence “J’ai acheté une voiture rouge” for which the English word-for-word translation is “I bought a car red”. In contrast, when constructing sentences in a Germanic language, the colour adjective is located before the noun. The Dutch sentence “I heb een rode auto gekocht” for which the English word-for-word translation is “I rent a red car”, illustrates this point.

To examine the relationship between L1 ELK and grammatical transfer in TLA, participants had to complete two set tasks. In the first, participants were handed prompt cards with images depicting Dutch verbs, and they were also given cards on which Dutch verbs were

written. Participants were requested to match the written verbs with the images and utter the words in Dutch (Falk et al., 2015). In the second task, participants were set in pairs; every pair was required to make a deal for buying a dog. The agreement was to take place via communication in Dutch. Participants were handed a sheet wherein three dogs were drawn in three different colours (blue, red, and yellow). There was a caption under each picture in Dutch for which the English word-for-word description is: “Happy red dog”, “Sad blue dog” and “Angry yellow dog”. Descriptions were used to help participants favour selection. Participants had to say which dog they wished to purchase in Swedish (e.g., “We want to buy the red dog, happy dog”). From both tasks, a corpus of 239 adjectives were collected and examined.

Results showed that high L1 ELK seemed to increase the rate of positive grammatical transfer from L1 to L3. These results were obtained by comparing the percentage of correctly placed adjectives between Group A and Group B. Both groups had a high level of L2 ELK; however, only Group A participants had a high L1 ELK. Group A had a significantly higher percentage of correctly placed adjectives than Group B ( $M=59.94 > M=44.12$ ;  $p < .005$ ). Peric and Novak Mijic (2017) thereafter postulated that a high L1 ELK can enhance positive grammatical transfer from L1 into L3. In summary, this study suggested that a high level of L1 ELK could enhance positive grammatical transfer from L1 into L3.

### ***3.3.2 L2 and L3 level of proficiency***

This section investigates the impact of learners’ L2 and L3 level of proficiency on grammatical transfer in TLA. A psycholinguistic model of L2/L3 proficiency would comprise both ELK and ILK of these two languages. In the studies that this chapter is going to review, some of the research very clearly addresses the impact of learner’s L2/L3 ELK on grammatical transfer in TLA, which was evident in learners’ L3 ELK (e.g., Falk & Bardel, 2011; Hermas, 2015). Other studies reflect the impact of general L2/L3 level of proficiency on grammatical

transfer in TLA. A transfer which was evident in learners' L3 general knowledge (ELK and ILK).

Studies that investigated the impact of L2 and L3 level of proficiency on grammatical transfer in TLA comprised two tasks. The first task was the proficiency test sat prior to the commencement of the study and determining participants L2/L3 level of proficiency. The second task was a grammar task to examine grammatical transfer in TLA. In order to determine if these two tasks addressed ELK, many factors should be taken into consideration. These factors include the absence of time pressure on tasks, certainty of answers provided and post-test interviews to record awareness by participants of conscious use of grammatical transfer from L1/L2 into L3 as a strategy in L3 use. This rationale was based on Ellis et al.'s (2009) definition of ELK as conscious linguistic knowledge, and his conclusion that for a test to measure ELK, the following five factors must be taken into account: 1) judgment accuracy, 2) certainty of judgment, 3) type of knowledge utilised in making the judgment, 4) learner's ability to correct an ungrammatical sentence, 5) time availability for answers. Where the research instruments took these factors into account, we can infer that the studies examined the impact of L2/L3 level of ELK and grammatical transfer in TLA, and this syntax transfer is evident in L3 ELK. This section also discusses the extent to which the design of these respective studies gauged the impact of L2/L3 level of proficiency on grammatical transfer on TLA rather than simply documenting the effect of L2/L3 proficiency on participants' accuracy of L3 grammatical production.

In this section I will examine the impact of L2/L3 level of ELK on grammatical transfer in TLA, and if this transfer was evident in participants L3 ELK. Participants' level of ELK in a given language may reflect on their level of proficiency of this language. In Hermas' (2015) study, participants formed two groups. Group A had 11 Arabic native speakers with L2 French and L3 English. Group B comprised 15 Arabic native speakers with L2 French and L3 English.

Group A participants had a post-intermediate level of L2 ELK and a pre-intermediate level of L3 ELK. Group B participants had a post-intermediate level of L2 ELK but had an advanced level of L3 ELK. The only variable differentiating these two groups was the level of L3 ELK. Group B participants had an advanced level of L3 ELK; in contrast, Group A participants had an elementary level of L3 ELK. Participants' L2 and L3 level of proficiency was determined by the Oxford Online Placement Test (OOPT). The OOPT examines the level of proficiency of all European languages. Participants sat the OOPT in both their L2 and L3. The digital OOPT is a standardised test from Oxford University. Learners' rating on OOPT is based on the Common European Framework of Reference for Languages (CEFR). There are two parts to the OOPT: writing and listening. The writing part comprises a lengthy written passage with gaps, and participants were asked to fill in these gaps. This task measures learners' ELK because it complies with Ellis et al.'s (2009) conditions. It examines learners' ability to use metalinguistic knowledge. Participants in the study described here were given sufficient time to provide an accurate answer and were asked to provide a correct answer on the basis that every incorrect answer would eliminate a correct answer.

The listening part of the OOPT comprises three tasks. In the first task, learners are presented with a number of short dialogues. In the second task, learners are presented with a lengthier dialogue. In the third part, learners listen to a very lengthy monologue. In the three tasks learners must answer a multiple-choice question reflecting their understanding of the meaning of the information provided. The listening part of the OOPT determines learners' L2/L3 general level of proficiency because it examines learners' understanding for the general meaning of the linguistic input. In this OOPT, in order for a learner to have an upper-intermediate or advanced level of L2/L3 proficiency, they must show adequate proficiency in both the writing and the listening sections. Since the overall ranking in the OOPT is the lower of the two sections, the overall ranking can be taken as a ranking of participants' L2/L3 ELK.

In Hermas' (2015) study, the critical issue affecting the transfer from L1 Arabic or L2 French into L3 English was the difference in the way that Arabic and French treat lexical complementisers (C) in sentences that include an unspecified indefinite subject or unspecified indefinite object. In English, relative pronouns (e.g., that, who) are sometimes referred to as lexical complementisers (C). They function as a subordinating conjunction to introduce a clause. In English and French when a sentence includes an unspecified subject it is only considered grammatically correct when a sentence includes a complementiser to introduce a complement clause. The following grammatically correct English sentence illustrates this case "A boy (unspecific subject) who (C) saw the crime, was shocked (clause)". The correct French translation for the previous English sentence given as an example is "Un garçon (sujet indéfini) qui (C) a vu le crime choqué (clause)". By contrast, in Arabic a sentence that contains an unspecified subject is only considered grammatically correct when no complementiser is used. The English word -for -word translation for the grammatically correct Arabic sentence is the following "A boy Ø (null C) saw the crime was shocked". This grammatical feature was selected to trace negative grammatical transfer from L1 Arabic into L3 English. This feature can also be a potential source of positive grammatical transfer from French into English. In this case, positive transfer can be observed because an interview was held immediately after the test. In this interview participants clearly explained that their use of grammatical rules was based on the similarity between their previous learned language and the target language. A critique of methods studying positive grammatical transfer is included later in this chapter.

In English and French, when a sentence contains an unspecified object, it is only considered grammatically correct if a complementiser is used to introduce a complement clause as in the English sentence, "A poem (indefinite object) that (C) John recited to the class was exciting (clause)". The correct French translation for the English sentence given above is "Un poème (indefinite subject) que (C) Jean réciter à la classe était existant (clause)". By contrast,

in Arabic, when a sentence includes an unspecific subject it is only considered grammatically correct when no complementiser is used to introduce a complement clause. The English word-for-word translation for the grammatically correct Arabic sentence is “A poem (unspecific subject) Ø (null complementiser) John recited to the class was exciting (clause)”. This grammatical feature was also selected to trace negative grammatical transfer from L1 Arabic into L3 English. This grammatical feature can also be a potential source of positive grammatical transfer from French into English. In this case positive transfer can be observed because an interview was held after the test.

Participants took the English version of the Acceptability Judgement Test (AJT). The task had 30 different sentences. Participants first indicated whether each presented item was grammatically correct. Then, they had to indicate the degree of certainty of their answer on a four-point scale varying from “certainly unacceptable” to “certainly acceptable”. “The construction of the sentences was based on the selected grammatical features. The AJT was not time-pressured. This task was followed by an interview. Participants were asked to declare if their answers were based on random choices or on their grammatical knowledge of previously learned languages. The purpose of the interview was to establish L1/L2 grammatical transfer into L3 in participants’ answers.

Results on the accuracy of mean average scores, for sentences that included both indefinite subjects and indefinite objects with a lexical complementiser, were the following. Group A (M=77.77%) scored higher than Group B (M=52.43%). An interview was conducted to investigate the participants’ knowledge on these two grammatical features. Group A participants reported that they depended mainly on their L2 French linguistic knowledge. Group B participants reported they mainly counted on their L3 linguistic knowledge. These results suggest that a high L3 level of proficiency may inhibit the participants’ positive grammatical transfer from L2 into L3 grammatical production. However, participants with a

low level of L3 proficiency may manifest positive grammatical transfer from L2 into L3 grammatical production.

In Hermas' (2015) study the AJT task provided an accurate means to test the effect of L2 and L3 level of ELK on grammatical transfer in TLA. This is because the test measured the degree of certainty of answers and only answers provided with a high degree of certainty were taken into consideration. Secondly, this task was not time-pressured. Thirdly, based on the answers provided by participants during the interview, it was clear that learners were consciously aware of using grammatical transfer from previously learned languages as a strategy to answer questions that included grammatical features with which they were unfamiliar. Consistent with the rationale related to the design of a task used to measure ELK, this study showed the effect of L2/L3 level of ELK on grammatical transfer in TLA. However, asking students to provide the correct version of the ungrammatical sentences in this task would have made the test a more valid measure of ELK.

In summary, Hermas'(2015) suggested that in TLA, participants with a high level of L3 ELK may have inhibited positive grammatical transfer from a previously learned language. By contrast, participants with a low level of L3 ELK may have promoted positive grammatical transfer from previously learned languages. This occurred when participants' L2 level of ELK was post-intermediate.

Falk and Bardel (2011) investigated the effect of L2/L3 ELK on grammatical transfer in TLA. Participants in their study formed two groups. Group A (n=22) had L1 French, L2 English and L3 German. Participants in Group B (n=25) had L1 English, L2 French and L3 German. Participants of both groups had an advanced L2 level of ELK and an intermediate L3 level of ELK. Participants' levels of proficiency were based on the OOPT in written form. The written OOPT evaluates proficiency in accordance with the Common European Framework of

Reference (CEFR). The written OOPT addresses ELK, as it is similar in context to the digital OOPT. The examination was made by a certified CEFR-examiner (Division, 2001).

In Faulk and Bardel's (2011) study a negative grammatical transfer can only take place from French into English in the placement of an object reflexive pronoun in sentences that include main clauses. In this case the object placement is pre-verbal in French and post-verbal in English and German. The examples provided below illustrate this rule:

Example 1) placement of an object pronoun in the sentences that include main clauses

a. German: "Ich (subject) erkenne (finite verb) ihn (object pronoun)".

English word-for-word translation: "I recognised him".

b. English: "I recognised him".

c. French: "Je (subject) le (object pronoun) reconnais (finite verb)".

English word-for-word translation: "I him recognised".

In this study a negative grammatical transfer can only take place from English into German in the placement of object pronouns in sentences that include subordinate clauses. In this case the object placement is pre-verbal in French and German and post-verbal in English. The examples provided below illustrate this rule:

Example 2. Placement of an object pronoun in the sentences that include subordinate clauses

a. German: "Ich sehe, dass Nicolas (subject) selbst (object pronoun) verletzt ist (finite verb)".

English word-for word translation: "I see that Nicolas himself hurt".

b. English: I see that Nicolas hurt himself

c. French: "Je vois que Nicolas (subject) s' (object pronoun) est blessé (finite verb)".

English word-for-word translation: “I see that Nicolas himself hurt”.

Falk and Bardel (2011) examined the placement of object pronouns in both main and subordinate clauses in a Grammaticality Judgement Correction Task (GJCT). The GJCT was composed of 144 German sentences of which 84 items were grammatically correct and the other 60 items were grammatically incorrect. For the grammatically incorrect sentences, 30 represented cases of negative grammatical transfer from French into German (as in example 1) and the other half represented cases of negative grammatical transfer from English into German (as in example 2). In this task, the sentences were presented in a written form and participants had to assess their grammaticality and correct the ungrammatical items. When participants did not know the correct answers, they were advised not to provide an answer. This task was not followed by an interview. Participants were not asked to declare if their answers were based on random choices or on their grammatical knowledge of previously learned languages. The GJCT takes into consideration the following three factors: judgment accuracy; certainty of judgment; learners’ ability to correct an ungrammatical sentence. This study therefore investigated the effect of L2/L3 level of ELK on grammatical transfer in TLA.

Results showed that group B (M = 17, 9 %) made more errors than group A (M= 1.9%) in the wrong placement of an object pronoun in the German sentences that included main clauses. Falk and Bardel (2011) indicated that learners’ grammatical mistakes were influenced by the negative grammatical transfer from French into German. This negative transfer occurred more when French was the participants’ L2 than when French was their L1 (17.9% > 1.9%). Results showed that group A (M = 15. 2 %) made more errors than group B (M= 3.9%) in wrongly placing an object pronoun in the German sentences that included subordinate clauses. Researchers indicated that learners’ grammatical errors were influenced by the negative

grammatical transfer from English into German. This transfer occurred more when English was the participants' L2 than when it was the participants' L1 (15.2 > 3.9%).

In sum, this study showed that when L1 and L2 are typologically dissimilar from L3, L2 is the main cause of negative grammatical transfer into L3. This occurred in cases where the L3 level of ELK was intermediate and L2 level of ELK was advanced.

The correction phase in the task was established to examine positive grammatical transfer from L1 or L2 into L3. Each time students corrected the wrong placement of an object pronoun in German sentences that include main clauses this was interpreted as being a positive grammatical transfer from English into German. Every time students corrected the wrong placement of an object pronoun in the German sentences that included subordinate clauses this was interpreted as being a positive grammatical transfer from French into German.

Results showed that Group B participants performed better than group A participants. This concerned the correction of the wrong placement of an object pronoun in German sentences that include main clauses ( $M=28,8\% > M=24.6\%$ ). Falk and Bardel (2011) indicated that learners' grammatical performance was influenced by positive grammatical transfer from French into German. They stated that positive grammatical transfer from French into German was higher when French was the participants' L2 than when French was the participants' L1.

Results also showed that Group A participants performed better than group B participants. This concerned the correction of the wrong placement of an object pronoun in German sentences that include subordinate clauses ( $M=29,9\% > M=18,96\%$ ). Falk and Bardel (2011) indicated that learners' grammatical performance was influenced by the positive grammatical transfer from English into German. They stated that positive grammatical transfer from English into German was higher when English was the participants' L2 than when English was their L1.

To conclude, a high level of L3 ELK may inhibit positive grammatical transfer from a previously learned language (Hermas, 2015). By contrast, a low level of L3 ELK may promote positive grammatical transfer from previously learned languages (Hermas, 2015). When L1 and L2 are typologically similar to L3, L2 is the main facilitator of positive transfer into L3. This occurred in cases where learners' L2 level of ELK is advanced and their L3 level of ELK is intermediate (Falk & Bardel, 2011). Similarly, when L1 and L2 are typologically dissimilar with L3, L2 is the dominant source of negative grammatical transfer into L3. This occurred in cases where learners' L2 level of ELK is advanced and their L3 level of ELK is intermediate (Falk & Bardel, 2011).

I will now examine the impact of L2/L3 general level of proficiency on grammatical transfer in TLA. Bardel and Falk (2007) investigated negative grammatical transfer from L1 and L2 into L3 in an initial state of L3 acquisition (low level of L3 proficiency).

Their study recruited 5 participants who were arranged into two groups. Group A comprised three participants, who spoke L1 Dutch, L2 English and L3 Swedish. Group B included two participants. One participant had L1 English, L2 Dutch and L3 Swedish. The other had L1 Hungarian, L2 Dutch, and L3 Swedish. All participants had an advanced L2 level of proficiency and a low L3 level of proficiency. Their L2 and L3 level of proficiency was examined according to participants' self-estimation.

In the five languages investigated by the research (English, Hungarian, Dutch, German, and Swedish), the key factor influencing transfer from L1 or L2 into L3 was linked to the difference in how these languages treat negative patterns. In pre-verbal negation, the negator precedes the main verb, as is the case in Hungarian. In post-verbal negation, the negator follows the main verb, as is the case in Dutch, German and Swedish. In English, the negator comes between an auxiliary and the main verb. This creates a potential source of negative

grammatical transfer from English and Hungarian into Swedish. The examples below illustrate how this can occur.

- English language: “The child does (auxiliary) not (negator) speak (verb)”.
- Hungarian language: “A gyerek (the child) nem (not: negator) beszél (speak: verb)”.
- Dutch language: “Het kind (the child) spreekt (speak: verb) niet (not: negator)”.
- German language: “Das Kind (the child: subject) spricht (speaks; verb) nicht (not: negator)”.
- Swedish language: “Barnet (the child) talar (speaks) inte (not: negator)”.

All participants (n=5) were enrolled in a Swedish language course of 4 months duration at the University of Nijmegen in the Netherlands. All lessons were video-taped and audio-recorded. This allowed the researcher to trace the grammatical features and to report results. Researchers made a transcript for the recordings documenting all errors pertaining to the use of negative patterns in participants’ L3 Swedish grammatical production. Group A participants (n=3) had L1 Dutch and L2 English. In Group B (n=2), one participant had L1 English and the other had L1 Hungarian; both had L2 Dutch. Comparing negative grammatical transfer between these two groups enabled Bardel and Falk (2007) to determine whether negative grammatical transfer occurred more frequently from L1 or from L2 in participants’ L3 Swedish grammatical production. An aural productive task was used to monitor student aural linguistic behaviour concerning the grammatical feature examined. This task did not address ELK for the following reasons: 1) Learner’s ability to correct an ungrammatical sentence was not examined; 2) Learners did not make any grammatical judgment of accuracy over any presented input nor were able to show the certainty over their grammatical decision.

Results showed that Group A participants made 81 errors in their Swedish L3 grammatical production of negative patterns. This might have been the result of negative grammatical transfer from L2 English into L3 Swedish. English and Swedish differ in how they treat the grammatical feature of negative patterns. The researchers stated that in the initial stage of Swedish L3 acquisition, when English L2 level of proficiency is advanced, L2 has a high grammatical negative transfer effect on L3 grammatical oral production.

Results also showed that Group B participants made 54 errors in their Swedish L3 grammatical production of negative patterns. Researchers stated that in the initial stage of Swedish L3, L1 (Hungarian or English) has a considerable grammatical negative transfer effect on L3 grammatical production. This occurred because participants' L1 (Hungarian or English), and L3 Swedish, differ in how they treat the grammatical feature of negative patterns.

By comparing the two Group results (Group A, errors =81> Group B, errors=54,  $p < 0.01$ ) Bardel and Falk (2007) found that, in cases where the L2 is typologically dissimilar to the L3, there are more cases of negative grammatical transfer than in cases where L1 is typologically dissimilar to L3.

In summary, the study carried out by Bardel and Falk (2007) showed that in the initial stage of L3 acquisition, and when L2 level of proficiency is advanced, L2 has a higher grammatical negative transfer effect than L1 on L3 grammatical oral production. This occurred when participants' L3 level of proficiency was low.

### **3.4 Individual factors**

Individual differences among learners such as age, attitude and cognitive ability influence the likelihood of grammatical transfer in SLA (Ellis, 2015). In TLA, learners' age

and attention control are the factors that were found to influence L1/L2 grammatical transfer into L3.

### **3.4.1 Age**

Flynn et al. (2004) investigated the role of age in determining grammatical transfer in TLA. This study recruited two groups of participants comprising different age groups. Group A were adults (N=33) aged over 18. Group B consisted of children (N=30) whose age was between 10 and 12. All participants had L1 Kazakh, L2 Russian and L3 English. The L3 level of proficiency for all participants was elementary. Participants' L2 level of proficiency varied. Group A included learners with low (n=7), intermediate (=14) and advanced (n=12) levels of L2. Group B included learners with low (n=10), intermediate (n=12) and advanced (n=9) levels of L2 proficiency. The Michigan English Test (MET) was used to assess participants' level of L3 proficiency. This test concerns listening, grammar and speaking. The MET for listening and grammar includes one hundred multiple-choice questions. The MET for speaking proficiency was a structured, one-on-one interaction between the examiner and student. The study did not mention the specific task used to evaluate the L2 level of proficiency though it claimed that participants sat the adequate test to evaluate their L2 level of proficiency. However, Flynn et al. (2004) failed to describe the task used to measure participants' L2 level of proficiency.

Russian is a right branching Slavic language with subject-verb-object (SVO) word order and has a similar word order to English which is also a right branching Indo-European language. There are three grammatical features common to both languages, in which when constructing a sentence, the relative clause appears to the right of the noun (subject/object). The three grammatical features are the following: a) lexically headed clause with semantic content; b) Lexical headed clause with no semantic content and c) free relative clause. By

contrast, Kazakh is a left branching language in which relative clauses are positioned to the left of their nouns (subject/object). These grammatical structures constitute a potential source of negative grammatical transfer from L1 Kazakh into L3 English.

A relative clause is considered to be a lexically headed clause with semantic content only if its relative pronoun refers to a specific noun (subject/object). This specific noun is valuable in semantic terms as having a reference, a sense, and some truth values. The following example in English illustrates the case “I met Bernie (specific noun) [who (relative pronoun) became my best friend] (relative clause)”. By contrast a relative clause is considered lexically headed with no semantic content only if its relative pronoun refers to a nonspecific noun (subject/object). The following example illustrates the case “The janitor criticized the person (noun) [who (relative pronoun) called the lawyer] (relative clause). A relative clause which does not include a noun (subject or object), to which usually a relative pronoun refers, is considered to be a headless relative clause. The following example illustrates this case “[whoever (relative pronoun) spoke against the totalitarian president was executed] (relative clause)”. The noun in the given example is syntactically presented but phonologically and orthographically empty. A free relative clause, is also known by the term headless relative clause. The above-mentioned similarities between L2 Russian and L3 English may create a potential positive grammatical transfer between these two languages. Table 3.1 illustrates the grammatical differences and similarities in Russian, English, and Kazakh.

**Table 3.1***Position of the Relative Clause in English, Russian and Kazakh*

Grammatical features	English sentence	Russian correct translation	Kazakh correct translation
Lexically headed, head with semantic content	The owner questioned Nicolas (noun) [who (relative pronoun) greeted the worker] (relative clause).	Владелец (the owner) опросил (questioned) никола (the business man: noun) который (who: relative pronoun) приветствовало работника (greeted the worker).	Иесі (the owner) Николас (the business man) сәлем (greeted) беріп отырған (give) кәсіпкерге (the worker) күмән келтірді (who questioned).
Lexically headed, head with no semantic content	The janitor criticised the person (noun) [who (relative pronoun) called the lawyer] (relative clause).	Дворник (the janitor) раскритиковал (criticised) человека (the person: noun), который [(who: relative pronoun) вызвал (called) адвоката (the lawyer)] (relative clause)	Күзетші (the guard) адвокатты шақырған (who called the lawyer) адамды сынға алды (criticised the person).
Free relative (headless relative)	Ø (no noun) [whoever (relative pronoun) spoke against the totalitarian president was executed]	Ø. [кто бы ни (whoever) говорил (spoke) против (against) тоталитарного (the totalitarian) президента (president) был (was) казнен(executed)](relative clause)	Тоталитарлық (the totalitratritarian) президентке (president) қарсы (against) сөйлегендердің (spoke) барлығы орындалды (whoever executed)

In Flynn et al's study (2004), participants sat an Elicited Imitation Test (EIT) in which they listened to twelve English sentences and were asked to imitate each sentence. Students were not restricted by time. Sentences in this study reflect three grammatical target features. Each was presented in four sentences. The three target features as described before were: a) lexical head with semantic content; b) lexical head with no semantic content and c) free relative.

Results showed that Group A (adults) scored higher than Group B (children) (M66% > 32%). A greater amount of negative grammatical transfer occurred among young learners. This suggests young learners were possibly consciously drawing on dissimilarities between their L1 and L3. Flynn et al (2004) postulated that young learners are more affected by the typological dissimilarities between L1 and L3 and that negative grammatical transfer from L1 into L3 may occur more frequently among young learners than older learners.

The methodology of the study did not fully control for L3 amount and exposure. The following explanation will justify the case. Group A and B included participants with three different levels of proficiency (low, intermediate, advanced). A comparison between the performances of these two groups was made in order to understand the effect of age on grammatical transfer in TLA. However, a superior methodology would entail the comparison of each category of proficiency between counterparts in the other pair. For example, a comparison of the performance of young learners with intermediate L2/L3 proficiency could be made with their older counterparts in Group B who have a similar level of L2/L3 proficiency. It is also of crucial importance that the two groups compared have received the same amount of L3 instruction, as this will help to more accurately reflect the effect of age on syntactic transfer by isolating the effect of other factors.

In their longitudinal study, Pfenninger and Singleton (2016) examined the degree in which the starting age and the amount of L3 exposure can impact negative grammatical

transfer from L1 and L2 into L3. Starting age refers to the age from which a bilingual student begins to learn their third language.

In their study, participants formed two groups. Group A (n=100) had L1 German, L2 French and L3 English. They studied German from 1st grade onwards, English from the 2nd grade and French from 5th grade. As French is one of the Swiss national languages, learners are exposed to more French in daily life than English. Swiss students are usually more proficient in French than English, despite starting to learn English at school before French. On this basis, French was considered to be participants' L2 language and English their L3. Group A participants were taught foreign languages in accordance with the new guidelines issued by the Swiss Minister of Education. For Group B (n=100) participants had L1 German, L2 French and L3 English. They studied German from the 1st Grade, French from the 5th grade and English from the 7th grade. Group B participants studied L3 English in accordance with the old curriculum. There were two differences between participants of the two groups: starting age and amount of L3 exposure. Group A participants began learning L3 English in primary school whereas Group B students only commenced learning L3 English in secondary school. Data collection took place after all students finished Grade 12. Group A participants received 1120 hours of English instruction. By contrast Group B participants only received 730 hours of English instruction. Group A participants therefore had 390 additional hours of instruction in primary school. The study did not indicate any difference in the style of teaching between the old and the new curriculum.

The key factor influencing transfer from L1 German into L3 English pertained to the difference in how these languages treat negative patterns. In post-verbal negation the negator follows the main verb, as is the case in German. In French and English, the negator comes between an auxiliary and the main verb. Negative grammatical transfer from L1 German into

L3 English entailed the incorrect placement of a finite verb in a declarative negative sentence.

The examples below illustrate the case.

- English language: “The child does (auxiliary) not (negator) speak (verb)”.
- French language: “L'enfant (the child) ne (negator) parle (speak verb) pas”.
- German language: “Das Kind (the child: subject) spricht (speaks; verb) nicht (not: negator)”.

Another grammatical feature was also examined. A potential negative grammatical transfer (morph-syntactic) from L1 German into L3 English also included the difference in the usage of the agentive suffix “er” with singular and plural nouns. In both German and English adding an agentive suffix to the verb will turn it into a noun (sing: singer/ säng: sänger). In English the letter “s” must be added to the agentive suffix “er” to turn the singular noun into its plural version (singer: singers). This is not the case in the German language as both singular and plural nouns terminate with only the agentive suffix (singers: sänger).

In Pfenninger and Singleton’s (2016) study, participants were asked to write two essays in English, one argumentative and one narrative. For the argumentative essay participants were asked to explicitly orally describe the advantages and disadvantages of a TV show (talent show). In the narrative essay participants were asked to write in a narrative style describing a silent movie they had viewed. Participants were also asked to undertake two oral tasks in English (re-telling and spot-the-difference tasks). For the re-telling task, participants were requested to orally describe the silent movie that they had previously watched. In the second oral task participants were put into pairs and asked to describe the differences between pictures that contained a number of overlapping scenes.

Results of the first task (oral task) showed that participants of both Groups A and B made errors. These errors pertained to their Swedish L3 grammatical production of ‘negative patterns’. These errors also pertained to participants not adding an “s” to the agentive suffix ‘er’ with plural nouns in their L3. Errors occurred with a mean of 17% for Group A participants and a mean of 19% for Group B participants. Pfenninger and Singleton (2016) postulated that these errors are the result of negative grammatical transfer from L1 German into L3 English.

Results of the second task (oral task) showed that participants of both groups A and B made errors. These errors pertained to their Swedish L3 grammatical production of negative patterns. These errors also pertained to participants not adding an “s” to the agentive suffix “er” with plural nouns in their L3. Errors occurred with a mean of 80% for Group A participants and a mean of 83% for Group B participants. Pfenninger and Singleton (2016) suggested that these errors are the result of negative grammatical transfer from L1 German into L3 English. Pfenninger and Singleton (2016) believed that in both tasks Group A participants performed better than group B participants because participants of group A had an extra 450 hours of Swedish L3 instruction, and they had started learning L3 earlier than participants of Group B.

Overall, this review found no solid evidence in Pfenninger and Singleton's (2016) study reflecting the degree to which the amount of instruction and starting age impacted grammatical transfer in TLA. The small difference in results could simply be related to L3 linguistic input. Furthermore, the methodology of this study does not completely differentiate between the effect of two separate causative factors influencing L3 learning ability, namely the amount and timing of L3 exposure. Hence one could draw an alternative interpretation of the results, being that the amount of L3 exposure was the variant accounting for the slight discrepancy of results between the two groups as opposed to the age at which participants began studying their L3.

In summary, this section argued that L3 adult learners are more aware of - and can exploit - typological similarities between L2 and L3 whereas children may depend more on their L1 in their L3 grammatical production. This section also showed that early L3 learning, with a considerable amount of L3 instruction, may help L3 learners in inhibiting negative grammatical transfer from L1 and L2 into L3.

### ***3.4.2 Attention control.***

Sánchez and Bardel (2016) examined the role of L3 learners' cognitive ability in inhibiting negative grammatical transfer from L2 into L3. Their study of cognitive ability included the factors of working memory ability, attentional control ability and attention switching ability. This review only investigates the attention control factor as only this was found to have a significant influence on the amount of negative grammatical transfer in TLA by Sánchez and Bardel (2016).

Participants formed two groups. Both Group A (n=27) and Group B (n=20) had L1 Spanish, L2 German and L3 English. All participants had an advanced L2 level of proficiency but an intermediate L3 level of proficiency. Proficiency was also examined, based on the Online Oxford Placement Test. Group B participants had a higher attention control ability than Group A. Attention control ability is defined as the capability a learner of a new language has to select linguistic features appropriate to the L3 from previously learned languages by utilizing all the available attention units in their mind. This was determined by the so-called Trail Making Test (TMT). The TMT comprises 25 circles, each representing a number. These circles are randomly distributed on paper and participants are asked to draw a line connecting all the circles in ascending sequential order by joining numbers from 1 to 25. Results showed that participants in Group B were faster at accomplishing this task ( $M = 42.63$  seconds  $>$   $M = 24.76$

seconds). Accordingly, Group B participants had a higher attentional control ability than Group A participants.

In the English and Spanish languages, the object post-locates the finite verb in sentences constituting of main clauses or embedded clauses with an auxiliary verb. By contrast, in German, and under the same grammatical conditions, the object is located between the finite verb and the past participle. This constitutes a potential negative transfer from German into English. Examples 1 and 2 below illustrate the case.

Example 1) *Case of sentence with a main clause and an auxiliary verb in English, Spanish and German.*

- English language: “Nicolas (subject) has (finite verb) read (past participle) the book (object)”.
- Spanish language: “Nicolas (subject) ha (has: finite verb) leído (read: past participle) el periódico (the book: object)”.
- German language: Nicolas (subject) hat (has: finite verb) die zeitung (the book: object) gelesen (read: past participle)”.

Example 2) *Case of sentence with an embedded clause and an auxiliary verb in English, Spanish and German.*

- English language: “The man (subject) with green eyes (embedded clause) has bought (finite verb) the newspaper (object)”.
- Spanish Language: “El hombre (the man: subject) de ojos verdes (with green eyes: embedded clause) ha comprador (has bought: the finite verb) el periódico (the newspaper: object)”.

- German Language: “Der Mann (the man: subject) mit den grünen Augen (with green eyes: embedded clause) hat (has: finite verb) die Zeitung (the newspaper: object) gekauft (bought: past participle)”.

In the English and Spanish languages, the object post-locates the finite verb in sentences which are composed of a main clause or an embedded clause with a modal verb. By contrast, in German, and under the same grammatical conditions, the object is located between the infinite verb and the modal verb. In this study grammatical differences across related languages constituted a potential source of negative grammatical transfer from German into English. Example three and four below illustrate the case.

Example 3) *Case of sentence with a main clause and a modal verb in English, Spanish and German.*

- English language: “Nicolas (subject) should (modal verb) read (finite verb) the journal (object)”.
- Spanish language: “Nicolás (Nicolas: subject) debería (should: modal verb) leer (read: finite verb) la revista (the journal: object)”.
- German language: “Nicolas (subject) sollte (should: modal verb) di Zeitschrift (the journal: object) lesen (read: infinite verb)”.

Example 4) *Case of sentence with an embedded clause and a modal verb in English, Spanish and German.*

- English language: “That man (subject) with red hair (embedded clause) should buy (finite verb) the car (object)”.

- Spanish Language: “Ese hombre (that man: subject) con el pelo rojo (with red hair: embedded clause) debe comprar (should buy: finite verb) el automóvil (the car: object)”.
- German Language: “Dieser Mann (Subject) mit roten Haaren (with red hair: embedded clause) sollte (should) das Auto (the car: Object) kaufen (infinite verb)”.

Sánchez and Bardel (2016) collected data by asking participants to listen to a narrative task describing Charlie Chaplin’s silent film “Modern Times”. The narration was simultaneously accompanied by extracted photographs from the film. These photographs produced visual stimuli to help participants understand the meaning of the film. Once the scenes and the narration were delivered, participants were asked to write a complete summary of the story. All participants had previously studied the grammatical features tested in their learned language, but these features were not part of the participants’ L3 linguistic knowledge. This enabled the researchers to determine the factor of attention control in prohibiting negative grammatical transfer.

Sánchez and Bardel (2016) found that Group A participants made less errors than Group B participants pertaining to the use of the grammatical feature examined in this study ( $M = 41\% < M=60\%$ ). The difference in performance between participants of these two groups was statistically significant ( $p= 0.049$ ). Based on these results, Sánchez and Bardel (2016) stated that less negative grammatical transfer from L2 English into L3 Spanish occurred more among Group B participants than among Group A participants. Researchers stated that the high attention control ability of Group A participants made them perform better than Group B participants. Group A participants made fewer negative grammatical transfers from their L2 in comparison with Group B participants.

In sum, this section suggests that a high attention control ability in L3 learners will allow them to inhibit negative grammatical transfer from L2 into L3.

### **3.5 Psycholinguistic factors**

These are the factors concerning learners' perceptions on transferability (Ellis, 2015). In a TLA context, this is the transferability of L1/L2 grammatical features into L3 grammatical production. In TLA, psychotypological similarities across relevant languages constitute a factor that influences grammatical transfer in TLA.

#### ***3.5.1 Psychotypology***

This section investigates the role of psychotypology in grammatical transfer in TLA. Psychotypology does not refer to the actual similarity or difference between languages, but rather the learner's perception of such similarities or differences (Ellis, 2015).

Rothman's (2010) study also examined the role of psychotypology in grammatical transfer in TLA. Rothman's (2010) way of investigating learners' perceptions was based on asking participants to elicit which particular grammatical structure they favoured, out of some given alternatives.

As previously noted, participants formed two groups. Group A (n=15) had L1 Spanish, L2 English and L3 Brazilian-Portuguese (BP). Group B (n=16) had L1 English, L2 Spanish and L3 BP. Rothman's (2010) study applied a Choice Matching Task (CMT) to understand the role of psychotypology in grammatical transfer in TLA. The task comprised ten sentences in BP. These sentences were designed to include an ambiguous clause which can result in multiple interpretations in terms of selecting the subject. The ambiguity of the ten sentences occurs as a

result of there being two potential subjects. Both subjects pre-locate the finite verb. However, one is located at the beginning of the sentence (the first subject) and one is closer to the finite verb (the second subject). This is illustrated by the example below sentence with an ambiguous relative clause. Both answer a) and b) are correct; some participants will favour answer a), the others will favour b). The motive behind their preferred choice will be explained after the example.

Sentence example: Last week I saw the mother of my husband who, after the separation, treated me unfairly

- question: “Who treated me poorly?”
- possible answers:
  - a) The mother of my husband
  - b) My husband
  - c) Not sure
  - d) Participants who are influenced by Spanish will choose answer b)

Rothman (2010) believed that participants who are influenced by Spanish as one of their previously learned languages will choose answer a). His rationale was based on previous research which found that participants who favour the first subject “the mother of my husband” do so because they believe that Spanish is more typologically similar to Brazilian-Portuguese than English. These participants consciously or subconsciously favoured selecting the subject that is the most distant from the finite verb (the first subject). This bias arises from a belief that Spanish does not always follow the V2 Rule (Subject, Verb, Object) and the subject can be located far from the finite verb (see., Dussias, 2004; Gibson et al., 1996).

Rothman’s (2010) believed that participants who are influenced by English as one of their previously learned languages will choose answer b). His viewpoint was based on previous

research which found that participants who favoured the second subject (“the husband”) do so because they believe that English is more typologically similar to Brazilian-Portuguese than Spanish. These participants are consciously or subconsciously familiar with selecting the second subject that is located closer to the finite verb. This bias arises from participants’ beliefs that English usually follows the (V2) Rule (Subject, Verb, Object) and the subject cannot be located far from the finite verb (Carreiras & Clifton, 1999; Gibson & Pearlmutter, 1998; Miyamoto, 1998).

The two groups had the following scores: Group A and B both selected the first subject 70% of the time. Spanish language influenced their answers more than English. This occurred whether Spanish was participants’ L1 or L2. In an interview that took place after the test, participants stated that their answers were influenced by their linguistic knowledge of Spanish. They believed that Spanish is closer to Brazilian-Portuguese than English in regard to the grammatical feature tested. Researchers interpreted the results as signifying that the psychotypological similarity between Spanish and Brazilian-Portuguese has influenced the positive grammatical transfer between these two languages. This transfer occurred in cases where Spanish was participants’ L1 or L2.

There is scope to improve this research methodology by requesting participants report the reason for their choices following each of their answers. This methodology is likely to provide a more accurate insight than the post-test interview. After the conclusion of the test, and when providing general feedback to researchers, participants may be unable to fully recall what influenced their decisions in answering each and every sentence. This would not be the case if participants reported their choice after each and every answer.

In summary this section showed that positive grammatical transfer from L1 and L2 into L3 does not only depend on actual typological similarity across related languages but can also be influenced by a learner's perception of their similarity.

### **3.6 Other factors.**

In TLA the amount of L2 exposure was found to influence L1/L2 grammatical transfer into L3. The following section will investigate this factor.

#### **3.6.1 L2 type and amount of instruction.**

This section will investigate the impact the amount of L2 linguistic exposure has on grammatical transfer in TLA.

Stadt et al. (2018) investigated the effect of L2 amount of exposure and instruction on negative grammatical transfer in TLA. Fifty-four native Dutch speakers participated in this study and they formed two groups. Group A participants (n=16) had a lot of L2 English linguistic exposure. They were third-year secondary school students enrolled in an "immersion school program". Participants in Group B (n=11) had little L2 English Linguistic exposure. They were also third year secondary school students but were enrolled in a "regular school program". In the Netherlands, the so called immersion school program entails teaching 50% of the curriculum units in English and the remainder in Dutch. By contrast, in Dutch schools that have a regular school program, English is taught as a separate subject for an average of 6 hours per week. Participants in both groups had a high level of L2 proficiency but only Group A participants had a high amount of L2 exposure.

The critical issue affecting transfer from L1 or L2 into L3 is the difference with which English, French and Dutch people treat the construction of sentences, including adverbs of frequency. In Dutch and English, the finite verb is placed after both the subject and the adverb of frequency. By contrast, in French, the finite verb is placed immediately after the subject and before the adverbs of frequency the examples provided below illustrate this rule:

- English sentence: “Nicolas (subject) sometimes (adverbs of frequency) goes (finite Verb) to the city”.

Structure of the sentence: Subject, adverb of frequency, finite verb;

- Dutch sentence: “Nicolas (subject) soms (adverbs of frequency) gaat (finite Verb) naar de”.

English word for word translation: “Nicolas sometimes goes to the city”.

Structure of the sentence: Subject, adverb of frequency, finite verb;

- French sentence: “Nicolas (subject) va (verb) parfois (adverb of frequency) au ville”.

English word for word translation: “Nicolas goes sometimes to the city”.

Structure of the sentence: Subject, finite verb, adjective of frequency.

Researchers looked to the verb placement in the aforementioned grammatical feature. They collected data via a Grammaticality Judgment Task (GJT) in which 234 sentences were orally presented to students. All the sentences were grammatically incorrect. Students were asked to judge the grammaticality of the sentences presented by clicking “yes” or “no” buttons. The task was not timed and participants were not asked to correct the ungrammatical sentences.

Results demonstrated that Group A made fewer errors than Group B pertaining to the placement of the finite verb in sentences with adverbs of frequency. Group A participants average of errors was  $M=5.93\%$ ,  $SD= 2.23$ . Group B participants average of errors was

$M=3.8\%$ ,  $SD= 2.82$ . The difference in results was significant with  $p= .003$ . Stadt et al. (2018) interpreted the results by declaring that Group A made more errors than Group B because Group A had a moderately significant higher amount of negative grammatical transfer than Group B from L2 into L3, resulting from a higher amount of L2 exposure. Researchers also recruited two different groups of Year 4 students with different levels of L2 exposure. Participants were given the same task. Results also showed that there was a greater amount of negative syntactic transfer from L2 into L3 in the group that had a greater amount of L2 exposure and instruction. This study claimed to investigate the effect of L2 exposure on grammatical transfer in TLA. However, it only specifically considered the amount of L2 exposure through the medium of instructed learning, though language exposure can also occur from the language environment and other channels such as electronic media. Furthermore, Group A differed from Group B, not only in the amount of L2 exposure and instruction, but also in the type of L2 exposure. Group A was exposed to both general English and academic English, as half of the curriculum units in the immersion school program were taught in English.

This study suggested that in TLA, an increase in the amount of L2 exposure, through the instruction of general and academic usage, may increase the rate of negative grammatical transfer from L2 into L3.

### **3.7 Chapter discussion.**

This review led to the finding that in TLA, negative grammatical transfer depends on typological dissimilarities across related languages (L1, L2) with L3. Positive grammatical transfer in TLA, however, relies on typological similarities across related languages (L1, L2)

with L3. Accordingly, typological proximity (linguistic factor) appears to be the necessary condition for the transfer phenomena to occur rather than a mere influential factor.

It seems that typological proximity as a factor on its own would have little impact on positive grammatical transfer in TLA if learners have no perception of it. It was found that positive grammatical transfer from L1 and L2 to L3 does depend both on the actual typological similarities across related languages with L3 and learners' perception of these similarities (psychotypology/psycho-linguistic factor) (Rothman, 2010). This review uncovered a knowledge gap regarding the influence of psychotypology on negative grammatical transfer in TLA, which needs to be addressed in future research. This could be attempted by applying a "similar" methodology to that which was developed by Rothman (2010) but for this purpose it must be used to examine negative grammatical transfer in TLA. This can be done by including grammatical items that reflect on negative grammatical transfer from L1/L2 into L3.

Furthermore, with grammatical transfer being a mental phenomenon, its occurrence should also depend, to a certain degree, on participants' cognitive abilities (individual factor). Sánchez and Bardel (2016) found that a high attention control ability in L3 learners allowed them to inhibit negative grammatical transfer from L2 to L3. In their study, Group A participants had more considerable attention control ability than Group B participants. This ability concerns all languages. One could argue that learners with high cognitive abilities may also be able to make use of typological similarities across related languages with their L3. It is worth noting that cognitive ability is not only limited to attention control, but it can also include many other factors such as learners' a) working memory ability, b) attentional control ability, and c) attention switching ability.

One of the questions that this chapter investigated in the literature relates to which language, L1 or L2, is more influential on L3 grammatical production. Rothman (2010) gave equal importance to L1 and L2 in terms of their influence on negative grammatical transfer in

TLA. However, Falk and Bardel's (2011) findings showed L2 as the main generator of negative grammatical transfer in TLA. One could argue that one of the primary differences between Rothman's (2010) and Falk and Bardel's (2011) studies was the participants' level of L2 proficiency: intermediate in Rothman's (2010) study and advanced in Falk and Bardel's (2011) study. From this, one can conclude that L2 level of proficiency (linguistic factor) can be a critical factor in grammatical transfer in TLA. Aligned with this, Pfenninger and Singleton's (2016) study found that an increase in the amount of L2 exposure through the instruction of general and academic usage may increase the rate of negative grammatical transfer from L2 to L3.

Knowing that L2 level of proficiency is an influential factor in grammatical transfer in TLA one should examine the magnitude of this influence when participants L2 level of proficiency is relatively close to L1. It may be difficult to recruit participants meeting this criterion, mainly as L2, in many cases, is acquired as a foreign language. However, one of the proposed solutions could be to select participants with an L2 that was acquired simultaneously with L1 from an early age. An example of such a jurisdiction is afforded by Switzerland, whose residents are formally instructed in two languages (such as Swiss-German and French) from an early age. To investigate this phenomenon, it is preferable to recruit participants who have received formal academic instruction in their L2. Such participants will have both explicit and implicit linguistic knowledge (ILK, ELK) in their L2. This will ensure participants' L2 linguistic knowledge approximates their L1 proficiency.

One factor that can enhance or prohibit grammatical transfer in TLA is the level of L3 proficiency. If a student has an elementary level of proficiency in L3, they will rely on their previously learned languages when communicating in L3 because students are left without other options. In contrast, when students have a high level of L3 proficiency, they perform better in L3; however, they may still be exposed to both positive and negative grammatical

transfer from their previously learned languages. Hermas (2015) found that a high level of L3 ELK may inhibit positive grammatical transfer from L2 to L3. He also found that a low level of L3 ELK may promote positive grammatical transfer from L2 to L3. Future research addressing negative and positive grammatical transfer from L1/L2 to L3 in cases where participants' level of proficiency in L3 varies (low/intermediate/high) is needed. This will help to illustrate the influence of L3 level of proficiency on grammatical transfer in TLA.

Garcia Mayo and Slabakova (2015) argued that in specific cases, trilinguals are more exposed to grammatical transfer than bilinguals. This is because in TLA, there are two potential sources of transfer (L1 and L2) in contrast to one possible source (L1) in the case of Second Language Acquisition (SLA). In their study, three groups were recruited: two groups of trilingual participants and one group of bilingual participants. They examined the amount of negative grammatical transfer between trilingual groups (A and B), on the one hand, and bilingual groups (C), on the other. The results demonstrated that participants of Groups A and B were more subjected to negative grammatical transfer than participants of Group C. Their research suggested that the amount of negative grammatical transfer in the process of learning a new language might depend on the number of previously learned languages. This is true in cases where typological dissimilarities across related language and L3 apply. These results provided further evidence that the discipline of TLA should be investigated independently and not considered similar to SLA. Slabakova and Mayo (2015) suggested that future research should investigate this in the context of positive grammatical transfer in TLA.

Another point that this review discussed concerns the nature of grammatical transfer in TLA: explicit (conscious) and implicit (unconscious) phenomena. Falk et al. (2015) argued that the nature of a positive grammatical transfer is explicit. They believe that participants, in most cases, are self-determined and conscious in selecting grammatical rules from previously learned languages (L1 and L2). Participants consciously use the selected rules from previously

learned languages (L1 and L2) in their L3 grammatical production. Falk et al. (2015) suggested that participants' level of L1 ELK (linguistic factor) is a critical factor that influences grammatical transfer in TLA. Their study recruited two groups of participants who only differed in terms of their L1 level of ELK. They found that the group with a high level of L1 ELK generated a more significant amount of positive grammatical transfer from L1 to L3.

Contradictory to Falk et al.'s (2015) hypothesis that grammatical transfer is an explicit phenomenon, Flynn et al. (2004) argued that negative grammatical transfer in TLA can also occur implicitly. This can be examined if one can find evidence of the occurrence of grammatical transfer from L1 to L3 among trilingual children (before the age of maturity). This is because children's knowledge of their L1 is mainly implicit, resulting from early implicit learning. Flynn et al. (2004) recruited two groups of participants comprising participants belonging to different age groups. The only variable that differed among the participants was age (individual factor).

Group A consisted of adults (N = 33) aged over 18. Group B consisted of children (N = 30) aged between 10 and 12. The researcher found that negative grammatical transfer from L1 to L3 may occur more frequently among young learners than among older learners. Flynn et al. (2004) argued that the study results did not only reflect the effect of age on grammatical transfer in TLA (individual factor) but also proved that grammatical transfer could occur implicitly. This is because the participants in his study were children. One of the critical issues concerning this claim was that the participants of Group B (children) had only ILK of L1. For this group, participants' age varied between 10 and 12. Participants were school students exposed to L1 instructed teaching (explicit learning) and most likely developed certain ELK in their L1.

It is worth noting that Ellis et al. (2009) operationalized these two types of knowledge (ILK vs ELK). Furthermore, they designed the Untimed Grammaticality Judgment Test

(UGJT) and the Metalinguistic Knowledge Test (MKT) to measure students' grammatical ELK of L2/L3. They also created The Oral Imitated Test (OEIT) and Timed Grammatical Judgment Test (TGJT) to measure students' grammatical ILK of L2/L3.

To examine grammatical transfer in TLA, one must consider the two factors leading to the development of learners' L3 linguistic knowledge. The first factor is exposure to L3 grammatical linguistic input. The second factor is the positive grammatical transfer resulting from the common grammatical features between previously learned languages and the L3. Therefore, any claim of positive grammatical transfer influencing L3 proficiency must be carefully validated, as linguistic input also influences linguistic performance. In this review, most studies that examined positive grammatical transfer relied on post-study interviews, where participants declared that their usage of L3 grammatical rules was based on grammatical transfer from a previously learned language. The accuracy of a post-study interview is constrained by the limited ability of a participant to fully recall the causation determining the formation of their answers. Secondly, it has been well documented that processing the embedded structure of language input is largely implicit. This implies that learners will hardly be aware of any conscious transfer. One of the methods that could be useful in examining positive grammatical transfer in TLA is comparing the linguistic production of two groups pertaining to a specific grammatical rule: one group with an L3 that matches L1 and L2 in the examined grammatical rules and another group with L1 and L2 that are grammatically different from L3 pertaining to the examined grammatical rules. If participants of the first group perform better than the participants of the second group, this may indicate that positive transfer has occurred in the L3 grammatical production among participants of the first group. However, a participant's linguistic performance, in this case, is a result of both syntax transfer and L3 language input.

This chapter discussed factors that influence grammatical transfer in TLA. Any future research conducted to evaluate any potential source of grammatical transfer in TLA must isolate all the factors presented in this chapter. For instance, to assess participants' attentional control ability (individual factors) on grammatical transfer in TLA, all other factors should be held steady: linguistic (such as typology), individual (such as learners' attention control ability and age), psycho-linguistic (such as psychotypology and the learners' awareness of cognates), and other factors (such as L2 type and amount of instruction).

### **3.8 Chapter summary.**

As a general statement, and with regard to positive grammatical transfer in TLA, this review showed that typological similarity is the main generator of positive grammatical transfer from L1 and L2 into L3 (Garcia Mayo & Slabakova, 2015; Rothman, 2010). It was found that when L1, L2, and L3 are equally proximate, it is the L2 that has the primary influence on positive grammatical transfer in TLA (Bardel & Falk, 2007; Falk & Bardel, 2011). Some of the studies reviewed by this chapter discussed the interaction across related languages (L1, L2, L3) and their impact on grammatical transfer in TLA. In summary, and concerning this interaction, it was found that a low level of L3 ELK may promote positive grammatical transfer from L1 and L2 into L3 (Hermas, 2015). This transfer occurs more frequently when participants have a high level of L1 and L2 ELK (Peric & Novak Mijic, 2017). Furthermore this review also found that a high level of L3 ELK may inhibit positive grammatical transfer from a previously learned language (L1, L2) (Hermas, 2015).

This review provided readers with some additional suggestions pertaining to grammatical transfer in TLA. As each suggestion is supported by one study, the absolute validity of these suggestions can be subjected to further examination. These suggestions

include two major points. Firstly, L3 adult learners are more aware of, and can exploit, typological similarities between L2 and L3 whereas children may count more on their L1 as a source of positive grammatical transfer into L3 (Flynn et al., 2004). Secondly, positive grammatical transfer from L1 and L2 into L3 does not only depend on actual typological similarity between L2 to L3 but can also be influenced by a learner's perception of their similarity (Rothman, 2010).

Claims of negative grammatical transfer are less contentious as these are more readily observed to be the outcome of grammatical transfer as opposed to linguistic instruction. However, when examining the impact of one specific factor (e.g., age) on grammatical transfer in TLA, researchers must hold all other potential influential factors steady (e.g., L3 proficiency, L2 exposure). As a general statement this review showed that in TLA the typological dissimilarity across related languages is the main factor causing negative grammatical transfer from L1 and L2 into L3. However, it was also found when L1, L2, and L3 are equally proximate, it is the L2 that has the primary influence on negative grammatical transfer in TLA (Bardel & Falk, 2007). Some of the studies this chapter examined interaction across related languages (L1 & L2 & L3) and the impact of this on grammatical transfer in TLA. In summary, these studies found that a low or intermediate level of L3 proficiency may promote negative grammatical transfer from a previously learned language. They also found that this transfer mainly occurred when participants had a high level of proficiency in their L1 and L2 (Bardel & Falk, 2007; Falk & Bardel, 2011).

This review provided readers with some additional suggestions pertaining to negative grammatical transfer in TLA. As these suggestions are only supported by one research finding further examinations on these subjects are required. These suggestions included three main points. Firstly, it was found that early L3 learning (age < 10 years), with a considerable amount of L3 instruction, will only moderately inhibit negative grammatical transfer from L1 and L2

into L3 as confirmed by Pfenninger and Singleton (2016). Secondly this review also found that a high attention control ability in L3 learners may allow learners to inhibit negative grammatical transfer from L2 into L3 (Sánchez & Bardel, 2016). Finally it was found that in TLA, an increase in the amount of L2 exposure, through instruction of general and academic L2, may increase the rate of negative grammatical transfer from L2 into L3 (Stadt et al., 2018)

## Chapter 4. Lexical transfer in third language acquisition (TLA)

### 4.1 Introduction

Language transfer can take place when there is evidence that the linguistic features of one language influence the linguistic features of other languages (Ellis, 2015). In Third Language Acquisition (TLA) when L1 and L2 are typologically similar to L3 there is a large amount of both positive and negative lexical transfer from L1 and L2 lexicon into L3. By contrast, typological dissimilarity between L1 and L2 with L3 will only result in a minor amount of positive and negative lexical transfer from L1 and L2 to L3 (Herwig, 2001). Herwig proposed a component structure for lexical cross-language activation in TLA. This structure consisted of three lexico-semantic networks and three lexico-formal networks for each language. The basis of lexical cross-language activation in trilingualism lies “in three sets of associations within each representational level and a third one connecting the two levels.” (Herwig, 2001, p. 119). For instance the lexico-semantic network of an L3 learner of English (with L1 French and L2 Spanish) is not only interconnected with itself but also with the French and Spanish lexico-semantic networks.

The lexico-semantic networks organise and process words according to their conceptual similarity. Lexico-semantic transfer comprises mainly clagues and semantic extensions. The commonality of these three categories is that they show transfer of meaning rather than of form. The lexico-formal networks organise and process words according to their phonological, orthographical and morphographical resemblance. Lexico-formal transfer mainly comprises language switches, deceptive cognates and true cognates. The three categories are single lexical items that show transfer of form not meaning (Ringbom, 1987).

An explicit definition of the five aforementioned categories is provided in the following paragraph. This is followed by a comprehensive description of the directionality of lexical transfer in TLA . The discussion continues with an illustration of the factors influencing lexical transfer in TLA. This chapter concludes with a summary of the factors influencing lexical transfer in TLA

## 4.2 Definition of technical terms

This section defines a number of technical terms relating to different aspects of language transfer. The definition of terms is included in Tables 4.1 and 4.2 .

**Table 4.1**

*Lexical Transfer of Form*

Lexical transfer of form	Type of lexical transfer.	Underlying cause
Language switches	Negative lexical transfer of form	Language switches occur when the L3 learner incorrectly uses a word/s from their L1 or L2 while processing words in their L3. The L3 learner uses word/s from their L1 or L2 lexicon because he/she is not aware of its equivalent meaning in L3. A language switch can occur from either L1 or L2 to L3. For example, a Finnish student learning L3 English might substitute the English word “jam” with the Finnish word “hillo”, uttering the following sentence in L3: “The hillo was hidden in the cupboard”.

Deceptive cognates	Negative lexical transfer of form	Deceptive cognates occur when a learner is processing words in their L3 that are phonologically and orthographically similar but semantically dissimilar to words from their L1 and L2 lexicon. For example, a Swedish learner of L3 English may use the Swedish word “eventuellt” (meaning “possibly”) as a false cognate of the English word “eventually”.
True cognates	Positive lexical transfer of form	True cognates occur when a learner is processing words in their L3 that are phonologically, orthographically and semantically similar to words from their L1 and L2 lexicon. For example, the word “construction” is a French-English true cognate word, which is orthographically identical in both languages and somewhat similar phonologically.

**Table 4.2***Lexical Transfer of Meaning*

Lexical transfer of meaning	Type of lexical transfer.	Underlying cause
Claques	Negative lexical transfer of meaning	Claques occur when L3 learners have an awareness of existing L3 lexicon but not of the relevant semantic collocational restrictions. It mainly occurs when translating figurative language (e.g., idioms, phrasal verbs from a source language (L1/L2) to a target language (L3). This occurs when L3 learners use the Word for Word translation strategy. For instance, the correct translation of the Swedish idiom “Visa var skåpet ska stå” is “Show someone how things must be done properly”. This correct translation is the result of translation of meaning. However, the claque would be “Show where the closet or cupboard is going to stand”. This is an example of a Word for Word translation resulting in a loss of meaning

Semantic extension	Negative lexical transfer of meaning	Semantic extensions occur when L3 learners are aware of the form of a word in their L3 lexicon but are unaware of the semantic restriction applying to its use. For example, the Finnish word “kieli” means both “tongue” and “language”. A Learner of L3 English with L1 or L2 Finnish who is unaware of the semantic restriction can mistranslate this word when they give less attention to the context.
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### 4.3 Directionality of lexical transfer in TLA

Lexical transfer in TLA can occur in two ways. Forward lexical transfer is a transfer from first language acquired (L1) or second language learned (L2) to the third language learned (L3). Reverse lexical transfer is a transfer from the newest language(s) learned to the oldest language learned. When both of these types of lexical transfer occur, this is known as multidirectional transfer (Boratyńska-Sumara, 2014). Multidirectional transfer “can be applied to languages that perform the function of both source and recipient languages simultaneously” (Jarvis & Pavlenko, 2008, p. 22). The vast majority of researchers in TLA have mainly investigated forward lexical transfer. More emphasis is placed on forward lexical transfer due to its potential to assist in learning a new language by making use of a learner’s existing L1 and L2 lexicon to assist with the development of their L3 lexicon (Boratyńska-Sumara, 2014).

### 4.4 Factors influencing lexical transfer in TLA.

Ellis (2015) illustrated the factors that influence both lexical and grammatical transfer from L1 to L2. This section applies his framework to show the factors that influence lexical transfer in TLA in cases of transfer from L1 and L2 to L3. The lexical transfer in TLA is influenced by the following five factors: linguistic, psycho-linguistic, contextual,

developmental and individual (Angelis, 2005; Bardel & Lindqvist, 2006; De Angelis & Selinker, 2001; Dewaele, 2001; Ecke, 2001; Gibson et al., 2001; Hammarberg, 2001; Herwig, 2001; Meyer, 1910; Mulík et al., 2018; Ringbom, 2001a)

#### ***4.4.1 Linguistic Factors***

These factors relate to the language features of both native and target language (Ellis, 2015). Evidence was found that phonological and orthographical factors as well as language distance can influence lexical transfer in TLA.

**Phonological and orthographical similarity.** The mental lexicon of a learner contains information about all of the lexical items (words) that a speaker knows, including their orthographic, phonological and conceptual representations (Aitchison, 2003). The lexicon of a trilingual person comprises mental representations of words from all three languages (L1, L2 and L3) (Mulík et al., 2018). Empirical evidence suggests that bilinguals activate phonologically and orthographically similar words “from their L1 while processing words in their L2” (Mulík et al., 2018, p. 2). Similarly, trilinguals activate words from L1 or L2 while processing words in their L3.

Mulík et al. (2018) suggested that “the visual or auditory presentation of a word can lead to the parallel activation of orthographic and phonological representations” across the three languages of a trilingual learner (L1, L2, L3) (p. 13). The orthographical transfer across languages is activated by reading (sight stimuli). The orthographical transfer is mainly examined through translation tasks from L1/L2 to L3 (sight stimuli). The phonological transfer is examined via Word Recognition Tests (WRT) (voice stimuli). (Dimitropoulou et al., 2011; Lemhöfer et al., 2008; Mulík et al., 2018). Activation of L1 or L2 words in L3 word processing

depends on the degree to which the L1 or L2 words are phonologically and orthographically similar to the L3 words. The lexical transfer from L1 or L2 to L3 therefore is not random but systematic (Lemhofer et al., 2004; Lemhöfer & Dijkstra, 2004; Mulík et al., 2018; Papagno & Vallar, 1995; Pinto, 2013). For instance L3 English learners with L1 Arabic and L2 French may activate the French word “accident” when learning the English word “accident”. The word “accident” is a French-English true cognate word that is phonologically and orthographically similar to its English pair “accident” and has the same semantic meaning in both languages. In TLA, negative lexical transfer can also occur. Negative lexical transfer occurs in TLA when learners activate words from L1 or L2 which are orthographically and phonologically similar to words in their L3 lexicon, but dissimilar semantically (Marian et al., 2003; Weber & Cutler, 2004). For instance, L3 English learners with L1 Arabic and L2 French may activate the French word “nid” (silent D) (nest) when hearing the English word “knee”. Both words are phonologically similar but semantically dissimilar.

Mulík et al. (2018) examined the extent to which L1 and L2 activation in L3 lexical learning depends on the phonological and orthographical similarity across languages. They further examined the extent to which L2 activation in the L3 lexicon depends on the L2 level of proficiency. Mulík et al. (2018) recruited 35 Spanish students with L1 Spanish and L2 English learning L3 Slovak. Participants were divided into two subgroups. Group A had advanced L2 English proficiency. Group B had low L2 English proficiency. In this study, participants encountered L3 Slovak for the first time in their life. Mulík et al. (2018) used “120 Slovak words which pertained to four experimental conditions (word types) as a function of their phonological and orthographical similarity with English and Spanish: 30 Spanish false cognates with 30 matched control words (true cognates), and 30 English false cognates with 30 matched control words (true cognates)” (Mulík et al., 2018, p. 5). Participants were set three tasks. The stimuli were comprised of two lists of sixty words each (List A and List B) (Mulík

et al., 2018). List A was used in the first and the third task, and List B was used in the second task. Both lists contained all four subcategories (Spanish false cognates, Spanish true cognates, English false cognates, and English true cognates). Every subcategory was represented by 15 words. It is notable that despite the intention of the researchers to examine L1 and L2 positive and negative lexical transfer to L3, the design of the tests inadvertently favoured the positive and negative lexical transfer from L1 Spanish to L3 Slovakian among all groups.

Task One was the Paired- Associate Learning Task (Mulík et al., 2018). This task was computerised and was composed of three phases. In Phase One, a blank screen with a fixated point in the middle (“x” symbol) appeared for 500 ms. In Phase Two, a Slovakian word was presented in the middle of the screen for 3000 ms. The Slovakian word was accompanied with an auditory stimuli, presented twice. The auditory stimuli represented the Spanish equivalent word of the Slovak word. The auditory stimuli was presented twice, at 0ms and at 1500ms after the onset of the written translation. In the last phase a blank screen appeared again for 1500 ms as an “inter-trial interval (ITI)” (Mulík et al., 2018, p. 8) and a new trial began (see Figure 1 below). Participants were asked to learn the presented Slovakian words. A total of 60 Slovakian words were randomly presented twice (Mulík et al., 2018). Task one presented all words in L1 Spanish and no words were presented in English. The second task was the Translation Recognition and Decision Task (TRDC). A total of “60 word-pairs were presented in randomized order, one pair at a time” (Mulík et al., 2018, p. 8). This task involved four phases. In Phase One, a blank screen with a fixated point in the middle (“x” symbol) appeared for 500 ms. In Phase Two, the visual stimuli (Slovakian word) was presented simultaneously with the auditory stimuli (Spanish word). The Slovakian words remained in the middle of the screen for 5000ms. In the last phase, a blank screen appeared again for 1500 ms and a new trial began. In the last phase participants were asked to decide as quickly as possible if the Spanish translation was accurate by pressing a designated button. “After each participant’s response,

the correct translation was shown in green along with a message in Spanish indicating whether the answer was correct or incorrect (“Muy bien!” “Well done!” or “Te equivocaste!” “Wrong answer! ”) ” (Mulík et al., 2018, p. 9) . The third task was a Slovak-to-Spanish translation task. The 60 auditory Slovak words from the first task were presented one-by-one. Participants were asked to translate these words into Spanish. They presented their answers on a paper sheet. (Mulík et al., 2018).

Mulík et al. (2018) reported that in all tasks, Spanish participants, in their L3 processing, activated lexical knowledge from both L1 Spanish and L2 English during the novel L3 Slovak word learning (task 1), recognition (task 2) and translation (task 3) . The Spanish and English true cognate words played an equally important role in helping the participants learn their L3 Slovakian pairs (positive lexical transfer). Moreover, the Spanish and English false cognate had a negative facilitative effect in the activation of the L3 lexicon. However, the L2 low-proficiency group had a higher rate of false cognates transferred from L1 than L2 into L3 (Mulík et al., 2018). Participants with high-proficiency L2 were less subject to negative transfer from L2 false cognates. In summary, these findings suggested that in TLA both positive and negative lexical transfer can occur from both L1 and L2 during novel L3 word learning. However, there was mainly negative lexical transfer from the less dominant L2 (Mulík et al., 2018).

To conclude, this section suggests that in TLA L3 learners activate words from their L1 or L2 depending on their phonological and orthographical similarity to the L3 processed word. The activation does not occur randomly; rather it occurs systematically from the L1 or L2 words that are the most phonologically and orthographically similar to the L3 processed word. Phonological transfer and orthographical transfer can be positive (e.g; true cognates) or negative (e.g; false cognates).

**Language distance.** A number of studies in the field of TLA have demonstrated that language distance (typological closeness) between related languages (L1, L2, L3) is one of the main factors influencing lexical transfer in L3 learning (Llama et al., 2010; Möhle, 1989; Odlin & Jarvis, 2004; Ringbom, 1987, 2001a). This section will investigate the role of language distance in the transfer of lexicon in TLA.

Odlin and Jarvis (2004) examined whether trilinguals activate lexical knowledge from their L2 during L3 word processing and whether the extent of lexical transfer is proportional to the degree of language proximity between L2 and L3. They recruited two groups of participants. Group A consisted of 140 Finnish students with L1 Finnish, L2 English and L3 Swedish. Group B consisted of 70 Swedish students with L1 Swedish, L2 English and L3 Finnish. The participants' level of L3 was intermediate as determined by six months of instructed L3 learning. Speakers had been learning L2 English for a period of three to seven years. Participants were aged between 11 and 16 years. Participants were asked to view a Charlie Chaplin silent movie. After they had finished watching this film, they were required to provide a written description of the scenes in their respective L3. Odlin and Jarvis (2004) examined participants' use of the Finnish and Swedish equivalent words of "instead", "for", "some" and "what" in their transcripts. The rationale was that these four English words only have true cognates with Swedish. As Finnish is an unrelated language it does not have any true cognates with English. This is because English and Swedish are both members of the Indo-European language family whereas Finnish belongs to the Finno-Ugrian language family. On this basis both positive and negative transfer of these cognate words could be traced. The participants in Group A correctly used the Swedish equivalents of the words "instead", "for", "some" and "what" (English / Swedish true cognates). The positive lexical transfer from L2 English to L3 Swedish occurred due to the typological similarity between these two languages. The participants in Group B found it difficult to find the Finnish equivalents of the words

“instead”, “for”, “some” and “what”. There was no lexical transfer from L2 English to L3 Finnish. This is due to the typological dissimilarity between these two languages. Based on this research Odlin and Jarvis (2004) concluded that lexical transfer from L2 into L3 only occurs when L2 and L3 are typologically similar. However there can be no lexical transfer when the L2 and L3 languages are unrelated.

Ringbom (2001a) examined whether trilinguals activate lexical knowledge from their L1 and L2 during L3 word processing and whether the extent of lexical transfer is proportional to the degree of language proximity between L1 and L2 with L3. He investigated negative lexical transfer of form and negative lexical transfer of meaning from L1 Finnish and L2 Swedish into L3 English. Participants in this study formed two groups. The first group consisted of 577 students with L1 Finnish, L2 Swedish and L3 English. The second group consisted of 577 students with L1 Swedish, L2 Finnish, and L3 English. All students were aged between 16 and 17 and had studied English for at least seven years in grammar school. All participants had high L2 proficiency. L2 had been taught in their schools since they were 8 years of age. Participants were asked to translate 61 words from both their L1 and L2 into their L3. Half of the words were from their L1 and half from their L2. Words were presented in an English sentence (e.g., I am building my <HUS> (Hus is house in Swedish)). Results showed that there was a less negative lexical transfer of meaning and form from L1 Finnish to L3 English (582 errors) than from L1 Swedish to L3 English (649 errors). Results suggested that negative lexical transfer of form and meaning from L1 to L3 is more likely to occur when L1 is typologically similar to L3. Results also showed that negative lexical transfer of meaning and form from L2 Finnish to L3 English included 21 errors. This was less than that from L2 Swedish to L3 English which included 164 errors. Ringbom (2001a) suggested that negative lexical transfer occurs from both L1 and L2 to L3. The language (L1 or L2) that is the most typologically similar to L3 will be the main source of negative and positive lexical transfer. However he

further postulated that if L1 and L2 are typologically similar to L3, L1 is the main source of both negative and positive lexical transfer.

Angelis' (2005) study also provided evidence concerning the influence of typological similarity on lexical transfer in TLA across related languages. Angelis (2005) recruited 108 participants. Participants formed the following four groups:

- Group A had English as an L1 and Spanish as an L2 (n=37).
- Group B had English as an (L1) and French as (L2) (n=17).
- Group C had Spanish as L1 and English as L2 (n=45).
- Group D had English as L1 and French as L2 (n=9).

All participants had Italian as L3, as they were enrolled in a 1st year Italian language course. Groups A and B studied at the University of Pittsburgh and Group C and D studied at the University of Puerto Rico. Participants were asked to read a paragraph in their L1 and to write a summary about it in Italian (L3). They were not permitted to use dictionaries.

The following results were obtained with respect to the lexical transfer of function words and content words. In Group A (L1 English, L2 French), the occurrences of lexical transfer from L1 English to L3 Italian was (n=30). The occurrence of lexical transfer from L2 English to L3 Italian was (n= 21). These results showed that when both L1 and L2 are typologically similar to L3 L1 is the main source of lexical transfer into L3.

For Group B (L1 English, L2 Spanish), the number of occurrences of lexical transfer from L1 English to L3 Italian was (n= 87). The number of occurrences of lexical transfer of L2 Spanish to L3 Italian was null (n= 103). These results showed L2 was a greater source of Lexical transfer because Spanish is more typologically similar to Italian than English.

For Group C (L1 Spanish, L2 English), the occurrence of lexical transfer from L1 Spanish to L3 Italian was (n= 263). However, there was hardly any lexical transfer from L2 English to L3 Italian which was (n=5). Group C results showed that L1 (Spanish) was the main source of lexical transfer into L3 Italian. Angelis (2005) provided an explanation accounting for the small amount of lexical transfer from L2 English into L3 Italian. He suggested that the low occurrence of lexical transfer could be due to students' perspectives that English and Italian are typologically dissimilar.

In Group D (L1 Spanish, L2 French), the occurrences of lexical transfer from L1 Spanish to L3 Italian was (n=28). The occurrence of lexical transfer from L2 French to L3 Italian was (n= 22). This result showed that when both L1 and L2 are typologically similar to L3, L1 is the main source of lexical transfer into L3.

More recently Peric and Novak Mijic (2017) examined whether trilinguals activate lexical knowledge from their L1 and L2 during L3 word processing and whether the amount of lexical transfer is positively correlated with language proximity between L1 and L2 with L3. They investigated negative lexical transfer of form and negative lexical transfer of meaning from L1 Croatian and L2 English into L3 Spanish. Lexical transfer of form included false cognates, coinage and code switching. Lexical transfer of meaning included clagues and semantic extension. In their study sixty participants were recruited. They formed two groups. Group A (n=30) were second year college students. Group B (n=30) were third year college students. Participants were learning Spanish L3 in the American College of Management and Technology in Croatia. All participants had L1 Croatian, L2 English (high proficiency level) and L3 Spanish. Participants were required to write a text of 200 words in their L3 within a time limit of 100 minutes. They were asked to write about any topic they wanted.

In the case of both Group A and Group B there was more negative lexical transfer from L2 English than L1 Croatian into L3 Spanish. This was because English is more typologically similar to Spanish than Croatian. For instance, For Group A, negative lexical transfer of form from L1 Croatian to L3 Spanish included code switching (41 errors), coinage (2 errors) and false cognates (zero errors.). Negative lexical transfer of form from L2 English to L3 Spanish comprised code switching (141 errors), coinage (96 errors) and false cognates (34 errors). In conclusion, there were more cases of negative lexical transfer of form from L2 English to L3 Spanish (271 errors) than from L1 Croatian to L3 Spanish (43 errors). This result mainly occurred because Spanish is more typologically similar to English than to Croatian (Peric & Novak Mijic, 2017). Negative lexical transfer of meaning from L1 Croatian to L3 Spanish included semantic extension (3 errors) and clagues (26 errors). Negative lexical transfer of meaning from L2 English to L3 Spanish included semantic extension (20 errors) and clagues (47 errors). In conclusion, there were more cases of negative lexical transfer of meaning from L2 English to L3 Spanish (67 errors) than from L1 Croatian to L3 Spanish (29 errors). This result mainly occurred because Spanish is more typologically similar to English than to Croatian. The results for Group B demonstrated the same point (Peric & Novak Mijic, 2017).

Hamdani (2021) investigated the effect of typological similarities on lexical transfer in TLA. She recruited 14 participants who were majoring in English at the Higher Institute of Human Sciences in Medenine, Tunisia. Participants had L1 Arabic, L2 French and L3 English. Arabic is the native language of Tunisia and the main language of instruction in the Tunisian schools. French is introduced from Grade three as a first foreign language, and English from Grade six. Foreign languages (French and English) are taught for three sessions per week; each session lasts 45 minutes.

Hamdani (2021) employed the Synonym Provision Task (SPT). In this study the SPT is composed of 35 English sentences. Each sentence has one underlined word. Participants

were requested to provide a synonym in English for these underlined words. The underlined words in these 35 sentences permit both negative and positive lexical transfer from Arabic and French into English.

To examine positive lexical transfer from Arabic into English 10 sentences were selected with 10 underlined words (one underlined word per sentence). Providing synonyms to these words permits the selection of words that belong to the category of Arabic -English true cognate words. The following example will illustrate the case:

- The word “germs” in the sentence “A person has to clean the germs from his hand” has an Arabic-English true cognate word as synonym (i.e., bacterium بكتيريا).

To examine negative lexical transfer from Arabic into English six sentences were selected with six underlined words (one underlined word per sentence). Providing synonyms to these words can permit wrong answering by choosing false Arabic-English cognate words. The following example will illustrate the case:

- An Arabic speaker can give a synonym “mar” to the word “bitter” in the following sentence “Raw blueberries have a bitter taste”. This is because the word “مر /mor”, which means bitter in Arabic sounds like the English word “mar” and is in this case an Arabic-English false cognate word. The English word “mar” means spoiling something.

To examine positive lexical transfer from French into English 10 sentences were selected with 10 underlined words (one underlined word per sentence). Providing synonyms to these words permits the selection of lexis that belongs to the category of French-English true cognate words. The following example will illustrate the case:

- The word “disaster” in the sentence “Humanity should overcome any disaster” has catastrophe as a true synonym. The word catastrophe is a French-English true cognate word that means disaster in both French and English.

To examine negative lexical transfer from French into English, six sentences were selected with six underlined words (one underlined word per sentence). Providing synonyms to these words can permit wrong answering by choosing French-English false cognate words. The following example illustrates the case:

- A French speaker can give a wrong synonym (i.e., “bless”) to the word “hurt” in the following sentence “The child’s wound can hurt”. The French word “blesser” means hurt and is a false cognate word to the English words “to bless” that means to grace.

Hamdani (2021) predicted that the amount of lexical transfer from French into English will surpass the amount of lexical transfer from Arabic into English. This is because French and English are typologically close while Arabic and English are typologically distant. Results showed that only 22.22% of the answers provided belong to the categories of Arabic-English or French-English cognate words (true and false). Concerning lexical transfer from Arabic into English in participants’ answers, results showed that 36 answers reflected on positive lexical transfer from Arabic into English (i.e., Arabic-English true cognate words), but there were no incidents of negative lexical transfer from Arabic into English (i.e., Arabic-English false cognate words). Concerning lexical transfer from French into English in participants’ answers, results reported that 24 answers were reflective of positive lexical transfer from French into English (i.e., French-English true cognate words) and there were six instances of negative lexical transfer from French into English (i.e., French-English false cognate words).

Overall the results of Hamdani's (2021) study showed that transfer from Arabic into English was more evident than transfer from French into English. This occurred despite the fact that French is typologically similar to English while Arabic is a non-Indo-European language unrelated to English. However, the difference in the amount of transfer from Arabic into English, and from French into English, was not statistically significant ( $P > 0.05$ ). As this study did not provide participants' proficiency in the French language, one can speculate that perhaps a low level of French proficiency, and a high level of Arabic proficiency, being the native language of participants, made participants borrow words from Arabic more than French when providing their answers.

In a nutshell, a number of studies suggest that both positive and negative lexical transfer from L1 to L3 are more likely to occur when L1 and L3 are typologically similar. Similarly, both positive and negative lexical transfer from L2 into L3 are also more likely to occur when L2 and L3 are typologically similar. When L1 and L2 are relatively equally linguistically proximate to L3, there is always a greater degree of lexical transfer from L1 into L3 (Odlin & Jarvis, 2004; Peric & Mijic, 2017; Ringbom, 2001).

**Morphological similarity.** Lexical transfer between languages includes transfer of similar morphemes across relative languages (Weinreich, 1953). For example, the lexical unit “bas” is a common morpheme across these 4 languages: basic (English), básico (Spanish), de base (French), di base (Italian). This section investigates the effect of morphological similarity between related languages on the amount of lexical transfer in TLA.

De Angelis and Selinker (2001) undertook a qualitative study in which they investigated morphological interlanguage transfer from L1 (French or English) and L2 (English or Spanish) into L3/L4 Italian lexical production. They investigated the correlation between morphological lexical transfer and degree of linguistic similarity across these related

languages. Morphological interlanguage transfer is “the production of inter-language forms in which a free or bound non-target morpheme is mixed with a different free or bound target morpheme to form an approximated target language word” (De Angelis & Selinker, 2001, p. 43). An example of morphological interlanguage transfer is the lexical unit “bas” in: abbastante (Catalan), bastante (Spanish), abbastanza (Italian). These words mean “sufficient” in English. De Angelis and Selinker (2001) recruited two participants. The first participant (P1) was a 50-year-old French-Canadian female with (L1 French) and three acquired languages (L2 English, L3 Spanish, and L4 Italian). She lived for 35 years in predominantly English-speaking countries and received instruction in Spanish for over 5 years. She spent a total of six months in Spanish-speaking countries (3 months in Mexico, 3 months in Spain). Participant Two (P2) was a 45-year-old British man (L1 English) with two acquired languages (L2 Spanish and L3 Italian). He received 5 months intensive formal instruction in Spanish before moving to and living in Chile for three and a half years. Both participants first studied Italian for 2 years during high school and were enrolled in an Italian language course again for 1 week prior to the commencement of study (De Angelis & Selinker, 2001).

Both participants first attended an interview with a native Italian interviewer. After six months, a second interview was held. During this time, participants had no exposure to Italian nor did they travel to Italy. De Angelis and Selinker (2001) aimed to provide evidence of lexical transfer in L3 production in two different settings.

*For P1 it was the following:*

- 1) She was asked whether she was familiar with a list of English words which were read aloud to her one at a time. She was asked to answer with either “Yes” or “No”.
- 2) She was asked to translate the same English words to Italian. The words were read aloud to her in English one by one. A translation was requested after hearing each word.

3) She was asked whether she had ever heard the Italian target words. The correct target words were read aloud to her one at a time. She was asked to answer either “Yes” or “No”.

*For P2 the task was as follows:*

1) P2 was recorded 22 times over a five-week period. Prior to each recording, He was tasked with watching the Italian Evening News almost daily, and to then produce an oral report of the events. He was undergoing two hours of daily Italian Language instruction. From week two to week six data were collected. P2 had a harder task because he was a fluent Spanish speaker.

De Angelis and Selinker (2001) provided evidence of morphological interlanguage transfer from L1 (French), L2 (English) and L3 (Spanish) into L4 (Italian) in P1. For P1, the amount of morphological interlanguage transfer was determined by the degree of linguistic similarity across these related languages. Morphological interlanguage transfer occurred in this descending order of significance: L1 French, L3 Spanish and L2 English. For P2, morphological interlanguage transfer also occurred from both L1 (English) and L2 (Spanish) into L3 (Italian). The amount of morphological interlanguage transfer was once again determined by the degree of linguistic similarity across these related languages. Therefore, there was more morphological interlanguage transfer from L2 (Spanish) than from L1 (English) into L3 (Italian).

This section suggests that morphological similarities between L1 and L3 may result in the activation of words from the L1 lexicon while processing the L3 lexicon. Furthermore, morphological similarities between the L2 and L3 lexicon may also result in activation of the L2 lexicon while processing the L3 lexicon. However, morphological lexical transfer from L1 and L2 to L3 may increase in proportion to the proximity of the related languages.

#### ***4.4.2 Individual factors***

Individual differences among learners such as age and attitude influence the likelihood of lexical transfer in SLA (Ellis, 2015). In TLA age is a factor that influences L1/L2 transfer to L3.

**The age of the learner.** In SLA, Ellis (2015) suggested that: “in general, L1 transfer occurs to a greater extent in older than in younger learners. This reflects differences in the extent to which younger and older learners depend on their L1 or on L2 input as a source of data for learning” (p. 137). Ellis’ (2015) suggestion for SLA also applies to TLA. Cenoz (2001) examined the influence of L1 Basque and L2 Spanish on L3 English oral production. She investigated the extent to which age influences lexical transfer in TLA. This was done by comparing “the same group of L3 learners at two different times in their acquisition process” (p.1). Cenoz (2001) recruited 20 students from Year Four (8 years of age). This same group were again recruited when they reached Year Six (10 years of age). Since their birth participants were simultaneously exposed to L1 (Basque) and L2 (Spanish). However, the curriculum subjects were instructed in L1 (Basque), while L2 (Spanish) and L3 (English) were instructed as subjects. Participants received instruction in English and Spanish from the age of four. Participants were asked to look at 24 pictures from the children’s book ‘Frog, where are you?’ written by Mayer (1969). They were then asked to recite the story orally. Answers were audio recorded and transcribed. This study investigated the occurrence of transfer lapses from L1 (Basque) and L2 (Spanish) in the aural production of L3 (English). Transfer lapses are the unintentional use of one or more words from L1 or L2 lexicon in the production of an L3 utterance (Cenoz, 2001). Transfer lapses occur naturally and cannot be detected through specific speaking signs such as marked intonation or hesitation (Cenoz, 2001). They mainly

comprise borrowing and foreignising. Borrowing is “the use of an L1 (or Ln) word without any phonological and/or morphological adaptation and foreignising is the use of words from L1 and L2 lexicon with these adaptations” (Poulisse, 1989, p. 111). Transfer lapses are a form of negative lexical transfer.

Cenoz’s (2001) study also examined the occurrence of interactional strategy from L1 (Basque) and L2 (Spanish) into L3 (English). Interactional strategy occurs when a student mixes words from their L1 and L2 lexicon when speaking in their L3 language. Students were asked to use their L3 language when interacting with their examiner. Interactional strategy is a form of negative lexical transfer (Cenoz, 2001) .

Cenoz (2001) found that older learners (10 years old) made more transfer lapses from both Basque L1 and Spanish L2 to produce L3 English lexicon than younger learners (8 years old). Among older learners the percentage of transfer lapses from L1 Basque to L3 English was  $M= 26.78/ SD= 44.35$  and the percentage of transfer lapses from L2 Spanish to L3 English was  $M= 72.62 / SD= 37.89$ . Among younger learners transfer lapses from L1 Basque to L3 English  $M=14.76, SD= 31.42$ , and the percentage of transfer lapses from L2 Spanish to L3 English, was  $M=67.99/ SD= 41.29$ . Cenoz (2001) also found that older learners (10 years old) made greater use of interactional strategy from both Basque L1 and Spanish L2 to produce L3 lexicon than younger learners (8 years old). Among older learners the percentage of interactional strategy from L1 Basque to L3 English was  $M= 83.89/ SD= 16.48$  and the percentage of interactional strategy from L2 Spanish to L3 English was  $M= 6/ SD=11.09$ . Among younger learners the percentage of interactional strategy from L1 Basque to L3 English was  $M= 80.53/ SD= 27.62$  and the percentage of interactional strategy from L2 Spanish to L3 English was  $M=5.53/ SD= 11.09$ .

These results showed that there is a greater amount of negative transfer from L1 and L2 into L3 among older learners than younger learners. These results contradicted Cenoz’ (2001)

expectation that there will be a lower rate of negative lexical transfer among older learners (10 years old) than younger learners (8 years old). This assumption was premised on the fact that the older learners had two additional years of L3 instruction and therefore had a higher level of L3 proficiency. She proposed an alternative explanation, which tries to account for these counter-intuitive findings by exploring the influence played by age on linguistic behavior. She proposed that, with the increase of age, negative lexical transfer will increase. However, while a tentative conclusion regarding the role of age in negative lexical transfer in TLA might be drawn from this research, it is important to note that this finding has yet to be replicated by other studies. Moreover, the author's methodology can be critiqued inasmuch as the age range between the two groups of learners is relatively small and that students at both stages of learning were below the critical period age. At best it may only speak to age in pre-critical period learners. Although this study points to the effect of age on lexical transfer it does so only in relation to the difference between very young and slightly older children and does not actually address the issue of whether transfer among adults varies in accordance with age.

This section proposes that in the pre-critical period negative lexical transfer from L1 and L2 into L3 may increase systematically with age.

#### ***4.4.3 Contextual factors***

Contextual factors relate to “the nature of the learners’ exposure to the target language” (Ellis, 2015, p. 121). In TLA contextual factors can influence L1 and L2 transfer to L3 lexical production.

**Macro-contextual factors.** The macro-contextual factor refers to context defined in very broad terms as an instructional context versus a naturalistic context. According to Ellis

(2015), the macro-contextual factor mainly concerns the difference between a natural learning setting and a formal classroom setting and their influence on language transfer. He argued that positive language transfer from L1 to L2 may occur in a formal setting such as a classroom ( i.e. in a focused context), whereas negative language transfer from L1 to L2 may occur in a natural setting where learners do not properly distinguish between L1 and L2 (i.e. in an unfocused context).

In TLA, the macro-contextual factor was found to influence lexical transfer. This was evident in the study of Dewaele (2001). He investigated the extent to which a shift in the formality of a situation ( formal vs informal interview) can influence lexical transfer from L1 and L2 into L3. Dewaele (2001) recruited a total of twenty five Dutch participants. Nineteen participants had French as an (L2) and English as an (L3) (Group A). Six participants had English as an (L2) and French as an (L3) (Group B). Their L2 language was taught for five hours per week over six years in primary and secondary school, while their L3 language was taught for three hours per week over four years in secondary school. Dewaele (2001) collected a corpus of French (L2/L3). This corpus resulted from L3 learners participating in two interviews, one being formal and one being informal. The communication language of the interviews was French. The informal interview was a one-on-one conversation set in a casual atmosphere. The discussion topics were informal (hobbies, traveling) and answers were not time pressured. In contrast, the formal interview was a speaking test (oral exam) with a ten-minute time restriction. The topics of discussion were formal (politics, philosophy, and economics) set in a serious atmosphere. Students were told beforehand that their score would depend on linguistic accuracy as well as content. The interviews were recorded, transcribed and analysed. Negative lexical transfer mainly included mixed utterances. Mixed utterances occurs when L3 learners use words from previously learned languages (L1 and L2) when speaking in their L3 language .

Results showed that in the informal interview the amount of mixed utterances made by participants of both groups was higher than that made in the formal interview. A t-test showed a significant “difference ( $t(24)=3.773, p<0.001$ ) between the proportion of mixed utterances in the informal situation ( $M=9\%$ ,  $SD=8.8$ ) and the formal situation ( $M=3\%$ ,  $SD=3.9$ )” (Dewaele, 2001, p. 79). Dewaele (2001) suggested that these results might have occurred because learners in natural settings do not properly distinguish between L1, L2 and L3. Although Dewaele (2001) did not measure the amount of positive lexical transfer from L1 and L2 into L3 for both groups, he did observe that in the formal situation the amount of positive lexical transfer from L1 and L2 to L3 was greater in the formal setting. He suggested that this probably occurred because students in formal settings carefully selected true cognate words from L1 and L2 into their L3 lexical production.

This section suggests that in TLA negative lexical transfer from L1 and L2 into L3 occurs more frequently in informal settings than in formal settings. This is thought to result from learners in natural settings not properly distinguishing between L1, L2 and L3. By contrast, positive lexical transfer from L1 and L2 into L3 occurs more frequently in formal settings than in informal settings because students in formal settings carefully select true cognate words from L1 and L2 into their L3 lexical production.

#### ***4.4.4 Psycholinguistic factors***

These are the factors “relating to the learners’ perceptions about transferability” (Ellis, 2015, p. 121). In a TLA context, this is the transferability of L1/L2 lexical features to L3 lexical production. In TLA, psychotypological similarities across relevant languages constitute a factor that influences lexical transfer in TLA.

**Psychotypological similarities.** This section investigates the role of psychotypology in lexical transfer in TLA. Psychotypology does not refer to the actual similarity or difference between languages, but rather the learner's perception of such similarities or differences (Ellis, 2015).

Bardel and Lindqvist (2006) examined the role of psychotypology in lexical transfer in TLA. In their study they recruited a multilingual participant who was a learner of L3 Italian. The participant's native language was Swedish and she had multiple L2s (English, French and Spanish). Her English and French L2 level of proficiency was advanced, as she studied English for 10 years and French for 8 years. When she participated in this study, she was writing her PhD at Stockholm University on the acquisition of Romance languages in French. Her L2 Spanish Level of proficiency was average as she had only studied Spanish for one year. However, her Spanish was activated in a Spanish language course. Prior to the study the participant also had a basic knowledge of Italian (L3).

Before the beginning of the study, the participant informed the researchers that she was more proficient in English than French. Prior to the study's commencement, the participant had enrolled in an Italian course for 11 weeks in Stockholm University. Data were collected from four recordings which took place on four separate occasions. The first recording was held right before the start of the course. The second occurred two weeks after its onset. The third recording was held directly after the completion of the course and the last recording took place six months after the end of the course. All the recordings involved an interview on a random topic and three retelling tests, one of comic strips and two of mute cartoon videos. Researchers were interested in examining the participant's "word construction" in her L3 Italian. Word construction is the participant's attempt to create Italian words based on the previous learned languages. Word construction phenomena can be detected because it is mainly accompanied with hesitation.

The word construction phenomena can result in the formation of correct L3 words based on the other L2s (positive lexical transfer). For instance, participant used a word in Italian, based on its true cognate counterpart in one or all of her L2s, that she assumed existed in the L3. For instance, the word “doctorant” in Italian has a true cognate in English, Spanish and French (doctorate, doctorante, doctorante respectively). To examine the psychotypological factor, the researchers only looked at instances of correct word construction where there was an equal potential for lexical transfer from all L2s due to the existence of true cognate words in all the L2s. This test was designed to confirm that lexical transfer from L2 languages into L3 is influenced by psycho-typological proximity, as the L3 had true cognate word pairs in all three L2 languages. Hence when a learner favours only one of their three L2 languages for lexical transfer into L3, on the basis that this is most typologically similar to the L3, this is only a perception, as objectively all the L2 languages are equally typologically similar to the L3. After the four recordings took place, an interview with the participant was arranged to understand her choices.

The word construction phenomena can also result in the formation of incorrect L3 words. This occurs when a speaker uses false cognates or the creation of non-existent words based on their L2 lexicon. For instance, in Bardel and Lindqvist (2006), the participant mistakenly uses the French word “lire” (read) or the Spanish words “roda” (read) instead of the Italian word “leggere” (read). The psychotypological factor was believed not only to influence positive lexical transfer (correct constructed words) but also negative lexical transfer. Once learners begin favouring a specific L2 language for positive linguistic transfer, the likelihood of negative lexical transfer from that language increases. The calculation of the rate of constructed words comprised both correct and incorrect constructed words.

Results showed there were no constructed words from Swedish L1 ( $X=0\%$ ). Bardel and Lindqvist (2006) accounted for this result by virtue of the fact that Italian and Swedish are

typologically dissimilar. Results showed that in all the 4 recordings all the constructed Italian words were mainly from French L2 (X=81%) and the percentage of the constructed words based on L2 English was minimal (X=3%). Results also showed that the percentage of the constructed words based on L2 Spanish was null (X=0%). The participant reported using L2 French notwithstanding the fact that Spanish is morphologically closer to Italian (and she knew all the Italian constructed words Spanish true cognates) and her L2 English was more proficient than her L2 Spanish. She also reported that she made negative lexical transfers from her L2 French which were influenced by her decision to count only on her L2 French. Before the commencement of the test, the participant stated that she would draw on her L2 Spanish due to its phonological proximity to Italian. However during the course of the test the participant avoided all lexical transfer from Spanish and English. Hence her perspective of typological similarity between these languages changed before, during and after the test. After the test she stated that if she took the test again she would count on English as this was her most competent L2 Language.

In sum this test was designed to confirm that lexical transfer from L2 languages into L3 is influenced by psycho-typological proximity, as the L3 had true cognate word pairs in all three L2 languages. Hence when a learner favours only one of their three L2 languages for lexical transfer into L3 on the basis that this is most typologically similar to the L3, this is only a perception, as objectively all the L2 languages are equally typologically similar to the L3. However, Bardel and Lindqvist (2006) did not involve self-reported data so arguably it may address more language distances rather than learner's perception on language distance.

This section suggests that positive and negative lexical transfer from L2 to L3 does not only depend on actual typological similarity between L2 to L3, but can also be influenced by a learner's perception of their similarity. This is known as the psychotypological factor.

#### 4.4.5 Other factors

**L2 Level of exposure and proficiency.** This section will investigate the impact of the learner's L2 level of proficiency and amount of L2 linguistic exposure on lexical transfer in TLA.

Tremblay (2006) investigated the effect a learner's L2 level of proficiency, and amount of L2 linguistic exposure, had in determining lexical transfer L2 French to L3 German. Thirteen native English speakers participated in her study. Participants formed three groups. Group A (n=6) had a low L2 level of proficiency and a low amount of L2 exposure. Group B (n=3) had a high level of L2 proficiency but a low amount of L2 exposure. Group C (n=4) had a high level of L2 proficiency with a high amount of L2 exposure. The amount of L2 negative lexical transfer to L3 German in L3 aural production was calculated and results were compared across these three groups. Negative lexical transfer from L2 French included linguistic inventions and language shifts. Participants watched twenty five sets of cartoons forming a sequence of events. These sets formed multiple silent stories. Participants were asked to explicitly describe each story in L3 German (Tremblay, 2006).

Results showed that a high amount of L2 exposure seems to increase the rate of negative lexical transfer from L2 into L3. These results were obtained by comparing the amount of negative lexical transfer between Group B and Group C. Both groups had a high level of L2 proficiency but only Group C participants had a high amount of L2 exposure. Group C had a moderately significantly higher amount of negative lexical transfer than Group B ( $n = 35 \text{ errors} > n = 5 \text{ errors}; p = .003$ ). Tremblay (2006) stated that "L2 exposure seems to influence learners' ability to use their knowledge of L2 in order to overcome lexical difficulties in L3" (p. 109).

By contrast, results showed that the level of L2 proficiency had a minimal effect on the rate of negative lexical transfer from L2 into L3. However "unless a threshold level of L2 proficiency is achieved, cross linguistic influence from L2 into L3 will be very

marginal”(Tremblay, 2006, p. 109) . These results were obtained by comparing the amount of negative lexical transfer between Group A and Group B. Both groups had a low level of L2 exposure but only Group B participants had a high level of L2 proficiency. Group B had a slightly higher amount of negative lexical transfer than Group A. However this amount was statistically insignificant ( $n= 5 \text{ errors} > n=2 \text{ errors}; p= .249$ ).

Tremblay’s study (2006) suggests that in TLA an increase in the amount of L2 exposure increases the rate of negative lexical transfer from L2 into L3. Results showed that unless a threshold level of L2 proficiency is achieved, negative lexical transfer from L2 into L3 will be very minimal.

**L3 Level of proficiency.** The L3 level of proficiency has been found to have a significant impact on lexical transfer across related languages (Celaya, 2006; Fuller, 1999; Hammarberg, 2001; Peric & Novak Mijic, 2017)

In the aforementioned study, Peric and Novak Mijic (2017) also investigated “the relationship between L3 proficiency level and L3 error production” (P, 91). Their study included participants with L1 Croatian, L2 English and L3 Spanish and comprised two groups (Group A and B). Group B participants’ L3 level of proficiency was superior to their colleagues in Group A. Participants in Group B learned L3 Spanish over a total of 240 lessons covering four semesters while Group A participants learned Spanish for a total of 120 lessons over 2 semesters.

Results indicated that lexical transfer of form from both L1 Croatian and L2 English into L3 Spanish, in Group B, was less than in Group A (314 errors < 53 errors). Lexical transfer of form comprises language switches, coinage and false cognates. Results also showed that lexical transfer of meaning from L1 Croatian and L2 English into L3 Spanish

in Group A was less than in Group B (96 errors < 75 errors). Lexical transfer of meaning comprises *claque* and semantic extension. As Group B had a higher level of L3 proficiency than Group A, the results indicated that level of proficiency was an important factor determining the amount of negative lexical transfer from L1 and L2 into L3. Peric and Novak Mijic (2017) stated that “the absolute number of lexical errors decreased as experience with the language increases” (Peric & Novak Mijic, 2017, p. 91). They also observed that positive lexical transfer may decrease systematically as the L3 level of proficiency increases. Participants mainly drew on their L3 lexicon in their L3 lexical production when they reached a high level in their L3 (Peric & Novak Mijic, 2017).

Hammarberg (2001) also investigated the influence of L3 level of proficiency on lexical transfer in TLA across related languages. In his longitudinal study, he recruited a participant named Sarah Williams who had L1 English, L2 German and was a new learner of L3 Swedish. He noticed a change in her linguistic behaviour during the progression of her L3 learning. Her positive and negative lexical transfer from L1 English and L2 German into L3 Swedish varied in accordance with her L3 level of proficiency (intermediate vs advanced). Hammarberg (2001) reported that this learner reduced switching to L1 (English) in her L3 lexical production after 8 months, and reduced switching to L2 (German) after four months. A gradual decrease in switching to L1 was observed during the five years. However, a complete null switch to her L2 (German) was observed after 2.5 years. Sarah Williams’s L2 negative lexical transfer to L3 diminished twice as quickly as her L1 negative lexical transfer to L3. In conclusion, Hammarberg (2001) reported that as Sarah’s L3 level of proficiency increased, her negative lexical transfer of form, from L1 and L2 into L3, decreased (e.g. language switch). Similarly, he observed that her L1 and L2 positive lexical transfer into L3 increased as her L3 level of proficiency improved.

In TLA a high level of L3 proficiency inhibits learners' negative lexical transfer from L1 and L2 into their L3 lexicon. By contrast, it promotes positive lexical transfer from L1 and L2 into L3. When L3 learners achieve a high level of proficiency they mainly count on their L3 lexicon in their L3 lexical production.

#### **4.5 Chapter summary**

This section summarises the key findings from this chapter followed by a few general concluding remarks. This chapter reviewed the results of primary research into lexical transfer in TLA. These studies were mainly conducted in a European context (Bardel & Lindqvist, 2006; De Angelis & Selinker, 2001; Dewaele, 2001; Ecke, 2001; Gibson et al., 2001; Hammarberg, 2001; Herwig, 2001; Mulík et al., 2018; Peric & Novak Mijic, 2017; Ringbom, 2001a). This paper identified a number of factors that might influence lexical transfer in TLA: phonology, orthography, morphology, language distance, age, macro-contextuality, psychotypology, L2 level of proficiency and exposure and L3 level of proficiency. The concluding points below summarise the role of these factors in lexical transfer in TLA.

Concluding points :

- 1) In TLA lexical transfer into L3 can occur from both L1 and L2. The language (L1 or L2) that is the most typologically similar to L3 may be the source of positive and negative lexical transfer into L3. In this sense, typological similarity includes, but is not limited to, phonological, orthographical and morphological similarity between related languages. However, when L1 and L2 are linguistically proximate to L3, there may be a greater degree of lexical transfer from L1 into L3 than from L2.

- 2) In the pre-critical period, negative lexical transfer from L1 and L2 into L3 may increase with age.
- 3) In TLA negative lexical transfer from L1 and L2 into L3 occurs more frequently in informal settings than in formal settings. This is thought to result from learners in natural settings not properly distinguishing between L1, L2 and L3. By contrast, positive lexical transfer from L1 and L2 into L3 occurs more frequently in formal settings than in informal settings . This may be due to students in formal settings carefully selecting true cognate words from L1 and L2 into their L3 lexical production.
- 4) In TLA, an increase in the amount of L2 exposure increases the rate of negative lexical transfer from L2 into L3. Results showed that unless a threshold level of L2 proficiency is achieved, negative lexical transfer from L2 into L3 will be very minimal.
- 5) In TLA, a high level of L3 proficiency inhibits learners' negative lexical transfer from L1 and L2 into their L3 lexicon. By contrast it promotes positive lexical transfer from L1 and L2 into L3. When L3 learners achieve a high level of proficiency they mainly count on their L3 lexicon in their L3 lexical production.

## Chapter 5. Method chapter

### 5.1 Research purpose.

This research investigated both negative and positive lexical and grammatical transfer in Third Language Acquisition (TLA) where the native language L1 is typologically different from the acquired ones (L2/ L3). The Lebanese context, where L1 Arabic, (L2/L3) French, and (L2/L3) English are present in most academic institutions, provided an excellent context for this research. In this study Arabic-speaking learners differ in terms of whether they have acquired English as a second language (L2) or a third language (L3), forming two different groups (B & C). Participants of Group B (n=35) and C (n=35) were third year university students at the Lebanese American University (LAU). A group of third year university students enrolled at Curtin university, all of whom were English native speakers, were also recruited (Group A, n=10). Group A provides a baseline against which the results of other participants can be compared. The research comprised the following stages:

- a) Investigating whether the lexical and grammatical transfer into English involved the participants' implicit or explicit linguistic knowledge (ILK vs ELK). This was undertaken by designing tests intended to provide separate measures of these two types of knowledge and later testing whether the tests successfully achieved this (as discussed in the analysis section).
- b) Investigating Arabic and French lexical and grammatical transfer in participants' production of English;
- c) Examining possible differences in the lexical and grammatical transfer effects between Arabic and French on English across both groups (B vs C).

In this study two grammaticality tests were used. The Untimed Grammaticality Judgment Test (UGJT) aimed to measure participants' ELK of Grammar, and the Oral Elicited Imitation and Word Monitoring Test (OEITM), aimed at measuring the participants' ILK of grammar. Two vocabulary tests were used. The purpose of the Yes and No Test (written) was to measure participants' ELK of English lexis. The purpose of its counterpart, the Yes and No (aural) test, was to measure participants' ILK of English lexis. The main distinguishing characteristics of these tests is that tests of ILK allow the relatively spontaneous use of English whereas tests of ELK require more careful use of English.

Three research questions were formulated.

RQ1 examines if the UGJT and Yes and No Test (written) measured participants' ELK of English, and the OEITM and Yes and No Test (aural) measured participants' ILK of English. RQ2 compares the difference in grammatical transfer from previously learned languages into participants L2/L3 English in groups B and C. RQ3 compares the amount of lexical transfer from previously learned languages into participants L2/L3 English between groups (B&C).

- RQ1) “Do the tests provide separate measures of ILK and ELK?”
- RQ2) “Are there any differences in the grammatical transfer of Arabic and French into English between Group B (L3 English) and Group C (L2 English)?”
- RQ3) “Are there any differences in the lexical transfer of Arabic and French into English between Group B (L3 English) and Group C (L2 English)?”

If the answer to Research Question 1 is positive, Research Questions 2 and 3 will be investigated in terms of differences in the groups' ILK and ELK by combining scores for the tests measuring the two types of knowledge. However, if the answer to Research Question 1 is

negative, Research Questions 2 and 3 will be investigated by examining group differences in each of the four tests.

This chapter is organised in the following manner: First, a brief description of the Lebanese context is provided, followed by a report of the pilot study. The report discusses the pilot study's participants, context, instruments, and procedures. This section also discusses the issues encountered and their proposed solutions. The section after this discusses the main study's participants, design, instruments, and procedures. The fourth section explains how the research questions will be answered. This section also explains how the selected tests will be analysed to see if they provide separate measures of implicit and explicit knowledge.

## **5.2 The Lebanese context.**

Lebanon's location makes it very receptive to different cultures and languages. At one point, it was called "the gateway between east and west". The influence of foreign languages in Lebanon has undergone three phases. The first phase, between the 17th and 20th centuries, was characterised by influence from European missionaries, mainly French and English. The second phase, during the French Mandate (1924), imposed the mandatory teaching of Arabic and French in private schools. Although French foreign schools constituted 80% of the schools at this time, the mandate also applied to English schools. The third phase, following Lebanese independence in 1943, saw an increase in the number of English-teaching schools. In the 1970s, the trilingual system was introduced.

The current Lebanese education curriculum mandates the teaching of three languages (Arabic, French and English). The most recently adopted Lebanese National Language Curriculum, endorsed by Cabinet in 1994, mandated all schools provide instruction in a second "foreign" language. In practise this means that in addition to Arabic, all schools must also teach

either English or French as a first “foreign” language in addition to a second “foreign” language (N. N. Bacha & R. Bahous, 2011). All schools are required to teach the native language (Arabic) as a separate subject. Schools must also select a second language as the medium of instruction in which subjects such as Science and Mathematics are taught. Some schools (approximately 70%) nominate French as their chosen second language while the remainder (30%) select English.

The time allocated for both Arabic and the first foreign language varies with the educational stage. From Grade One to Grade Three, students receive seven hours of instruction in Arabic and seven hours in the first foreign language. From Grade Four to Grade Nine, students receive a total of five hours of instruction in L1 (Arabic) and five hours in the first foreign language. Between grades Nine to Twelve (graduation), students receive three hours of instruction in their native language and three hours in their first foreign language. The first foreign language remains the medium of instruction for most subjects including Science and Mathematics. The second foreign (English or French) is only taught for two hours per week and instruction commences in the sixth grade and continues to the last year of school (Grade Twelve).

Overall, 75% of students learn French as a second foreign language and English as a third foreign language while 22% to 24% of students learn English as a second language (N. Bacha & R. Bahous, 2011). One-third of high school students educated in French pursue higher education in English-speaking institutions, as English has attained the status of being the most widely spoken language worldwide. This is because the English language enables graduates to find jobs in multinational companies, both within their home country and abroad. Moreover, English is one of the most influential languages in business.

### **5.3 Pilot study.**

The pilot study section will include information that covers the following: a) purpose, b) method, and c) issues encountered and solutions.

#### ***5.3.1 Purpose.***

The primary purpose of this pilot study was to explore the practicality of the research whilst searching for potential methodological or logistical problems before undertaking a large-scale study. This pilot study examined the adequacy of the resources available and sought to find solutions to logistical problems. Furthermore, it gave opportunities to evaluate the practicality of the digital instruments, refine the data collection techniques, obtain an estimation of time and cost and confirm the adequacy of sample size. By observing these elements, it sought to improve operational procedures and address potential problem areas whilst gathering data. In sum, the primary purpose of the pilot study was to ascertain whether the instruments and data collection procedures were adequate or whether changes were needed.

#### ***5.3.2 Method.***

**Context.** On 15th May 2018, Professor Rima Bahous (this study's research mediator in the Lebanese American University (LAU)) was contacted. A subsequent meeting took place on 16th May for a general discussion about the project and how LAU can facilitate the work. To recruit participants, brochures were distributed inside the university and formal emails were sent by Professor Rima to students in the School of Education on 17th May. The brochure and the email briefly described the project and included an invitation to attend an information

session. Eleven LAU students attended the presentation on 18th May. On 19th May, eight participants completed the pilot study.

**Participants.** Eight students participated in the pilot study. Seven participants were females and one was male. Students were aware of the pilot study's intent and purpose, and they participated out of their own free choice. Participants signed a consent form and were assured of their right to leave at any stage of the pilot study at any time. They formed two groups. Group A consisted of five participants who had L1 Arabic, L2 French and L3 English. Group A participants had studied in schools where French is the first foreign language and English the second. The remaining three participants constituted Group B. They had L1 Arabic, L2 English and L3 French. These students had studied in schools where English was the first foreign language and French the second foreign language.

**Instruments.** The researcher in the pilot study used the Language History Questionnaire (LHQ) by Li et al. (2006) to collect information about the students' linguistic background of their L2/L3 use. There was also a Cloze Test to measure participants' English proficiency. Four instruments were selected to investigate students' ILK and ELK of English. The following sections will give a brief description of these instruments.

***Language Experience Questionnaire.*** The Language History Questionnaire (LHQ) provided background information about participants' linguistic knowledge (Li et al., 2006). This questionnaire consisted of 32 questions designed to extract information about participants' knowledge of all of their known languages.

***Cloze Test.*** The standardised Cloze Test was used to provide a measure of the learners' general English proficiency. In this test, participants were presented with an English text that had several missing words. A blank represented every missing word. Participants were asked to fill in the blanks with the correct words. The Cloze Test is a gap-filling test from the group of the reduced redundancy tests. This test measures students' level of proficiency in their newly learned language under the assumption that learners' proficiency can be distinguished by their ability to handle reduced redundancy in a given passage. Advanced learners of a new language hold adequate lexical and grammatical knowledge of this language that allows them to accomplish the Cloze Test. This is not the case for learners of a new language with a low level of proficiency (Hulstijn, 2010).

***Elicited Oral Imitation Test Incorporating Word Monitoring (OEITM).*** This test was used to investigate grammatical transfer in the learners' implicit knowledge of English grammar. This test is a computerised test that measures oral language proficiency by having the subject hear and repeat utterances under time pressure. These utterances contain some specific grammatical features that create potential for negative syntactic transfer from Arabic or French into English (Suzuki & DeKeyser, 2015). This test may investigate grammatical transfer from participants' previously learned language(s) into their ILK of English. This is because this test has a primary focus of attention on meaning and was conducted under time pressure (R. Ellis, 2005; Ellis et al., 2009).

***Untimed Grammatical Test (UGT).*** This test was used to measure grammatical transfer in learners' explicit knowledge of English grammar. It consists of 36 sentences and requires students to indicate if each sentence is grammatical, what type of knowledge they use, and whether their decision is based on a "feel" or "rule". This test is intended to investigate

grammatical transfer from participants' previously learned language(s) into their ELK of English. This test has a primary focus of attention on form. Participants in this test also have an ample amount of time to provide answers (R. Ellis, 2005; Ellis et al., 2009).

***Yes and No Test aural version.*** This test was used to measure lexical transfer in learners' implicit English lexical knowledge. Participants in this test were presented with a list of words and asked to indicate whether they knew the words (clicking yes) or not (clicking no) (Pellicer-Sánchez & Schmitt, 2012). These words were organised into five categories: 1) frequent French-English true cognates, 2) infrequent French-English true cognates, 3) French-English false cognates, 4) Arabic-English true cognates, and 5) nonsense words. This test was time-pressured. It measured learners' recognition of the phonological form of words, not their meaning. For this reason, this test can be considered a test of ILK (Choo et al., 2012).

***The Bubble Test.*** This test was used to measure lexical transfer in learners' explicit English lexical knowledge. Participants were given ample time to accomplish this task. Students were given a couple of Latin suffixes in English and were asked to produce as many English words as possible starting with these suffixes. It was well documented that learners were able to access their ELK when writing (N. C. Ellis, 2005; Ellis, 2015; Gutiérrez, 2012).

### ***5.3.3 Pilot study procedures.***

The LAU made five separate small rooms available. Each student was allocated a room. Separation among students was necessary to assure that they did not help each other with

answers. On 24<sup>th</sup> May 2018, the participants sat for the Cloze Test followed by the LHQ. On 25<sup>th</sup> May 2018, the OEITM and the UGJT were conducted. On 26<sup>th</sup> May 2018, the Yes and No Test and Bubble Test were administered. A twenty-minute break was provided between each pair of tests. The researcher moved between rooms to ensure there were no problems encountered during the tests. The LAU provided an information technology (IT) professional whose role was to download the computerised test results onto a USB (OEITM, UGJT, Yes and No test) and collect the paper and pen tests (Cloze Test, LHQ, Bubble test).

#### ***5.3.4 Pilot study results***

Results will be presented in the same sequence in which the tests were administered.

**Cloze Test results.** In the Cloze Test, the scores of the participants in Group A ranged from 70 to 75, with an average mean score of 72.5%. Scores for Group B participants ranged from 73 to 75, with an average mean score of 74%. These results demonstrate that the English proficiency of all students selected for the pilot study was at an intermediate or advanced level.

**Participant's language background.** The Language History Questionnaire (LHQ) provided information about the participants' linguistic background. A description of the LHQ will be given later in this chapter. The LHQ indicated that participants in both groups A and B demonstrated a high rate of English usage in their daily lives. For Group A participants (L2 French, L3 English), this rate was 37%. For Group B participants (L2 English, L3 French), this rate was 43%. The LHQ revealed some information about the participant's English language proficiency. Five participants had completed the SAT (Scholastic Assessment Test) with an average score above 70%. The remaining three participants had completed the EEE (English Entrance Exam) with an average score above 60%. The EEE is used by LAU to evaluate

student's English proficiency. LAU students that fail to score a minimum of 500/600 points in the EEE are required to complete an intensive English course before beginning academic studies at LAU. One participant attained 8.0 points in the IELTS exam (International English Language Testing System). Thus, the data collected from the LHQ and Cloze Test demonstrated that all of the participants in the pilot study met the minimum requirements of English language proficiency.

**The battery of tests – results.** In the OEITM students with L2 English ( $M=63$ , 3%;  $SD=0.025$ ) scored higher than students with L3 English ( $M=52\%$ ;  $SD=0.117$ ). In the UGJT students with L2 English ( $M=68$ , 6%;  $SD=0.071$ ) scored higher than students with L3 English ( $M=65$ , 4%;  $SD=0.098$ ). The small scale of this study prohibited any assumptions concerning grammatical transfer in TLA. However, these results suggested that students with L1 Arabic, L2 French and L3 English had a lower score than students with L1 Arabic and L2 English. One possible explanation as to why students with L2 French scored less is the occurrence of negative grammatical transfer from French into English in their answers.

In the Yes and No Test (aural), students with L3 English scored higher than students with L2 English ( $M=0.601$ ,  $SD=0.074$ ) > ( $M=0.565$ ;  $SD=0.035$ ). The existence of French lexis among students with L1 Arabic, L2 French and L3 English may have played a role, allowing them to recognise French-English true cognates as English words. These students possibly were able to control negative grammatical transfer from French into English. This may have occurred because they were able to recognise the false French-English cognates as non-English words.

In the Bubble Test, students with L2 English (Group A) provided almost the same number of English words of French origin as students with L3 English (Group B) ( $54.82\% < 55.83$ ).

Participants' results in the Yes and No Test (aural) and Bubble test were not consistent. On the Yes and No Test (aural), students with L1 Arabic, L2 French and L3 English scored higher than students with L1 Arabic and L2 English and L3 French. In contrast, in the Bubble Test, all students had a similar score. One possible explanation is that students with L2 French took advantage of their L2 lexis in the Yes and No Test (aural) but this was not the case in the Bubble Test. In the Yes and No Test (aural), the phonological recognition of true French-English cognates as English words may be easier than producing English words from French origin in writing as required in the Bubble test.

### ***5.3.5 Issues encountered in the pilot study and proposed changes.***

Several problems were encountered in the pilot and thus several changes were subsequently made for the main study. They are summarised as follows:

- 1) The sample size in the pilot study was small – only eight participants in their third year of university study participated. The recruitment of the participants for the pilot study was difficult. This is because I undertook the pilot study at the time during the end of the semester's final exams. The students that participated were directly contacted by the research mediator via an email. For the main study, the researcher recruited students during their semester regular study days.
- 2) The problems concerning the participants' performance on the tests are as follows. There were two separate incidents where the digital OEITM test froze. This problem occurred because the computerised tests were installed on laptops of varying hardware specifications. This may have occurred because I failed to test all the laptops' workability before the pilot study's commencement. The computerised tests'

workability was examined before the commencement of the main study. A technician was recruited to assure the workability of all the digital tests in case any technical problems occurred.

- 3) The participants in the pilot study raised a problem with the Cloze Test. They complained that it was too difficult to determine the missing words from the context provided and suggested this problem could be mitigated by the provision of one or two letters at the start of each missing word. In response to this, I decided to replace the Cloze Test with the C-Test. Both tests provided passages with gaps for missing words and participants are required to fill in these gaps with correct/appropriate words. The only difference between these two tests is that the C-test allows the provision of one or two letters at the start of the missing words. Although this feature of the C-Test makes it easier for students to know the missing words, it does not affect its validity in measuring English proficiency. Similar to the Cloze Test, when the C-Test is administered, it requires the simultaneous activation of multiple language components (e.g. grammar and lexis) and skills (e.g. reading ability and comprehension) (Ajideh & Mozaffarzadeh, 2012). Furthermore, there is evidence that the C-Test is a more valid measurement of participants' general proficiency than the Cloze Test (Dörnyei & Katona, 1992). The validity of the C-Test in measuring language proficiency will be further discussed in detail later in this chapter.
- 4) Participants in the pilot study complained about the medical passage selected in the Cloze Test. They stated that students with prior knowledge of medicine might have had an advantage due to their higher understanding of the topic in contrast to participants with little to no experience in this field. In the main study, the passages selected for the C-test had more general topics.

- 5) In the pilot study I neglected to measure participants' French proficiency. In the LAU English is the primary language of instruction. Due to the absence of French exposure, participants' L2/L3 French proficiency may have deteriorated. In the main study, a C-Test in French was conducted to measure all participants' French proficiency.
- 6) I detected a problem relating to one sentence in the OEITM. One ungrammatical sentence (i.e., I him loved) used in the OEITM test was relatively short being less than 2.04 seconds. This might have led the participants to rely on their phonological short term memory rather than their ILK (Baddeley et al., 1975).
- 7) There was a problem in the design (ie., items) of the Bubble Test. The reader is reminded that this test provided participants with two or three letters, "commencement letters", and requested them to make up as many words as possible starting with these letters ( e.g., con: construction, continum, contain). The vast majority of these commencement letters are prefixes of French-English true cognate words. Irrespective of whether participants L2 was French or English, they were found to mainly provide French-English true cognate words in their answers. This may have occurred because the majority of French-English true cognate words started with Latin prefixes, latin being the origin of the French language (see, Wall, 2016). Therefore, the researcher decided to replace the Bubble Test with a written version of the Yes and No Test.
- 8) Seven grammatical structures in the OEITM and UGJT were used in the pilot study to track negative grammatical transfer from Arabic and French into English. The cause of this transfer is the grammatical dissimilarity between Arabic and French with English. In the main study, one of these structures was eliminated. The removed grammatical structure was the wrong use of the past perfect tense by English students from an Arabic background. The replacement of the past perfect tense with the past simple tense by Arabic students in their use of English is no longer considered a grammatical mistake.

This is because, in modern (contemporary) English, the past simple tense replaces the past perfect tense when referring to an earlier time. This structure is not a source of potential negative grammatical transfer from Arabic into English and was therefore removed.

- 9) During the pilot, one student complained that noise prohibited him from focusing. In the main study this problem was not encountered, the data was collected online. Participants completed the tests in their private space.
- 10) During the pilot study, I was located 25 km away from the LAU. The heavy traffic in Beirut exhausted me mentally and physically. In the main study this was avoidable, the data was collected online.

## **5.4 Main study**

### ***5.4.1 Research questions***

The research questions of the main study are the same as those for the pilot study (found on page, 162).

### ***5.4.2 Participants.***

In this study a total of eighty students participated, forming three groups. The first group (Group A) consisted of ten Australian students (males = 4, females =6) with an average age of 22.5 years. Group A participants were third year university students at Curtin University, Western Australia. They were majoring in Business (n=3) and Education (n=7). Only one participant in Group A was bilingual (L2 Japanese) having resided in Japan for two years with

an advanced level of Japanese proficiency scoring 87% in the Japanese-Language Proficiency Test JLPT Level N2.

Group B consisted of 35 Lebanese university students (M=15, F=20) with an average age of 22.9 years. Group B participants had L1 Arabic, L2 French and L3 English. They were third year university students at the Lebanese American University (LAU), located in the Lebanese capital of Beirut. Participants were undertaking different majors (e.g., Education, Biology, Chemistry, Medicine, etc.). Group B participants had been instructed in Arabic (L1) from Grade Four to Grade Nine and had received a total of five hours of instruction in Arabic (L1) per week. Between grades Nine to Twelve (graduation), Group B participants received three hours of instruction in Arabic (L1) each week. Arabic is considered the main language spoken language in Lebanon. Concerning foreign language learning, Group B participants had studied French (L2) for 14 years at school and English (L3) for 10 years (seven years at school and three years in university). Group B participants had received seven hours of instruction in French (L2) per week. From Grade Four to Grade Nine, they received a total of five hours of instruction in French (L2) per week. Between Grades nine to twelve (graduation), students received three hours of instruction in French (L2) each week. At school, French (L2) was the medium of instruction for most subjects including Science and Mathematics. Regarding L3 English Education for Group B participants, English (L3) was only taught for two hours per week and instruction commenced in their sixth grade and continued to their last year of school (Grade Twelve). Group B received their tertiary education with English as the only medium of instruction. Eight participants of Group B reported having undertaken the International English Language Testing System Exam (IELTS) with scores ranging from 70%-75%. None of the Group B participants had resided in an English-speaking country.

Group C consisted of 35 Lebanese university students (M=12, F=23) with an average age of 22 Years. Group C participants had L1 Arabic, L2 English, and L3 French. They were

third year university students at the Lebanese American University (LAU) studying various majors (e.g., Education, Biology, Chemistry, Medicine, etc). Regarding their education in Arabic (L1), Group C participants had received a total of five hours of instruction in L1 (Arabic) per week from Grade Four to Grade Nine. Between grades Nine to Twelve (graduation), they received three hours of instruction in Arabic (L1) each week. In regards to foreign language learning, Group C participants had studied English (L2) for 14 years at school and three years at university. From Grade Four to Grade Nine, they received seven hours of instruction in English (L2) per week. Between grades Nine to Twelve (graduation), they had received a total of five hours of instruction in English (L2) per week. Between grades Nine to Twelve (graduation), these students received three hours of instruction in English (L2) each week. For Group C participants, English (L2) was the medium of instruction for all units undertaken in their secondary school. They received their tertiary education with English as the only medium of instruction. Concerning L3 French, Group C participants were instructed in this language for seven years at secondary school. They were taught French for two hours per week and instruction commenced in the sixth grade and continued to the last year of school (Grade Twelve). Eleven participants of Group C reported having undertaken the International English Language Testing System Exam (IELTS) with scores ranging from 75%-80%. Six participants had resided in an English-speaking country for between six to nine months.

#### ***5.4.3 Design.***

The research was conducted using quantitative descriptive research involving the quantification of variables. Quantitative descriptive research involves techniques used to specify, delineate, or describe phenomena which in my study were collected by means of tests. There was no experimental manipulation. "Descriptive research can be heuristic or deductive.

While technically, qualitative research is also concerned with description, descriptive research as a type or category of research refers to investigations which utilises already existing data or non-experimental research with a preconceived hypothesis. A descriptive study might describe an aspect of second language acquisition from a more synthetic perspective or might focus on the description of a specific constituent of the process, such as on the acquisition of a particular language structure or on one particular language learning behaviour to the exclusion of others. That is, in a descriptive study the researchers begins with general question in mind about the phenomenon they are studying or with more specific questions and with a specific focus” (Seliger et al., 1989, p. 117). Descriptive research applies to a novel area of research such as in this thesis, which constitutes the first attempt to investigate transfer into an L3 in terms of implicit and explicit knowledge. In the future, further exploratory investigations building on the foundation laid by this research will be possible (Seliger et al., 1989).

The methodology of this study aimed to examine the phenomena of positive and negative grammatical and lexical transfer from Arabic or French into participants’ implicit and explicit knowledge of their L2/L3 English. This research involves a quantitative cross-sectional based design with two subgroups. The first group is composed of students with L1 Arabic, L2 French and L3 English. The second group is composed of students with L1 Arabic and L2 English and L3 French.

The independent variables in this study are the languages acquired by the participants (Arabic, English, and French). While in both groups Arabic exists as the participants’ L1, the first group has French as their L2 and English as L3, whereas participants of the second group have L2 English and L3 French. The research aims to monitor the lexical and grammatical transfer in participants ILK and ELK. Hence, these two types of knowledge constitute the dependent variables of the study as shown in Table 5.1.

**Table 5.1***The Dependant and Independent Variables*

Independent variable	Dependent variables	
L1 Arabic (Both groups)	ILK	ELK
L2 French (First group)		

**5.4.4 Instruments and Procedures.**

The primary study employed a Language History Questionnaire (LHQ) to collect information on students' linguistic background and their acquired languages. This study also used the C-test to measure participants' English and French proficiency. The other instruments provided data to answer the research questions. The names and the purpose of these four tests are listed in Table 5.2.

**Table 5.2***Test Selected to Measure Learners' ILK and ELK of English.*

Name of test	Objective
Elicited Oral Imitation Test incorporating Word Monitoring (OEITM)	Investigating grammatical transfer in the learners' ILK of grammar in English.
Untimed Grammatical Test (UGT)	Measuring grammatical transfer in the learners' ELK of grammar in English.
Yes and No Test (audio version)	Investigating lexical transfer in the learners' ILK of lexis in English.
Yes and No test (written version)	Investigating lexical transfer in learners' ELK of lexis in English.

**C-test.** The C-test is an instrument used to measure students' proficiency in their newly learned language (Dörnyei & Katona, 1992). This section presents information concerning the

C-test's design. This includes its modality, procedures and scoring. The following section also discusses the validity of the C-test as a measure of language proficiency. The C-test in the main study was administrated in English and French. More specific details on these tests are presented under the following two sections a) the C-test for participants' English proficiency and b) the C-test for participants' French proficiency

The C-test is a gap-filling test from the group of the reduced redundancy tests. Individuals with a high level of proficiency in a language can be distinguished from beginners by their ability to deal with reduced redundancy in a given passage. Each passage is usually eighty to one hundred words in length and about a specific topic. In every passage, the first and last sentences are complete. In the other sentences, the second half of every second word is deleted. Numbers and proper names are usually kept without any change (Raatz & Kelein-Braley, 2002). The content of the passages is intended to be general for the intended learners. Passages should not consist of any specialised vocabulary, only words from the general knowledge domain (Grotjahn & Stemmer, 2002). A dash (---) denotes incomplete words. Some of these incomplete words need only one or two letters to be completed; the others require several letters to be added. In this test, students were asked to fill in the dashes. Raatz and Kelein-Braley (2002) suggested giving students 25 seconds to fill in each incomplete word. Their suggestion was based on the observation of multiple students who successfully undertook this test without any complaints regarding the time allocated to the C-test. A three-minute break between passages should also be provided. This is to avoid fatigue.

Validation of the C-test as a test measuring general language proficiency was reported by Dörnyei and Katona (1992). In their study, participants formed two groups. Group A consisted of one-hundred-and-two university students majoring in English literature at Eotvos University, Budapest. Group B participants consisted of fifty-three secondary school pupils in Budapest. Dörnyei and Katona (1992) found that scores for Group A participants on the C-test

were closely correlated with their scores on the Test of English for International Communication TOEIC test ( $r= 0.62$  with  $p<0.001$ ). Group B participants' scores on the Cloze Test were correlated with their scores on TOEIC more weakly ( $r= 0.52$ . with  $p < 0.001$ ). These results indicated that the C-test is a more valid test of language proficiency than the Cloze Test (for more information see., Dörnyei & Katona, 1992).

*C-Test for participants' English proficiency.* The C-test used in this study was the same as that used by Dörnyei and Katona (1992). This C-test consisted of four passages. The first passage was 80 words in length. The first passage described how the property of a person was stolen (theft scene). The second passage was 44 words in length. This text described human-made deforestation of the earth. The third passage was 40 words and concerned students' shopping. The fourth passage was 60 words in length, describing the phenomenon of good leadership.

The first text had 16 incomplete words; the second has 15 incomplete words, and the third and fourth have sequentially 15 and 20 incomplete words. There was a total of 66 incomplete words in the four passages. The four incomplete passages and their answers are presented in Appendix A. The four passages did not include any words from a specific knowledge domain but rather were comprised of general lexis. These words belong to the 5000 most frequently used words in English as presented in the Frequency Dictionary of Contemporary American English by Davies and Gardner (2013).

In this computerised test, students were asked to fill in the missing letters as shown by the number of dashes in each word. Students were given 25 seconds to fill in each incomplete word as suggested by Dörnyei and Katona (1992). For the first passage, which included 16 incomplete words, 6.67 minutes was allocated. For the second and third passages, 6.25 minutes was allocated for each. Both passages included 15 incomplete words. For the fourth passage,

8.33 minutes were allocated for 20 incomplete words. A three-minute break between each passage was also provided. During these breaks, the computer screen turned blank. The total time required to complete the C-test in English was 27.5 minutes (6.57+6.25+6.25 +8.33) plus 9 minutes, making a total of 36.5 minutes. After the English C-test ended, participants were given a 10-minute break before the commencement of the French C-test.

The C-test was scored using the exact word method. No importance was placed on minor spelling mistakes. In the main study, for a student to be selected, he/she had to score a minimum of 70% on the English C-test. This method ensured an intermediate or advanced level of English proficiency. Hence, the selected participants held sufficient lexical and grammatical knowledge of English to undertake the tests of the main study.

*C-Test for participant's French proficiency.* The text of the four passages in the English C-Test was translated into French. The incomplete words in these tests were the same as their equivalents in the English test and the procedure was identical. In this computerised test, students were asked to fill in the missing letters signified by a number of dashes in each word. They were given 25 seconds to complete each word, as suggested by Dörnyei and Katona (1992). Every passage in French had approximately the same number of words as its English counterpart. The total time required to complete the C-Test in French was 27.5 m. The appointed time for each passage has been summarised as follows: 1) 6.57 m for the first, b) 6.25 m for the second, c) 6.25 m for the third, and d) 8.33 m for the last. Participants were given three-minute breaks in between passages, amounting to a total of nine minutes. Thus, the total time needed for the French C-Test was 36.5 (27.5 + 9) m.

The scoring method of the French C-Test was based on the "exact word method", requiring gaps to be filled by the exact letters to complete the exact missing words. The passages included general lexis and avoided jargon drawn from specific knowledge domains.

The words in the passages were among the 5000 most frequently used French words, as presented by Lonsdale and Le Bras (2009). The four passages have been presented in Appendix A.

In the main study, in order to be selected, participants with L2 French (Group B) had to score a minimum of 70% in the French C-Test. This score ensured that the proficiency of French of the selected participants was at an intermediate or advanced level. Moreover, this test allowed the researcher to evaluate the level of French proficiency of participants with L3 French (Group A). The research did not apply any restrictions on the level of French proficiency for participants with L3 French. The research aims to examine forward lexical and grammatical transfer from L2 French into English. The researcher does not aim to examine reversal transfer from L3 French into L2 English.

**Language History Questionnaire (LHQ).** Information about the participants was collected employing the Language History Questionnaire (VERSION 1.0). The version used in the main study was identical to the one provided by Li et al. (2006, pp. 207-209). The purpose of this instrument was to collect detailed information about the participants' linguistic background in all their languages (e.g., age of acquisition, duration of instructed learning, degree of usage of L2, etc.). Copies of this questionnaire can be found in Appendix B.

Part A targets information related to participants' starting age for learning French and English, length of L2/L3 learning, level of education and years of residency in countries where L2 and L3 are native languages. Part A also requires participants to self-assess their L2 and L3 proficiency. This includes proficiency in reading, writing, speaking, and listening. Part B examines learner's home and school linguistic environments, L2 and L3 exposure, place of usage, linguistic habits, language dominance in various social and linguistic settings, L2 and L3 experience, and results from previous professional English tests.

The language history questionnaire was found to be a valid tool to obtain broad based information concerning learners' general linguistic knowledge of an additionally learned language. Li et al. (2006) administered the Language History Questionnaire (Part A and B) to 40 English/Spanish bilinguals at the University of Richmond, Virginia. They established its validity and reliability using four methods: 1) a bivariate correlation with significant correlations between important indicators (e.g., age of acquisition, years of learning, amount of L2 use) and self-assessed reading, writing, speaking and comprehension ability. 2) an aggregate score determined from all answers predicting L2 proficiency. 3) a discriminant and multiple regression analysis, including SAT-II score in Spanish, showing the questionnaire can distinguish low, intermediate and high proficiency groups. 4) a split-half reliability of the quantitative variables, showing high reliability (split-half coefficient of .85).

**Vocabulary tests of implicit and explicit lexical knowledge.** The Yes and No Test measures a learner's lexical level of proficiency in their non-native language(s) (Pellicer-Sánchez & Schmitt, 2012). In this study, the test was administered in two forms: audio and written. The context, purpose, and procedures of the test have been presented in detail in the following sections.

**Target Items.** The target items consist of 217 words. These words belong to five different categories. All the categories, along with their related words, have been enumerated in Appendix C.

- Category one consists of 75 words: these words are high-frequency French-English true cognates (e.g. construction), found in Appendix C, Table 1 (Taken From, Lonsdale & Le Bras, 2009).
- Category two consists of 75 words: these words are non-frequent French-English cognates (e.g. camouflage), found in Appendix C, Table 2 (Hammer & Monod, 1976).

- Category three consists of 31 words: these words are French-English false cognates (e.g. envy), found in Appendix C, Table 3 (LeBlanc & Séguin, 1996).
- Category four consists of 44 words: these words are Arabic-English cognates (e.g. assassin), found in Appendix C, Table 4 (Jassem, 2012).
- Category five consists of 24 nonce words (i.e., made-up words) . These words are used as a filler. These words function as control items. Using these non-existent words, the researcher can see to what extent the participants responded appropriately to the test. Students with relatively high proficiency in English, which is the case in this study, should recognise these nonsense words as non-existent items. These nonsense words show whether the participants responded appropriately to the content of the test. If the researcher finds that participants claimed the nonsense words as English, this suggests that the test is not reliable.

A cognate is a word with a common origin between languages. A false cognate (called a false friend) is a word that looks phonologically or orthographically similar to another word but is unrelated. An example of a French-English true cognate word is the English word “zero” and the equivalent French “zero”. Both words have the same meaning and are very close in their phonology and orthography. An example of a French-English false cognate is envy, which sounds similar to the French “envie”. The English word means a feeling of discontent while the French word indicates a desire to do something. The Arabic-English true cognate words are words that are phonologically similar and have the same meaning, for instance, the English word “sugar” and its Arabic equivalent سَكَّر “sukar”. There are no Arabic-English false cognates in this study. This is because the Arabic and English language are typologically dissimilar. This research selected two categories of French-English true cognates: frequent vs. infrequent. The frequent French-English true cognate words were selected from the top 500 most frequently used French words from the Frequency Dictionary of French (REF). Notably,

a French-English true cognate word could be frequently used in French, but infrequently used in English. For instance, the French-English true cognate word “association” is frequently used in French but infrequently used in English. In this study the selected infrequent French-English true cognates words were infrequent in both French and English. The Frequency Dictionary of French (REF) includes the 5000 most frequently used words from a corpus of 23,000,000 French words. Half of the corpus is derived from written transcriptions (e.g., short stories, novels, newspaper articles, essays, memoirs, academic journals, etc.) and the other half from oral language use from an eclectic variety of sources (e.g., dialogues from phone calls, TV programs, interviews, etc.). The sources include terms used in a wide range of topics, including science, sports, medicine, business, clothing, and domestic topics (Lonsdale & Le Bras, 2009). The infrequent French-English true cognates are words that are not included in the Frequency Dictionary of French.

The Arabic-English true cognates were selected for my study because they may generate a potential positive lexical transfer from Arabic into English. French-English true cognates are also selected because they may cause a potential positive lexical transfer from French into English. The French-English false cognates are selected because they may generate a potential negative lexical transfer from French into English.

*The Yes and No Test (audio version).* The audio version of the Yes and No Test was employed to measure participants' ILK of English lexis, as it is mainly based on participants' recognition of several words, which are orally presented. Evidence suggests that people's recognition of sound, including primarily spoken words and music, is associated with implicit memory (Ettliger et al., 2011). Recognition of spoken words takes place in “the striatum and prefrontal cortex. These brain regions are associated with the implicit memory system” (Ettliger et al., 2011, p. 7).

The audio version of the test aimed to measure both positive and negative lexical transfers from Arabic and French to participants' L2/L3 ILK of English. In this computerised test, 217 words (target items) were orally presented in the form of a random distribution. Participants had to declare whether they recognised each presented word by clicking on the designated "yes" or "no" button. Participants were given 1500 ms (1.5 s) to decide their answer on each presented word. This was the mean time needed by 15 native speakers to recognise each presented word in the test. If the participants were unable to decide on a word within 1.5 s, the programme automatically displayed the subsequent word. Occasions where participants did not answer within 1.5 s were considered as "no answers".

At the end of the Yes and No test (aural version), the participants were presented with a list of French-English false cognate words they recognised; then they were asked to answer the following request command: "Recall the first meaning that comes into your mind when encountering these words. Please indicate if your comprehension of it is based on French or English". To the right of each word, there were two letters, F (for French) and E (for English). Participants were asked to click on the letter that represents their answer and the digitalised test registered the answer. It is well documented that the act of recalling tends to tap more on the unconscious mind ( implicit knowledge) (Mlodinow, 2013).

Positive lexical transfer from Arabic to English can occur in participants' answers due to the presence of Arabic-English true cognates in the target items. Positive and negative lexical transfer from L2 French to L3 English may also occur due to the presence of French-English false and true cognate words in the target items.

Negative lexical transfer was monitored in participants' incorrect judgment of the French- English false cognates and was scored if the following two conditions were met.

- a) Participants recognised French-English false cognate words (first phase);

- b) Participants suggested their recognition of the words was based on the meaning of this word in French. This takes place in the last phase of the Yes and No test (aural).

With respect to scoring, the average mean and standard deviation of the participants' scores, along with the average mean and standard deviation of their scores, on each of the five categories of words, were calculated.

*The Yes and No Test (written version).* The written version of the Yes and No Test was employed to measure participants' ELK of English lexis, as it is mainly based on their recognition of the meaning of the target words, which are presented in writing. Explicit memory has been shown to be responsible for the recognition of the meaning of written words (orthography) (Heckman et al., 2018; van Goethem et al., 2018). Parts of the explicit memory that are related to the recognition of the meaning of written words include the "hippocampus, basal ganglia, cerebellum, and the premotor cortex" (Cech & Martin, 2011, p. 198).

In the written version of the Yes and No Test, participants were sequentially shown the same list of 217 words (target items) used in the audio version of the test on a screen. Each word presented appeared in the middle of the screen, and the participants were required to indicate whether they recognised them and knew their meaning. The participants were given all the time they needed to answer. After completing this step, the participants were shown a list of the words they were able to recognise and asked the following question: "Can you provide the meaning of the recognised words by defining them using any language(s) you know?" Undefined answers were eliminated. Following this, the participants were asked the following question: "Did you recognise this word in English because you knew its cognate in a previously learned language(s)?" Participants had to answer this question by clicking on the "yes" or "no" digital buttons. Only affirmative answers were used in scoring to ensure that the

participants were aware that their answers were based on their lexical knowledge of a previously learned language(s). Thus, whether a lexical transfer from a previously learned language occurred might be evident.

With respect to scoring, the average mean and standard deviation of the participants' scores, along with the average mean and standard deviation of their scores, on each of the five categories of words, were calculated. To determine whether a point should be awarded for a correct answer I examined the participants' definitions of the words they claimed they recognized. Only the correctly defined words were scored. Correct answers on Arabic-English true cognate words were indicative of positive lexical transfer from Arabic into English. Correct answers on French-English true cognate words were indicative of positive lexical transfer from French into English. If the participants recognised a French-English false cognate word, but then defined them with their French meaning, no point was awarded. However these incorrect judgment scores were indicative of negative lexical transfer from Arabic into English.

**Grammaticality tests of implicit and explicit grammatical knowledge.** The instruments used to measure grammar were the UGJT and OEITM. The UGJT is used to measure grammatical transfer from previously learned languages in the participants' ELK. This test's primary focus was on form and it was self-paced. The OEITM is intended to examine the syntactic transfer from previously learned languages in the participants' ILK. This test's primary focus of attention is on meaning and was conducted under time-pressure. Both instruments used the same target items. A description of these items is provided below.

**Target items (syntax).** I identified specific grammatical features that potentially generate negative grammatical transfer from Arabic or French into English. Raimes and Miller-

Cochran (2013) stated that students make some grammatical errors that are influenced by the difference in grammatical features between their newly learned language and their native language. Their suggestions were based on monitoring students' linguistic behaviour for more than ten years. Ramies's and Miller-Cochran's observation covered students from many nationalities including Arabic nations, Lebanon, France, and other countries. From Raimes and Miller-Cochran (2013) study, I selected three target items that could generate a potential negative grammatical transfer from Arabic into English in participants' English production. I only selected the grammatical features that generated negative syntactic transfer from Arabic into English. This transfer is mainly generated by the grammatical dissimilarity between Arabic, on the one hand, and French and English on the other. The three target structures are a) verb precedes subject, b) pronoun object included in relative clauses, and c) the non-use of the verb "to be" when describing things in the present. The following section will explain how each item generates a potential for negative grammatical transfer from Arabic to English.

The first language feature that could create a potential negative grammatical transfer from Arabic into English was the verb precedes subject. Arabic sentences use either SVO or VSO, depending on whether the subject or the verb is more important from the speakers' perspective. In general, this is not permitted in French or English. French and English tend to follow a fixed SVO order. This grammatical feature was selected to trace negative syntactic transfer from L1 Arabic into L3 English. The following examples illustrate the case.

- English Sentence: "I had a good grade on the math exam".
- Equivalent French sentence: "J'ai eu une bonne note à l'examen de mathématiques".
- The English word-for-word translation: "I had a good grade on the math exam".
- Equivalent Arabic sentence : "على تقدير جيد حصلت في امتحان الرياضيات"
- The English word-for-word translation: "A good grade I had on the exam".

- Correct English translation: “I had a good grade on the math exam”.

The second Arabic language feature that could create a potential negative grammatical transfer from Arabic into English was a pronoun object included in relative clauses. In Arabic, in certain cases, it is considered grammatically correct to include the pronoun object in relative clauses, unlike English and French which omit the pronoun object. This grammatical feature was selected to trace negative syntactic transfer from participants' L1 Arabic into their L2/L3 English. The following examples illustrate the case.

- English Sentence: “The car that I drive is 7 years old”.
- Equivalent French sentence : “La voiture que je conduis a 7 ans”.
- The English word-for-word translation: “The car that I drive is 7 years old”.
- Equivalent Arabic sentence: “السيارة التي أقودها عمرها 7 سنوات”
- The English word-for-word translation: “The car that I drive it is 7 years old”.
- English correct translation: “The car that I drive is 7 years old”.

The third Arabic language feature that could create a potential negative grammatical transfer from Arabic into English was the non-use of the verb “to be” when describing things in the present. In Arabic, the verb “to be” is not used when describing things in the present time. In English, the verb “to be” and the French verb “être”, the equivalent of the verb “to be”, are always used when describing things in the present time. This grammatical feature was selected to trace negative syntactic transfer from participants' L1 Arabic into their L2/L3 English. The following examples illustrate the case.

- English sentence: “She is happy because her father gave her money”.

- Equivalent French sentence : “Elle est heureuse parce que son père lui a donné de l'argent”.
- The English word for word translation: “She is happy because her father to her gave money”.
- Equivalent Arabic sentence: “هي سعيدة لأن والدها قدم لها المال”
- The English word for word translation:”She happy because her father gave her money”.
- English correct translation: “She is happy because her father gave her money”.

From Raimes and Miller-Cochran’s (2013) study, the researcher also selected another three grammatical features that could generate a potential negative grammatical transfer from French into English. The researcher only selected the grammatical features that generate a negative syntactic transfer from French into English. This transfer is mainly generated by grammatical dissimilarity between French, on the one hand, and Arabic and English on the other. The three target structures that reflect negative transfer from French into English are a) wrong placement of object pronoun, b) wrong use of a definite article for the proper noun of places and c) wrong use of present perfect. The following section will illustrate how these target items can generate a negative grammatical transfer from French into English among participants with L2 French.

The first language feature that could create a potential negative grammatical transfer from French into English was the wrong placement of the object pronoun. Arabic and English differ from French in the placement of an object pronoun in sentences that include main clauses. In this case, the object placement is pre-verbal in French and post-verbal in Arabic and English. This grammatical feature was selected to trace negative syntactic transfer from participants’ L2 French into their L3 English.

- English sentence: “I asked him to put the food on the round table in the kitchen”.
- Equivalent French sentence: “Je lui ai demandé de mettre la nourriture sur la table ronde dans la cuisine”.
- The English word-for-word translation: “I him asked to put the food on the round table in the kitchen”.
- Equivalent Arabic Sentence: “طلبت منه أن يضع الطعام على المائدة المستديرة في المطبخ”
- The English word-for-word translation: “I asked him to put the food on the round table in the kitchen”.

The second language feature that could create a potential negative grammatical transfer from French into English was the wrong use of a definite article for proper noun of places. The negative syntactic transfer can take place from French into English in the use of definite pronouns before Western place names. In English and Arabic, sometimes the definite articles are not used before Western place names but are used in French. This grammatical feature was selected to trace negative syntactic transfer from participants’ L2 French into their L3 English. The examples provided below illustrate this rule.

- English sentence: “I love Switzerland because I spent my best vacation in Zurich”.
- French Equivalent sentence: “J'adore la Suisse car j'ai passé mes meilleures vacances à Zurich”.
- The English word-for-word translation: “I love the Switzerland because I spent my best vacation in Zurich”.
- Equivalent Arabic Sentence: “أنا أحب سويسرا لأنني قضيت أفضل عطلتي في زيوريخ”
- The English word-for-word translation: “I love Switzerland because I spent my best vacation in Zurich”.

The third language feature that could create a potential negative grammatical transfer from French into English was the wrong use of present perfect. In Arabic and English, the simple past tense is used to describe an event that happened or existed before now. In Arabic, there is only one form of past tense, which is the simple past tense. The following example illustrates the case:

- The Arabic sentence: “لعبت كرة السلة مع أصدقائي”
- The word-for-word translation which is also the correct version: ‘I played basketball with my friends’.

In French, the ‘*passé composé*’ tense (literally “compound past”) is used to describe an event that happened or existed before now. However, the conjugation of the “*passé composé*” tense is very similar to that of the present perfect in English. To form the *passé composé*, one needs a helping verb (the auxiliary verb, usually “*avoir*”) plus the past participle of the verb expressing the action. The present perfect in English is mainly used to describe an action that started in the past and continues in the present (e.g., she has played the piano ever since she was a teenager). This similarity in conjugation (form) and the dissimilarity in function between the *passé composé* and present perfect, creates a potential negative syntactic transfer from French into English. In summary, French students believe that the present perfect is the English version of the *passé composé*. This creates a negative grammatical transfer from French into English.

The following example illustrates the case:

- English sentence: “Yesterday Nicolas played baseball”.

- French equivalent sentence: “Hier Nicolas a joué au baseball”.
- The English word -for -word translation: “Yesterday Nicolas has played baseball”.
- English correct translation: “Yesterday Nicolas played baseball”.
- Arabic equivalent sentence: “أمس نيكولاس لعب البيسبول”
- The English word-for-word translation: “Yesterday, Nicolas played baseball”.

*Sentences selected for tests of learners’ ILK and ELK.* Table 5.3 and 5.4 show the sentences used to measure potential grammatical transfer in the participants’ ILK or ELM in the UGJT and OEITM. A description of these tests is presented in the next section .

In Table 5.3, for each target item designed to measure potential negative syntactic transfer from Arabic into English, six sentences were constructed. Three sentences were grammatically correct and three sentences were ungrammatical. The ungrammatical sentences reflect the potential negative syntactic transfer from Arabic into English. In summary, Table 5.3 presents 18 sentences, half of which are grammatically correct, and half of which are grammatically incorrect. The ungrammatical sentences reflect the potential negative grammatical transfer from Arabic into English

In Table 5.4 below, for each target item reflecting potential negative syntactic transfer from French into English, six sentences were constructed. Three sentences were grammatically correct, and three sentences were ungrammatical. The ungrammatical sentences reflect a potential negative syntactic transfer from French into English. Table 5.4 presents eighteen sentences. Half of these sentences are grammatically correct, and the remainder is grammatically incorrect. The ungrammatical sentences reflect the potential negative grammatical transfer from French into English. It is important to note that in Tables 5.3 and 5.4, some sentences are factually incorrect. The purpose of these sentences will be later described in the chapter.

**Table 5.3**

*Sentences reflecting on the potential of negative syntactic transfer from Arabic into English*

Settings/Arabic Language Features	Ungrammatical sentences	Grammatical sentences
Verb precedes subject	<ol style="list-style-type: none"> <li>1. I am encouraged because a good grade I had on the math exam.</li> <li>2. Billions of comments I had on my Facebook post.</li> <li>3. I am excited because positive corrective feedback I had on my article.</li> </ol>	<ol style="list-style-type: none"> <li>4. I am encouraged because I had a good grade on the math exam.</li> <li>5. I had billions of comments on my Facebook post.</li> <li>6. I am excited because I had positive corrective feedback on my article</li> </ol>
Pronoun object included in relative clauses	<ol style="list-style-type: none"> <li>1. The Mercedes-Benz car that I drive it is 7000 years old.</li> <li>2. The book that I am reading it is written by a famous writer.</li> <li>3. My girlfriend whom I love her lives in Berlin, Germany.</li> </ol>	<ol style="list-style-type: none"> <li>4. The Mercedes-Benz car that I drive is 7000 years old.</li> <li>5. The book that I am reading is written by a famous writer.</li> <li>6. My girlfriend whom I love lives in Berlin, Germany.</li> </ol>
The non-use of the verb “to be” when describing things in the present	<ol style="list-style-type: none"> <li>1. He happy because his father bought him a new pair of shoes</li> <li>2. They upset, because they forgot their backpack in the hotel in their last trip to the sun.</li> <li>3. She content, because her mother bought for her a new bicycle.</li> </ol>	<ol style="list-style-type: none"> <li>4. He is happy because his father bought him a new pair of shoes.</li> <li>5. They are upset because they forgot their backpack in the hotel on their last trip to the sun.</li> <li>6. She is content because her mother bought her a new bicycle.</li> </ol>

**Table 5.4**

*Sentences reflection on the potential of negative syntactic transfer from French into English.*

Settings/French Language Features	Ungrammatical sentences	Grammatical sentences
Wrong placement of object pronoun	<ol style="list-style-type: none"> <li>1. I him asked to put the food on the round table in the kitchen.</li> <li>2. I him failed in the exam because all his answers were irrelevant.</li> <li>3. I them admire because they donate money for poor people living on the moon.</li> </ol>	<ol style="list-style-type: none"> <li>4. I asked him to put the food on the round table in the kitchen.</li> <li>5. I failed him in the exam because all his answers were irrelevant.</li> <li>6. I admire them because they donate money for poor people living on the moon.</li> </ol>
A definite article is sometimes used for the proper noun of places.	<ol style="list-style-type: none"> <li>1. I love the Switzerland because I spent my best vacation in Zurich.</li> <li>2. I live in the Australia where the kangaroos are of 70 meters high.</li> <li>3. I admire the England because it is a friendly society.</li> </ol>	<ol style="list-style-type: none"> <li>4. I love Switzerland because I spent my best vacation in Zurich.</li> <li>5. I live in Australia where the kangaroos are 70 meters high.</li> <li>6. I admire England because it is a very friendly society</li> </ol>
Wrongly using present perfect	<ol style="list-style-type: none"> <li>1. Yesterday he has played baseball with his friends at the park</li> <li>2. One year ago, my oldest uncle has bought a car 8000 years old.</li> <li>3. Last night I have sold my old guitar for two thousand dollars</li> </ol>	<ol style="list-style-type: none"> <li>4. Yesterday, he played baseball with his friends at the park.</li> <li>5. One year ago, my oldest uncle bought a 8000 years old car.</li> <li>6. Last night, I sold my old guitar for two thousand dollars.</li> </ol>

*The Oral Elicited Imitation Test Plus Word Monitoring (OEITM).* The OEITM test is designed to measure L2 ILK (Suzuki & DeKeyser, 2015). Each of the three target items that have a potential negative syntactic transfer from Arabic into English is represented by six sentences, three of which are incorrect. Among these 18 sentences, half are correct. Five sentences are semantically incorrect. The same is the case for the three items that create the potential for negative syntactic transfer from French into English. This test is composed of 36 sentences. Each of these 36 sentences contains a stimuli word.

In summary the computerized OEITM used in this study is composed of 36 sentences. Among these sentences, 18 are grammatically correct (nine for Arabic target structures and nine for French target structures) and the other 18 sentences are grammatically incorrect (nine for Arabic target structures and nine for French target structures). Twelve of the 36 sentences are factually incorrect. All the 36 sentences have a stimuli word. The purpose of the stimuli words and the semantically incorrect sentences will be discussed in the section concerning OEITM procedures. All these sentences are presented in Tables 5.5 and 5.6. The stimuli words are written in red to be noticeable for the reader. The acronym “SI” (semantically incorrect) will be located at the end of every nonfactual sentence

**Table 5.5**

*Sentences Selected for OEITM -Potential Negative Syntactic Transfer from Arabic into English*

Settings/Arabic Language	Ungrammatical sentences	Grammatical sentences
Features		
Verb precedes subject	<ol style="list-style-type: none"> <li>1. I am encouraged because a good grade I <u>had</u> on the math exam.</li> <li>2. Billions of comments I <u>had</u> on my Facebook post. (S.I.)</li> <li>3. I am excited because positive corrective feedback I <u>had</u> on my article.</li> </ol>	<ol style="list-style-type: none"> <li>4. I am encouraged because I had a good grade on the math exam.</li> <li>5. I had billions of comments on my Facebook post (S.I.).</li> <li>6. I am excited because I had positive corrective feedback on my article.</li> </ol>
Pronoun object included in relative clauses	<ol style="list-style-type: none"> <li>1. The Mercedes-Benz car that I drive <u>it</u> is 7000 years old. (S.I.)</li> <li>2. The book that I am reading <u>it</u> is written by a famous writer.</li> <li>3. My girlfriend whom I love <u>her</u> lives in Berlin, Germany.</li> </ol>	<ol style="list-style-type: none"> <li>4. The Mercedes-Benz car that I drive is 7000 years old (S.I.).</li> <li>5. The book that I am reading is written by a famous writer.</li> <li>6. My girlfriend whom I love lives in Berlin, Germany.</li> </ol>
The non-use of the verb “to be” when describing things in the present	<ol style="list-style-type: none"> <li>1. He <u>happy</u> because his father bought him a new pair of shoes</li> <li>2. They upset because they forgot their backpack in the hotel in their last to the sun (S.I)</li> <li>3. She <u>content</u> because her mother bought for her a new bicycle.</li> </ol>	<ol style="list-style-type: none"> <li>4. He is happy because his father bought him a new pair of shoes.</li> <li>5. They are upset because they forgot their backpack in the hotel on their last trip to the sun (S.I).</li> <li>6. She is content because her mother bought her a new bicycle.</li> </ol>

**Table 5.6**

*Sentences Selected for OEITM-Potential Negative Syntactic Transfer from French into English)*

Settings/French Language Features	Ungrammatical sentences	Grammatical sentences
Wrong placement of object pronoun	<ol style="list-style-type: none"> <li>1. I him asked to put the food on the round table in the kitchen.</li> <li>2. I him failed in the exam because all his answers were irrelevant.</li> <li>3. I them admire because they donate money for poor people living on the moon. (S.I).</li> </ol>	<ol style="list-style-type: none"> <li>4. I asked him to put the food on the round table in the kitchen.</li> <li>5. I failed him in the exam because all his answers were irrelevant</li> <li>6. I admire them because they donate money for poor people living on the moon. (S.I).</li> </ol>
A definite article is sometimes used for the proper noun of places.	<ol style="list-style-type: none"> <li>1. I love the Switzerland because I spent my best vacation in Zurich.</li> <li>2. I live in the Australia where the kangaroos are of 70 meters high (S.I.)</li> <li>3. I admire the England because it is a friendly society.</li> </ol>	<ol style="list-style-type: none"> <li>4. I love Switzerland because I spent my best vacation in Zurich.</li> <li>5. I live in Australia where the kangaroos are 70 meters high (S.I.)</li> <li>6. I admire England because it is a very friendly society.</li> </ol>
Wrongly using present perfect	<ol style="list-style-type: none"> <li>1. Yesterday he has played baseball with his friends at the park</li> <li>2. One year ago my oldest uncle has bought a car 8000 years old. (S.I.)</li> <li>3. Last night I has sold my old guitar for two thousand dollars</li> </ol>	<ol style="list-style-type: none"> <li>4. Yesterday he played baseball with his friends at the park.</li> <li>5. One year ago, my oldest uncle bought a car 8000 years old. (S.I.)</li> <li>6. Last night I sold my old guitar for two thousand dollars.</li> </ol>

In the main study, the OEITM procedure involved the following steps: (a) processing an auditory stimulus sentence, (b) evaluating whether the sentence is factually correct, and c) imitating the sentence. The word monitoring paradigm was utilised to make this task a dual one. The stimulus word of each sentence was shown in the middle of the screen, and the subjects were asked to click a designated keyboard button as quickly as possible upon hearing the word in the presented sentence. There was a two-second gap between reading the word on the screen and hearing the sentence. Immediately after hearing the sentence, a question appeared in the middle of the screen: “Was the sentence you heard factually correct?” Participants had to click the right arrow of the keyboard to indicate that the sentence presented was semantically correct and the left arrow to show that the sentence was semantically incorrect. This question ensured that the students had processed the semantic meaning of the sentence. Participants were given three seconds to reach a decision. A countdown from three to one appeared in the centre of the screen.

Participants were asked to imitate the presented sentence. Participants were told that the imitation of each sentence had to be as accurate as possible and must be made within four seconds. Another countdown from four to one appeared in the centre of the screen. The participants’ responses were audio recorded. If the participants failed to produce the imitation in four seconds, the screen immediately went blank, with the computerised OEITM moving onto the next sentence. Participants were not expected to produce the stimulus sentences verbatim (i.e., they may change the words to express the same meaning).

The researcher appointed four seconds for imitation due to the following reasons: a) two seconds is the maximum time interval needed for information to decay from short-term phonological memory without rehearsing or refreshing it (Baddeley et al., 1975); b) the time interval of four seconds may prevent participants’ responses to be based on short-term memory;

c) this time interval may ensure that the participants drew on their ILK because they were relatively time-pressured in their responses.

Below is an example of the procedure for a stimulus sentence involving the potentially incorrect use of the definite article with place names by an Arabic speaker of English.

Example 1) President George Bush lives in the Lebanon. (Factually and grammatically incorrect)

- 1- The word Bush will appear in the middle of the screen for three seconds.
- 2- Participants will press a button when they hear the word Bush.
- 3- Participants will declare in three seconds if the sentence is factually correct or not by clicking on the designated buttons.
- 4- Participants will have four seconds to imitate the sentence presented as accurate as possible.

A digital bell was rung, indicating the end of the time to respond. Then a blank screen appeared. The next sentence followed when the participant clicked on the space button. The sentences were composed of high-frequency vocabulary as the purpose of this test is not to examine subjects' L3 lexical capability. These words are selected from the 5000 most frequently used words in English listed in the Frequency Dictionary of contemporary American English by Davies and Gardner (2013). The speed of the recorded voice is equal to the average rate of a newscaster in an English program. That is, each sentence exceeds the span of 1.5–2.0 seconds (the time it takes for information to decay from phonological short-term memory without rehearsal or refreshing information). The position of the stimuli word varied. The stimuli word was any word in the sentence except the target item and the first word. This

strategy was applied to ensure participants could randomly guess the position of the target word.

According to Ellis et al. (2009). , for a test to measure ILK, the following three factors must be taken into account: 1) time pressure 2) participants during the task should focus on meaning rather than form 3) participants' answers should not draw on metalinguistic knowledge (Ellis et al., 2009). The OEITM used in this study meets these criteria. This task concerns L2/L3 English grammatical knowledge, and it is time-pressured. The OEITM included 'nonfactual sentences to distract participants' from attending to form rather than meaning. The idea was to induce processing of the grammatical forms without awareness. It was expected that participants would be able to repeat an ungrammatical sentence in correct English if they possessed the knowledge to enable them to do so.

The scoring was done separately for correct judgment scores and incorrect judgment scores. Correct judgment scores were indicative of a potential positive grammatical transfer from Arabic or French into English. Incorrect judgment scores were indicative of a potential negative grammatical transfer from Arabic or French into English. Detailed explanation about this is presented in the analysis section. The researcher was also aware that incorrect judgment scores could solely be the result of a lack of English language proficiency.

To ensure that participants' responses tap into their ILK the following conditions had to be met: a) Participants had to press on the designated button when they heard the stimuli words. This was to induce participants' processing of the grammatical form of the sentences presented without awareness; b) Participants had to be able to say whether the sentence was factually correct – this shows that participants were focusing on the meaning rather than the form of the sentence presented. The fulfilment of these conditions provided evidence to suggest that answers may tap into the participants' ELK of English.

*The UGJT.* The UGJT is a computerised test designed to examine the participants' L2 ELK (Ellis et al., 2009). The UGJT in this study consists of the same 36 sentences presented in the OEITM task. The sentences can be found in Tables 5 and 6 previously presented. The test measures four things: judgment accuracy, the certainty of judgment, the type of knowledge utilised in making the judgment, and the learner's ability to correct an ungrammatical sentence.

First, sentences were sequentially presented in writing, one at a time on a computer screen in the form of a random distribution. Second, participants were asked to indicate if each sentence was grammatically correct or ungrammatical by entering G or UG for each sentence. Thirdly, participants were asked to indicate the degree of certainty of their decisions by choosing from a scale of one to five, where five is "very certain", four is "certain", three is "quite certain", two is "uncertain" one is a "complete guess". Fourth, participants were required to specify if their decision was based on "feel" or "rule". Finally, participants were asked to correct a sentence if they judged it to be ungrammatical. The computerised UGJT stored the answers automatically.

The following example illustrates what participants had to do. The example is a sentence involving an error resulting from the wrong use of the present perfect tense:

- 1) The following sentence will appear on the computer screen: "He has played football yesterday at 5 pm".
- 2) Participants will click "UG" on the screen if they think the sentence presented is ungrammatical or "G" if they think it is grammatical
- 3) Participants will click "RULE" on the screen if they thought about a grammatical rule when making the judgment. If participants indicate rule, they are asked to state the rule. Participants will click "FEEL" if their answers were based on their intuition.

- 4) Participants will indicate the level of certainty of their judgment.
- 5) Participants will write out the sentence correctly if they judge it as ungrammatical.

According to Ellis et al. (2009). , for a test to measure ELK, the following three factors must be taken into account: 1) certainty of judgment, 2) the ability to correct an ungrammatical sentence, 3) time availability for answers. Furthermore, many researchers have found that the UGJT is a valid task measuring ELK of a given language (Bowles, 2011; R. Ellis, 2005; Erlam, 2006; Gutiérrez, 2013; Kim & Nam, 2017; Suzuki & DeKeyser, 2015, 2017; Zhang, 2015).

The scoring was done separately for correct judgment scores and incorrect judgment scores. Correct judgment scores were indicative of a potential positive grammatical transfer from Arabic or French into English. Incorrect judgment scores were indicative of a potential negative grammatical transfer from Arabic or French into English. Detailed explanation about this is presented in the Analysis section. The researcher was also aware that incorrect judgment scores could solely be the result of a lack of English language proficiency.

This task was designed to examine if this transfer occurred in students' ELK. To witness negative syntactic transfer in students' ILK of English, the following criteria were applied for scores on both the grammatical and the ungrammatical sentences; a) Participants' decision must be based on "rule" not on "feeling", and b) Participants must be sure of their decision. Only "certain" and "very certain" answers are selected. If these conditions were applied, this will further justify the claim that participants counted on their ELK in their answers.

#### ***5.4.5 General procedure***

After the imposition of travel restrictions following the advent of the global Coronavirus pandemic (Covid-19), I decided to collect the data remotely. Online data collection for the native speakers of English occurred between 1/6/2020 and 15/6/2020. Data collection for the Lebanese participants was undertaken between 1/5/2020 and 1/9/2019. I recruited an Information Technology (IT) professional from Lebanon. The IT professional's job entailed the digitalisation of the LHQ, the tests and the creation of a website for the digitalised questionnaire and test. The URL to the website is <http://nicolastestss.epizy.com/home.html>. This website was designed to permit the storage of the data (answers) on a server. Participants' answers on the LHQ and both versions of C-tests (French & English) were stored separately on PDF files. Participants' answers on UGJT, OEITM, Yes and No Test (aural) and Yes and No Test (written) were stored separately on excel files. For OEITM, the data included an additional audio recorded file. This was to record participants' verbal reproduction of test items (N=36). The data sets were sent to me on a daily basis via emails. The data sets were deleted from the server once it was sent to me to protect participants' confidentiality. During data collection the IT professional was an on the ground expert able to resolve any technical problems as they arose. Being in the same time zone was very helpful in this regard. This data collection was conducted on a daily basis.

The Graduate Research School at Curtin University reimbursed the cost associated with hiring an IT professional. This reimbursement was approved after the researcher met the requirements of the office in supplying the following items:

- a) Proof of the IT professional's qualifications
- b) IT practioners' contact details

c) Scope of the IT work (digitalisation of tests and development of website).

This research satisfied the requirements of Curtin University's Human Research Ethics Committee. It also received formal approval from the Lebanese American University (LAU). All participants' voluntarily consented to participate in the study. During recruitment, the purpose and scope of the study were explained to potential candidates (via emails). On the 25/05/2020 the research mediator in the LAU was contacted. The mediator agreed to collect the data online and to obey social and travel restrictions related to the Covid 19 pandemic. The mediator gave me a list of student emails to enable communication to be initiated.

Participants were asked to sign and return a consent form to me after being assured they were free to refuse to participate. They were informed of the purpose of the study, its theoretical background, the methods to be used, and the length of the tests to be undertaken. Also, participants were advised they would be provided with the outcomes of the research and informed about possible future publications. Complete confidentiality of the participants was assured. Participants were free to withdraw at any time without justification. All these matters were clarified in emails sent before the commencement of the study. All the participants were asked to complete the tests in three days. On the first day the LHQ was completed followed by the C-tests (English & French) respectively. On the second day the OEITM and the UGJT respectively were completed. On the final day the Yes and No Test (aural) version followed by the Yes and No Test (written) were completed. Participants had a 20-minute break between tests. To collect the data, the researcher needed four months from 1/5/2020 till 1/9/2019.

#### ***5.4.6 Analysis***

In addition to the Language History Questionnaire (LHQ) (languages background), this research included six language tests comprising two C-tests, one in English and the other in

French to measure respectively the participants' English and French proficiency. Four other tests were included to answer the research questions. The OEITM was intended to measure students' ILK for English grammar. The Yes and No Test (aural) was intended to measure students' ILK of English lexis. The UGJT was intended to measure students' ELK of English grammar. The Yes and No Test (aural) was intended to measure students' ILK of English lexis. These tests included specific items selected to investigate lexical transfer (N=265) and grammatical transfer (N=36) from previously learned language(s) Arabic and/or French into participants' English. There were three groups. Group A participants were the native speakers of L1 English (n=10). Group B participants had L1 Arabic, L2 English and L3 French (n=35). Group C included participants with L1 Arabic, L2 French and L3 English (n=35).

To begin with, I computed descriptive statistics for the three groups of participants' (A, B and C) answers in the tests. This included the mean average scores and standard deviations for the six tests. The C-test French and English were scored using the "exact word method". The scoring of the OEITM consisted of examining whether a) the participants corrected the ungrammatical sentences and, b) whether they successfully reproduced the grammatical sentences. The scoring of the UGJT was similarly based on a) whether the participants judged the ungrammatical sentences as grammatical and b) the grammatical sentences as grammatical. However, in this test, participants' judgments were only considered correct if they had also indicated that they were based on "rule" not "feeling", and if they had indicated they were sure of their decisions. In other words, only "certain" and "very certain" responses were considered to constitute correct answers (see description of this test on p. 36-37). These two conditions (rule-based and certain answers) reflected the purpose of the UGJT, which was to measure the careful use of English as opposed to spontaneous language use. In the Yes and No Test (aural) points were awarded if participants successfully recognized a word as being English. In the

Yes and No Test (written), points were awarded if the participants were able to recognize a word as being English and also provide a definition.

For the non-native participants (groups A & B, n=70) I conducted the Test of Normality (Shapiro Wilk) to determine if test scores were normally distributed. This applied to the OEITM, UGJT, UGJT Ungrammatical, UGJT Grammatical, and Yes and No Test (aural), Yes and No Test (written). Scores on the UGJT Grammatical denote participants' accurate recognition of grammatical items as grammatically correct sentences. Scores on the UGJT ungrammatical pertain to the participants' recognizing the grammar errors in the ungrammatical sentences and correcting them.

The reliability of the study's test was calculated using Cronbach alpha. This was applied to scores of the following groups: A, B, C and combined non-native participants (B&C) in the UGJT, UGJT grammatical, UGJT ungrammatical, OEITM, Yes and No Test (aural) and Yes and No Test (written). The interrelationships between the various tests scores for groups A, B, C and non- native participants were investigated using appropriate correlational statistics.

In the following sections I will describe how the research questions were answered.

*RQ1) "Do the selected tests provide a separate measure of the participants' ILK and ELK"*

A Principal Axis Factor Analysis of the non-native learners' test scores was carried out. The rotation method used was the Varimax with Kaiser Normalization (SPSS Version 26). This Exploratory Factor Analysis (EFA) was undertaken to investigate whether the tests afforded separate measures of ILK vs ELK. The researcher predicted that the OEIT and Yes

and No Test (aural) would measure participants' ILK and the UGJT and Yes and No Test (written) participants' ELK.

*RQ2) "Are there any differences in the grammatical transfer of Arabic and French into English between Group B (L3 English) and Group C (L2 English)?"*

For OEITM this question was answered by investigating positive and negative grammatical transfer from Arabic and French into English in participants' answers. This involved four steps:

*A) Investigating positive syntactic transfer from Arabic into English in Group B and C*

Participants' scores on items 19 to 36 were indicative of positive grammatical transfer from Arabic into English. These items reflect grammatical features whose use in French is deemed grammatically incorrect, and use in Arabic and English is considered grammatically correct. Descriptive statistics (mean and standard deviation) on scores demonstrating positive syntactic transfer from Arabic into English for items 19 to 36 were conducted. These scores included:

- Participants' reproductions that altered the ungrammatical sentences by making them grammatically correct.
- Participants' reproductions of the grammatical sentences without introducing any ungrammatical error to them.

As the scores were not normally distributed, a Mann Whitney Test (non- parametric test) was computed (2 groups x 1 measure) to examine if the groups differed in scores, demonstrating positive grammatical transfer from Arabic into English for items 19 to 36 (see

Appendix E, Table 6). The results were used to assess whether Group B or Group C was more inclined to make a positive grammatical transfer from Arabic to English.

*B) Investigating positive grammatical transfer from French into English in Group B and C.*

Participants' scores on items one to eighteen provide evidence of positive grammatical transfer from French into English. These items reflect grammatical features whose use in Arabic is considered grammatically incorrect, but in French and English is considered grammatically correct.

Descriptive statistics (mean and standard deviation) *on scores demonstrating positive grammatical transfer from French into English* for items one to eighteen was conducted. These scores included:

- Participants' reproductions that altered the ungrammatical sentences by making them grammatically correct.
- Participants' reproductions of the grammatical sentences without introducing any ungrammatical errors.

As the scores were not normally distributed, a Mann Whitney Test (non- parametric test) was computed (2 groups x 1 measure) to examine if the groups differed in scores demonstrating positive grammatical transfer from French into English for items one to eighteen (see Appendix E, Table 5). The results were used to assess whether Group B or Group C was more inclined to make a positive grammatical transfer from French to English.

*C) Investigating negative syntactic transfer from Arabic into English in Group B and C.*

I analysed items one to eighteen in order to investigate whether Group B or Group C was more inclined to make negative grammatical transfer from Arabic to English. Nine items were ungrammatical, and the other items were grammatically correct. Negative grammatical transfer from Arabic into English can occur because the ungrammatical sentences reflect grammatical features whose use in Arabic is considered grammatically incorrect, but in French and English is considered grammatically correct. Descriptive statistics (mean and standard deviation) for items one to eighteen were conducted. These scores included:

- Participants' reproductions of the ungrammatical sentences without correcting them.
- Participants' reproductions that altered the grammatically correct sentences into ungrammatical sentences by introducing an error into the target feature (i.e., the feature that was predicted to induce negative syntactic transfer from Arabic into English).

As the scores were not normally distributed, a Mann Whitney Test was computed (2 groups x 1 measure) to examine if the groups differed in scores demonstrating negative grammatical transfer from Arabic into English for items one to eighteen (see Appendix E, Table 5). The results were used to assess whether Group B or Group C was more inclined to make a negative grammatical transfer from Arabic to English.

*D) Investigating negative grammatical transfer from French into English in Group B and C.*

Finally, I analysed items 19-36 in order to investigate which group (B or C) was more inclined to make negative grammatical transfer from French to English. Nine items were ungrammatical, and the other items were grammatically correct. Negative grammatical transfer from French into English can occur because the ungrammatical sentences reflect grammatical features whose use in French is considered grammatically incorrect while in Arabic and English it is considered grammatically correct. Descriptive statistics (mean and standard deviation) on scores demonstrating negative syntactic transfer from French into English for items 19-36 were conducted. These scores included:

- Participants' reproductions of the ungrammatical sentences without correcting them.
- Participants' reproductions that altered the grammatically correct sentences into ungrammatical sentences by introducing an error into the target feature (i.e., the feature that was predicted to induce negative grammatical transfer from French into English).

As the scores were not normally distributed, a Mann Whitney Test was computed (2 groups x 1 measure) to examine if the groups differed in scores demonstrating negative grammatical transfer from French into English for items 19 to 36 (see Appendix E, Table 6). The results were used to assess whether Group B or Group C was more inclined to make a negative grammatical transfer from French to English.

For UGJT, I followed the same four steps and applied the same statistical approaches used to answer RQ2 for OEITM. RQ2 stated as follows:

“Are there any differences in the grammatical transfer of Arabic and French into English between Group B (L3 English) and Group C (L2 English)?”

*A) Investigating positive grammatical transfer from Arabic into English in Group B and C*

Participants' scores on items 19 to 36 would be indicative of positive grammatical transfer from Arabic into English. These items reflect grammatical features whose use in French is deemed grammatically incorrect and use in Arabic and English is considered grammatically correct. Descriptive statistics (mean and standard deviation) on scores demonstrating positive syntactic transfer from Arabic into English for items 19 to 36 were computed. These scores included:

- Participants' accurate recognition of grammatical items as grammatically correct sentences (Items: 19 - 36).
- Participants' recognising the grammar error in the ungrammatical sentences and correcting it (Items: 19-36).

As the scores were not normally distributed, a Mann Whitney Test was computed (2 groups x 1 measure) to examine if the groups differed in scores demonstrating positive grammatical transfer from Arabic into English for items 19 to 36 (see Appendix E, Table 6). The results were used to assess whether Group B or Group C was more inclined to make a positive grammatical transfer from Arabic to English.

*B) Investigating positive grammatical transfer from French into English in Group B and C.*

Participants' scores on items one to eighteen provided evidence of positive grammatical transfer from French into English. These items reflect grammatical features whose use in Arabic is considered grammatically incorrect, but in French and English is considered grammatically correct.

Descriptive statistics (mean and standard deviation) on scores demonstrating positive grammatical transfer from French into English for items one to eighteen were conducted. These scores included:

- Participants' accurate recognition of grammatical items as grammatically correct sentences (Items 1-18).
- Participants' recognising the grammar error in the ungrammatical sentences and correcting it (Items: 1 -18).

As the scores were not normally distributed, a Mann Whitney Test was computed (2 groups x 1 measure) to examine if the groups differed in scores demonstrating positive grammatical transfer from French into English for items one to eighteen (see Appendix E, Table 5). The results were used to assess whether Group B or Group C was more inclined to make a positive grammatical transfer from French to English.

*C) Investigating negative syntactic transfer from Arabic into English in Group B and C.*

I analysed items one to eighteen in order to investigate whether Group B or Group C was more inclined to make negative grammatical transfer from Arabic to English. Nine items

were ungrammatical, and the other items were grammatically correct. Negative grammatical transfer from Arabic into English can occur because the ungrammatical sentences reflect grammatical features whose use in Arabic is considered grammatically incorrect, but in French and English is considered grammatically correct. Descriptive statistics (mean and standard deviation) for items one to eighteen were conducted. These scores included:

- Participants' judgements of ungrammatical items as grammatically correct sentences (Items 1-18).
- Participants' recognition of grammatical sentences as grammatically incorrect sentences and reconstruction of them by introducing an error in the targeted grammatical features (Items 1-18).

As the scores were not normally distributed, a Mann Whitney Test was computed (2 groups x 1 measure) to examine if the groups differed in scores demonstrating negative grammatical transfer from Arabic into English for items one to eighteen (see Appendix E, Table 5). The results were used to assess whether Group B or Group C was more inclined to make a negative grammatical transfer from Arabic to English.

*D) Investigating negative grammatical transfer from French into English in Group B and C.*

Finally, I analysed items 19-36 in order to investigate which group (B or C) was more inclined to make negative grammatical transfer from French to English. Nine items were ungrammatical, and the other items were grammatically correct. Negative grammatical transfer from French into English can occur because the ungrammatical sentences reflect grammatical features whose use in French is considered grammatically incorrect while in Arabic and English

it is considered grammatically correct. Descriptive statistics (mean and standard deviation) on scores demonstrating negative syntactic transfer from French into English for items 19-36 were calculated. These scores included:

- Participants' judgements of ungrammatical items as grammatically correct sentences (Items 19-36).
- Participants' recognition of grammatical sentences as grammatically incorrect sentences and reconstruction of them by introducing an error in the targeted grammatical features (Items 19-36).

As the scores were not normally distributed, a Mann Whitney Test was computed (2 groups x 1 measure) to examine if the groups differed in scores demonstrating negative grammatical transfer from French into English for items 19 to 36 (see Appendix E, Table 6). The results were used to assess whether Group B or Group C was more inclined to make a negative grammatical transfer from French to English.

*RQ3) Are there any differences in the lexical transfer of Arabic and French into English between Group B (L3 English) and Group C (L2 English)?*

In the Yes and No Test (aural), the descriptive statistics (mean and standard deviation) for the scores on Arabic-English true cognate words (N=44) and French-English true cognate words (N=150) were calculated for Group B (L3 English) and Group C (L2 English). To assess whether Group B and Group C differed in their use of Arabic-English true cognate words, a Mann Whitney Test was conducted (2 groups, 1 measure) as the scores were not normally distributed. Participants' recognition of Arabic-English true cognate words were taken as

indicative of positive lexical transfer from Arabic into English. To examine whether Group B and Group C differed in their use of French- English true cognate words, I conducted a Mann Whitney Test (2 groups, 1 measure) as the scores were not normally distributed. Participants' recognition of French-English true cognate words would be indicative of positive lexical transfer from French into English.

Group B and Group C scores on infrequent French-English true cognate words (N=75) and frequent French-English true cognate words (N=75) were calculated. Participants' recognition of infrequent and frequent "French-English" true cognate words would be indicative of positive lexical transfer from French into English. To examine whether Group B and Group C differed in their use of infrequent French-English true cognate words, I conducted a Mann Whitney Test (2 groups, 1 measure) as the scores were not normally distributed. To assess whether Group B and Group C differed in their use of frequent Arabic-English true cognate words I conducted a Mann Whitney Test (2 groups, 1 measure) as the scores were not normally distributed. Statistically significant differences in the amount of positive lexical transfer between infrequent and frequent French-English true cognate words between Group B and Group C were taken as indicating the effect of the frequency of use of French-English true cognate words on positive grammatical transfer from French into English.

I conducted descriptive statistics (mean and standard deviation) on participants' recognition of French-English false cognate words (N=31) as English words for Group B and Group C. Participants' recognition of French-English false cognate words as English words served as indicators of negative lexical transfer from French into English. To assess whether Group B and Group C differed in the amount of negative lexical transfer from French into English, I conducted a Mann Whitney Test (2 groups, 1 measure) as scores were not normally distributed.

Scores demonstrating negative lexical transfer from French into English comprised:

- a) Participants' recognition of French-English false cognate words (first phase).
- b) Participants' indicating that their answers were based on them recalling the meaning of these words in French during the test in the post-task report.

#### A. Yes and No Test (written)

For the Yes and No Test (written), I applied the same statistical approach used to answer research RQ3: *Are there any differences in the lexical transfer of Arabic and French into English between Group B (L3 English) and Group C (L2 English)?*

To determine whether a point should be awarded for a correct answer to Arabic-English and French- English true cognate words, I examined the participants' definitions of the words they claimed to recognise. Only correctly defined words were scored. Correct answers on Arabic-English true cognate words (N=44) would be indicative of positive lexical transfer from Arabic into English. Correct answers on French-English true cognate words (N=150) were indicative of positive lexical transfer from French into English. When participants recognised a French-English false cognate word (N=31) as an English word, and defined it with its French meaning, no point was awarded. These types of answers were taken to be indicative of negative lexical transfer from French into English.

## Chapter 6. Investigating the participants' ILK and ELK of lexis and grammar

### 6.1 Introduction:

This study aimed to investigate the relative effects of lexical and grammatical transfer from Arabic (L1) and French (L2/L3) into English (L2/L3). A unique feature of the study is the attempt to investigate this lexical and grammatical transfer in both Implicit Linguistic Knowledge (ILK) and Explicit Linguistic Knowledge (ELK) of learners' English. To examine if there are grounds for claiming that the battery of tests provides separate measures of ILK and ELK, in the first section of this chapter, I will address Research Question 1 (RQ1), namely "Do the selected tests provide a separate measure of ILK and ELK?"

This section reports the results of the battery of tests designed to provide separate measures of ILK and ELK. In other words, it investigates RQ1; "Do the selected tests provide a separate measure of ILK and ELK?" This section includes the following: 1) Descriptive statistics for the tests, 2) Reliability measures, 3) Normality Test 4) Correlations, and 5) Factor analysis results (RQ1).

#### *6.1.1 Descriptive statistics*

Table 6.1 presents the mean average scores and standard deviations for the six tests for the three groups of participants (A, B and C). The native speakers (Group A) achieved scores close to 100% on all tests except the C-Test (French) where they scored zero. On the remaining tests the native speakers' scores exceeded those of the L3 English (Group B) and the L2 English (Group C). The results reported in Table 6.1 reveal differences in the relative difficulty of the tests. Group A results manifest a low level of difficulty, with the mean average scores ranging

from 91.59 % to 97.18%. Results (M=0%) for Group A participants confirm that this group demonstrated an absence of French knowledge. For Group B participants, the OEITM was the most difficult test demonstrating a “moderate level” of difficulty (M=61.9%). Scores in the remaining tests were higher, ranging from 69.5% to 83.97%. For Group C participants, the C-test in French was the most difficult test (M = 54.72%). The remaining tests were easier with mean average scores ranging from 68.43% to 88.117%.

**Table 6.1***Descriptive Statistics for The Six Tests*

<i>Tests</i>	<i>Group A (L1 English)</i>		<i>Group B (L3 English)</i>		<i>Group C (L2 English)</i>	
	<i>(n=10)</i>		<i>(n=35)</i>		<i>(n=35)</i>	
	Mean	SD	Mean	SD	Mean	SD
	Percentage		Percentage		Percentage	
C-Test English	97.18	1.8	80.84	7.8	88.11	7.2
C-Test French	0	0	87	8.4	54.72	3.7
UGJT	92.50	7.6	78.81	9.3	86.98	6.89
UGJT ungrammatical	87.78	.14	73.65	12.3	85.87	9.9
UGJT Grammatical	96.67	.03	83.97	9.8	88.10	9.7
OEITM	92.22	6.3	61.9	8.6	82.09	7.3
Yes and No Test (written)	96.19	2.1	69.5	3.6	84.08	7.3
Yes and No Test (aural)	91.59	4.6	74.17	10.1	68.43	9.05

## 6.2 Reliability

Table 6.2 shows the measures of reliability (Cronbach alpha) for the grammar and lexical tests for the three groups of participants (A, B and C) and also for the combined non-native participants (A+B). For Group A, the UGJT was moderately reliable ( $\alpha=.65$ ). The remaining tests demonstrated adequate reliability ( $\alpha \geq 0.7$ ). For Group B, the grammatical and ungrammatical UGT scores demonstrated moderate reliability; scores were respectively ( $\alpha=.632$ ,  $\alpha=.648$ ). For Group B the UGJT, OEITM and both versions of the Yes and No tests showed adequate reliability ( $\alpha \geq 0.7$ ). For Group C all tests manifested a statistically significant reliability except the UGJT grammatical ( $\alpha=.514$ ). For the non-native participants, combined scores on the UGJT grammatical and ungrammatical demonstrated only moderate reliability, where the scores were respectively ( $\alpha=.632$ ,  $\alpha=.648$ ).

**Table 6.2**

*Reliability Measures on the Six Tests*

Participants	Tests	Number of items	Reliability
<i>Group A Natives (n=10)</i>	UGJT	36	$\alpha= .701$
	UGJT Ungrammatical	18	$\alpha=.756$
	UGJT Grammatical	18	$\alpha=.65$
	OEITM	36	$\alpha= .736$
	Yes and No Test (written)	265	$\alpha=.879$
	Yes and No Test (aural)	265	$\alpha= .893$
	UGJT	36	$\alpha=.729$
	UGJT Ungrammatical	18	$\alpha=.632$

<i>Group B</i>	UGJT Grammatical	18	$\alpha=.648$
<i>L3 English</i>	OEITM	36	$\alpha=.708$
<i>(n=35)</i>	Yes and No Test (written)	265	$\alpha=.708$
	Yes and No Test (aural)	265	$\alpha=.937$
	UGJT	36	$\alpha= .703$
	UGJT Ungrammatical	18	$\alpha=.717$
<i>Group C</i>	UGJT Grammatical	18	$\alpha=.514$
<i>L2 English</i>	OEITM	36	$\alpha= .704$
<i>(n=35)</i>	Yes and No Test (written)	265	$\alpha=.914$
	Yes and No Test (aural)	26	$\alpha= .883$
	UGJT	36	$\alpha= .707$
	UGJT Ungrammatical	18	$\alpha=.514$
<i>Non</i>	UGJT Grammatical	18	$\alpha=.537$
<i>Native</i>	OEITM	36	$\alpha= .711$
<i>Participants</i>	Yes and No Test (written)	265	$\alpha=.941$
<i>(n=70)</i>	Yes and No Test (aural)	265	$\alpha= .928$

### 6.3 Normal distribution of the tests' scores

Table 6.3 shows the results of the tests of normality for the tests. The UGJT, UGJT ungrammatical, UGJT grammatical, and Yes and No Test (written) test p-values are less than the value of  $\alpha$  (.05) indicating that their data are not normally distributed. The scores on the OEITM and Yes and No Test (aural) tests are normally distributed. Concerning the subsequent

analyses, use was made of non-parametric statistics, as these are applicable in cases where scores are not normally distributed.

**Table 6.3**

*Test of Normality*

Tests	Shapiro Wilk		
	W	Df	Sig
UGJT	.962	70	.039*
UGJT Ungrammatical	.947	70	.005**
UGJT Grammatical	.932	70	.001***
OEITM	.967	70	.062
Yes and No Test (written)	.930	70	.001***
Yes and No Test (aural)	.975	70	.181

\*p < .05. \*\*p < .01. \*\*\*p < .001

**6.4 Correlational matrix for the five tests**

Table 6.4 shows the correlations among the five tests for the non-native participants (n=70). For the correlation analysis, I computed the Spearman's rank correlation coefficient. This test is the nonparametric version of the Pearson correlation coefficient. The Spearman correlation analysis is used instead of Pearson correlation coefficient because test scores are not normally distributed (Table 6.3, page 213).

UGJT Total correlated significantly with all test scores at the 0.01 level and above. UGJT Ungrammatical correlated significantly with all test scores at the 0.05 level and above except for Yes and No Test (aural) ( $r=-.166$ ). The UGJT Grammatical correlated significantly with UGJT Total ( $r=.737^{**}$ ) and UGJT Ungrammatical ( $r=.292^{*}$ ) but not with any of the other tests. The OEITM was not significantly correlated with the UGJT Grammatical ( $r=.198$ ) or the C-

Test English ( $r=.139$ ) whereas it was significantly correlated with the remaining tests at the 0.01 level.

The Yes and No Test (written) was not significantly correlated with Yes and No Test (aural) ( $r=-.207$ ) and UGJT Grammatical( $r=.077$ ), whereas it was significantly correlated with the remaining tests at the 0.05 level and above. The Yes and No Test (aural) was found to be significantly correlated only with the OETM ( $r= -.405^{**}$ ) and UGJT Total ( $-.001^{**}$ ) at the 0.01 level and above. The C-test English was found to be significantly correlated only with UGJT Total ( $r=.437^{**}$ ), UGJT Ungrammatical ( $r=.400^{**}$ ) and Yes and No Test (written) ( $r= .299^*$ ) at the 0.01 level and above.

**Table 6.4***Correlational Matrix for the Five Tests*

Test	<i>UGJT Total</i>	<i>UGJT Ungrammatical</i>	<i>UGJT Grammatical</i>	<i>OEITM</i>	<i>Yes and No Test (written)</i>	<i>Yes and No Test (aural)</i>	<i>C-test English</i>
<i>UGJT Total</i>		.860**	.737**	.427 **	.358**	-.001**	.437**
<i>UGJT Ungrammatical</i>			.292*	.422 **	.333**	-.166	.400**
<i>UGJT Grammatical</i>				.198	.077	-1.95	.139
<i>OEITM</i>					.711**	-.405**	.139
<i>Yes and No Test (written)</i>						-.207	.299*
<i>Yes and No Test (aural)</i>							-.189

\*p&lt;.05. \*\*p&lt;.01

**6.5 Exploratory factor analyses**

A Principal Axis Factoring (PFA) of the non-native learners' test scores was carried out. Concerning the sample size (first issue), an Exploratory Factor Analysis (EFA) is generally regarded as a technique suitable for a large sample size (N), with N = 50 as a minimum (Jung & Lee, 2011). This condition was satisfied as the sample size in this study is N=70. Moreover,

the Bartlett's test of sphericity of the study's data was statistically significant ( $p \leq 0.05$ ) (see., Kaiser, 1970, 1974). Furthermore, the Kaiser-Meyer-Olkin (KMO) index was also statistically significant (KMO index  $> 0.554$ ) (see., Tabachnick & Fidell, 2013).

An Exploratory Factor Analysis (EFA) was undertaken to investigate whether the tests afforded separate measures of ILK vs ELK. The researcher predicted that the OEITM and Yes and No Test (aural) would measure participants' ILK and the UGJT Ungrammatical and Yes and No Test (written) participants' ELK. The UGJT grammatical was excluded because it does not correlate with the other tests. Table 6.5 reports the Eigenvalue of the two factors. The two factors accounted for 76.4% of the total variance. Table 6.6 shows the results of the Principal Axis Factoring of the non-native learners' test scores. The rotation method used was the Varimax with Kaiser Normalization. I requested a two-factor solution. This decision was made to comply with the original design of the tests, which was to measure two distinct constructs - ILK vs ELK. Results demonstrated that tests loading on Factor 1 were UGJT Ungrammatical (.414), OEITM (.881) and Yes and No Test (written) (.896), while the tests loading on Factor 2 were Yes and No Test (aural) (.519) and Yes and No Test (written) (.358). From the factor analysis results this study cannot claim that the tests are measuring ILK and ELK. Given that the tests do not afford separate measures of ILK and ELK, RQ 2 and RQ 3 were investigated by examining group differences in each of the four tests.

Factor 2 is interpretable as a "vocabulary factor"; the two versions of the Yes and No Test (aural vs written) are vocabulary tests. Factor 1 is difficult to interpret as it includes a test of oral online ability (OEITM) and two tests of written offline ability the UGJT Ungrammatical and the Yes and No Test (written). Hence, Factor 1 cannot be considered as either a grammar factor or an offline factor. The administration on the OEITM was subject to various technical problems which affected the intended design of OEITM as a measure of unplanned, time-pressured performance. I speculate that the way the OEIT was administered allowed for

offline/planned performance. Accordingly, I suggest that factor 2 is interpretable as an offline/planned factor. What follows is a reminder to the reader about the OETM procedure and a description of the nature of the problem with this test.

The OEITM was designed to tap rapid online performance. The OEITM procedure involved the following three phases: 1) processing an auditory stimulus sentence, 2) recognition of a stimulus word, 3) evaluating whether the sentence was factually correct, and 4) reproducing the sentence. Concerning the processing of an auditory sentence, the speed of the recorded voice did not exceed the rate of 150 wpm (word per minute). This is the average speech rate of broadcasters on the radio in British English (Huang & Gráf, 2020). The shortest auditory stimulus sentence was 2.04 seconds, and this surpasses the span of 1.5–2.0 seconds. This is the time it takes for information to decay from phonological short-term memory without rehearsal or refreshing information (Baddeley et al., 1975). The word monitoring paradigm was utilised to make this task a dual one. The stimulus word of each sentence was shown in the middle of the screen, and the subjects were asked to click a designated keyboard button as quickly as possible upon hearing the word in the presented sentence. There was a two-second gap between reading the word on the screen and hearing the sentence. Immediately after hearing the sentence, a question appeared in the middle of the screen: “Was the sentence you heard factually correct?” Participants had to click the right arrow of the keyboard to indicate that the sentence presented was semantically correct and the left arrow to show that the sentence was semantically incorrect. This question ensured that the students processed the semantic meaning of the sentence. Participants were given three seconds to reach a decision. A countdown from three to one appeared in the centre of the screen. Participants were asked to imitate the presented sentence. Participants were told that the imitation of each sentence had to be as accurate as possible and must be made within four seconds. Another countdown from four to one appeared in the centre of the screen. The participants’ responses were

audio recorded. If the participants failed to produce the imitation in four seconds, the screen immediately went blank, with the computerised OEITM moving onto the next sentence. Participants were not expected to produce the stimulus sentences verbatim (i.e., it was anticipated that they would change the words to express the same meaning).

The 4-second interval of time allocated for imitation was employed for the following three reasons a) two seconds is the maximum time interval needed for information to decay from short-term phonological memory without rehearsing or refreshing it (Baddeley et al., 1975); b) the time interval of four seconds can be considered sufficient to prevent participants basing their responses on short-term memory; c) this time interval would lead to the participants drawing on their ILK because they were relatively time-pressured in their responses.

The OEITM was digitalised and uploaded onto a website. Running the OEITM requires a minimum bandwidth (connection speed) of 8 Mega bites per second (8Mbps= 8000000 bit/s) in a continuous data transfer. However, in Lebanon this condition was not available as the internet connection runs between 2Mbps to 6 Mbps, the former speed being the most common case. As a result, the speed of an auditory stimulus sentence (first phase) slowed on many occasions. Concerning the two-second gap between reading the word on the screen and hearing the sentence the technical problem sometimes caused this time gap to surpass two-seconds. The three seconds time allocated for participants to decide if the sentences were semantically correct or incorrect also increased. Regarding the four seconds allocated for imitation, this time also increased because of the same technical problems.

The data were collected remotely due to the imposition of travel restrictions following the advent of the global Corona-Virus Pandemic (Covid-19). The data were collected between 1/9/2019 and 15/6/2020. During the data collection and even during the writing of this chapter Lebanon was experiencing social, economic and political unrest. These economic

crises have affected all types of services (e.g., internet) to date. The rapid increase of economic crises and social and political unrest prohibited basic life necessities such as transport and food. The safest and most effective way to continue this study under such conditions was to create a website for all digitalised tests and store the data (answers) on a server. Prior to the data collection, the internet service in Lebanon was relatively quick and surpassed 8Mbps. Thus, there was no way of solving the problems encountered in administering the OEITM.

In short, I suspect that the technical problems affected the implementation of the OEITM and as a result may have elicited planned rather than unplanned performance. That is, the participants had more time to answer the OEITM than was intended resulting in planned rather than planned performance.

**Table 6.5**

*Principal Axis Factoring.*

<i>Component</i>	<i>Eigenvalue</i>	<i>Variance %</i>	<i>Cumulative %</i>
1	2.04	51.09	51.09
2	1.02	25.6	76.4

**Table 6.6***Loadings for Principal Axis Factoring*

Tests	Factor one	Factor two
UGJT Ungrammatical	.414	.006
OEITM	.881	-.071
Yes and No Test (written)	.896	.358
Yes and No Test (aural)	.024	.519

In the coming chapters I will proceed to investigate what the separate tests for grammar and lexis reveal about language transfer in the trilingual mind. This includes two steps.

- Firstly, I will investigate what the separate tests for lexis Yes and No Test (written) and Yes and No Test (aural) reveal about lexical transfer from Arabic and French into English. This concerns RQ3, namely: “Are there any differences in the lexical transfer effects between Arabic and French on English between Group B (L3 English) and Group C (L2 English)?”
- Secondly, I will investigate what the separate tests for grammars (UGJT vs OEIT) reveal about grammatical transfer from Arabic and French into English. This concerns RQ2, namely: “Are there any differences in the grammatical transfer effects between Arabic and French on English between Group B (L3 English) and Group C (L2 English)?”

## **Chapter 7. Grammatical transfer from Arabic and French into English**

### **7.1 Introduction**

This section aims to answer RQ2 namely, "Are there any differences in the syntactic transfer effects between Arabic and French in English between Group B (L3 English) and Group C (L2 English)?"

To answer this question, two separate analyses were undertaken; one pertains to the UGJT and the other to the OETM. Each analysis has three sections, the First section discusses tests of normality on scores for those items designed to measure positive and negative grammatical transfer from Arabic and French into English. The second section investigates the difference in scores between the three groups (A, B, and C). The purpose of including Group A (native speakers) was to establish whether there was any difference in scores between Group A, on the one hand, and groups B and C on the other. Having established there is a difference in scores between Group A (native speakers) and groups B and C (non-native speakers) I then proceeded to investigate whether there was a difference between B and C groups in order to examine the difference in transfer effects from Arabic and French for these two groups. Group A comprises the native speakers of English (n=10). Group B comprises participants with L1 Arabic, L2 French, and L3 English and Group C includes participants with L1 Arabic, L2 English L3 French. The third section will examine if there are group differences (B vs C) in scores on the different grammatical structures in UGJT, UGJT grammatical and ungrammatical and similarly for the OIETM score

## 7.2 UGJT

In this section, I report the results for tests of normality for Groups A, B and C Arabic in this order:

1. UGJT (total scores)
2. UGJT grammatical (grammatical items)
3. UGJT ungrammatical (ungrammatical items)

### *7.2.1 Tests of normality on scores for UGJT.*

Table 7.1 shows the results of the tests of normality for the sample as a whole, and for each group (A, B, and C) for UGT total, UGT grammatical and UGT ungrammatical. For all the results, test p-values are less than the value of  $\alpha$  (.05) indicating that scores are not normally distributed. As a result, non-parametric statistics were used in all subsequent analyses as these are applicable in cases where scores do not have a normal distribution

**Table 7.1**

*Test of Normality for UGJT, UGJT Grammatical and UGJT Ungrammatical for the Four Categories of Scores*

<i>Category of transfer</i>	<i>Shapiro Wilk (UGJT)</i>			
	<i>W</i>	<i>DF</i>	<i>N</i> (items)	<i>SIG</i>
<b>UGJT</b>				
Total participants (N=80)	.862	320	36	<.001
Group A (N=10)	.680	40	36	<.001
Group B (N=35)	.918	140	36	<.001
Group C (N=35)	.808	140	36	<.001
<b>UGJT grammatical</b>				
Total participants (N=80)	.895	160	18	<.001
Group A (N=10)	.795	20	18	<.01
Group B (N=35)	.929	70	18	<.01
Group C (N=35)	.814	70	18	<.001
<b>UGJT ungrammatical</b>				
Total participants (N=80)	.814	160	18	<.001
Group A (N=10)	.580	20	18	<.001
Group B (N=35)	.871	70	18	<.001
Group C (N=35)	.802	70	18	<.001

### ***7.2.2 Investigating scores on items designed to investigate grammatical transfer rates from Arabic and French into English.***

For UGJT, UGJT Grammatical and UGJT ungrammatical, Tables 2, 3 and 4 respectively present the mean average scores and standard deviations for the test items for the three groups (A, B, and C). These items were designed to investigate grammatical transfer from Arabic and French into English for the plurilingual participants (Group B vs Group C). Group A's (native speakers) scores on these items serve as a baseline. For each of UGJT, UGJT Grammatical and UGJT ungrammatical an omnibus Kruskal Wallis test was conducted to examine if the distribution of the scores in the three groups (A & B & C), and four conditions of grammatical transfer, was statistically significant. This was followed by the application of multiple Mann-Whitney tests to determine if there was a difference in scores between pairs of group scores.

### ***7.2.3 UGJT***

For UGJT, the Kruskal Wallis demonstrated that the distribution of the scores in the three groups (A & B & C) and four conditions of grammatical transfer was statistically significant with  $H(2) = 34.4, p < .001$

**Table 7.2***Participants' Scores in UGJT on Items Designed to Investigate Grammatical Transfer*

	Scores on items designed to investigate PGT from Arabic into English			Scores on items designed to investigate NGT from Arabic into English			Scores on items designed to investigate PGT from French into English			Scores on items designed to investigate NGT from French into English		
Groups	<i>M%</i>	<i>SD</i>	<i>N</i>									
Group A	96.66	9.6	9	96.66	5.3	9	88.88	17.3	9	86.67	13.6	9
Group B	81.9	15.7	9	87.3	10.1	9	71.11	14.8	9	77.77	16.8	9
Group C	83.17	16.2	9	93	12.0	9	87.3	13.7	9	84.44	15.6	9

PGT= Positive Grammatical Transfer; NGT = Negative grammatical Transfer

**Scores on items designed to investigate PGT from Arabic into English.** For UGJT, the mean score of Group A ( $M=96.66$ ) was higher than Group B ( $M=81.9$ ) on the items designed to investigate PGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100$ ,  $n=10$ ), Group B ( $Mdn=77.78$ ,  $n=35$ ),  $U=70.5$ ,  $z=-2.9$ ,  $p=0.003$ ,  $d=1.13$ . Also, the mean score of Group A ( $M=96.66$ ) was higher than Group C (83.17) on the items designed to investigate PGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100$ ,  $n=10$ ), Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=88.5$ ,  $z=-2.4$ ,  $p=0.013$ ,  $d=1.01$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=81.9$ ) was lower than Group C ( $M=83.17$ ) on the items designed to investigate PGT from

Arabic into English but a Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group B ( $Mdn=77.78$ ,  $n= 35$ ), Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=579.5$ ,  $z= -0.39$ ,  $p=0.690$ ,  $d=0.07$ .

In summary, for UGJT, there was a statistically significant group difference in the following categories of participants (Group A vs Group B) and (Group A vs Group C). Group A demonstrated a higher score on these items than Group B and Group C. The group difference in the scores on these related items for the following categories of participants (Group B vs Group C) was statistically non-significant.

**Scores on items designed to investigate NGT from Arabic into English.** For UGJT, the mean score of Group A ( $M=96.66$ ) was higher than Group B ( $M=87.3$ ) on the items designed to investigate NGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100$ ,  $n= 10$ ), Group B ( $Mdn=88.89$ ,  $n=35$ ),  $U=81$ ,  $z=-2.7$ ,  $p=0.006$ ,  $d=1.16$ . The mean score of Group A ( $M=96.66$ ) was higher than Group C ( $M=93$ ) on the items designed to investigate NGT from Arabic into English but a Mann-Whitney test indicated that the difference in scores were statistically non-significant: Group A ( $Mdn=100$ ,  $n= 10$ ), Group C ( $Mdn=100$ ,  $n=35$ ),  $U=158.5$ ,  $z=-0.54$ ,  $p=0.589$ ,  $d=0.39$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=87.3$ ) was lower than Group C ( $M= 93$ ) on the items designed to investigate NGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group B ( $Mdn=88.9$ ,  $n= 35$ ), Group C ( $Mdn=100$ ,  $n=35$ ),  $U=384.5$ ,  $z= -2.86$ ,  $p=0.004$ ,  $d=0.51$ .

In summary, for UGJT, concerning participants' scores on items designed to measure NGT from Arabic into English in plurilingual participants, there was a statistically significant group difference in the following categories of participants (Group A vs Group B) and (Group B vs Group C). Group A demonstrated a higher score on these items than Group B. Group C demonstrated a higher score on these items than Group B. The group difference between Group A and Group C was statistically non-significant. In other words, on the NGT items Group C performed at close to the same level as the native speakers.

**Scores on items designed to investigate PGT from French into English.** The mean score of Group A ( $M=88.88$ ) was higher than Group B ( $M=71.11$ ) on the items designed to investigate PGT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=94.44$ ,  $n=10$ ) and Group B ( $Mdn=66.67$ ,  $n=35$ ),  $U=64.5$ ,  $z=-3.09$ ,  $p=0.002$ ,  $d=1.10$ . The mean score of Group A ( $M=88.88$ ) was higher than Group C ( $M=87.3$ ) on the items designed to investigate PGT from French into English but a Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group A ( $Mdn=94.44$ ,  $n=10$ ) and Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=153.5$ ,  $z=-0.619$ ,  $p=.536$ ,  $d=0.10$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=71.11$ ) was lower than Group C ( $M=87.3$ ) on the items designed to investigate PGT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group B ( $Mdn=77.78$ ,  $n=35$ ) and Group C ( $Mdn=83.33$ ,  $n=35$ ),  $U=264$ ,  $z=-4.19$ ,  $p < .001$ ,  $d=1.13$ .

In summary, in UGJT, on the items designed to investigate PGT from French into English in plurilingual participants there was a statistically significant group difference as follows: (Group A vs Group B) and (Group B vs Group C). Group A demonstrated a higher score on these items than Group B. Group C demonstrated a higher score on these items than

Group B. In contrast, the group difference in the scores between Groups A vs Group C was statistically non-significant.

**Scores on items designed to investigate NGT from French into English.** In UGJT, the mean score of Group A ( $M=86.67$ ) was higher than Group B ( $M=77.77$ ) on the items designed to investigate NGT from French into English, but a Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group A ( $Mdn=88.89$ ,  $n=10$ ) and Group B ( $Mdn=77.78$ ,  $n=35$ ),  $U=117$ ,  $z=-1.6$ ,  $p=0.105$ ,  $d=0.58$ . The mean score of Group A ( $M=86.67$ ) was higher than Group C ( $M=84.44$ ) on the items designed to investigate NGT from French into English, but a Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group A ( $Mdn=88.89$ ,  $n=10$ ) and Group C ( $Mdn=88.5$ ,  $n=35$ ),  $U=166$ ,  $z=796$ ,  $p=0.798$ ,  $d=0.15$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=77.77$ ) was lower than Group C ( $M=84.44$ ) on the items designed to investigate NGT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group B ( $Mdn=77.78$ ,  $n=35$ ) and Group C ( $Mdn=88.5$ ,  $n=35$ ),  $U=436$ ,  $z=-2.215$ ,  $p=0.034$ ,  $d=0.41$ .

In summary, for UGJT, concerning the items designed to investigate NGT from French into English, there was a statistically significant group difference for Group B vs Group C. Group B demonstrated a lower score on these items than Group C. In contrast, there was statistically non-significant group differences for (Group A vs Group B and for Group A vs Group C).

### 7.2.4 UGJT grammatical

For UGJT grammatical, the Kruskal Wallis demonstrated that the distribution of the scores in the three groups (A & B & C), and two conditions of grammatical transfer, was statistically significant with  $H(2) = 21.7, p < .001$ . Accordingly, multiple Mann-Whitney tests were run to determine if there were any differences in scores between Group A and Groups B and C

**Table 7.3**

*Participants' Scores in UGJT Grammatical on Items Designed to Investigate Grammatical Transfer*

Groups	Scores on items designed to investigate PGT from Arabic into English			Scores on items designed to investigate PGT from French into English		
	<i>M%</i>	<i>SD</i>	<i>N</i>	<i>M%</i>	<i>SD</i>	<i>N</i>
Group A	96.66	9.6	9	88.88	17.3	9
Group B	81.9	15.7	9	71.11	14.8	9
Group C	83.17	16.2	9	87.3	13.7	9

**Scores on items designed to investigate PGT from Arabic into English.** For UGJT grammatical, the mean score of Group A ( $M=96.66$ ) was higher than Group B ( $M=81.9$ ) on the items designed to investigate PGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100, n=10$ ), Group B ( $Mdn=77.78, n=35$ ),  $U=70.5, z= -2.9, p=0.003, d= 1.13$ . Also, the mean score of

Group A ( $M=96.66$ ) was higher than Group C ( $83.17$ ) on the items designed to investigate PGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100$ ,  $n=10$ ), Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=88.5$ ,  $z=-2.4$ ,  $p=0.013$ ,  $d=1.01$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=81.9$ ) was lower than Group C ( $M=83.17$ ) on the items designed to investigate PGT from Arabic into English, but a Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group B ( $Mdn=77.78$ ,  $n=35$ ), Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=579.5$ ,  $z=-0.39$ ,  $p=0.690$ ,  $d=0.07$ .

In summary, for UGJT, there was a statistically significant group difference between the following groups (Group A vs Group B) and (Group A vs Group C). Group A demonstrated a higher score on these items than Group B and Group C. The group difference in the scores on these related items for Group B vs Group C was statistically non-significant.

**Scores on items designed to investigate PGT from French into English.** The mean score of Group A ( $M=88.88$ ) was higher than Group B ( $M=71.11$ ) on the items designed to investigate PGT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=94.44$ ,  $n=10$ ) and Group B ( $Mdn=66.67$ ,  $n=35$ ),  $U=64.5$ ,  $z=-3.09$ ,  $p=0.002$ ,  $d=1.10$ . The mean score of Group A ( $M=88.88$ ) was higher than Group C ( $M=87.3$ ) on the items designed to investigate PGT from French into English but a Mann-Whitney test indicated that the difference in scores was statistically non-

significant: Group A ( $Mdn=94.44$ ,  $n= 10$ ) and Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=153.5$ ,  $z=-0.619$ ,  $p=.536$ ,  $d= 0.10$

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=71.11$ ) was lower than Group C ( $M=87.3$ ) on the items designed to investigate PGT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group B ( $Mdn=77.78$ ,  $n= 35$ ) and Group C ( $Mdn=83.33$ ,  $n=35$ ),  $U=264$ ,  $z=-4.19$ ,  $p=0.00$ ,  $d=1.13$ .

In summary, in UGJT, on the items designed to investigate PGT from French into English in plurilingual participants, there was a statistically significant group difference as follows: Group A vs Group B and Group B vs Group C. Group A demonstrated a higher score on these items than Group B. Group C demonstrated a higher score on these items than Group B. In contrast, the group difference in the scores between Group A vs Group C was statistically non-significant.

### ***7.2.5 UGJT Ungrammatical***

For UGJT ungrammatical, the Kruskal Wallis demonstrated that the distribution of the scores in the three groups (A & B & C), and two conditions of grammatical transfer, was statistically significant with  $H(2) = 22.41$ ,  $p= 0.00$ . Accordingly, multiple Mann-Whitney tests were run to determine if there were any differences in scores between Group A and Groups B and C.

**Table 7.4**

*Participants' Scores in UGJT Ungrammatical on Items Designed to Investigate Grammatical Transfer*

Groups	<i>Scores on items designed to investigate NGT from Arabic into English</i>			<i>Scores on items designed to investigate NGT from French into English</i>		
	<i>M%</i>	<i>SD</i>	<i>N</i>	<i>M%</i>	<i>SD</i>	<i>N</i>
Group A	96.66	5.3	9	88.88	17.3	9
Group B	87.3	10.1	9	71.11	14.8	9
Group C	93	12.0	9	87.3	13.7	9

PGT: Positive Grammatical transfer

NGT: Negative Grammatical transfer

**Scores on items designed to investigate NGT from Arabic into English.** For UGJT ungrammatical, the mean score of Group A ( $M=96.66$ ) was higher than Group B ( $M=87.3$ ) on the items designed to investigate NGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant. Group A ( $Mdn=100$ ,  $n=10$ ), Group B ( $Mdn=88.89$ ,  $n=35$ ),  $U=81$ ,  $z=-2.7$ ,  $p=0.006$ ,  $d=1.16$ . The mean score of Group A ( $M=96.66$ ) was higher than Group C ( $M=93$ ) on the items designed to investigate NGT from Arabic into English but a Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group A ( $Mdn=100$ ,  $n=10$ ), Group C ( $Mdn=100$ ,  $n=35$ ),  $U=158.5$ ,  $z=-0.54$ ,  $p=0.589$ ,  $d=0.39$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=87.3$ ) was lower than Group C ( $M=93$ ) on the items designed to investigate NGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was

statistically significant: Group B ( $Mdn=88.9$ ,  $n=35$ ), Group C ( $Mdn=100$ ,  $n=35$ ),  $U=384.5$ ,  $z=-2.86$ ,  $p=0.004$ ,  $d=0.51$ .

In summary, for UGJT, concerning participants' scores on items designed to measure NGT from Arabic into English in plurilingual participants, there was a statistically significant group difference in Group A vs Group B and Group B vs Group C. Groups A and C demonstrated a higher score on these items than Group B. The group difference between Group A and Group C was statistically non-significant. In other words, on the NGT items, Group C performed at close to the same level as the native speakers.

**Scores on Items Designed to Investigate NGT from French into English.** In UGJT, the mean score of Group A ( $M=86.67$ ) was higher than Group B ( $M=77.77$ ) on the items designed to investigate NGT from French into English but a Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group A ( $Mdn=88.89$ ,  $n=10$ ) and Group B ( $Mdn=77.78$ ,  $n=35$ ),  $U=117$ ,  $z=-1.6$ ,  $p=0.105$ ,  $d=0.58$ . The mean score of Group A ( $M=86.67$ ) was higher than Group C ( $M=84.44$ ) on the items designed to investigate NGT from French into English but a Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group A ( $Mdn=88.89$ ,  $n=10$ ) and Group C ( $Mdn=88.5$ ,  $n=35$ ),  $U=166$ ,  $z=796$ ,  $p=0.798$ ,  $d=0.15$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=77.77$ ) was lower than Group C ( $M=84.44$ ) on the items designed to investigate NGT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group B ( $Mdn=77.78$ ,  $n=35$ ) and Group C ( $Mdn=88.5$ ,  $n=35$ ),  $U=436$ ,  $z=-2.215$ ,  $p=0.034$ ,  $d=0.41$ .

In summary, for UGJT, concerning the items designed to investigate NGT from French into English, there was a statistically significant group difference for Group B vs Group C. Group B demonstrated a lower score on these items than Group C. In contrast, there were

statistically non-significant group differences for (Group A vs Group B and for Group A vs Group C).

### ***7.2.6 Group scores on the different grammatical structures***

This section will examine if there were group differences (B vs C) in scores on the different grammatical structures in UGJT, UGJT grammatical and ungrammatical. Table 7.5 presents the descriptive statistics for the different grammatical structures for group A and B. Furthermore, Multiple Chi-Square tests were conducted to examine if there were group differences (B vs C) in the total scores for each grammatical structure.

**Table 7.5**

*Participants' UGJT, UGJT Ungrammatical, and UGJT Grammatical Scores on the Different Grammatical Structure*

	Grammatical structures reflecting on the potential grammatical transfer <i>from Arabic into English</i>						Grammatical structures reflecting on the potential grammatical transfer <i>from French into English</i>											
	Verb precedes subject			Pronoun object included in relative clauses			The non-use of the verb "to be" when describing things in the present			Wrong placement of object pronoun			A definite article is sometimes used for the proper noun of places.			Wrong use of present perfect		
	<i>Total</i>	<i>M%</i>	<i>SD</i>	<i>Total</i>	<i>M%</i>	<i>SD</i>	<i>Total</i>	<i>M</i>	<i>SD</i>	<i>Total</i>	<i>M</i>	<i>SD</i>	<i>Total</i>	<i>M%</i>	<i>SD</i>	<i>Total</i>	<i>M%</i>	<b>SD</b>
	<i>Score</i>			<i>score</i>			<i>Score</i>			<i>Score</i>			<i>Score</i>			<i>Score</i>		
UGJT (N=6 per item)																		
Group B	140	67.4	16.4	170	80.95	14.6	187	89.52	15.17	165	78.57	19.6	171	81.4	14.5	163	77.6	25.1
Group C	174	82.85	21.5	194	92.38	13	200	95.23	8.6	192	91.25	16.3	172	81.9	18.6	184	87.6	15.9
UGJT grammatical (N=3 per item)																		
Group B	96	91.4	14.7	84	80	18.4	94	89	19.4	81	77.14	23.9	92	87.5	16.3	83	79	19.9
Group C	98	93.3	13.5	94	89.52	19.4	101	96	10.7	89	84.75	23.3	81	76.8	27	92	87.6	87.6
UGJT ungrammatical (N=3 per item)																		
Group B	44	40.94	32.4	86	81.9	21.9	93	88.5	19.7	84	80	21.07	79	75.2	23.3	80	76.2	27
Group C	76	72.3	36.5	100	95.23	11.8	99	94.2	15.09	103	98	7.08	91	86.6	22.8	92	87.6	19.9

Table 7.6 below presents the results of multiple Chi-Square tests for Group B and Group C’s scores on the different grammatical structures for UGJT, UGJT ungrammatical, and UGJT grammatical. This is followed by a summary of the results.

**Table 7.6**

*Chi Square Tests*

	Grammatical structures reflecting on the potential grammatical transfer from Arabic into English										Grammatical structures reflecting on the potential grammatical transfer from French into English																			
	Verb precedes subject					Pronoun object included in relative clauses					The non-use of the verb “to be” when describing things in the present					Wrong placement of object pronoun					A definite article is sometimes used for the proper noun of places.					Wrong use of present perfect				
	TS (B)	TS (C)	df	$\chi^2$	P	TS (B)	TS (C)	df	$\chi^2$	P	TS (B)	TS (C)	df	$\chi^2$	P	TS (B)	TS (C)	df	$\chi^2$	P	TS (B)	TS (C)	d f	$\chi^2$	P					
UGJT	142	174	4	22.7	.000	170	194	3	16.2	.001	187	200	4	5.5	.23	165	192	5	10.5	.06	171	172	4	5.2	.26	163	184	5	9.1	.1
UGJT gram	96	98	1	0.32	.56	84	94	2	8.8	.012	94	101	2	3.2	.19	81	89	2	3	.22	92	81	4	3.2	.35	83	92	3	2.6	.44
UGJT ungram	44	76	3	19.5	.000	86	100	2	9.02	0.011	93	99	2	2.1	.346	84	103	2	18.6	.000	79	91	3	9	.028	80	92	2	4.1	.124

TS (A) = total score for Group A

TS (B) = total score for Group B

df = degree of freedom

$\chi^2$ = the Chi-Square value

P= p-value

UGJT gram= UGJT grammatical; UGJT ungram= UGJT ungrammatical

For UGJT there was a group difference (B vs C) in scores for two of the grammatical structures, namely verb precedes subject, and pronoun object included in relative clauses with Group C demonstrating a higher score for both. In contrast, there was a statistically non-significant group difference (B vs C) in scores for the non-use of the verb “to be” when describing things in the present, wrong placement of object pronoun, a definite article is sometimes used before proper nouns for places, and the wrong use of the present perfect.

For UGJT grammatical, there was a statistically significant group difference (B vs C) in scores for only one grammatical structure namely Pronoun object included in relative clauses with Group C demonstrating a higher score. In contrast, there was a statistically non-significant group difference (B vs C) in scores for the following grammatical structures: verb precedes subject, the non-use of the verb “to be” when describing things in the present, wrong placement of object pronoun, a definite article is sometimes used before proper nouns for places, and the wrong use of the present perfect.

For UGJT ungrammatical there was a statistically significant group difference (B vs C) in scores for the following grammatical structures: verb precedes subjects, pronoun object included in relative clauses, wrong placement of object pronoun, and a definite article is sometimes used before a proper noun of a place. Group C demonstrated higher scores than Group B for all these grammatical structures. In contrast, there was a statistically non-significant group differences (B vs C) in scores for: the non-use of the verb “to be” when describing things in the present, and the wrong use of the present perfect.

### **7.3 OEITM**

This section aims to answer RQ2 namely, "Are there any differences in the grammatical transfer effects between Arabic and French into English between Group B (L3 English) and

Group C (L2 English)?"'. Accordingly, this section investigates grammatical transfer between Arabic and French into English using scores from the OEITM. Group A comprises the native speakers of English (n=10). Group B comprises participants with L1 Arabic, L2 French, and L3 English and Group C include participants with L1 Arabic, L2 English L3 French.

The analysis has three sections. The first section (7.3.1) discusses tests of normality on scores from items designed to measure positive and negative grammatical transfer from Arabic and French into English. The second section (7.3.2) investigates the difference in scores between the three groups (A & B & C). The purpose of including Group A (native speakers) was to establish whether there was any difference in scores between Group A on the one hand and groups B and C on the other. Having established there was a difference in scores between Group A (native speakers) and groups B and C (non-native speakers) I then proceeded to investigate whether there was a difference between B and C groups in order to examine the difference in transfer effects from Arabic and French for these two groups. The third section (7.3.3) will examine if there are group differences (B vs C) in scores for the different grammatical structures in OEITM, OEITM grammatical and OEITM ungrammatical.

### ***7.3.1 Tests of normality for OEITM scores***

Table 7.7 shows the results of the tests of normality for the sample as a whole, and for each group (A, B, and C) for OEITM total, OEITM grammatical and OEITM ungrammatical. For all the results, test p-values were less than the value of  $\alpha$  (.05) indicating that scores are not normally distributed. As a result, non-parametric statistics were used in all subsequent analyses as these are applicable in cases where scores do not have a normal distribution

**Table 7.7**

*Test of Normality for OEITM, OEITM Grammatical and OEITM Ungrammatical for the Four Categories of Scores*

Category of transfer	Shapiro Wilk			
	W	DF	N (items)	SIG
<b>OEITM</b>				
Total participants (N=80)	.915	320	9	<.001
Group A (N=10)	.713	40	9	<.001
Group B (N=35)	.949	140	9	<.001
Group C (N=35)	.859	140	9	<.001
<b>OEITM grammatical</b>				
Total participants (N=80)	.926	160	9	<.001
Group A (N=10)	.705	20	9	<.001
Group B (N=35)	.940	70	9	<.01
Group C (N=35)	.871	70	9	<.001
<b>OEITM ungrammatical</b>				
Total participants (N=80)	.900	160	9	<.001
Group A (N=10)	.726	20	9	<.001
Group B (N=35)	.932	70	9	<.01
Group C (N=35)	.853	70	9	<.01

### ***7.3.2 Investigating scores designed to measure grammatical transfer rates from Arabic and French into English.***

For OEITM, OEITM Grammatical and OEITM ungrammatical, Tables 7.8, 7.9 and 7.10 respectively present the mean average scores and standard deviations for the test items for the three groups (A, B, and C). These items were designed to investigate grammatical transfer from Arabic and French into English for the plurilingual participants (Group B vs Group C). Group A's (native speakers) scores serve as a baseline. For each of OEITM, OEITM

grammatical and OEITM ungrammatical, an omnibus Kruskal Wallis test was conducted to examine if the distribution of the scores in the three groups (A & B & C), and four conditions of grammatical transfer, was statistically significant. This was followed by the application of multiple Mann-Whitney tests to determine if there was a difference in scores between pairs of group scores.

### 7.3.3 OEITM

For OEITM, the Kruskal Wallis demonstrated that the distribution of the scores in the three groups (A& B & C) and four conditions of grammatical transfer was statistically significant:

$$H(2) = 106.4, p < .001$$

**Table 7.8**

*Participants' scores in OEITM on items designed to investigate grammatical transfer*

Groups	Scores on items designed to investigate PGT from Arabic into English			Scores on items designed to investigate NGT from Arabic into English			Scores on items designed to investigate PGT from French into English			Scores on items designed to investigate NGT from French into English		
	M%	SD	N									
Group A	90	12.2	9	96.7	7.4	9	93.33	14	9	88.88	11.7	9
Group B	58.4	17.3	9	78.0	15.3	9	58.0	18	9	53.0	11.7	9
Group C	87.9	11.5	9	82.8	16.2	9	69.2	19.2	9	88.2	10	9

PST= Positive Grammatical Transfer. NST= Negative Grammatical Transfer.

**Scores on items designed to investigate PGT from Arabic into English.** For OEITM, the mean score of Group A ( $M=90$ ) was higher than Group B ( $M=58.4$ ) on the items designed to investigate PGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=94.44$ ,  $n=10$ ), Group B ( $Mdn=55.56$ ,  $n=35$ ),  $U=25.5$ ,  $z=-4.1$ ,  $p < .001$ ,  $d=2.10$ . The mean score of Group A ( $M=90$ ) was higher than Group C ( $87.9$ ) on the items designed to investigate PGT from Arabic into English but a Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group A ( $Mdn=94.44$ ,  $n=10$ ), Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=154$ ,  $z=-0.6$ ,  $p=0.545$ ,  $d=0.17$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=58.4$ ) was lower than Group C ( $M=87.9$ ) on the items designed to investigate PGT from Arabic into English. The Mann-Whitney test indicated that the difference in scores was statistically significant: Group B ( $Mdn=55.56$ ,  $n=35$ ), Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=107.5$ ,  $z=-6.05$ ,  $p < .001$ ,  $d=2.0$ .

In summary, there was a statistically significant group difference in the following pairs of participants (Group A vs Group B) and (Group B vs Group C). Group A demonstrated a higher score on these items than Group B. Group C demonstrated a higher score on these items than Group B. The group difference for Group A vs Group C was statistically non-significant. In other words, on the PGT items Group C performed at close to the same level as the native speakers.

**Scores on items designed to investigate NGT from Arabic into English.** The mean score of Group A ( $M=96.7$ ) was higher than Group B ( $M=78$ ) on the items designed to investigate NGT from Arabic into English. The Mann-Whitney test indicated that the

difference in scores was statistically significant. Group A ( $Mdn=100$ ,  $n= 10$ ), Group B ( $Mdn=77.78$ ,  $n=35$ ),  $U=51$ ,  $z=-3.4$ ,  $p < .001$ ,  $d=1.55$ . The mean score of Group A ( $M=100$ ) was higher than Group C ( $M=82.8$ ) on the items designed to investigate NGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores were statistically significant: Group A ( $Mdn=100$ ,  $n= 10$ ), Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=70$ ,  $z=-2.9$ ,  $p=0.003$ ,  $d= 1.10$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=78$ ) was lower than Group C ( $M= 82.8$ ) on the items designed to investigate NGT from Arabic into English but a Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group B ( $Mdn=77.78$ ,  $n= 35$ ), Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=508$ ,  $z=-1.2$ ,  $p=0.206$ ,  $d=0.30$ .

In summary, participants' scores on items designed to measure NGT from Arabic into English, were significantly different for Group A vs Group B and Group A vs Group C. Group A demonstrated a higher score on these items than Group B and Group C. The difference between Group B and Group C was statistically non-significant.

**Scores on items designed to investigate PGT from French into English.** The mean score of Group A ( $M=93.33$ ) was higher than Group B ( $M=58$ ) on the items designed to investigate PGT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100$ ,  $n= 10$ ) and Group B ( $Mdn=55.56$ ,  $n=35$ ),  $U=25.5$ ,  $z=-4.1$ ,  $p < .001$ ,  $d=2.19$ . The mean score of Group A ( $M=93.33$ ) was higher than Group C ( $M=69.2$ ) on the items designed to investigate PGT from French into English. A Mann-Whitney test indicated that the difference was statistically significant: Group A ( $Mdn=100$ ,  $n= 10$ ) and Group C ( $Mdn=77.78$ ,  $n=35$ ),  $U=40$ ,  $z=-3.7$ ,  $p < .001$ ,  $d=1.43$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=58$ ) was lower than Group C ( $M=69.2$ ) on the items designed to investigate PGT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group B ( $Mdn=55.56$ ,  $n=35$ ) and Group C ( $Mdn=77.78$ ,  $n=35$ ),  $U=415$ ,  $z=-2.3$ ,  $p=0.019$ ,  $d=0.60$ .

In summary, there was a statistically significant group difference in the following pairs of participants (Group A vs Group B), (Group A vs Group C) and (Group B vs Group C). Group A demonstrated a higher score on these items than Group B. Group A also demonstrated a higher score on these items than Group C. Group C demonstrated a higher score on these items than Group B.

**Scores on items designed to investigate NGT from French into English.** The mean score of Group A ( $M=88.88$ ) was higher than Group B ( $M=53$ ) on the items designed to investigate NGT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=88.89$ ,  $n=10$ ) and Group B ( $Mdn=55.56$ ,  $n=35$ ),  $U=6.5$ ,  $z=-4.6$ ,  $p < .001$ ,  $d=3.0$ . The mean score of Group A ( $M=88.88$ ) was higher than Group C ( $M=88.2$ ) on the items designed to investigate NGT from French into English, but a Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group A ( $Mdn=88.89$ ,  $n=10$ ) and Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=165.5$ ,  $z=-0.27$ ,  $p=0.785$ ,  $d=0.06$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=53$ ) was lower than Group C ( $M=88.2$ ) on the items designed to investigate NGT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group B ( $Mdn=55.56$ ,  $n=35$ ) and Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=11.5$ ,  $z=-7.1$ ,  $p < .001$ ,  $d=3.23$ .

In summary, for the items designed to investigate NGT from French into English, there was a statistically significant group difference between Group A and Group B, and between Group B and Group C. Group A scored higher on these items than Group B. Group C scored higher on these items than Group B. In contrast, the difference between Group A and Group C was statistically non-significant.

### 7.3.4 OEITM Grammatical

For OEITM grammatical, the Kruskal Wallis demonstrated that the distribution of the scores in the three groups (A & B & C), and two conditions of grammatical transfer, was statistically significant with  $H(2) = 55.57, p = 0.00$ . Accordingly, multiple Mann-Whitney tests were run to determine if there were any differences in scores between Group A and Groups B and C.

**Table 7.9**

*Participants' Scores in OEITM Grammatical on Items Designed to Investigate Grammatical Transfer*

Groups	Scores on items designed to investigate PGT from Arabic into English			Scores on items designed to investigate PGT from French into English		
	<i>M%</i>	<i>SD</i>	<i>N</i>	<i>M%</i>	<i>SD</i>	<i>N</i>
Group A	90	12.2	9	93.33	14	9
Group B	58.4	17.3	9	58	18	9
Group C	87.9	11.5	9	69.2	19.2	9

**Scores on Items designed to investigate PGT from Arabic into English.** For OEITM, the mean score of Group A ( $M=90$ ) was higher than Group B ( $M=58.4$ ) on the items designed to investigate PGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=94.44$ ,  $n=10$ ), Group B ( $Mdn=55.56$ ,  $n=35$ ),  $U=25.5$ ,  $z=-4.1$ ,  $p=0.00$ ,  $d=2.1$ . The mean score of Group A ( $M=90$ ) was higher than Group C ( $87.9$ ) on the items designed to investigate PGT from Arabic into English but a Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group A ( $Mdn=94.44$ ,  $n=10$ ), Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=154$ ,  $z=-0.6$ ,  $p=0.545$ ,  $d=0.17$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=58.4$ ) was lower than Group C ( $M=87.9$ ) on the items designed to investigate PGT from Arabic into English. The Mann-Whitney test indicated that the difference in scores was statistically significant: Group B ( $Mdn=55.56$ ,  $n=35$ ), Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=107.5$ ,  $z=-6.05$ ,  $p < .001$ ,  $d=2.0$ .

In summary, there was a statistically significant group difference in the following pairs of participants (Group A vs Group B) and (Group B vs Group C). Group A demonstrated a higher score on these items than Group B. Group C demonstrated a higher score on these items than Group B. The group difference for Group A vs Group C was statistically non-significant. In other words, on the PGT items, Group C performed at close to the same level as the native speakers.

**Scores on items designed to investigate PGT from French into English.** The mean score of Group A ( $M=93.33$ ) was higher than Group B ( $M=58$ ) on the items designed to investigate PGT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100$ ,  $n=10$ ) and Group B ( $Mdn=55.56$ ,

$n=35$ ),  $U=25.5$ ,  $z=-4.1$ ,  $p < .001$ ,  $d=2.19$ . The mean score of Group A ( $M=93.33$ ) was higher than Group C ( $M=69.2$ ) on the items designed to investigate PGT from French into English. A Mann-Whitney test indicated that the difference was statistically significant: Group A ( $Mdn=100$ ,  $n= 10$ ) and Group C ( $Mdn=77.78$ ,  $n=35$ ),  $U=40$ ,  $z=-3.7$ ,  $p < .001$ ,  $d=1.43$ .

Turning now to the difference between Groups B and C. The mean score of Group B ( $M=58$ ) was lower than Group C ( $M=69.2$ ) on the items designed to investigate PGT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group B ( $Mdn=55.56$ ,  $n= 35$ ) and Group C ( $Mdn=77.78$ ,  $n=35$ ),  $U=415$ ,  $z=-2.3$ ,  $p=0.019$ ,  $d= 0.60$ .

In summary, there was a statistically significant group difference in the following pairs of participants (Group A vs Group B), (Group A vs Group C) and (Group B vs Group C). Group A demonstrated a higher score on these items than Group B. Group A also demonstrated a higher score on these items than Group C. Group C demonstrated a higher score on these items than Group B.

### ***7.3.5 OEITM ungrammatical***

For OEITM ungrammatical items, the Kruskal Wallis demonstrated that the distribution of the scores in the three groups (A& B & C), and two conditions of grammatical transfer, was statistically significant with  $H(2) = 52.02$ ,  $p < .001$ . Accordingly, multiple Mann-Whitney tests were run to determine if there were any differences in scores among Group A, B and C.

**Table 7.10**

*Participants' Scores in OEITM ungrammatical on Items Designed to Investigate Grammatical Transfer*

Groups	Scores on items designed to investigate NGT from Arabic into English			Scores on items designed to investigate NGT from French into English		
	<i>M%</i>	<i>SD</i>	<i>N</i>	<i>M%</i>	<i>SD</i>	<i>N</i>
Group A	96.7	7.4	9	88.88	11.7	9
Group B	78	15.3	9	53	11.7	9
Group C	82.8	16.2	9	88.2	10	9

PST: Positive grammatical transfer

NST: Negative grammatical transfer

**Scores on items designed to investigate NGT from Arabic into English.** The mean score of Group A ( $M=96.7$ ) was higher than Group B ( $M=78$ ) on the items designed to investigate NGT from Arabic into English. The Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100$ ,  $n=10$ ), Group B ( $Mdn=77.78$ ,  $n=35$ ),  $U=51$ ,  $z=-3.4$ ,  $p < .001$ ,  $d=1.55$ . The mean score of Group A ( $M=100$ ) was higher than Group C ( $M=82.8$ ) on the items designed to investigate NGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100$ ,  $n=10$ ), Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=70$ ,  $z=-2.9$ ,  $p=0.003$ ,  $d=1.10$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=78$ ) was lower than Group C ( $M=82.8$ ) on the items designed to investigate NGT from Arabic into English but a Mann-Whitney test indicated that the difference in scores was

statistically non- significant: Group B ( $Mdn=77.78$ ,  $n= 35$ ), Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=508$ ,  $z=-1.2$ ,  $p=0.206$ ,  $d=0.30$ .

In summary, participants' scores on items designed to measure NGT from Arabic into English, were significantly different for Group A vs Group B and Group A vs Group C. Group A demonstrated a higher score on these items than Group B and Group C. The difference between Group B and Group C was statistically non-significant.

**Scores on items designed to investigate NGT from French into English.** The mean score of Group A ( $M=88.88$ ) was higher than Group B ( $M=53$ ) on the items designed to investigate NGT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=88.89$ ,  $n=10$ ) and Group B ( $Mdn=55.56$ ,  $n=35$ ),  $U=6.5$ ,  $z=-4.6$ ,  $p < .001$ ,  $d= 3.0$ . The mean score of Group A ( $M=88.88$ ) was higher than Group C ( $M=88.2$ ) on the items designed to investigate NGT from French into English, but a Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group A ( $Mdn=88.89$ ,  $n=10$ ) and Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=165.5$ ,  $z=-0.27$ ,  $p=0.785$ ,  $d=0.06$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=53$ ) was lower than Group C ( $M=88.2$ ) on the items designed to investigate NGT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group B ( $Mdn=55.56$ ,  $n=35$ ) and Group C ( $Mdn=88.89$ ,  $n=35$ ),  $U=11.5$ ,  $z= -7.1$ ,  $p < .001$ ,  $d= 3.23$ .

In summary, for the items designed to investigate NGT from French into English there was a statistically significant group difference between Group A and Group B, and between Group B and Group C. Group A scored higher on these items than Group B. Group C scored

higher score on these items than Group B. In contrast, the difference between Group A and Group C was statistically non-significant.

### ***7.3.6 Group scores on the different grammatical structures***

Table 7.11 presents the descriptive statistics for the different grammatical structures for Group B and C on the OEITM, OEITM grammatical and OEITM ungrammatical. Multiple Chi-Square tests were conducted to examine if there were group differences (B vs C) on the different grammatical structures. Table 7.12 shows the scores awarded for an entire group (B vs C) on specific grammatical structures.

**Table 7.11**

*Participants' Scores on the Grammatical Structures for OEITM, OEITM Ungrammatical, and OEITM Grammatical*

	Grammatical structures reflecting on the potential grammatical transfer from Arabic into English									Grammatical structures reflecting on the potential grammatical transfer from French into English								
	Verb precedes subject			Pronoun object included in relative clauses			The non-use of the verb "to be" when describing things in the present			Wrong placement of object pronoun			A definite article is sometimes used for the proper noun of places.			Wrong use of present perfect		
	<i>Total Score</i>	<i>M%</i>	<i>SD</i>	<i>Total score</i>	<i>M%</i>	<i>SD</i>	<i>Total Score</i>	<i>M</i>	<i>SD</i>	<i>Total Score</i>	<i>M</i>	<i>SD</i>	<i>Total Score</i>	<i>M%</i>	<i>SD</i>	<i>Total Score</i>	<i>M %</i>	<i>SD</i>
OEITM (N=6 per item)																		
Group B	113	53	17.1	158	74.7	19.1	157	75.7	20	128	61.4	17.5	125	60	16.2	98	44.6	16.2
Group C	135	64	19.02	163	77.6	20.9	182	86.1	15	180	84.2	13.3	183	87	13.4	191	90.6	21.7
OEITM grammatical (N=3 per item)																		
Group B	87	82.5	17.2	81	77	22.5	77	74.24	26.9	67	63.7	18.7	72	67.5	23.9	27.95	27.6	23.5
Group C	89	84.48	18.9	82	78.9	25.7	90	85.6	18.25	92	87.6	18.2	89	84.7	18.7	96.2	86.6	30.4
OEITM ungrammatical (N=3 per item)																		
Group B	26	24.71	30.55	77	73.25	26.6	80	74.2	31.4	61	58	30.6	53	55.2	21	70	66.6	25.5
<b>Group C</b>	46	43.7	34	81	77	22.6	92	87	21.5	88	83.7	16.9	94	89.51	17.6	94.8	89.5	15.7

Table 7.12 presents the results of multiple Chi-Squared tests comparing Group B' and Group C's scores on the different grammatical structures for OEITM, OEITM grammatical, and OEITM ungrammatical.

**Table 7.12**  
*Chi Squared Tests*

	Grammatical structures reflecting on the potential grammatical transfer from Arabic into English										Grammatical structures reflecting on the potential grammatical transfer from French into English																			
	Verb precedes subject					Pronoun object included in relative clauses					The non-use of the verb 'to be' when describing things in the present					Wrong placement of object pronoun					A definite article is sometimes used for the proper noun of places.					Wrong use of present perfect				
	TS (B)	TS (C)	df	$\chi^2$	P	TS (B)	TS (C)	df	$\chi^2$	P	TS (B)	TS (C)	df	$\chi^2$	P	TS (B)	TS (C)	df	$\chi^2$	P	TS (B)	TS (C)	df	$\chi^2$	P	TS (B)	TS (C)	df	$\chi^2$	P
OEITM	113	135	4	6.5	.159	158	163	5	5.19	.393	157	182	4	7.3	.119	128	180	4	29.4	.000	125	183	4	33	.000	98	191	5	52.3	.000
OEITM gram	87	89	1	.229	.632	81	82	3	1.84	.605	77	90	2	5.4	.066	67	92	2	22.6	.000	72	89	3	8.8	.31	27.9	96.2	3	10.3	.016
OEITM ungra	26	46	3	5.85	.119	77	81	3	1.17	.758	80	92	2	.59	0.74	61	88	3	13.4	.004	53	94	2	36.8	.000	70	94.8	3	23	.000

TS (B) = total score for Group B

TS (C) = total score for Group C

DF= degree of freedom

$\chi^2$ = the Chi-Square value

P= p-value

It was found that for the OEITM total there was a group difference (B vs C) in scores for three of the grammatical structures, namely wrong placement of object pronoun, a definite article is sometimes used for the proper noun of places, and wrongly using present perfect. Group C demonstrated a higher score on these three grammatical structures. In contrast, there was a statistically non-significant group difference (B vs C) in scores for the remaining grammatical structures namely verb precedes subject, pronoun object included in relative clauses, and the non-use of the verb “to be” when describing things in the present.

For OEITM grammatical, there was a statistically significant group difference (B vs C) in scores for two grammatical structures namely wrong placement of object pronoun and wrongly using present perfect. Group C demonstrated a higher score. In contrast, there was a statistically non-significant group difference (B vs C) in scores for the following grammatical structures verb precedes subject, pronoun object included in relative clauses, the non-use of the verb “to be” when describing things in the present, wrong placement of object pronoun, and a definite article is sometimes used before proper nouns for places.

For OEITM ungrammatical there was a group difference (B vs C) in scores for three of the grammatical structures, namely wrong placement of object pronoun, a definite article is sometimes used for the proper noun of places, and wrongly using present perfect. Group C demonstrated a higher score on these three aforementioned grammatical structures. In contrast, there was a statistically non-significant group difference (B vs C) in scores for the following grammatical structures, verb precedes subject, pronoun object included in relative clauses, and the non-use of the verb “to be” when describing things in the present.

## 7.4. Summary of the results

This section summarises the results and comprises two sub sections. The first concerns the differences in participants' scores on the items designed to investigate grammatical transfer from Arabic and French into English (see Table 7 and Table 8 in appendices G and H). The second section examines if there were group differences (B vs C) on the different grammatical structures (see Table 9 in Appendix I).

### *7.4.1. Investigating grammatical transfer from Arabic and French into English*

In this section I will include only group differences where  $d$  is medium (between .50 and .79) or  $d$  is large (greater than .80).

**Results for UGJT, UGJT grammatical, and UGJT ungrammatical (see Table 7 in Appendix G).**

- PGT

For both UGJT total and UGJT grammatical, Group A (English native speakers) scored higher than Group B (L3 English) on items designed to investigate positive grammatical transfer (PGT) from Arabic into English ( $d = 1.13$ ) and from French into English ( $d = 1.1$ ). However, Group A scored higher than Group C only on items designed to measure PGT from Arabic into English ( $d = 1.01$ ).

- NGT

For both UGJT total and UGJT ungrammatical, Group A scored higher than Group B on items designed to measure negative NGT from Arabic into English ( $d = 1.16$ ) and from French into English ( $d = 0.58$ ).

**Results for OEITM, OEITM grammatical, and OEITM ungrammatical (see Table 8 in Appendix H).**

- PGT

In both, the OEITM total and the OEITM grammatical, Group A scored higher than Group B on items designed to investigate PGT from Arabic into English ( $d = 2.1$ ) and from French into English ( $d = 2.19$ ). Also Group A scored higher than Group C on items designed to investigate PGT from French into English ( $d = 0.6$ ).

- NGT

In both the OEITM total and the OEITM ungrammatical, Group A scored higher than Group B on items designed to investigate NGT from Arabic into English ( $d=1.55$ ) and from French into English ( $d= 3.0$ ). Group A scored higher than Group C on items designed to investigate NGT from Arabic into ( $d= 1.10$ ).

**Group B (L3 English) vs Group C (L2 English)- results for UGJT, UGJT grammatical, and UGJT ungrammatical (see Table 7 in Appendix G).**

- PGT

For UGJT total and UGJT grammatical, examining the difference in scores for non-native participants (C vs B), Group C scored higher than Group B on the items designed to investigate PGT from French into English ( $d=1.13$ )

- NGT

For UGJT total and UGJT ungrammatical, examining the difference in scores for non-native participants (C vs B), Group C scored higher than Group B on the items designed to investigate NGT from Arabic into English ( $d=.51$ ).

**Results for OEIT. OEITM grammatical and OEITM ungrammatical (see Table 8 in Appendix H).**

- PGT

For OEITM total and OEITM Grammatical, examining the difference in scores for non-native participants (C vs B), Group C scored higher than Group B on items designed to investigate PGT from and Arabic into English ( $d= 2$ ) and from French into English ( $d=.60$ ).

- NGT

For OEITM total and OEITM ungrammatical, examining the difference in scores for non-native participants (C vs B), Group C scored higher than Group B on items designed to investigate NGT from French into English ( $d=3.23$ ).

#### ***7.4.2 Examining group differences (B vs C) on the different grammatical structures.***

In the summary below I report where I found group differences, noting that in all these cases Group C demonstrated higher scores than Group B. Table 9 in Appendix I displays the Multiple Chi-Square tests that were conducted to examine if there were group differences (B vs C) on the different grammatical structures. Table 9 shows results on UGJT, UGJT grammatical and UGJT ungrammatical. Results demonstrates the following:

For UGJT total there was a group difference (B vs C) in scores for two of the grammatical structures, with Group C demonstrating a higher score for both. These two grammatical structures were:

- 1) Verb precedes subject,
- 2) Pronoun object included in relative clauses.

For UGJT grammatical there was a statistically significant group difference (B vs C) in scores for only one grammatical structure, namely Pronoun object included in relative clauses, with Group C demonstrating a higher score.

For UGJT ungrammatical, there was a statistically significant group difference (B vs C) in scores for four grammatical structures. Group C demonstrated higher scores than Group B for all these grammatical structures. These grammatical structures were:

- 1) Verb precedes subjects,
- 2) Pronoun object included in relative clauses,
- 3) Wrong placement of object pronoun,
- 4) A definite article is sometimes used before a proper noun of a place.

For OEITM total and OEITM ungrammatical, there was a group difference (B vs C) in scores for three of the grammatical structures. Group C demonstrated a higher score on these three grammatical structures. These three structures were:

1. Wrong placement of object pronoun,
2. A definite article is sometimes used for the proper noun of places,
3. Wrongly using present perfect.

For OEITM grammatical, there was a statistically significant group difference (B vs C) in scores for two grammatical structures. Group C demonstrated a higher score on the following two grammatical structures.

1. Wrong placement of object pronoun,
2. Wrongly using present perfect.

## 7.5 Discussion

This section comprises two sub-sections; one pertains to the UGJT, and the other to the OETM. Participants' scores on these tests were as follows: Group A (native speakers) outperformed Group C (L2 English), and Group C outperformed Group B (L3 English). Furthermore, the fact that native speakers' scores (Group A) were close to 100% on the UGJT (M=92.5 %) and OEITM (M=92.2 %) shows that these tests were functioning as intended. NS's scores for the four categories of transfer in both UGJT and OEITM were also close to 100% and significantly higher than those of Group B and Group C (see, Table7.2 & Table7.8, above). The issue of whether transfer is evident among the non-native participants can only be established by comparing results from groups B and C, which is my focus here. Grammatical transfer covers a) positive grammatical transfer (PGT) from Arabic into English, b) negative grammatical transfer (NGT) from Arabic into English, c) PGT from French into English and d) NGT from French into English.

### *7.5.1 Investigating grammatical transfer in this study*

Three grammatical structures were selected to investigate both PGT from Arabic into English, and NGT from French into English. Another three structures were selected to investigate both PGT from French into English and NGT from Arabic into English. These six structures are presented in Table 7.13. As explained earlier, for grammaticality tests (UGJT &

OETM) each structure was presented in six sentences, three of them were grammatical and the other three were ungrammatical.

**Table 7.13**

*Structure Reflecting on the Potential Grammatical Transfer from Arabic or French into English*

Basic Structure	Arabic	French	English	Example for UGJT
				<ol style="list-style-type: none"> <li>1. Grammatical Sentence</li> <li>2. Ungrammatical Sentence</li> </ol>
1) Basic Word Order	VSO*	SVO	SVO	<ol style="list-style-type: none"> <li>1. I am encouraged because I had a good grade on the math exam.</li> <li>2. I am encouraged because a good grade I had on the math exam.</li> </ol>
2) Use of resumptive pronouns in relative clauses.	Applicable	Not Applicable	Not Applicable	<ol style="list-style-type: none"> <li>1. The Mercedes-Benz car that I drive is 7000 years old.</li> <li>2. The Mercedes-Benz car that I drive it is 7000 years old.</li> </ol>

3) Use of the verb “to be” describing things in the present.	“be” omitted	“be” included	“be” included	<ol style="list-style-type: none"> <li>1. He is happy because his father bought him a new pair of shoes.</li> <li>2. He happy because his father bought him a new pair of shoes</li> </ol>
4) Location of object pronouns in sentences that include main clauses	Post-verbal	Pre-verbal	Post-Verbal	<ol style="list-style-type: none"> <li>1. I asked him to put the food on the round table in the kitchen.</li> <li>2. I him asked to put the food on the round table in the kitchen.</li> </ol>
5) Use of the definite article with some proper nouns of places	Not Obligatory	Obligatory	Not Obligatory	<ol style="list-style-type: none"> <li>1. I love Switzerland because I spent my best vacation in Zurich.</li> <li>2. I love the Switzerland because I spent my best vacation in the Zurich.</li> </ol>
6) Use of simple past tense to refer to an action completed in the past.	Correct use	Incorrect use, (replacing simple past tense with present perfect)	Correct Use	<ol style="list-style-type: none"> <li>1. Yesterday Nicolas played baseball.</li> <li>2. Yesterday Nicolas has played baseball.</li> </ol>

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It is worth noting that Arabic allows both SVO and SOV word orders, however, the selected items on the basic word order structure allows only SOV word order in Arabic. In

English, use of the definite article is permitted with some proper nouns of places (e.g., the USA) these cases were also excluded from the selected items.

**PGT from Arabic into English.** PGT from Arabic into English in Group B's answers is examined by comparing scores (B vs C) on total items (n=18) reflective of the selected structures (n=3) namely a) location of object pronouns in sentences that include main clauses, b) use of the definite article with some proper nouns of place, and c) use of simple past tense to refer to an action completed in the past. These structures are the same in Arabic and English but different in French. Each of these structures is represented by six items; three are grammatically correct and the other three are incorrect. Participants' scores reflecting PGT from French into English included scores were:

- Recognition of grammatical items as grammatically correct sentences (n=9).
- Recognition of the grammar error in the ungrammatical sentences and able to correct it (n=9).

**NGT from Arabic into English.** NGT from Arabic into English can be examined by comparing participants' incorrect judgments (B vs C) in answering total items (n=18) involving the selected structures (n=3). These structures are the same in French and English but different in Arabic. These structures are a) basic word order; b) use of resumptive pronouns in relative clauses, and c) use of the verb "to be" describing things in the present. Each of these structures is represented by six items; three are grammatically correct and the other three are incorrect. Participants' wrong judgments reflecting NGT from Arabic into English include:

- Judgements of ungrammatical items as grammatically correct sentences (n=9).

- Recognition of grammatical sentences as grammatically incorrect sentences and introducing an error when attempting to correct.

**PGT from French into English.** PGT from French into English in Group B's answers is examined by comparing scores (B vs C) on total items (n=18) reflective of the selected structures (n=3). These structures are a) location of object pronouns in sentences that include main clauses, b) use of the definite article with some proper nouns of places, and c) use of the verb "to be" describing things in the present. These structures are the same in French and English but different in Arabic. Each of these structures is represented by six items; three are grammatically correct and the other three are incorrect. Participants' scores reflecting PGT from French into English were:

- Recognition of grammatical items as grammatically correct sentences (n=9).
- Recognition of grammar error in the ungrammatical sentences and correct it (n=9).

**NGT from French into English.** NGT from French into English can be examined by comparing participants' incorrect judgments (B vs C) in answering total items (n=18) involving the selected structures (n=3). These structures are the same in Arabic and English but different in French. These structures are a) location of object pronouns in sentences that include main clauses, b) use of the definite article with some proper nouns of place and c) use of simple past tense to refer to an action completed in the past. Each of these structures is represented by six items; three are grammatically correct and the other three are incorrect. Participants' wrong judgments reflecting NGT from French into English include:

- Participants' judgements of ungrammatical items as grammatically correct sentences (n=9).
- Participants' recognition of grammatical sentences as grammatically incorrect sentences and introducing an error when attempting to correct.

### 7.5.2 UGJT

This section deals with UGJT total scores. It concerns the four categories of grammatical transfer, namely 1) positive grammatical transfer (PGT) from Arabic into English, 2) negative grammatical transfer (NGT) from Arabic into English, 3) PGT from French into English, and 4) NGT from French into English. In this discussion there is one section dealing with transfer from Arabic into English (PGT&NGT) followed by another dealing with transfer from French into English (PGT & NGT). The section ends with a summary of transfer that was observed and a comparison of transfer from Arabic and French.

**PGT from Arabic into English in UGJT.** This section addresses the occurrence of PGT from Arabic into English in Group B's answers for total items and for selected items in the UGJT.

In comparing participants' scores (B vs C) on the total items reflecting PGT from Arabic into English (n=18) on the following structures a) location of object pronouns in sentences that include main clauses, b) use of the definite article with some proper nouns of places and c) use of simple past tense to refer to an action completed in the past. I found that Group B (M=81.9) scored lower than Group C (M=83.17) but with a minimal effect size (d=0.11). These results indicate no evidence of PGT from Arabic into English in Group B's answers. Only if Group B's scores had been greater than Group C's, would there have been

evidence of transfer. These results are best explained by the difference in the two group's general English proficiency, with Group C having a higher level of English proficiency than Group B.

Comparing participants' scores (B vs C) on each of the selected grammatical structures (6 items per structure) reflecting potential PGT from Arabic into English, I found that Group B scored lower than Group C on all three structures with a medium effect size ( $d=0.70$ ) on one grammatical structure but with a small ( $d=0.47$ ) or minimal ( $d=0.02$ ) effect size on the other two; see Table 7.14. As Group B scored at the same level as Group C on use of the definite article with some proper nouns of place, this may indicate a transfer effect as one would expect Group C's score to be greater than Group B's on this structure as it is on the other structures.

Results indicated that PGT from L1 Arabic into L3 English occurred in Group B's answers on the grammatical structure that is unmarked in the source language (i.e., use of the definite articles with some proper nouns of place). In contrast, results showed that PGT from L1 Arabic into L3 English did not occur in Group B's answers on the grammatical structures that are marked in the source language (i.e., location of object pronouns in sentences that include main clauses and use of simple past tense to refer to an action completed in the past). In general, the unmarked grammatical features are those core, or basic rules, of a given language, whereas marked grammatical features are the peripheral or more complex ones. In TLA it was observed that unmarked grammatical features are transformable from previously learned language(s) (e.g., Arabic and French) into the newly learned language (e.g., English). In contrast, learners rarely or never transfer marked grammatical features from previously learned language(s) into the newly acquired language (Mukherjee & Hundt, 2011; Saud Alahmadi & Kesseiri, 2013; Westergaard, 2003).

The use of the definite article with proper nouns (omitted in Arabic and English) is a marked grammatical structure in Arabic, which best explains the non-occurrence of PGT from L1 Arabic into L3 English in Group B. In Arabic “indefiniteness is unmarked on nouns whereas definiteness is marked by the definite article prefix *al / ال*- “the” which precedes all nouns except for proper nouns” (Al Barrag & Alzahrani, 2019, p. 288) . It is worth mentioning that this structure is also unmarked in English. The general rule is that, in English, definiteness markings (e.g., *the*) are unnecessary with proper nouns because the latter are by default definite. The absence of definiteness markers is reflective of an unmarked grammatical feature (Van Langendonck & Van de Velde, 2009). However, in English, the definite article can also be used with some proper nouns of places (e.g., *the Nile River*). However, these cases were excluded in this study as they do not provide evidence of PGT from Arabic into English.

The use of simple past tense to refer to an action completed in the past is a marked grammatical structure in Arabic, which best explains the non-occurrence of PGT from L1 Arabic into L3 English in Group B’s answer on this structure. In Arabic, the formation of the simple past tense requires the addition of a suffix that varies according to person, gender, and number; it is therefore considered a marked grammatical feature (Fehri, 2012). Simple past tense in English regular verbs is also a marked grammatical feature as it requires the addition of a suffix *ed* (*walk~ walked*). Leech stated, “where there is a contrast between two or more members of a category such as a number, case, or tense, one of them is called marked if it contains some extra suffix/affix, as opposed to the unmarked member which does not.”(Leech, 2006, p. 11). This study only included regular verbs in the sentences where the simple past tense referred to an action completed in the past.

The location of object pronouns in sentences that include main clauses (post-verbal in Arabic and English) is a marked grammatical structure in Arabic, which best explains the non-occurrence of PGT from L1 Arabic into L3 English in Group B. In Arabic, relativisation can

be classified as a marked grammatical feature when it is introduced by a relative pronoun and an unmarked grammatical feature without the relative pronoun. The non-inclusion of the relative pronoun is the core grammatical rule and its inclusion is the more complex, less utilised and marked, grammatical feature (Hahn, 2012) . All the selected items (n=6) in English reflective of this structure have their counterpart sentences in Arabic that include a relative pronoun and hence, are considered reflective of a marked grammatical structure. In Arabic, the markedness of the location of object pronouns in sentences that include main clauses best explains the non-occurrence of transfer.

**Table 7.14**

*Participants' Scores on Selected Items in UGJT Reflecting on PGT from Arabic into English.*

Structures	Group B (M %)	Group C (M %)	d value
Location of object pronouns in sentences that include main clauses (n=6)	78.5	91.2	.70
Use of the definite article with some proper nouns of place. (n=6)	81.4	81.9	.02
Use of simple past tense to refer to an action completed in the past. (n=6)	77.6	87.6	.47

On the whole, the above results did not provide evidence of PGT from Arabic into English in Group B's answers. However, a group average can hide what is occurring at the individual learner's level. PGT from Arabic into English may have occurred in those Group B participants with a lower level of proficiency, and transfer may have gradually decreased as learning took place. The proficiency test showed that Group C ( $M=88.11$ ) scored significantly higher than Group B ( $M=80.84$ ) on the English C-test ( $d=1.06$ ) with all the participants in Group C scoring higher than 85% on the test. Group B participants were further divided into two sub-groups according to their scores on the English C-test. One sub-group with lower proficiency scored between 70% and 77% and is referred to as B1 ( $n=6$ ). The second sub-group, with a higher level of English proficiency, scored between 80% and 85% and is referred to as B2 ( $n=21$ ).

In comparing participants' scores (B1 vs C) on the total items reflecting PGT from Arabic into English ( $n=18$ ) in UGJT, I found that Group B1 ( $M=92.53$ ) scored higher than Group C ( $M=83.17$ ) on these items with a large effect size ( $d=0.86$ ). These results indicate that there was PGT from Arabic into English in Group B1's answers. PGT from Arabic into English only occurred among Group B's participants with a lower English proficiency (B1). This indicates that English proficiency mediates PGT from L1 Arabic into L3 English; that is, a lower level of English proficiency leads to PGT from Arabic into English.

I further investigated whether there was PGT in individual grammatical structures in Group B1's answers. Comparing participants' scores (B1 vs C) on each of the selected grammatical structures (6 items per structure) reflecting potential PGT from Arabic into English, I found that Group B1 scored higher than Group C on use of the definite article with some proper nouns of place with a large effect size ( $d=2.5$ ) indicating the occurrence of PGT from L1 Arabic into L3 English. Group B1 also scored higher than Group C on use of past

tense to refer to an action completed in the past but with a small effect size ( $0.39$ ), providing weak evidence of PGT from Arabic into English. Group B1 scored lower than C but with a large effect size ( $d=0.70$ ) on location of object pronouns in sentences that include main clauses providing no evidence of PGT from L1 Arabic in L3 English. Results indicated that PGT from L1 Arabic into L3 English is more likely to occur in grammatical structures that are unmarked in the source and target language (i.e., use of the definite articles with some proper nouns of place). The results also suggest that learners are not likely to transfer grammatical features that are marked in the source (L1 Arabic) and target language (L3 English) (i.e., location of object pronouns in sentences that include main clauses and use of past tense to refer to an action completed in the past).

**Table 7.15**

*Group B1's Scores on Selected Items in UGJT Reflecting on PGT from Arabic into English.*

Structures	Group B1 (M %) N=6	Group C (M %) N=35	d value
Location of object pronouns in sentences that include main clauses (n=6)	85.94	91.2	0.70
Use of the definite article with some proper nouns of place. (n=6)	100	81.9	2.5

Use of past tense to refer to an action completed in the past. (n=6)	91.65	87.6	0.39
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In comparing participants' scores (B2 vs C), on the total items reflecting PGT from Arabic into English ( $n=18$ ), I found that Group B2 ( $M=76$ ) scored lower than Group C ( $M=83.17$ ) on these items but with a small effect size ( $d=0.66$ ). These results provide no evidence of PGT from Arabic into English in Group B2's answers. Only if Group B2's scores had been greater than Group C's, would there have been evidence of transfer. These results are best explained by the difference in the two group's general English proficiency, Group C having a higher level of English proficiency than Group B2. PGT from Arabic into English did not occur among Group B's participants with a higher-level English proficiency (i.e., B2).

I further investigated whether there was PGT in the individual grammatical structures in group B2's answers. I compared participants' scores (B2 vs C) on each of the selected grammatical structures (six items per structure), reflecting potential PGT from Arabic into English. I found that Group B2 scored lower than Group C on all the three structures. Group B2 scored lower than Group C with a large effect size ( $d>0.80$ ) on two of these three grammatical structures namely, location of object pronouns in sentences that include main clauses ( $d=2.2$ ), and use of simple past tense to refer to an action completed in the past ( $d=1.5$ ). However, Group B2 scored lower than Group C with a small effect size on use of the definite article with some proper nouns of places ( $d=0.23$ ); see Table 7.16. These results provide no evidence of PGT from Arabic into English in Group B2's answers.

**Table 7.16**

*Group B2's Scores on Selected Items in UGJT Reflecting on PGT from Arabic into English.*

Structures	<i>Group B2</i> ( <i>M %</i> )	<i>Group C</i> ( <i>M %</i> )	<i>d value</i>
Location of object pronouns in sentences that include main clauses (n=6)	70	91.2	2.2
Use of the definite article with some proper nouns of place. (n=6)	78.3	81.9	0.23
Use of simple past tense to refer to an action completed in the past. (n=6)	74.7	87.6	1.5

In summary, PGT from Arabic into English only occurred among those Group B's participants with lower English proficiency (i.e., B1), not in those with a higher level of proficiency (i.e., B2). This indicated that as learners gain in proficiency the grammatical forms initially transferred from Arabic are replaced by the target forms. For Group B1, PGT from L1 Arabic into L3 English only occurred in one structure, namely, use of the definite article with some proper nouns of place. It did not occur on the other two structures, namely, use of past tense to refer to an action completed in the past, and location of object pronouns in sentences

that include main clauses. This indicates that PGT from L1 Arabic into L3 English is more likely to occur if a feature is unmarked in the source language (L1 Arabic) but marked or less marked in the target language (L3 English).

**NGT from Arabic into English in UGJT.** This section will address the occurrence of NGT from Arabic into English in Group B's answers for total items and for selected items in the UGJT.

I compared participants' incorrect judgments (B vs C) on the total items ( $n=18$ ) reflecting NGT from Arabic into English ( $n=18$ ). These structures are a) basic word order, b) inclusion of pronoun object in relative clauses and c) use of the verb "to be" describing things in the present. Results found that Group B ( $M=12.2\%$ ) made more wrong judgements than Group C ( $M=7.6\%$ ) but with a small effect size ( $d=0.35$ ) indicating that there was no clear evidence of NGT from Arabic into English in Group B's answers. Only if Group B's incorrect judgments had been significantly greater than Group C's (e.g.,  $d \geq 0.50$ ), would there have been clear evidence of NGT in Group B's answers. These results are best explained by the difference in the two group's general English proficiency, Group C having a higher level of English proficiency than Group B.

Comparing participants' incorrect judgments (B vs C) on each of the selected grammatical structures (six items per structure), designed to investigate NGT from Arabic into English, I found little evidence of NGT from Arabic into English in Group B's answers as shown in Table 7.17. The evidence for NGT is weak for the structure object relative clauses where the effect size is 0.12 (minimal) but somewhat stronger for use of the verb "to be" describing things in the present ( $d=0.48$ ) and basic word order ( $d=0.52$ ).

There is some evidence for NGT from Arabic into English in Group B's answers for basic word order. As previously discussed, the high frequency of the use of SVO word order, despite its markedness, best explains the occurrence of NGT from Arabic into English in Group

B's answers on this structure. There was also evidence of NGT from Arabic into English in Group B's answers on the use of the verb "to be" describing things in the present. The omission of copula "be" is best explained by the fact that it is a universal feature of early interlanguage. There was no evidence of NGT from Arabic into English in the use of resumptive pronouns in relative clauses. In Arabic, relativisation can be classified as a marked grammatical feature when a relative pronoun introduces a relative clause and unmarked grammatical feature when the relative clause is not introduced with a relative pronoun (Hahn, 2012). Accordingly, the use of resumptive pronouns in relative clauses is considered a marked grammatical feature in Arabic, and this best explains the non-occurrence of NGT.

**Table 7.17**

*Participants' Wrong Judgment on Selected Items in UGJT Reflecting on NGT from Arabic into English.*

Structures	Group B (M %)	Group C (M %)	d value
The basic word order (n=6)	23	18	0.48
Use of resumptive pronouns in relative clauses (n=6)	20	17	0.12

Use of the verb “to be” describing things in the present. ( <i>n</i> =6)	11	5	0.52
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I further examined the occurrence of NGT from L1 Arabic into L3 English in Group B1's and B2's answers for total items and for selected items. As a reminder to the reader, Group B1 (*n*=6) had a lower level of English proficiency and Group B2 (*n*=29) a higher level. Comparing participants' incorrect judgments (B1 vs C) on the total items (*n*=18) reflecting NGT from Arabic into English, I found that Group B1 (*M*=25%) made more wrong judgements than Group C (*M*=7.6%) with a large effect size (*d*=2.3), indicating that there was evidence of NGT from Arabic into English in Group B1's answers. I further investigated whether there was NGT in individual grammatical structures in group B1's answers. Comparing participants' scores (B 1 vs C) on each of the selected grammatical structures (6 items per structure) I found that Group B1 made more wrong judgements than Group C on all three grammatical structures with large effect sizes (*d* > 0.80) (see Table 7.18), indicating that NGT from Arabic into English was evident in Group B1's answers on these structures. This reflects the role of English proficiency on NGT from L1 Arabic into L3 English; that is, a lower level of English proficiency leads to NGT from Arabic into English.

**Table 7.18**

*B1's Wrong Judgment on Selected Items in UGJT Reflecting on NGT from Arabic into English.*

Structures	Group B (M %)	Group C (M %)	d value
The basic word order (n=6)	33	18	1.12
Use of resumptive pronouns in relative clauses(n=6)	27	17	0.80
Use of the verb "to be" describing things in the present. (n=6)	15	5	1.05

Comparing participants' incorrect judgments (B2 vs C) on the total items (n=18) reflecting NGT from Arabic into English (n=18), I found that Group B2 (M=9.7%) made more wrong judgements than Group C (M=7.6%) but with only a small effect size (d=0.32), indicating that there was no clear evidence of NGT from Arabic into English in Group B2's answers. Only if Group B2's incorrect judgments had been notably greater than Group C's (e.g.,  $d \geq 0.5$ ) would it be possible to claim that there was evidence of NGT. These results are best explained by the difference in the two group's general English proficiency, Group C having a higher level of English proficiency than Group B2.

I further investigated whether there was NGT in individual grammatical structures in Group B2's answers. Comparing participants' scores (B 2 vs C) on each of the selected grammatical structures (6 items per structure) reflecting potential NGT from Arabic into English, I found that Group B2 made fewer wrong judgements than Group C on all three grammatical structures (see Table 7.19) indicating that NGT from Arabic into English was not evident in Group B2's answers on the same structures. This indicated that, as learners gain in proficiency, the grammatical forms initially transferred from Arabic are replaced by the target forms.

**Table 7. 19**

*B2's Scores on Selected Items in UGJT Reflecting on NGT from Arabic into English.*

Structures	Group B2 (M %)	Group C (M %)	d value
The basic word order (n=6)	10	18	0.71
Use of resumptive pronouns in relative clauses(n=6)	7	17	0.89
Use of the verb "to be" describing things in the present. (n=6)	2.8	5	0.12

In summary, NGT from L1 Arabic into L3 English also occurred in Group B's answers but only on the following grammatical structures, the basic word order, and use of the verb "to be" when describing things in the present but this was not the case for use of resumptive pronouns in relative clauses. The high frequency of the use of SVO word order, despite its markedness, best explains the occurrence of NGT from Arabic into English in Group B's

answers on the structure basic word order. The omission of copula “be” is best explained by the fact that it is a universal feature of early interlanguage. This justifies the occurrence of NGT from Arabic into English in Group B’s answers on the structure use of the verb ‘to be’ when describing things in the present. There was no evidence of NGT from Arabic into English in Group B’s answers on use of resumptive pronouns in relative clauses. In Arabic, use of resumptive pronouns in relative clauses are inclusive of a special relative marker and hence belong to the marked relative clause category. The markedness of this structure best explains the non-occurrence of grammatical transfer. For Group B1, NGT from L1 Arabic into L3 English occurred on all items and on all the selected grammatical structures; basic word order, use of the verb “to be” when describing things in the present and use of resumptive pronouns in relative clauses. The lower-level English proficiency in Group B1 best explains the occurrence of this transfer. NGT from Arabic into English was not evident in Group B2’s answers on total items and on all the aforementioned selected structures. This indicated that, as learners gain in proficiency, the grammatical forms initially transferred from Arabic are replaced by the target forms.

**PGT from French into English in UGJT.** This section will address the occurrence of PGT from French into English in Group B’s answers for total items and for selected items in UGJT.

In comparing participants’ scores (B vs C), on the total items reflecting PGT from French into English ( $n=18$ ), I found that Group B ( $M=71.11$ ) scored lower than Group C ( $M=87.3$ ) with a large effect size ( $d=1.13$ ). These results indicate that there was no evidence of PGT from French into English in Group B’s answers. Only if Group B’s scores had been

greater than Group C's, would there have been evidence of transfer. These results are best explained by the difference in the two group's general English proficiency, Group C having a higher level of English proficiency than Group B.

I further investigated whether there was PGT from French into English in individual grammatical structures in Group B answers. Comparing participants' scores (B vs C) on each of the selected grammatical structures (6 items per structure), reflecting potential PGT from French into English, I found that Group B had lower scores than Group C on all the three grammatical structures; see Table 7.20. These results indicated that PGT from French into English was not evident in Group B's answers on these structures.

**Table 7.20**

*Participants' Scores on Selected Items in UGJT Reflecting on PGT from French into English.*

Structures	<i>Group B</i> ( <i>M %</i> )	<i>Group C</i> ( <i>M %</i> )	<i>d value</i>
The basic word order (n=6)	77	82	0.42
Use of resumptive pronouns in relative clauses (n=6)	80	83	0.23
Use of the verb "to be" describing things in the present. (n=6)	89	95	0.50

This section further addressed the occurrence of PGT from L2 French into L3 English in answers provided by Group B1 and Group B2 for total, and selected items, in the UGJT.

Group B1 ( $n=6$ ) had a lower level of English proficiency and Group B2 ( $n=29$ ) a higher level. Comparing participants' scores (B1 vs C) on the total items ( $n=18$ ), reflecting PGT from French into English, I found that Group B1 ( $M=94.1\%$ ) scored higher on these items than Group C ( $M=87.3\%$ ) with a medium effect size ( $d=0.63$ ), indicating that there was some evidence of PGT from French into English in Group B1's answers. This reflects the role of English proficiency on PGT from L2 French into L3 English; that is, a lower level of English proficiency facilitates PGT from L2 French into L3 English.

I further investigated whether there was PGT from French into English in individual grammatical structures in the answers provided by Group B1. I compared participants' scores (B1 vs C) on each of the selected grammatical structures (6 items per structure), reflecting potential PGT from French into English. I found that Group B1 scored higher than Group C on basic word order with a medium effect size ( $d=0.70$ ) and on use of the verb "to be" describing things in the present with a large effect size ( $d=1.2$ ). Results show that PGT from French into English, in Group B1's answers on these grammatical structures, occurred. Use of the verb "to be" and the basic SVO word order are highly frequent structures in both French (Vega y Vega, 2020) and English (Davies & Gardner, 2013), and this best explains why the transfer occurs once learners obtain evidence of the similarity. In contrast, results showed that Group B1 scored higher than Group C on use of resumptive pronouns in relative clauses but with a minimal effect size ( $d=0.02$ ). In Lebanon, students who receive education in French as their first foreign language are introduced to relativisation in their eighth year of school, whereas the basic SVO word order, and use of the verb "to be", are taught from primary school onwards. Perhaps Group B1 students could not obtain evidence of the similarity between French and English in omitting resumptive pronouns in relative clauses because they are less exposed to

this structure in their L2 French than to the use of the verb “to be”, and SVO word order. Previous research has documented the role played by exposure to formal grammatical instruction on grammatical transfer in TLA. Such exposure will increase grammatical transfer from the source language (L2) into the target language (L3) (Najjar, 2021; Stadt et al., 2018). With a high amount of exposure, students may obtain evidence of the similarity between grammatical structures in the source (L2 French) and target language (L3 English).

**Table 7.21**

*B1's Scores on Selected items in UGJT reflecting on PGT from French into English.*

Structures	Group B (M %)	Group C (M %)	d value
The basic word order (n=6)	91	82	0.74
Use of resumptive pronouns in relative clauses (n=6)	93	92	0.02
Use of the verb “to be” describing things in the present. (n=6)	95.3	82	1.2

Comparing participants' scores (B2 vs C) on the total items (n=18) reflecting PGT from French into English, I found that Group B2 ( $M= 67\%$ ) scored lower on these items than Group C ( $M= 87.3 \%$ ) with a large effect size ( $d=1.64$ ) indicating that there was no evidence of PGT from French into English in Group B2's answers. Only if Group B2's scores had been greater than Group C's, would there have been evidence of transfer. These results are best explained by the difference in the two group's general English proficiency, Group C having a higher level

of English proficiency than Group B2. This indicated that as learners gain in proficiency the grammatical forms initially transferred from French are replaced by the target forms.

I further investigated whether there was PGT in individual grammatical structures in Group B2 answers. I compared participants' scores (B2 vs C) on each of the selected grammatical structures (6 items per structure), reflecting potential PGT from French into English, and again found no evidence of transfer in these grammatical structures. Group B2 scored lower than Group C on these structures with a large effect size ( $d > 0.8$ ) (see Table 7.22) showing no evidence of PGT from French into English in Group B2 answers.

**Table 7.22**

*B2' Scores on Selected Items in UGJT Reflecting on PGT from French into English.*

Structures	<i>Group B</i> ( <i>M %</i> )	<i>Group C</i> ( <i>M %</i> )	<i>d value</i>
The basic word order (n=6)	60	82	1.5
Use of resumptive pronouns in relative clauses (n=6)	67	83	1.11
Use of the verb "to be" describing things in the present. (n=6)	74	95	1.6

In summary, the results have demonstrated that PGT from L2 French into L3 English was evident in the answers of those Group B's participants with a lower level of English

proficiency (i.e., B1), but was not evident among participants with a higher level of English Proficiency (i.e., B2). I suggest that PGT from L2 French into L3 English gradually decreases as English proficiency increases. This also indicates that, as learners gain in proficiency, the grammatical forms initially transferred from French are replaced by the target forms. PGT from L2 French into L3 English occurred in Group B1's answers in basic word order and use of the verb "to be" when describing things in the present. Use of the verb "to be", and the basic SVO word order are highly frequent structures in French, allowing transfer to occur once learners obtain evidence of the similarity. In contrast, there was no evidence of PGT in Group B1's answers on the use of resumptive pronouns in relative clauses, perhaps because relativisation is less than the use of the verb "to be" and SVO word. This best explains the non-occurrence of grammatical transfer.

**NGT from French into English in UGJT.** Comparing participants' incorrect judgments (B vs C) on the total items ( $n=18$ ), reflecting NGT from French into English ( $n=18$ ), I found that Group B ( $M=22.3\%$ ) was making more wrong judgements than Group C ( $M=15.6\%$ ) but with a small effect size ( $d=0.41$ ), indicating that there was no clear evidence of NGT from French into English in Group B's answers. Only if Group B's incorrect judgments had been notably greater than Group C's (e.g.,  $d \geq 0.5$ ), would there have been evidence of NGT from French into English. These results are best explained by the difference in the two group's general English proficiency, Group C having a higher level of English proficiency than Group B.

Comparing participants' incorrect judgments (B vs C) on each of the selected grammatical structures (6 items per structure), designed to investigate NGT from French into English, I found evidence of NGT from French into English in Group B's answers as shown in Table 7.23. There was evidence of NGT in the use of the definite article with proper nouns of place. On this structure, Group B made more wrong judgements than Group C with medium

effect size ( $d=0.57$ ). Learners may transfer this feature because they can see evidence that English does sometimes put “the” before place names. In other words, learners overgeneralise the inclusion of “the”. So, what we see here is evidence of transfer working alongside a recognised universal learning process. For use of simple past tense to refer to an action completed in the past, Group B made more wrong judgments than Group C, with a small effect size ( $d=0.47$ ). Results indicated weak evidence of NGT in Group B’s answers. The frequent use of the *passé composé* (composed past) in French (Grisot, 2018) best explains the occurrence of NGT in Group B’s answers on this structure. As a reminder to the reader, a French learner of English may use the present perfect instead of simple past tense due to the similarity in conjugation (form) and the dissimilarity in function between *passé composé* in French (composed past) and present perfect in English, which creates a potential for NGT from French into English.

Group B also made more wrong judgments than Group C on the location of object pronouns in sentences that include a main clause but with a minimal effect size ( $d=0.03$ ), showing therefore no evidence of NGT from L2 French into L3 English on this grammatical structure. The reader is reminded that in relativisation the object pronoun is pre-verbal in English and post-verbal in French. The following gives a potential explanation as to why the transfer on the aforementioned structure did not occur. In Lebanon, students who receive education in French as their first foreign language are introduced to relativisation in their eighth year of school, whereas the use of *passé composé* (composed past) and the use of the definite article with proper nouns is taught from primary school. Previous research has documented the role played by exposure to formal grammatical instruction on NGT from L2 into L3 transfer in TLA. A decreased exposure will limit NGT from the source language (L2) into the target

language (L3). It can be argued that with less exposure to the grammar of the source language, students will not know the source language well enough to transfer its features, whether correctly or incorrectly, into the target language (Najjar, 2021; Stadt et al., 2018).

**Table 7.23**

*Participants' Scores on Selected Items in UGJT Reflecting on NGT from French into English.*

Structures	<i>Group B</i> ( <i>M %</i> )	<i>Group C</i> ( <i>M %</i> )	d value
Location of object			
pronouns in sentences that include main clauses	18.6	18.1	0.03
Use of the definite article with proper nouns of place	26.5	9.8	0.76
Use of simple past tense to refer to an action completed in the past	18.4	11.4	0.47

This section discusses the possible occurrence of NGT from French into English in answers provided by Group B1 and Group B2. Comparing participants' incorrect judgments (B1 vs C) on the total items ( $n=18$ ), reflecting NGT from French into English, I found that Group B1 ( $M=37.1\%$ ) made more wrong judgements than Group C ( $M=15.6\%$ ) with a large effect size ( $d=1.7$ ), indicating that there was evidence of NGT from French into English in Group B1's answers. This reflects the role of English proficiency on NGT from L2 French into L3 English; that is, NGT is more likely to occur in learners with a lower level of English proficiency

I further investigated whether there was NGT in individual grammatical structures in Group B1. Comparing participants' scores (B 1 vs C) on each of the selected grammatical structures (6 items per structure) reflecting potential NGT from Arabic into English, I found that Group B1 made more wrong judgements than Group C on all the three grammatical structures with large effect sizes ( $d > 0.79$ ) (see Table 7.24). These results indicate that NGT from Arabic into English was evident in Group B1's answers in all these structures.

**Table 7.24**

*B1's Scores on Selected Items in UGJT Reflecting on NGT from French into English.*

Structures	Group B1 (M %)	Group C (M %)	d value
Location of object pronouns in sentences that include main clauses	36	18.1	2.07
Use of the definite article with some proper nouns of place	36.3	8.8	3.6
Use of simple past tense to refer to an action completed in the past	39	12.4	2.9

Comparing participants' incorrect judgments (B2 vs C) on the total items ( $n=18$ ) reflecting NGT from French into English, I found that Group B2 ( $M=20.4\%$ ) made more wrong

judgements than Group C ( $M=15.6\%$ ) but with only a small effect size ( $d=0.31$ ), indicating that there was only weak evidence of NGT from French into English in Group B2's answers.

I further investigated whether there was NGT from French into English in individual grammatical structures in Group B2's answers by comparing participants' scores (B2 vs C) on each of the selected grammatical structures (6 items per structure) reflecting potential NGT from French into English (see Table 7.25). Concerning use of the definite article with proper noun, Group B2 made more wrong judgments than Group C with a large effect size ( $d=0.93$ ). Results showed evidence of NGT in Group B2's answers on this structure. Learners transfer this feature because they can see evidence that English does sometimes put "the" before place names. In other words, learners overgeneralise the inclusion of "the". So, what we see here is evidence of transfer working alongside a recognised universal learning process. For use of simple past tense to refer to an action completed in the past, Group B2 made more wrong judgments on this structure than Group C but with a small effect size ( $d=0.48$ ), indicating only weak evidence of NGT in Group B's answers on this structure. The explanation for these results is the same as given above.

**Table 7.25**

*B2's Wrong Judgments on Selected Items in UGJT Reflecting on NGT from French into English.*

Structures	<i>Group</i> <i>B2</i> <i>(M %)</i>	<i>Group</i> <i>C</i> <i>(M %)</i>	<i>d value</i>
Use of the definite article with proper nouns	21.01	8.8	0.93
Location of object pronouns in sentences that include main clauses.	14.9	18.1	0.28
Use of simple past tense to refer to an action completed in the past.	15.9	12.4	0.48

In summary the results have demonstrated that NGT from L2 French into L3 English was evident in Group B1's answers on all three selected structures, namely, use of the definite article with some proper nouns of place, location of object pronouns in sentences that include main clauses, and use of simple past tense to refer to an action completed in the past. In Group B2, NGT occurred in two structures, namely, use of the definite article with proper nouns, and use of simple past tense to refer to an action completed in the past. Learners transfer use of the definite article with proper nouns, because they can see evidence that English does sometimes

put “the” before place names. In other words, learners overgeneralise the inclusion of “the”. NGT in Group B2’s answers on use of simple past tense to refer to an action completed in the past occurred because Group B2 may have used the present perfect instead of the simple past tense due to the similarity in conjugation (form) and the dissimilarity in function between the *passé composé* in French and present perfect in English. In contrast, NGT did occur in Group B2’s answers about location of object pronouns in sentences that include main clauses. As discussed previously, for Group B2 the amount of exposure to this structure in French was less than “to be” and SVO word order, wherein NGT occurred. The low amount of exposure best explains the non-occurrence of NGT,

**Comparing grammatical transfer in UGJT.** The following is a comparison between transfers and provides a related interpretation. I compared grammatical transfers and I found that in Group B1’s answers there was more evidence of both PGT and NGT from L1 Arabic into L3 English than PGT and NGT from L2 French into L3 English. Grammatical transfer, starting from the most occurring into the least, was as follows, 1) PGT Arabic into English ( $d=0.86$ ), 2) NGT from Arabic into English ( $0.80$ ), 3) NGT from French into English ( $d=0.78$ ) and 4) PGT from French into English ( $d=0.70$ ). In third language acquisition (TLA), results on grammatical transfer showed that the first language (L1 Arabic) is more influential than the second (L2 French). This is applicable in cases where learners have a lower level of English proficiency. For Group B2’s answers, only NGT from French into English occurred. Results showed that, as learners gain in proficiency, the grammatical forms initially transferred from French are replaced by the target forms.

#### **7.5.4 OEITM**

This section discusses grammatical transfer in Group B's answers on OEITM. To establish whether transfer is evident in Group B's answers, I compared their results for total items and for selected items to those of Group C. In this discussion there is one section dealing with transfer from Arabic into English (PGT&NGT), followed by another dealing with transfer from French into English (PGT & NGT), ending with a summary inclusive of a comparison of transfers.

**PGT from Arabic into English in OEITM.** I compared participants' scores (B vs C) on the total items reflecting PGT from Arabic into English ( $n=18$ ) on the following structures a) location of object pronouns in sentences that include main clauses, b) use of the definite article with some proper nouns of place and c) use of simple past tense to refer to an action completed in the past. Results showed that Group B ( $M=58.14$ ) scored lower than Group C ( $M=87.9$ ) with a large effect size ( $d=2.09$ ). These results indicate no evidence of PGT from Arabic into English in Group B and are best explained by the difference in the two group's general English proficiency, with Group C having a higher level of English proficiency than Group B.

Comparing participants' scores (B vs C) on each of the selected grammatical structures (6 items per structure), reflecting potential PGT from Arabic into English, the results demonstrated that Group B scored lower than Group C on all three structures with large effect sizes ( $d > 0.80$ ) (see Table 7.26). Thus, there was no evidence of PGT from Arabic into English in Group B's answers on these structures.

**Table 7.26***B' Scores on Selected Items in OEITM Reflecting on PGT from Arabic into English.*

Structures	Group <i>B</i> ( <i>M</i> %)	Group <i>C</i> ( <i>M</i> %)	<i>d</i> value
Location of object pronouns in sentences that include main clauses (n=6)	67	87.5	1.02
Use of the definite article with some proper nouns of place. (n=6)	67.5	84.7	0.80
Use of simple past tense to refer to an action completed in the past. (n=6)	27.6	86.6	2.17

This section further addressed the occurrence of PGT from L1 Arabic into L3 English in answers provided by Group B1 and Group B2 for total and selected items. As a reminder to the reader, Group B1 ( $n=6$ ) had a lower level of English proficiency and Group B2 ( $n=29$ ) a higher level. Comparing participants' scores (B1 vs C) on the total items ( $n=18$ ), reflecting PGT from Arabic into English, I found that Group B1 ( $M=57.2$ ) scored lower on these items than Group C ( $M=87.3$ ) with a large effect size ( $d=1.6$ ), indicating no evidence of PGT from French into English in Group B1's answers. Comparing participants' scores (B1 vs C) on each of the selected grammatical structures (6 items per structure), reflecting potential PGT from Arabic into English, the results showed that Group B1 scored lower than Group C on all the three structures with large effect sizes ( $d>0.80$ ) (see Table 7.27), again providing no evidence of PGT from Arabic into English in Group B1's answers. All these results are best explained

by the difference in the two group's general English proficiency, Group C having a higher level of English proficiency than Group B1.

**Table 7.27**

*B1' Scores on Selected Items in OEITM Reflecting on PGT from Arabic into English.*

Structures	Group B1 (M %)	Group C (M %)	d value
Location of object pronouns in sentences that include main clauses (n=6)	64	88.5	1.35
Use of the definite article with some proper nouns of place. (n=6)	66.5	86.7	0.82
Use of simple past tense to refer to an action completed in the past. (n=6)	40.55	87.6	1.7

Similar results were obtained for Group B2 ( $M=56.73$ ), which also scored lower than Group C ( $M=87.3$ ) on both total scores with a large effect size ( $d=2.5$ ) and scores for the three individual structure structures with large effect sizes ( $d>0.80$ ) (see Table 7.28). Again, the obvious explanation is the differences in language proficiency in Group B2 and Group C.

**Table 7.28**

*B2's Scores in OEITM on Selected items Reflecting on PGT from Arabic into English.*

Structures	Group B2 (M %)	Group C (M %)	d value
Location of object pronouns in sentences that include main clauses (n=6)	70	88.5	1.5
Use of the definite article with some proper nouns of place. (n=6)	69	86.7	0.94
Use of simple past tense to refer to an action completed in the past. (n=6)	14.7	87.6	2.6

In summary, the results demonstrated no evidence of PGT from L1 Arabic into L3 English.

**NGT from Arabic into English.** I compared participants' incorrect judgments (B vs C) on the total items ( $n=18$ ), reflecting NGT from Arabic into English ( $n=18$ ) on the following structures a) basic word order, b) inclusion of pronoun object in relative clauses and c) use of the verb "to be" describing things in the present. I found that Group B ( $M=22$ ) made more wrong judgements than Group C ( $M=17.2$ ) but with a small effect size ( $d=0.30$ ), indicating that there was no clear evidence of NGT from Arabic.

Comparing participants' incorrect judgments (B vs C) on each of the selected grammatical structures (6 items per structure) designed to investigate NGT from Arabic into

English, I found some evidence of NGT from Arabic into English in Group B's answers on use of the verb "to be" describing things in the present as shown in Table 7.29. On this structure Group B made more wrong judgments than Group C with a medium effect size ( $d=0.50$ ). The omission of copula "be" is best explained by the fact that it is a universal feature of early interlanguage. Group B had more wrong judgments than Group C on the basic word order with a minimal effect size ( $d=0.05$ ) showing no evidence of NGT. Group B had more wrong judgments than Group C on use of resumptive pronouns in relative clauses but with a minimal effect size ( $d=0.05$ ) showing no evidence of NGT. These results are best explained by the difference in the two group's general English proficiency, Group C having a higher level of English proficiency than Group B.

**Table 7.29**

*Group B's Wrong Judgment on Selected Items in OEITM Reflecting on NGT from Arabic into English.*

Structures	Group B (M %)	Group C (M %)	d value
The basic word order (n=6)	17.5	16.5	0.05
Use of resumptive pronouns in relative clauses(n=6)	23	22	0.04
Use of the verb "to be" describing things in the present. (n=6)	26	15	1.5

Comparing participants' incorrect judgments (B1 vs C) on the total items ( $n=18$ ), I found that Group B1 ( $M= 35$ ) made more wrong judgements than Group C ( $M= 17.2$ ) with a large effect size ( $d=2$ ), indicating that there was evidence of NGT from Arabic into English in Group B1's answers. I further investigated whether there was NGT in individual grammatical structures in group B1's answers (see Table 7.30). I found that Group B1 made more wrong judgements than Group C on all three grammatical structures. These results indicated that NGT from Arabic into English was evident in these structures. Results were as follows. Group B1 had more wrong judgments than Group C on the use of the verb "to be" describing things in the present with a large effect size ( $d=1.26$ ), more wrong judgment than C on the use of the basic word order with a medium effect size ( $d = 0.71$ ), and more wrong judgment than C on the use of the use of resumptive pronouns in relative clauses with a medium effect size ( $d =$

0.58). Results showed that English proficiency mediates NGT from L1 Arabic into L3 English; that is, a lower level of English proficiency leads to PGT from Arabic into English.

**Table 7.30**

*B1's Wrong Judgment on Selected Items in OEITM Reflecting on NGT from Arabic into English.*

Structures	Group B1 (M %)	Group C (M %)	d value
The basic word order (n=6)	25	16.5	0.71
Use of resumptive pronouns in relative clauses (n=6)	29	22	0.58
Use of the verb "to be" describing things in the present (n=6)	30	15	2.26

Comparing participants' incorrect judgments (B2 vs C) on the total items ( $n=18$ ) reflecting NGT from Arabic into English ( $n=18$ ), I found that Group B2 ( $M=19.3$ ) made more wrong judgements than Group C ( $M=17.2$ ) but with only a small effect size ( $d=0.22$ ), indicating that there was no clear evidence of NGT from Arabic into English in Group B2's answers. I further compared participants' scores (B2 vs C) on each of the selected grammatical structures (6 items per structure) reflecting potential NGT from Arabic into English. Results showed that Group B2 made more wrong judgments on use of the verb "to be" for describing things in the present with large effect size ( $d=1.8$ ). The omission of copula "be" is best

explained by the fact that it is a universal feature of early interlanguage. NGT from Arabic into English was not evident on the following two structures: basic word order and use of resumptive pronouns in relative clauses. Results are presented in Table 7.31.

**Table 7.31**

*B2's Scores on Selected Items in OEITM Reflecting on NGT from Arabic into English.*

Structures	Group B2 (M %)	Group C (M %)	d value
The basic word order (n=6)	15.9	16.5	0.12
Use of resumptive pronouns in relative clauses (n=6)	22.5	22	0.02
Use of the verb "to be" describing things in the present (n=6)	25.17	15	1.8

In summary, NGT from L1 Arabic into L3 English, in Group B's and Group B2's answers, only occurred on the following structure; use of the verb "to be" describing things in the present. The omission of copula "be" is best explained by the fact that it is a universal feature of early interlanguage. In Group B1's answers, NGT from L1 Arabic into L3 English occurred on all three selected structures. These structures present the basic word order, use of resumptive pronouns in relative clauses, and use of the verb "to be" describing things in the present. Results showed that English proficiency mediates NGT from L1 Arabic into L3 English; that is, a lower level of English proficiency leads to NGT from Arabic into English.

In other words, as learners gain in proficiency, the grammatical forms initially transferred from Arabic are replaced by the target forms.

**PGT from French into English in OEITM.** In comparing participants' scores (B vs C) on the total items reflecting PGT from French into English ( $n=18$ ), I found that Group B ( $M=58$ ) scored lower than Group C ( $M=69.2$ ) with a medium effect size ( $d=0.63$ ). These results indicate that there was no evidence of PGT from French into English in Group B's answers. Only if Group B's scores had been greater than Group C's, would there have been evidence of transfer. These results are best explained by the difference in the two group's general English proficiency, Group C having a higher level of English proficiency than Group B.

Comparing participants' scores (B vs C) on each of the selected grammatical structures (6 items per structure), reflecting potential PGT from French into English, I found that Group B had lower scores than Group C on all the three grammatical structures (see Table 7.32). These results indicated that PGT from French into English was not evident in Group B's answers on these structures.

**Table 7.32**

*B's Scores on Selected Items in OEITM Reflecting on PGT from French into English.*

Structures	Group B (M %)	Group C (M %)	d value
The basic word order ( <i>n</i> =6)	53	64	0.6
Use of resumptive pronouns in relative clauses ( <i>n</i> =6)	70	77.6	0.38
Use of the verb “to be” describing things in the present. ( <i>n</i> =6)	75.7	86.1	0.58

I further addressed the occurrence of PGT from L2 French into L3 English in answers provided by Group B1 and Group B2 for total and selected items. Comparing participants' scores (B1 vs C) on the total items (*n*=18) reflecting PGT from French into English, I found that Group B1 ( $M=81.4$ ) scored higher on these items than Group C ( $M=69.9$ ) with a medium effect size ( $d=0.76$ ), indicating that there was evidence of PGT from French into English in Group B1's answers. This reflects the role of English proficiency on PGT from L2 French into L3 English; that is, a lower level of English proficiency leads to PGT from L2 French into L3 English.

I further investigated whether there was PGT from French into English in individual grammatical structures, in the answers provided by Group B1. I compared participants' scores (B 1 vs C) on each of the selected grammatical structures (6 items per structure) reflecting potential PGT from French into English. I found that Group B1 scored higher than Group C on basic word order with a medium effect size ( $d=0.70$ ) and on use of the verb “to be” describing

things in the present with a large effect size ( $d=1.2$ ). Therefore, PGT from French into English in Group B1's answers on these grammatical structures occurred. Use of the verb "to be" and the basic SVO word order are highly frequent structures in both French (Vega y Vega, 2020) and English (Davies & Gardner, 2013), which best explains why the transfer occurs once learners obtain evidence of the similarity. In contrast, results showed that Group B1 scored higher than Group C on use of resumptive pronouns in relative clauses but with a minimal effect size ( $d=0.02$ ). As discussed previously, perhaps Group B1 students could not obtain evidence of the similarity between French and English in omitting resumptive pronouns in relative clauses because they are less exposed to this structure in their L2 French than to the use of the verb "to be", and SVO word order.

**Table 7.33**

*B1's Scores on Selected Items in OEITM Reflecting on PGT from French into English.*

Structures	<i>Group B1</i> ( <i>M %</i> )	<i>Group C</i> ( <i>M %</i> )	<i>d value</i>
The basic word order ( <i>n=6</i> )	72	64	0.53
Use of resumptive pronouns in relative clauses ( <i>n=6</i> )	78	77.6	0.02

Use of the verb “to be” describing things in the present (n=6)	94.2	86.1	0.54
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Similar results were obtained for Group B2 ( $M=53.2$ ), which also scored lower than Group C ( $M=69.2$ ) on both total scores with a large effect size ( $d=0.92$ ) and scores for the three individual structures with a medium ( $d=0.53$ ) or large effect sizes ( $d>0.8$ ) (see Table 7.34). Again, the obvious explanation is the differences in proficiency in Group B2 and Group C.

**Table 7.34**

*B2' Scores on Selected Items in OEITM Reflecting on PGT from French into English.*

Structures	Group B2 (M %)	Group C (M %)	d value
The basic word order (n=6)	49.06	64	0.87
Use of resumptive pronouns in relative clauses (n=6)	68.34	77.6	0.53
Use of the verb “to be” describing things in the present. (n=6)	71.8	86.1	0.83

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In summary, the results have demonstrated that PGT from L2 French into L3 English was evident in the answers of those Group B's participants with a lower level of English proficiency (i.e., B1) but was not evident among participants with a higher level of English Proficiency (i.e., B2). I suggest that PGT from L2 French into L3 English gradually decreases as English proficiency increases. PGT from L2 French into L3 English occurred in Group B1's

answers in basic word order and use of the verb “to be” when describing things in the present. These two structures are highly frequent in French, allowing transfer to occur once learners obtain evidence of the similarity. In contrast, there was no evidence of PGT in Group B1’s answers on the use of resumptive pronouns in relative clauses, perhaps because relativisation is used less than the verb “to be” and SVO word.

**NGT from French into English in OEITM.** Comparing participants’ incorrect judgments (B vs C) on the total items ( $n=18$ ) reflecting NGT from French into English ( $n=18$ ), I found that Group B ( $M=47\%$ ) made more wrong judgements than Group C ( $M=11.8\%$ ) with a large effect size ( $d=3.23$ ), indicating that there was clear evidence of NGT from French into English in Group B’s answers. Comparing participants’ incorrect judgments (B vs C) on each of the selected grammatical structures (6 items per structure) designed to investigate NGT from French into English, I found evidence of NGT from French into English in Group B’s answers on all the three selected structures with large effect sizes ( $d > 0.8$ ); as shown in Table 7.35.

**Table 7.35**

*Participants' Scores on Selected Items in OEITM Reflecting on NGT from French into English.*

Structures	Group B (M %)	Group C (M %)	d value
Location of object pronouns in sentences that include main clauses	38.6	15.8	1.46
Use of the definite article with proper nouns of place	40	23	1.82
Use of simple past tense to refer to an action completed in the past	36.4	9.4	1.41

Similar results to Group B were obtained for Group B1 ( $M=69.8$ ), which also made more wrong judgments than Group C ( $M=11.8$ ) on both total items with a large effect size ( $d=7.6$ ) and scores for the three individual structures with large effect sizes ( $d>0.80$ ) (see Table 7.36). Again, these results indicate that NGT from French into English was evident in Group B1's answers on total items and on the three individual structures. These results reflect the role of English proficiency in mediating NGT from L2 French into L3 English; that is, a lower level of proficiency will lead to this transfer.

**Table 7.36**

*B1's Scores on Selected Items in OEITM Reflecting on NGT from French into English.*

Structures	Group B1 (M %)	Group C (M %)	d value
Location of object pronouns in sentences that include main clauses	72	18.1	7.07
Use of the definite article with some proper nouns of place	65	8.8	7.37
Use of simple past tense to refer to an action completed in the past	71.5	12.4	7.76

Similar results to Group B and B1 were obtained for Group B2 ( $M=46$ ), which also made more wrong judgments than Group C ( $M=11.8$ ) on both total items with a large effect size ( $d=2.72$ ) and on the three individual structures with large effect sizes ( $d>0.80$ ) (see Table 7.37). The results suggest the occurrence of NGT from French into English in Group B2 answers. However, as the effects sizes for B1 are much larger than those for B2 this indicates that, although NGT occurs in both B1 and B2, it is more prevalent in B1 (i.e. those learners with lower proficiency).

**Table 7.37**

*B2's Wrong Judgments on Selected Items in OEITM Reflecting on NGT from French into English.*

Structures	<i>Group</i> <i>B2</i> <i>(M %)</i>	<i>Group</i> <i>C</i> <i>(M %)</i>	<i>d value</i>
Use of the definite article with proper nouns	31.6	18.1	1.03
Location of object pronouns in sentences that include main clauses.	34.8	8.8	2.04
Use of simple past tense to refer to an action completed in the past.	29.13	12.4	1.33

In summary, NGT from L2 French into L3 English occurred in Group B1's and Group B2's answers on the total and selected items. The amount of NGT from L2 French into L3 English in B1's answers was larger than the amount in B2's answers. This indicated that as learners gain in proficiency grammatical forms initially transferred from French are replaced by the target forms.

**Summary on grammatical transfer in OEITM.** Comparing between grammatical transfer in group B (B1&B2) on the total items, starting from the most occurring to the least, the results were as follows; 1) NGT from French into English in Group B1 ( $d=7.6$ ), 2) NGT from French into English in group B2 (2.72), 3) NGT from Arabic into English in Group B1 ( $d=2$ ), and 4) PGT from L2 French into L3 English in group B'1s (0.71). In Third Language

Acquisition (TLA), NGT occurred from the first language (L1 Arabic) and second language (L2 French) into L3 English. However, transfer from French was more prevalent than transfer from Arabic, and the most obvious explanation is that French and English are typologically more similar. PGT only occurred from L2 French into L3 English and only concerned participants with lower proficiency (i.e., B1). NGT from L2 French into L3 English in B1 was greater than in B2. This indicates that as learners gain in proficiency the grammatical forms initially transferred from French are replaced by the target forms.

## **7.6 Chapter summary**

In this chapter I examined grammatical transfer from L1 Arabic and L2 French into L3 English, employing two grammaticality tests: the UGJT and the OEITM. The results point to several factors that influence grammatical transfer in TLA. The most significant factor was the L3 English proficiency level. A lower level of L3 English proficiency will lead to grammatical transfer whereas, when L3 English proficiency increases the grammatical forms initially transferred from Arabic or French, these are replaced by the target forms. The frequency of use of grammatical structures in Arabic and French was also found to be a salient factor influencing grammatical transfer in L3 English; transfer is evident in structures that are frequently used in Arabic and French and not in structures that are infrequent. The high amount of exposure to certain French grammatical structures also led to NGT from L2 French into L3 English. Psychotypology was also found to be a factor influencing NGT from French into English, as seen in participants overgeneralising the use of certain French grammatical structures in their production of English in cases where the use of such rules in English is grammatically incorrect.

Markedness was found to influence PGT and NGT from L1 Arabic into L3 English. That is, transfer occurs when a feature is unmarked in the source language (Arabic) but marked or more marked in the target language (English). However, this factor was only evident in participants' answers on UGJT. Overall, typological similarity between French and English led to greater grammatical transfer from French into English than from Arabic. Finally, grammatical transfer in the OETM was greater than that found in UGJT. Accordingly, this would suggest that when learners undertook the UGJT they were able to limit the effect of their previously learned languages.

## Chapter 8. Lexical transfer from Arabic and French into English

### 8.1 Introduction

In this chapter I will answer research question two namely: "Are there any differences in the lexical transfer effects between Arabic and French in English between Group B (L3 English) and Group C (L2 English)?"

To answer this question, two separate analyses were undertaken; one pertains to the Yes and No Test (written) (8.2) and the other to the Yes and No Test (aural) (8.3). Each analysis has three sections, the first section discusses tests of normality on scores for those items designed to measure lexical transfer from Arabic and French into English. The second section investigates the difference in scores between the three groups (A, B, and C). The purpose of including Group A (native speakers) was to establish whether there was any difference in scores between Groups A on the one hand, and groups B and C on the other. Having established there was a difference in scores between Group A (native speakers) and groups B and C (non-native speakers) I then proceeded to investigate whether there was a difference between B and C groups, in order to examine the difference in transfer effects from Arabic and French for these two groups. Group A comprises the native speakers of English (n=10). Group B comprises participants with L1 Arabic, L2 French, and L3 English and Group C includes participants with L1 Arabic, L2 English L3 French.

## **8.2 Yes and No Test (written)**

This section has two subsections. The first one concerns test of normality for participants' (groups A, B and C) scores on the Yes and No Test (written). The second investigates participants scores on items designed to investigate lexical transfer rates from Arabic and French into English

### ***8.2.1 Tests of normality on scores for the Yes and No Test (written)***

Table 8.1 shows the results of the tests of normality for the sample as a whole, and for each group (A, B, and C) for the Yes and No Test (written). For all the results, test p-values are less than the value of  $\alpha (.05)$ , indicating that scores are not normally distributed. As a result, non-parametric statistics were used in all subsequent analyses as these are applicable in cases where scores do not have a normal distribution.

**Table 8.1***Test of Normality for Participants' Scores on the Yes and No Test (written)*

Category of transfer	Shapiro Wilk (UGJT)			
	<i>W</i>	<i>DF</i>	<i>N</i>	<i>SIG</i>
Total participants	.938	265	80	<i>p</i> < .001
Group A	.541	265	10	<i>p</i> < .001
Group B	.916	265	35	<i>p</i> < .001
Group C	.900	265	35	<i>p</i> < .001

### ***8.2.2 Investigating scores on items designed to investigate Lexical Transfer rates from Arabic and French into English.***

For Yes and No (written), Table 8.2 presents the mean average scores and standard deviations for the test items for the three groups (A, B, and C). These items were designed to investigate lexical transfer from Arabic and French into English for the plurilingual participants

(Groups B and Group C). Group A's (native speakers) scores on these items serve as a baseline. Firstly, an omnibus Kruskal Wallis test was conducted to examine if the distribution of the scores in the three groups (A & B & C), and four conditions of lexical transfer, was statistically significant. This was followed by the application of multiple Mann-Whitney tests to determine if there was a difference in scores between pairs of group scores.

**Results of the Kruskal Wallis Test for the Yes and No Test (written).** For the Yes and No Test (written) the Kruskal Wallis demonstrated that the distribution of the scores in the three groups (A& B & C), and four conditions of lexical transfer, differed significantly with  $H(3) = 24.7, p < .001$ .

**Participants' scores on items designed to investigate lexical transfer.** The following table will illustrate the case

**Table 8.2**

*Participants' Scores in the Yes and No Test (written) on Items Designed to Investigate*

*Lexical Transfer*

Scores on items designed to investigate PLT from Arabic into English ( <i>Arabic-English true cognates</i> )		Scores on items designed to investigate PLT from French into English ( <i>Frequent French- English true cognates</i> )		Scores on items designed to investigate PLT from French into English ( <i>Infrequent French-English true cognates</i> )		Scores on items designed to investigate NLT from French into English ( <i>French-English false cognates</i> )						
Groups	<i>M%</i>	<i>SD</i>	<i>N</i>	<i>M%</i>	<i>SD</i>	<i>N</i>	<i>M%</i>	<i>SD</i>	<i>N</i>	<i>M%</i>	<i>SD</i>	<i>N</i>
Group A	93.8	7.6	44	100	0	75	99.2	1.8	75	99	2.1	31
Group B	61.6	11.6	44	82.4	5	75	59.6	6.6	75	72.2	10.1	31
Group C	83.05	11.3	44	93.6	6.8	75	84.6	13.4	75	89.8	10.5	31

PLT= Positive Lexical Transfer; NLT = Negative Lexical Transfer

**Scores on items designed to investigate PLT from Arabic into English (Arabic-English true cognates).** The mean score of Group A ( $M=93.8$ ) was higher than Group

B ( $M=61.6$ ) on the items designed to investigate PLT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=97.3$ ,  $n=10$ ), Group B ( $Mdn=59.09$ ,  $n=35$ ),  $U=4$ ,  $z=-4.17$ ,  $p < .001$ ,  $d=3.2$ . Also, the mean score of Group A ( $M=93.8$ ) was higher than Group C ( $M=83.05$ ) on the items designed to investigate PGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=97.3$ ,  $n=10$ ), Group C ( $Mdn=84.09$ ,  $n=35$ ),  $U=69.5$ ,  $z=-2.8$ ,  $p=0.004$ ,  $d=1.11$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=61.6$ ) was lower than Group C ( $M=83.05$ ) on the items designed to investigate PLT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group B ( $Mdn=59.09$ ,  $n=35$ ), Group C ( $Mdn=84.09$ ,  $n=35$ ),  $U=110$ ,  $z=-5.9$ ,  $p=0.00$ ,  $d=1.87$ .

In summary, for the Yes and No Test (written) on the items designed to investigate PLT from Arabic into English, there was a statistically significant group difference in scores in the following categories of participants (Group A vs Group B), (Group A vs Group C), and (Group B vs Group). Group A demonstrated a higher score on these items followed by Group C and B respectively.

**Scores on items designed to investigate PLT from French into English (frequent French- English true cognate words).** The mean score of Group A ( $M=100$ ) was higher than Group B ( $M=82.4$ ) on the items designed to investigate PLT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=1$ ,  $n=10$ ), Group B ( $Mdn=82.86$ ,  $n=35$ ),  $U=0$ ,  $z=-4.822$ ,  $p < .001$ ,  $d=4.9$ . Also, the mean score of Group A ( $M=100$ ) was higher than Group C ( $M=93.6$ ) on the items designed to investigate PGT from Arabic into English. A Mann-Whitney test indicated that the difference

in scores was statistically significant: Group A ( $Mdn=1$ ,  $n=10$ ), Group C ( $Mdn=97.14$ ,  $n=35$ ),  $U=55$   $z=-3.4$ ,  $p=0.001$ ,  $d= 1.33$

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=82.4$ ) was lower than Group C ( $M=93.6$ ) on the items designed to investigate PLT from Arabic into English. A Mann-Whitney test indicated that the difference in scores were statistically significant: Group B ( $Mdn=82.86$ ,  $n=35$ ), Group C ( $Mdn=97.14$ ,  $n=35$ ),  $U=166.5$ ,  $z=-5.26$ ,  $p <.001$ ,  $d=1.8$ .

In summary, for the Yes and No Test (written) on the items designed to investigate PLT from Arabic into English there was a statistically significant group difference in scores in the following categories of participants (Group A vs Group B), (Group A vs Group C), and (Group B vs Group C). Group A demonstrated a higher score on these items followed by Group C and B respectively.

**Scores on items designed to investigate PLT from French into English (infrequent French-English true cognate words).** The mean score of Group A ( $M=99.2$ ) was higher than Group B ( $M=59.6$ ) on the items designed to investigate PLT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=1$ ,  $n=10$ ), Group B ( $Mdn=60$ ,  $n=35$ ),  $U=0$ ,  $z=-4.8$ ,  $p <.001$ ,  $d=8.1$ . Also, the mean score of Group A ( $M=99.2$ ) was higher than Group C (84.6) on the items designed to investigate PGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=1$ ,  $n=10$ ), Group C ( $Mdn=82.86$ ,  $n=35$ ),  $U=$ ,  $z=$ ,  $p=$ ,  $d= 1.5$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=59.6$ ) was lower than Group C ( $M=84.6$ ) on the items designed to investigate PLT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group B ( $Mdn=60, n=35$ ), Group C ( $Mdn=82.86, n=35$ ),  $U=56.5, z=-6.5, p <.001, d=2.3$ .

In summary, for the Yes and No Test (written) on the items designed to investigate PLT from Arabic into English, there was a statistically significant group difference in scores in the following categories of participants (Group A vs Group B), (Group A vs Group C), and (Group B vs Group). Group A demonstrated a higher score on these items followed by Group C and B respectively.

**Scores on items designed to investigate NLT from French into English (French-English false cognate words).** The mean score of Group A ( $M=99$ ) was higher than Group B ( $M=72.2$ ) on the items designed to investigate PLT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100, n=10$ ), Group B ( $Mdn=70.97, n=35$ ),  $U=6, z=-4.64, p <.001, d=3.6$ . Also, the mean score of Group A ( $M=99$ ) was higher than Group C ( $89.8$ ) on the items designed to investigate PGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100, n=10$ ), Group C ( $Mdn=93.55, n=35$ ),  $U=64, z=-3.13, p=0.002, d= 1.2$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=72.2$ ) was lower than Group C ( $M=89.8$ ) on the items designed to investigate PLT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group B ( $Mdn=70.97, n=35$ ), Group C ( $Mdn=93.55, n=35$ ),  $U=150.5, z=-5.4, p <.001, d=1.7$ .

In summary, for the Yes and No Test (written) on the items designed to investigate PLT from Arabic into English, there was a statistically significant group difference in scores in the following categories of participants (Group A vs Group B), (Group A vs Group C), and (Group B vs Group). Group A demonstrated a higher score on these items followed by Group C and B respectively.

### **8.3 Yes and No Test (aural)**

This section has two subsections. The first one concerns the tests of normality for participants' (groups A, B and C) scores on the Yes and No Test (aural), the second investigates participants scores on items designed to investigate lexical transfer rates from Arabic and French into English

#### ***8.3.1 Tests of normality on scores for the Yes and No Test (aural)***

Table 8.3 shows the results of the tests of normality for the sample as a whole, and for each group (A, B, and C) for the Yes and No Test (aural). In all cases p-values are less than the value of  $\alpha (.05)$  indicating that scores are not normally distributed. As a result, non-parametric statistics were used in all subsequent analyses as these are applicable in cases where scores do not have a normal distribution

**Table 8.3***Test of Normality for Participants' Scores on the Yes and No Test (aural)*

Category of transfer	Shapiro Wilk (UGJT)			
	<i>W</i>	<i>DF</i>	<i>N</i>	<i>SIG</i>
Total participants	.954	241	80	$p < .001$
Group A	.654	241	10	$p < .001$
Group B	.964	241	35	$p < .001$
Group C	.936	241	35	$p < .001$

### ***8.3.2 Investigating scores on items designed to investigate lexical transfer rates from Arabic and French into English.***

For the Yes and No Test (aural), Table 8.4 presents the mean average scores and standard deviations for the test items for the three groups (A, B, and C). These items were designed to investigate lexical transfer from Arabic and French into English for the multilingual participants (Groups B and Group C). Group A's (native speakers) scores on these items serve as a baseline. Firstly, an omnibus Kruskal Wallis test was conducted to examine if the distribution of the scores in the three groups (A & B & C), and four conditions of lexical transfer, was statistically significant. This was followed by the application of multiple Mann-Whitney tests to determine if there was a difference in scores between pairs of group scores.

**Results of the Kruskal Wallis Test for the Yes and No Test (aural).** For the Yes and No Test (aural) the Kruskal Wallis demonstrated that the distribution of the scores in the three groups (A& B & C), and four conditions of lexical transfer, differed significantly with  $H(2) = 62.6, p < .001$ .

**Participants' scores on items designed to investigate lexical transfer.** The following table illustrates the case.

**Table 8.4**

*Participants' Scores in the Yes and No Test (aural) on Items Designed to Investigate Lexical Transfer*

Groups	Scores on items designed to investigate PLT from Arabic into English ( <i>Arabic-English true cognates</i> )			Scores on items designed to investigate PLT from French into English ( <i>Frequent French-English true cognates</i> )			Scores on items designed to investigate PLT from French into English ( <i>Infrequent French-English true cognates</i> )			Scores on items designed to investigate NLT from French into English ( <i>French-English false cognates</i> )		
	<i>M%</i>	<i>SD</i>	<i>N</i>	<i>M%</i>	<i>SD</i>	<i>N</i>	<i>M%</i>	<i>SD</i>	<i>N</i>	<i>M%</i>	<i>SD</i>	<i>N</i>
Group A	83.5	11.3	44	100	0	75	98.4	3.9	75	94.4	7.8	31
Group B	60	33.8	44	84.3	15.4	75	70	16.8	75	69.5	26.9	31
Group C	54.7	28.0	44	83.8	14.7	75	54	16.4	75	55.9	27.8	31

PLT= Positive Lexical Transfer; NLT = Negative Lexical Transfer

**Scores on Items designed to investigate PLT from Arabic into English (Arabic-English true cognates).** The mean score of Group A ( $M=83.5$ ) was higher than Group B

( $M=60$ ) on the items designed to investigate PLT from Arabic into English, but the Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group A ( $Mdn=88.2$ ,  $n=10$ ), Group B ( $Mdn=50$ ,  $n=35$ ),  $U=120$ ,  $z=-1.5$ ,  $p=.117$ ,  $d=0.93$ . Also, the mean score of Group A ( $M=83.5$ ) was higher than Group C ( $54.7$ ) on the items designed to investigate PGT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=88.2$ ,  $n=10$ ), Group C ( $Mdn=64.52$ ,  $n=35$ ),  $U=63$ ,  $z=693$ ,  $p=0.002$ ,  $d=1.34$

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=60$ ) was higher than Group C ( $M=54.7$ ) on the items designed to investigate PLT from Arabic into English, but the Mann-Whitney test indicated that the difference in scores was statistically non-significant: Group B ( $Mdn=50$ ,  $n=35$ ), Group C ( $Mdn=64.52$ ,  $n=35$ ),  $U=565$ ,  $z=-0.566$ ,  $p=0.572$ ,  $d=0.17$ .

In summary, for the items designed to investigate PLT from Arabic into English there was a statistically significant group difference between Group A and Group C. Group A scored higher on these items than Group C. In contrast, the differences between Group A and Group B and between Group B and C were statistically non-significant.

**Scores on items designed to investigate PLT from French into English (Frequent French-English true cognate words).** The mean score of Group A ( $M=100$ ) was higher than Group B ( $M=84.3$ ) on the items designed to investigate PLT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100$ ,  $n=10$ ), Group B ( $Mdn=93.75$ ,  $n=35$ ),  $U=10$ ,  $z=-4.5$ ,  $p <.001$ ,  $d=1.44$ . Also, the mean score of Group A ( $M=100$ ) was higher than Group C ( $M=83.8$ ). A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100$ ,  $n=10$ ), Group C ( $Mdn=87.5$ ,  $n=35$ ),  $U= z=-4.5$ ,  $p=0.00$ ,  $d= 1.55$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=84.3$ ) was slightly higher than Group C ( $M=83.8$ ) on the items designed to investigate PLT from Arabic into English, but a Mann-Whitney test indicated that the difference in scores was statistically insignificant: Group B ( $Mdn=93.75$ ,  $n=35$ ), Group C ( $Mdn=87.5$ ,  $n=35$ ),  $U=612.5$ ,  $z=$ ,  $0.00$ ,  $p=1$ ,  $d=0.03$ .

In summary, for the items designed to investigate PLT from French into English, (frequent French-English true cognate words) there was a statistically significant group difference between Group A and Group B, and between Group A and Group C. Group A scored higher on these items than Group B and Group C. In contrast, the difference between Group B and Group C was statistically non-significant.

**Scores on items designed to investigate PLT from French into English (infrequent French-English true cognate words).** The mean score of Group A ( $M=98.4$ ) was higher than Group B ( $M=70$ ) on the items designed to investigate PLT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100$ ,  $n=10$ ), Group B ( $Mdn=72.73$ ,  $n=35$ ),  $U=12.0$ ,  $z=-4.484$ ,  $p < .001$ ,  $d=3.238$ . Also, the mean score of Group A ( $M=98.4$ ) was higher than Group C ( $54$ ). A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100$ ,  $n=10$ ), Group C ( $Mdn=57.58$ ,  $n=35$ ),  $U=0.000$ ,  $z=-4.8$ ,  $p < .001$ ,  $d= 3.7$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=70$ ) was higher than Group C ( $M=54$ ) on the items designed to investigate PLT from Arabic into English. A Mann-Whitney test indicated that the difference in scores was

statistically significant: Group B ( $Mdn=72.73$ ,  $n=35$ ), Group C ( $Mdn=57.58$ ,  $n=35$ ),  $U=300$ ,  $z=-3.6$ ,  $p < .001$ ,  $d=0.96$ .

In summary, for the Yes and No Test (aural), on the items designed to investigate PLT from French into English, there was a statistically significant group difference in scores in the following categories of participants (Group A vs Group B), (Group A vs Group C), and (Group B vs Group C). Group A demonstrated a higher score on these items followed by Group B and C. Group B scored higher than Group C.

**Scores on items designed to investigate NLT from French into English (French-English false cognate words).** The mean score of Group A ( $M=94.4$ ) was higher than Group B ( $M=69.5$ ) on the items designed to investigate NLT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100$ ,  $n=10$ ), Group B ( $Mdn=82.14$ ,  $n=35$ ),  $U=60$ ,  $z=-3.1$ ,  $p=0.002$ ,  $d=1.25$ . Also, the mean score of Group A ( $M=99$ ) was higher than Group C ( $M=55.9$ ) on the items designed to investigate NLT from French into English. A Mann-Whitney test indicated that the difference in scores was statistically significant: Group A ( $Mdn=100$ ,  $n=10$ ), Group C ( $Mdn=64.3$ ,  $n=35$ ),  $U=33$ ,  $z=-3.9$ ,  $p < .001$ ,  $d=1.88$ .

Turning now to the difference between Groups B and C, the mean score of Group B ( $M=69.5$ ) was higher than Group C ( $M=55.9$ ) on the items designed to investigate PLT from Arabic into English. A Mann-Whitney test indicated that the difference in scores were statistically significant: Group B ( $Mdn=82.14$ ,  $n=35$ ), Group C ( $Mdn=64.3$ ,  $n=35$ ),  $U=433.5$ ,  $z=-2.11$ ,  $p=0.035$ ,  $d=0.5$ .

In summary, for the Yes and No Test (aural) on the items designed to investigate NLT from French into English there was a statistically significant group difference in scores in the following categories of participants (Group A vs Group B), (Group A vs Group C), and (Group

B vs Group C). Group A demonstrated a higher score on these items followed by Group B and C. Group B scored higher than Group C on these items.

#### **8.4 Summary**

This section summarises the chapter's findings investigating lexical transfer from Arabic and French into English. In this section, I will include only group differences where  $d$  is medium (between .50 and .79) or  $d$  is large (greater than .80). If the comparisons between A/B and A/C were not different, I will not report any difference between B and C. Concerning the Yes and No Test (written) there were differences between (A vs B), (A vs C), and (B vs C) on the four categories of selected items reflecting on the four types of lexical transfer. Group A scored the highest followed by Group C then Group B. For the Yes and No Test (aural) there were differences between (A vs B), (A vs C) and (B vs C) only on two categories of items namely, a) the items designed to investigate PLT from French into English (infrequent French-English true cognate words), and b) the items designed to investigate NLT from French into English (French-English false cognate words). In both cases, Group A scored the highest followed by Group B then Group C respectively.

#### **8.5 Discussion**

This section is devised into two separate sub-sections; one pertains to the Yes and No Test (written), and the other to the Yes and No Test (aural). The results for the written and aural tests will be discussed separately but it is important to indicate that there was a fundamental difference in the scores for the two tests – namely that, in the written test, C outperformed B while in the aural test, B performed either better than, or equivalent to C. This difference is

evident in both the total score and scores on the four categories of transfer. Furthermore, the fact that NS's scores (Group A) were close to 100% on the Yes and No Test (written) ( $M=96$ ) and Yes and No Test (aural) ( $M=91.59$ ) shows that these tests were functioning as intended. NS's scores on the four categories of transfer in both vocabulary tests were also close to 100% and significantly higher than those of Group B and Group C. The issue of whether transfer is evident among non-native participants can only be established by comparing results from groups B and C; which is further discussed in this section.

The discussion section presents related arguments in the following manner:

1. The categories of lexical transfer examined
2. Examining PLT in Yes and No Test (written)
3. Examining NLT in Yes and No Test (written)
4. Examining PLT in Yes and No Test (aural)
5. Examining NLT in Yes and No Test (aural)

#### ***8.5.1 The categories of lexical transfer examined in Yes and No Test (written)***

Lexical transfer in this section covers a) PLT from Arabic into English, b) PLT from French into English, and c) NLT from French into English. NLT from Arabic into English is excluded because there were no Arabic-English false cognate words in the items used in the Yes and No Test (written & aural). There is only a very limited number of Arabic-English false cognate words (reference).

**Differentiation between infrequent & frequent French English true cognate words.** Included in the following sections are a discussion of lexical transfer in the participants' answers on frequent and infrequent French-English true cognate words. It is

therefore worth reminding the reader of how I differentiated between frequent and infrequent French-English true cognate words. The frequent French-English true cognate words were selected from the top 500 most frequently used French words from the Frequency Dictionary of French (Lonsdale & Le Bras, 2009). It should be noted that the frequent French-English true cognate words are only frequent in French but infrequent in English and that the selection complies with the Frequency Dictionary of Contemporary American English by Davies and Gardner (2013). For the infrequent French-English true cognates, the selected words were infrequent in both the French and English contexts, as determined by the Frequency Dictionary of French (Lonsdale & Le Bras, 2009) and the Frequency Dictionary of contemporary American English by Davies and Gardner (2013).

**PLT from French into English (frequent French-English true cognate words).** The results showed that Group B ( $M=82.4$ ) scored lower than Group C ( $M=93.6$ ) on the frequent French - English true cognate words ( $d=0.11$ ), indicating that there was no PLT from French into English in Group B's answers. Only if Group B's scores had been greater than Group C's, would there have been evidence of transfer. However, this was not the case.

These results are best explained by the difference in the two group's general English proficiency. Group C ( $M=88.11$ ) scored significantly higher than Group B ( $M=80.84$ ) on the C-test English ( $d=1.06$ ).

Looking at the individual test items, the results also give no evidence of PLT from French into English in Group B's answers. Group B scored higher than Group C only on five

specific items of French-English true cognate words ( $n=5$ ;  $total=45$ ) but with low  $d$  values (see Table 8.5).

**Table 8.5**

*Scores on Specific Items of French English True Cognate Words (frequent)*

French-English true cognate words  ( $n=75$ )	Group B  ( $N=35$ )	Group C  ( $N=35$ )	Effect Size  ( $d$ )
1 antique	( $M=88.57, SD=32.28$ )	( $M=85.71, SD=35.5$ )	0.09
2 precedent	( $M=80, SD=40$ )	( $M=77, SD=42$ )	0.07
3 ministerial	( $M=91, SD=28.4$ )	( $M=88; SD=32.2$ )	0.10
4 attitude	( $M=94; SD=23$ )	( $M=91.1; SD=28.4$ )	0.11
5 compose	( $M=80; SD=40$ )	( $M=77; SD=42$ )	0.07

**PLT from French into English (infrequent French-English true cognate words).**

The results for the infrequent French-English true cognate words again showed that Group B ( $M=59.6$ ) scored significantly lower than Group C ( $M=84.6$ ) with  $d=2.3$ , indicating that there was no PLT from French into English in Group B's answers.

Looking at the individual test items, I found only one item (*quintessential*) where Group B scored higher than Group C with  $d = 0.7$ . This suggests that PLT occurred on this item. Quintessential is a highly infrequent English item and, for that reason, Group C learners are less likely to have acquired it from exposure to English. Group B participants were able to demonstrate knowledge of this item through French. In other words, PLT may be evident but only in highly infrequent items.

**NLT from French into English (French-English false cognate words).** Results showed that NLT from French into English did occur in Group B participants in the case of the French-English false cognate words. Group C ( $M=89.8$ ) scored significantly higher than Group B ( $M=72.2$ ) on these items ( $d=1.7$ ), excluding the likelihood of general proficiency explaining the results. The fact that B was more likely to judge a false cognate as a true English word than C cannot be explained by proficiency, only by NLT from French into English as Group B had a higher level of proficiency in French than Group C ( $M=87 > M= 54.7$ ;  $d=4.9$ ).

Looking at the individual test items, Table 8.6 indicates that Group C scored significantly higher than Group B on 13 out of 30 items. These items are shown in bold in Table 8.6. The French true cognate words of these 13 items are more frequently used in French than the French cognate words of the remaining items ( $n=18$ ) (see, Lonsdale & Le Bras, 2009). This perhaps accounts for Group B scoring significantly higher than Group C on these 12 items (see Table 8.6). Rank order was used as a measure of frequency in the case of French true cognate words (see Table 8.6). The English true cognate words of these 12 items are not in the 5,000 most frequently used words in the language as identified by Davies & Gardner, (2013). I argue that the clearest evidence of NLT from L2 French into L3 English is when a false cognate has high frequency in French (i.e., is commonly used) but low frequency in English (i.e., is rarely used).

### **Table 8.6**

*The Individual Test Items Scores on French-English False Cognate Words*

Number ( <i>n</i> =30)	French- English word	Group B ( <i>N</i> =35)	Group C ( <i>N</i> =35)	<i>d</i>	Rank order of the related French cognate words
1	library	( <i>M</i> =77.14, <i>SD</i> =42.6)	( <i>M</i> =91.4, <i>SD</i> =28.4)	0.39	4380
2	<b>attend</b>	( <i>M</i> =65.7, <i>SD</i> =48.1)	( <i>M</i> =88.5, <i>SD</i> =32.2)	<b>0.55</b>	<b>155</b>
3	brassiere	( <i>M</i> =85.7, <i>SD</i> =35.5)	( <i>M</i> =94.2, <i>SD</i> =23.5)	0.28	5000+
4	blessed	( <i>M</i> =82.8, <i>SD</i> =38.2)	( <i>M</i> =91.4, <i>SD</i> =28.4)	0.25	2004
5	bottom	( <i>M</i> =71.4, <i>SD</i> =45.83)	( <i>M</i> =88.5, <i>SD</i> =32.2)	0.45	4462
6	deception	( <i>M</i> =80, <i>SD</i> =38.2)	( <i>M</i> =97.14, <i>SD</i> =16.9)	0.58	2821
7	<b>envy</b>	( <i>M</i> =81.8, <i>SD</i> =38.2)	( <i>M</i> =97, <i>SD</i> =16.8)	<b>0.51</b>	<b>1237</b>
8	grape	( <i>M</i> =91.4, <i>SD</i> =28.4)	( <i>M</i> =97.14, <i>SD</i> =16.9)	0.24	5000+
9	<b>journey</b>	( <i>M</i> =60, <i>SD</i> =49.0)	( <i>M</i> =84.28, <i>SD</i> =36)	<b>0.56</b>	<b>1253</b>
10	<b>bras</b>	( <i>M</i> =91.4, <i>SD</i> =28.4)	( <i>M</i> =94, <i>SD</i> =23)	<b>0.10</b>	<b>587</b>
11	location	( <i>M</i> =71.4, <i>SD</i> =45.8)	( <i>M</i> =85.7, <i>SD</i> =35.5)	0.34	4297
12	<b>pass</b>	( <i>M</i> =57.14, <i>SD</i> =50.2)	( <i>M</i> =85.7, <i>SD</i> =35.5)	<b>0.65</b>	<b>90</b>
13	pain	( <i>M</i> =65.7, <i>SD</i> =48.1)	( <i>M</i> =80, <i>SD</i> =40.5)	0.32	2802
14	allure	( <i>M</i> =88.5, <i>SD</i> =32.2)	( <i>M</i> =94.28, <i>SD</i> =23.5)	0.20	3539
15	<b>habit</b>	( <i>M</i> =77.14, <i>SD</i> =42.6)	( <i>M</i> =95, <i>SD</i> =23.8)	<b>0.52</b>	<b>1186</b>
16	agreeable	( <i>M</i> =65.7, <i>SD</i> =48.1)	( <i>M</i> =82.82, <i>SD</i> =38.2)	0.40	2841
17	deception	( <i>M</i> =91.4, <i>SD</i> =28.4)	( <i>M</i> =94.28, <i>SD</i> =23.5)	0.11	2821
18	location	( <i>M</i> =94.28, <i>SD</i> =23.5)	( <i>M</i> =97.14, <i>SD</i> =16.9)	0.14	4297
19	eventually	( <i>M</i> =85.71, <i>SD</i> =35.5)	( <i>M</i> =91.4, <i>SD</i> =28.4)	0.17	4183
20	actually	( <i>M</i> =80, <i>SD</i> =40.5)	( <i>M</i> =97, <i>SD</i> =16)	<b>0.55</b>	<b>584</b>
21	<b>piece</b>	( <i>M</i> =70, <i>SD</i> =49.7)	( <i>M</i> =94.2, <i>SD</i> =23.5)	<b>0.62</b>	<b>813</b>
22	<b>rest</b>	( <i>M</i> =77.17, <i>SD</i> =42.6)	( <i>M</i> =94.2, <i>SD</i> =23.5)	<b>0.52</b>	<b>363</b>
23	<b>sale</b>	( <i>M</i> =60, <i>SD</i> =49.7)	( <i>M</i> =88.5, <i>SD</i> =32.2)	<b>0.68</b>	<b>2906</b>
24	adept	( <i>M</i> =88.5, <i>SD</i> =32.2)	( <i>M</i> =94.28, <i>SD</i> =23.5)	0.20	5000+
25	<b>affair</b>	( <i>M</i> =61.4, <i>SD</i> =50.7)	( <i>M</i> =88.5, <i>SD</i> =32.2)	<b>0.63</b>	<b>170</b>
26	affluence	( <i>M</i> =62.8, <i>SD</i> =49)	( <i>M</i> =80, <i>SD</i> =40.5)	0.38	5000+
27	<b>coin</b>	( <i>M</i> =65.7, <i>SD</i> =50.2)	( <i>M</i> =94.2, <i>SD</i> =23.5)	<b>0.72</b>	<b>1798</b>
28	<b>point</b>	( <i>M</i> =65.7, <i>SD</i> =48.1)	( <i>M</i> =91.4, <i>SD</i> =28.4)	<b>0.75</b>	<b>1907</b>
29	arose	( <i>M</i> =60, <i>SD</i> =45.8)	( <i>M</i> =67, <i>SD</i> =23.5)	0.19	5000+
30	<b>amity</b>	( <i>M</i> =43, <i>SD</i> =43.7)	( <i>M</i> =65, <i>SD</i> =23.2)	<b>0.62</b>	2272

Note: 5000 +, means that the rank order of the French cognate words of the related items is higher than 5000. Five thousand in this case refers to the most frequently used words in the French language according to the Frequency Dictionary of French (Lonsdale & Le Bras, 2009).

**PLT Arabic into English (Arabic-English true cognate words).** The results showed that Group B ( $M=61.6$ ) scored lower than Group C ( $M=83.05$ ) on the Arabic-English true cognate words with  $d=1.87$ , indicating that there was no PLT from Arabic into English in Group B's answers. These results are again best explained by the difference in the groups' general English proficiency. If Group B's scores had been greater than Group C's on these related items, this would have constituted evidence of PLT from Arabic into English in Group B's answers. However, this was not the case.

Looking at the individual test items, though, the results give some evidence of PLT from Arabic into English in Group B's answers. Group B scored higher than Group C only on two Arabic-English true cognate words ( $n=2$ ;  $total=45$ ) but with a small  $d$  value (see Table 8.7 below). This gives insufficient evidence of PLT in Group B's answers on these two items.

**Table 8.7**

*Scores for Arabic-English True Cognate Words (frequent)*

Arabic-English true cognate words ( $n=75$ )	Group B ( $N=35$ )	Group C ( $N=35$ )	Effect Size ( $d$ )
Zircon	( $M=71$ ; $SD=45$ )	( $M=57$ ; $SD=50$ )	0.29
Tariff	( $M=82.8$ ; $SD=38.2$ )	( $M=62.8$ ; $SD=49$ )	0.45

### 8.5.2 *The categories of lexical transfer examined in Yes and No Test (aural)*

In the Yes and No Test (aural), I will examine whether there is lexical transfer in a) PLT from Arabic into English, b) PLT from French into English, and c) NLT from French into English occurred.

**PLT from French into English (frequent French-English true cognate words).** The results showed that Group B ( $M=84.3$ ) scored higher than Group C ( $M=83.8$ ) on the frequent French-English true cognate words but with a low  $d$  value ( $d=0.03$ ), indicating that there is insufficient evidence of any PLT from French into English in Group B's answers.

Group B scored higher than Group C only on four frequent French-English true cognate words ( $n=5$ ;  $total=75$ ), with medium effect size "d values" ranging between .68 to .79. These items are shown in bold in Table 8.8. These results indicate that PLT from French into English occurred in Group B's answers. Because Group B had a lower level of proficiency in English but a higher one in French than Group C, I argue that Group B's recognition of these items ( $n=5$ ) was based on their knowledge of French and that PLT occurred in this case. The French true cognate words of these five items are more frequently used in French than the French cognate words of the remaining items ( $n=16$ ) (see, Lonsdale & Le Bras, 2009). This perhaps accounts for Group B scoring significantly higher than Group C on these four items (see Table 8.8). The rank order was used as a measure of frequency in the case of French true cognate words (see Table 8.8). The English true cognate words of these five items are not in the 5,000 most frequently used words in the language, as defined by Davies and Gardner (2013). One can argue that the clearest evidence of transfer from L2 French into L3 English is when a French-English true cognate word has high frequency in French (i.e., is commonly used) but low frequency in English (i.e., is rarely used).

Group B scored higher than Group C on a further 12 frequent French-English true cognate words but with a small effect size; the “d value” ranges between *.20 to .46*. These items are displayed in italics in Table 8.8, below. Group B also scored higher than Group C on four frequent French-English true cognate words but the effect size was minimal; the “d value” ranges between .05 and .09. These items are underlined in Table 8.8. These results (n=16) do not constitute clear evidence of PLT in Group B’s answers. Group B participants did not score significantly higher than Group C on these *16* items. A possible explanation is that these French true cognate words are less frequent in French than the remaining five items (Lonsdale & Le Bras, 2009).

**Table 8.8***Scores on Specific Items of French-English True Cognate Words (frequent)*

French-English true cognate words (n=75)	Group B (N=35)	Group C (N=35)	Effect Size (d)	Rank order of the related French cognate words
1. accusation	( <i>M</i> =91; <i>SD</i> = 28)	( <i>M</i> =80; <i>SD</i> =40.5)	.30	2236
2. archive	( <i>M</i> =97.1; <i>SD</i> =16.9)	( <i>M</i> =88.5; <i>SD</i> = 32)	.33	3994
3. artisan	( <i>M</i> =85.7; <i>SD</i> =35.5)	( <i>M</i> =74.2; <i>SD</i> =44.3)	.28	4011
4. generalise	( <i>M</i> =88.5; <i>SD</i> =32)	( <i>M</i> =68.5; <i>SD</i> =47.1)	.42	2939
5. <u>calendar</u>	( <i>M</i> =85.7; <i>SD</i> =35.5)	( <i>M</i> =82.8; <i>SD</i> =38.2)	<u>.07</u>	<u>2947</u>
6. <u>infraction</u>	( <i>M</i> =85.7; <i>SD</i> = 35.5)	( <i>M</i> =82.8; <i>SD</i> =38.2)	<u>.07</u>	<u>2958</u>
<b>7. plan</b>	<b>(<i>M</i>=80; <i>SD</i>=40)</b>	<b>(<i>M</i>=48; <i>SD</i>=50)</b>	<b>.70</b>	<b>164</b>
8. <u>preference</u>	( <i>M</i> =91.4; <i>SD</i> = 28.4)	( <i>M</i> =88.5; <i>SD</i> =32.2)	<u>.09</u>	<u>2970</u>
9. <u>clandestine</u>	( <i>M</i> =60; <i>SD</i> =49.7)	( <i>M</i> =57.14; <i>SD</i> = 50.2)	<u>.05</u>	<u>2992</u>
10. nomination	( <i>M</i> =91.4; <i>SD</i> =28.4)	( <i>M</i> =80; <i>SD</i> =40.5)	.32	3010
11. absorb	( <i>M</i> =91.4; <i>SD</i> =28.4)	( <i>M</i> =80; <i>SD</i> =40.5)	.32	3022
<b>12. attitude</b>	<b>(<i>M</i>=94.2; <i>SD</i>=42.6)</b>	<b>(<i>M</i>=62.8; <i>SD</i>=42.6)</b>	<b>.73</b>	<b>834</b>
13. rage	( <i>M</i> =91.4; <i>SD</i> =16.9)	( <i>M</i> =85.7; <i>SD</i> =16.9)	.33	3035
<b>14. possible</b>	<b>(<i>M</i>=88.5; <i>SD</i>= 32.2)</b>	<b>(<i>M</i>=60; <i>SD</i>=49.7)</b>	<b>.68</b>	<b>175</b>
15. dictatorship	( <i>M</i> =91.4; <i>SD</i> = 28.4)	( <i>M</i> =81; <i>SD</i> = 40.5)	.30	3041
16. equip	( <i>M</i> =94.2; <i>SD</i> = 23.5)	( <i>M</i> =82.8; <i>SD</i> =38.2)	.35	3043

<b>17. common</b>	<i>(M=89.7; SD= 35.5)</i>	<i>(M=57.14; SD= 50.2)</i>	<i>.78</i>	<i>851</i>
18. federal	<i>(M=94.2; SD=23.5)</i>	<i>(M=88.5; SD=32.2)</i>	<i>.20</i>	<i>3221</i>
19. basin	<i>(M=82.8; SD=38.2)</i>	<i>(M=65.7; SD=48.15)</i>	<i>.39</i>	<i>3032</i>
<b>20. precedent</b>	<i>(M=97.14; SD=16.9)</i>	<i>(M=74.7; SD= 38)</i>	<i>0.79</i>	<i>820</i>

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**PLT from French into English (infrequent French-English true cognate words).**

The results showed that Group B ( $M=70$ ) scored higher than Group C ( $M=54$ ) on the infrequent French-English true cognate words with a high  $d$  value ( $d=0.96$ ), indicating that PLT from French into English occurred in Group B's answers.

Group B scored higher than Group C on the majority of the infrequent French-English true cognate words, 68/75 with a high "d value". These results provide evidence of PLT from French into English in Group B's answers. These infrequent French-English true cognate words are infrequently used English items and, for that reason, Group B learners are less likely to have acquired them from exposure to English. In other words, PLT seems to have occurred, though only in highly infrequent items. The English true cognate words of these 68 items are not in the 5,000 most frequently used words in the language, as identified by Davies and Gardner (2013).

**NLT from French into English (French-English false cognate words).** Results showed that NLT from French into English occurred in Group B participants in the case of the French-English false cognate words. Group B ( $M=69.5$ ) scored significantly higher than Group C ( $M=55.9$ ) on these items with  $d=0.52$ . The fact that Group B was more likely to judge a false

cognate as a true English word than Group C cannot be explained by proficiency, only by NLT from French into English, as Group B had a lower level of proficiency in English than Group C.

Group B scored higher than Group C on the vast majority of the infrequent French-English true cognate words *23/31*. However, on one item, namely (i.e., “Coin”), Group B scored higher than Group C with a large size effect ( $d = 0.8$ ). This provides strong evidence for the occurrence of NLT from French into English in Group B’s answers. Because Group B had a lower level of proficiency in English than Group C, one can argue that Group B’s recognition of this item was based on their knowledge of French. Group B scored higher than Group C only on 11 French-English false cognate words, with medium effect size “d values” ranging between .5 and .78. These items are displayed in bold in Table 8.9. These results indicate that NLT from French into English occurred in Group B’s answers. Because Group B had a lower level of proficiency in English than Group C, we can argue that Group B’s recognition of these items ( $n=9$ ) was based on their knowledge of French and thus NLT occurred in this case.

Group B scored higher than Group C on eight French-English false cognate words but with only a small effect size; the “d value” ranges between .22 and .46. These items are displayed in italics in Table 8.9. Group B also scored higher than Group C on three other French-English false cognate words but with a minimal effect size; the “d value” ranges between .11 to .19. These items are underlined in Table 8.9. These results ( $n=11$ ) give insufficient evidence of PLT in Group B’s answer on these 11 items. This is possibly because the French true cognate words of these 11 items are less frequent in French than the other 12 items (Lonsdale & Le Bras, 2009). The English true cognate words of these 23 items are not in the 5,000 most frequently used words in the language (Davies & Gardner, 2013). I argue that the clearest evidence of negative transfer ( $n=12$ ) from L2 French into L3 English is when a

false cognate has high frequency in French (i.e., is commonly used) but low frequency in English (i.e., is rarely used).

**Table 8.9**

*Scores on Specific Items of French-English False Cognate Words*

Number	English word	Group B	Group C	D	Rank order of the related French cognate words
1.	<b><u>attend</u></b>	( <i>M</i> = 77.14; <i>SD</i> =42.6)	( <i>M</i> =54.28; <i>SD</i> = 50.5)	<b>0.50</b>	<b>155</b>
2.	<b><u>bras</u></b>	( <i>M</i> =54.28; <i>SD</i> =50.5)	( <i>M</i> =20; <i>SD</i> =40.5)	<b>0.74</b>	<b>1253</b>
3.	brassiere	( <i>M</i> = 65.7; <i>SD</i> =48.15)	( <i>M</i> =60; <i>SD</i> =49.7)	<u>0.11</u>	<u>5000+</u>
4.	blessed	( <i>M</i> = 62.8; <i>SD</i> =49)	( <i>M</i> = 82.8; <i>SD</i> =38.2)	0.45	2004
5.	bottom	( <i>M</i> = 91.4; <i>SD</i> =28.4)	( <i>M</i> = 80; <i>SD</i> =40.5)	0.32	4462
6.	adept	( <i>M</i> = 65.71; <i>SD</i> =48.15)	( <i>M</i> = 74.28; <i>SD</i> =44.3)	<u>0.19</u>	<u>5000+</u>
7.	grape	( <i>M</i> =68.5; <i>SD</i> =47.1)	( <i>M</i> = 60; <i>SD</i> =45.7)	<u>0.18</u>	<u>5000+</u>
8.	journey	( <i>M</i> =82.8; <i>SD</i> =38.2)	( <i>M</i> = 57.14 <i>SD</i> =50.2)	0.37	4380
9.	<b><u>library</u></b>	( <i>M</i> = 77.14; <i>SD</i> =42.6)	( <i>M</i> =60; <i>SD</i> =49.7)	<b>0.57</b>	<b>587</b>
10.	location	( <i>M</i> =45.7; <i>SD</i> =50.5)	( <i>M</i> =57.14; <i>SD</i> =50.2)	0.22	4297
11.	<b><u>pass</u></b>	( <i>M</i> =71.4; <i>SD</i> =45.8)	( <i>M</i> = 40; <i>SD</i> =49.7)	<b>0.65</b>	<b>90</b>
12.	agreeable	( <i>M</i> =77.14; <i>SD</i> =42.6)	( <i>M</i> = 57.14; <i>SD</i> =50.2)	0.43	2841
13.	<b><u>coin</u></b>	( <i>M</i> = 68.5; <i>SD</i> =49.7)	( <i>M</i> = 28.5; <i>SD</i> =45.8)	<b>0.83</b>	<b>1798</b>
14.	<b><u>piece</u></b>	( <i>M</i> = 71.4; <i>SD</i> =45.8)	( <i>M</i> = 42.8; <i>SD</i> =50.2)	<b>0.60</b>	<b>813</b>
15.	eventually	( <i>M</i> =74.28; <i>SD</i> =44.3)	( <i>M</i> =57.14; <i>SD</i> =50.2)	0.36	5000+
16.	allure	( <i>M</i> = 71.4; <i>SD</i> =45.8)	( <i>M</i> = 60; <i>SD</i> =49.7)	0.23	3539
17.	<b><u>rest</u></b>	( <i>M</i> = 74.2; <i>SD</i> =44.3)	( <i>M</i> = 40; <i>SD</i> =49.7)	<b>0.72</b>	<b>363</b>

18.	sale	( <i>M</i> = 71.4; <i>SD</i> =45.8)	( <i>M</i> =54.2; <i>SD</i> =50.5)	0.35	2906
19.	<b>envy</b>	( <i>M</i> =60; <i>SD</i> =49.7)	( <i>M</i> =28.5; <i>SD</i> =45.8)	<b>0.65</b>	<b>1237</b>
20.	<b>affair</b>	( <i>M</i> = 66.7; <i>SD</i> =48.15)	( <i>M</i> =28.5; <i>SD</i> =45.8)	<b>0.78</b>	<b>170</b>
21.	<b>actually</b>	( <i>M</i> = 69.4; <i>SD</i> =45.8)	( <i>M</i> = 34.2; <i>SD</i> =48.15)	<b>0.78</b>	<b>584</b>
22.	<b>habit</b>	( <i>M</i> = 77.44; <i>SD</i> =42.6)	( <i>M</i> = 54.2; <i>SD</i> =50.5)	<b>0.50</b>	<b>1186</b>
23.	<b>deception</b>	( <i>M</i> = 60; <i>SD</i> =49.7)	( <i>M</i> = 25.7; <i>SD</i> =44.34)	<b>0.72</b>	<b>2821</b>

**PLT Arabic into English (Arabic-English true cognate words).** The results showed that Group B (*M*=60) scored higher than Group C (*M*=54.7) on the Arabic-English true cognate words but with only a minimal effect size (*d*=0.17). These results give insufficient evidence of PLT from Arabic into English in Group B's answers.

Looking at the individual test items, Group B scored higher than Group C on the vast majority of the Arabic-English true cognate words (24/31). For six items in bold in Table 8.10, the difference in scores between groups B and C has a medium "d value", indicating the possibility of PLT from Arabic into English in Group B's answers. Because Group B had a lower level of proficiency in English, we can argue that Group B's recognition of these items was based on their knowledge of Arabic and thus PLT occurred in this case. The vast majority of Arabic-English true cognate words (*n*=23) are infrequently used in English and, for that reason, Group B learners are less likely to have acquired them from exposure to English. In other words, their answers were based on PLT from Arabic.

Group B scored higher than Group C on the remaining 19 items, but with a small "d value" (see Table 8.10) and thus do not constitute clear evidence of PLT from Arabic into English in Group B's answers.

**Table 8.10***List of Arabic-English True Cognate Words*

Number	List of English words of Arabic origin	B	C	D	Rank order of the related English cognate words
1.	algebra	( <i>M</i> =54.2; <i>SD</i> =50.5)	( <i>M</i> =40; <i>SD</i> =49.7)	0.28	5000+
2.	alkaline	( <i>M</i> =42.8; <i>SD</i> =50.2)	( <i>M</i> =28.5; <i>SD</i> =45.8)	0.29	5000+
3.	almanac	( <i>M</i> =68.5; <i>SD</i> =47.1)	( <i>M</i> =54.2; <i>SD</i> =50.5)	0.30	5000+
4.	average	( <i>M</i> =71.4; <i>SD</i> =45.8)	( <i>M</i> =60; <i>SD</i> =49.7)	0.23	3738
5.	azimuth	( <i>M</i> =57.1; <i>SD</i> =50.2)	( <i>M</i> =51.4; <i>SD</i> =50.7)	<u>0.11</u>	5000+
6.	soda	( <i>M</i> =74.2; <i>SD</i> =44.3)	( <i>M</i> =62.8; <i>SD</i> =49.0)	0.24	5000+
7.	zenith	( <i>M</i> =45.7; <i>SD</i> =50.5)	( <i>M</i> =37.1; <i>SD</i> =49.0)	0.17	5000+
8.	<b><u>zero</u></b>	( <i>M</i> =68.5; <i>SD</i> =47.1)	( <i>M</i> =31.4; <i>SD</i> =47.1)	<b><u>0.78</u></b>	5000+
9.	admiral	( <i>M</i> =65.7; <i>SD</i> =48.15)	( <i>M</i> =48.5; <i>SD</i> =50.7)	0.34	5000+
10.	adobe	( <i>M</i> =62.8; <i>SD</i> =49)	( <i>M</i> =42.8; <i>SD</i> =50.2)	0.40	5000+
11.	amber	( <i>M</i> =57.14; <i>SD</i> =50.2)	( <i>M</i> =51.4; <i>SD</i> =50.7)	<u>0.11</u>	5000+
12.	arsenal	( <i>M</i> =77.14; <i>SD</i> =42.6)	( <i>M</i> =62.8; <i>SD</i> =49.0)	0.31	5000+
13.	guitar	( <i>M</i> =77.4; <i>SD</i> =42.6)	( <i>M</i> =68.5; <i>SD</i> =47.1)	0.20	3928
14.	check	( <i>M</i> =74.2; <i>SD</i> =44.3)	( <i>M</i> =65.7; <i>SD</i> =48)	0.18	5000+
15.	cork	( <i>M</i> =40; <i>SD</i> =49.7)	( <i>M</i> =22.8; <i>SD</i> =42.6)	0.37	5000+

16.	<b><u>assassin</u></b>	( <i>M</i> =80; <i>SD</i> =40.5)	( <i>M</i> =57.14; <i>SD</i> =50.2)	<b><u>0.5</u></b>	5000+
17.	hazard	( <i>M</i> =45.7; <i>SD</i> =50.5)	( <i>M</i> =25.7; <i>SD</i> =44.3)	0.41	4916
18.	sofa	( <i>M</i> =74.2; <i>SD</i> =44.3)	( <i>M</i> =62.8; <i>SD</i> =49.0)	0.41	4816
19.	mummy	( <i>M</i> =57.14; <i>SD</i> =50.2)	( <i>M</i> =42.8; <i>SD</i> =50.2)	0.28	5000+
20.	ream	( <i>M</i> =77.14; <i>SD</i> =42.6)	( <i>M</i> =62.8; <i>SD</i> =49)	0.31	5000+
21.	<b><u>safari</u></b>	( <i>M</i> =31.4; <i>SD</i> =47.1)	( <i>M</i> =11.4; <i>SD</i> =32.2)	<b><u>0.5</u></b>	5000+
22.	<b><u>sash</u></b>	( <i>M</i> =51.4; <i>SD</i> =50.7)	( <i>M</i> =25.7; <i>SD</i> =44.3)	<b><u>0.54</u></b>	5000+
23.	<b><u>satin</u></b>	( <i>M</i> =48.5; <i>SD</i> =50.7)	( <i>M</i> =17.4; <i>SD</i> =38.2)	<b><u>0.7</u></b>	5000+
24.	<b><u>mascara</u></b>	( <i>M</i> =65.7; <i>SD</i> =48.15)	( <i>M</i> =40; <i>SD</i> =49.7)	<b><u>0.52</u></b>	5000+

Note: 5000 + means that the rank order of the related English cognate words is higher than 5000. The number 5000 in this case refers to the most frequently used words in the language, identified by Davies and Gardner, (2013).

## 8.6 Chapter summary

Group C outperformed B in the Yes and No Test (written). Thus, there was no evidence of PLT from L1 Arabic and L2 French into L3 English in Group B's answers. The one exception pertained to the item "quintessential". General proficiency cannot explain this because Group B had a lower level of English proficiency than Group C. On the other hand, there was evidence of NLT in Group B's answers on the Yes and No Test (written).

Group B performed either equivalent to, or better than, Group C in the Yes and No Test (aural), providing evidence of the occurrence of both PLT and NLT from L1 Arabic and L2 French into L3 English in Group B's answers. In contrast, only NLT occurred from L2 French into L3 English in Group B's answers in the Yes and No Test (written).

Concerning RQ3, Group B's answers on the Yes and No Test (written) test did not provide evidence for PLT from L1 Arabic and L2 French into L3 English. The one exception pertained to the item "quintessential". On the other hand, there was evidence of NLT in Group

B's answers on the Yes and No Test (written). The Yes and No Test (aural) provided evidence of the occurrence of both PLT and NLT from L1 Arabic and L2 French into L3 English in Group B's answers. The amount of lexical transfer in the Yes and No Test (aural) was greater than that recorded in the Yes and No Test (written). Accordingly, I suggest that learners in their *careful* production of English lexis count mainly on their L3 lexis, whereas, in the random use of L3 English lexis, participants draw on the lexis of their previously learned language. Results also showed the frequency of use of the Arabic English and French-English false and true cognate words influence lexical transfer in TLA. The more frequently used cognates are, the more transferable they are from L1 Arabic and L2 French into L3 English.

## Chapter 9. Conclusion

In this chapter I will consider the following: 1) the purpose of the thesis and its specific aims. 2) a summary of the main findings for each of the research questions. 3) the theoretical contributions made by the research. 4) the practical/pedagogic contributions the research has made, 5) the study's limitations, and 6) suggestions for future research.

### 9.1 Thesis purpose and specific aims

Aiming to better understand the phenomena of language transfer in third language acquisition (TLA), my study examined the effects of transfer from a first language (L1/Arabic) and second language (L2/French) into a third language (L3/English). The Lebanese context, where (L1) Arabic, (L2/L3) French, and (L2/L3) English are present in most academic institutions, provides an excellent context for this research. Lebanese students, who natively speak Arabic, were categorised into two different groups (B & C) based on whether they acquired English as a second language (L2) or a third language (L3). Participants of Group B (n=35) and C (n=35) were third year university students in the Lebanese American University (LAU). Group A (n=9) comprised of third year university native-English speaking students enrolled at Curtin University. This group provides a standard by which the results of other participants can be compared.

This study's aims are summarised as follows:

1. Examining whether lexical and grammatical transfer from L1 Arabic and L2 French into English involved the activation of participants' implicit or explicit linguistic knowledge (ILK vs ELK). To this end I developed tests designed to provide distinct measurements of these two types of knowledge. An Exploratory

Factor Analysis (EFA) was run to demonstrate whether these tests were, in fact, measuring the two constructs (ILK vs ELK).

2. Monitoring potential grammatical and lexical transfer from L1 Arabic and L2 French into L3 English by observing participants' answers in the tests.
3. Exploring potential differences in the lexical and grammatical transfer from L1 Arabic into L3 English in comparison to L2 French into L3 English.
- 4.

This research employed two grammar tests; The Untimed Grammaticality Judgment Test (UGJT) was intended to measure participants' ELK of Grammar, and the Oral Elicited Imitation and Word Monitoring Test (OEITM) was designed to examine their ILK of grammar. In addition, two vocabulary tests were used; the Yes & No Test (written) was intended to measure participants' ELK of English lexis, and the Yes & No Test (aural) to examine their ILK of English lexis. The primary distinguishing characteristic of these tests is that the tests of ILK required spontaneous use of English whereas the ELK elicited the careful use of English.

Three research questions were formulated. RQ1 examines whether the tests were successful in differentiating the participants' ILK and ELK of English. RQ2 compares differences in group B's and C's grammatical transfer in L2/L3 English. RQ3 compares the amount of lexical transfer from previously learned languages between groups B and C.

## **9.2 Summary of the main findings for each of the research questions.**

### **9.2.1 RQ1) “Do the tests provide separate measures of ILK and ELK?”**

Results of the Exploratory Factor Analysis (EFA) did not show an implicit /explicit solution. In other words, it did not demonstrate that the UGJT and Yes and No Test (written) provided measurements distinct from those of OEITM and Yes and No Test (aural). While the EFA did produce a two-factor solution, the UGJT, OEITM and Yes and No Test (written) all loaded on factor 1 while the Yes & No Test (aural) and Yes & No Test (written) loaded on Factor 2. Factor 1 is a mixed factor as it includes both tests designed to measure careful language use i.e., the UGJT, the Yes & No Test (written) and a test designed to measure automatic language use; the OEITM. Although, the OEITM was intended to provide a measure of ILK by eliciting unmonitored, automatic responses, it is doubtful whether it succeeded in doing so. Perhaps the OEITM functioned as an offline test of planned language use because the digitalised test ran very slowly due to a technological problem (slow internet connection), giving participants more than the intended time to answer. This technological constraint was unavoidable as it occurred in the immediate aftermath of a severe economic crisis in Lebanon, impacting the operation of essential infrastructure including electricity and communications. More details of this technological problem are provided later in the Limitations Section of this chapter. Factor 2 is interpretable as a vocabulary factor. The two versions of the Yes & No Test (aural vs written) were designed to measure participants' lexis knowledge of English.

RQ2 and RQ3 were intended to investigate lexical and grammatical transfer in participants' ILK and ELK of English. However, the answer to RQ1 was non-confirmative of the ILK/ELK solution. Therefore, I chose to address RQ2 and RQ3 by examining group differences in grammatical and lexical transfer in each of the four tests. I feel this was justified, as the participants' answers on the grammaticality tests still provided insights into grammatical

transfer from L1 /L2 into L3. The researcher identified specific grammatical features ( $n=36$  items) that potentially generate PGT and NGT from the source languages (L1 Arabic & L2 French) into the target language (L3 English). The same items were used in both grammar tests. When the grammatical feature is the same in the target and source language, linguistic interference can result in correct L3 grammatical production. This phenomenon is called PGT. For instance, as both French and English use SVO word order, the use of the SVO word order in English by a native French speaker could result from PGT from French into English. NGT occurs in TLA when L1 or L2 grammatical knowledge influences L3 grammatical production and results in errors, for instance when an Arabic speaker of English uses the VSO word order in English because the VSO is a correct word order in Arabic.

Participants' answers on the vocabulary test provided insights into lexical transfer from L1/L2 into L3. I identified specific English words ( $n=217$ ) that potentially generate PLT and NLT from the source languages (L1 Arabic & L2 French). Words generating PLT from Arabic into English were selected Arabic-English cognates (e.g., *assassin*) ( $n=44$ ). Words generating PLT from French into English were frequent ( $n=75$ ) and non-frequent French-English true cognates ( $n=75$ ) (e.g., *construction*). Words generating NLT from French into English were French-English false cognates (e.g., *envy*). The researcher also used the nonsense words (i.e., made-up words) as a filler ( $n=24$ ).

**9.2.2 RQ2) “Are there any differences in the grammatical transfer of Arabic and French into English between Group B (L3 English) and Group C (L2 English)?”**

In UGJT, there was no evidence of grammatical transfer in Group B’s total scores. Group B was further divided into Group B1 ( $n=6$ ) and Group B2 ( $n=29$ ) to provide a more objective method of monitoring grammatical transfer in TLA. The difference between these two groups lies in Group B2 having a higher level of English proficiency than Group B1 as shown by the results of the C-test in which participants of Group B1 scored between 70% and 77% whilst Group B2 participants scored between 80% and 85%. The C-test in English was employed to measure participants’ level of English proficiency. Regarding Group B1’s UGJT results, positive grammatical transfer (PGT) and negative grammatical transfer (NGT) from L1 Arabic into L3 English occurred more frequently than from L2 French. The following summarizes the results in terms of how likely transfer occurred: 1) PGT from Arabic into English, 2) NGT from Arabic into English, 3) NGT from French into English, and 4) PGT from French into English. For Group B2, I only reported the occurrence of NGT from French into English. Results showed that, as the learners advanced in their L3 proficiency, the grammatical rules originally transferred from the source language (L2/French) are substituted by the rules of the target language (L3/English).

In summary, the results for the UGJT found that L1 Arabic is the main language for grammatical transfer in TLA (i.e., Group B1). In contrast, for participants with a higher level of English proficiency (i.e., B2) L2 French became the only source of transfer.

Results for the OEITM, which reflect the occurrence of grammatical transfer in third language acquisition (TLA) from Group B (B1 & B2), are presented from most to least frequent 1) NGT from French into English for Group B1, 2) NGT from French into English for Group

B2, 3) NGT from Arabic into English for Group B1, and 4) PGT from L2 French into L3 English in Group B1. These results suggest that although both source languages, namely L1 Arabic and L2 French, led to grammatical transfer into L3 English, L2 French remained the main source of transfer. The most apparent reason for this is that French and English are typologically very similar. L2 French played the role of a grammatical facilitator (PGT) in L3 grammar production only among B1's participants (lower proficiency). NGT from L2 French into L3 English was greater in Group B1 than in Group B2. Results showed that, as learner's proficiency increases, the grammatical rules which were originally transferred from the source language (L2/French) were substituted by the rules of the target language (L3/English).

The study also provided evidence of multiple factors that have been found to influence PGT and NGT in TLA. The main factor that was found to influence grammatical transfer in TLA was L3 level of proficiency that is a lower level of L3 proficiency will be characterised more by grammatical transfer in TLA but as learners gain in proficiency grammatical forms initially transferred from Arabic and French are replaced by target forms of L3 English.

For instance, in regards to participants' answers on OEITM, NGT from L2 French into L3 English in B1's answers surpassed that in B2's answers. This concerns participants' answers on the total and selected items employed to permit NGT from French into English namely 1) use of the definite article with proper nouns, 2) location of object pronouns in sentences that include main clauses, and 3) use of the simple past tense to refer to an action completed in the past.

The second factor reported to influence grammatical transfer in TLA was the frequency of use of grammatical structures in the source languages (Arabic & French). That is, grammatical transfer from L1 Arabic and L2 French into L3 English was evident in structures that are frequently used in the source languages. PGT and NGT from L1 Arabic and L2 French into L3 English did not occur in the case of structures in Arabic and French that are used less frequently. The following provides two examples of this:

In the UGJT and OEITM, PGT from L2 French into L3 English occurred in Group B1's answers on two grammatical structures namely, basic word order and the use of the verb "to be", when describing things in the present. These two grammatical structures are very frequently used in French, permitting PGT to take place once students notice the similarity. In contrast, there was no evidence of PGT in the resumptive pronouns in relative clauses in B1, possibly because relativisation is less frequent than the use of the verb "to be" and SVO word order.

In the UGJT, NGT from L1 Arabic into L3 English was only evident in basic word order in Group B1. NGT from L1 Arabic into L3 English did not occur in Group B's answers in resumptive pronouns in relative clauses. The high frequency of the use of SVO word order in Arabic best explains the occurrence of transfer. The low frequency of use of the resumptive pronouns in relative clauses in Arabic best explains the non-occurrence of grammatical transfer.

The third factor shown to be facilitative of grammatical transfer in TLA was markedness - the occurrence of transfer when a feature is unmarked in the source language - L1 Arabic - but generally or increasingly marked in the target language - L3 English. The following is an example illustrating this. In the UGJT, PGT from L1 Arabic into L3 English was only evident in the definite article with proper nouns of places in B1. PGT in Group B1

was not evident in the use of the past tense to refer to an action completed in the past or in the location of object pronouns in sentences that include main clauses. This indicates that PGT from L1 Arabic into L3 English is more likely to occur if a feature is unmarked in the source language (L1 Arabic) but marked or less marked in the target language (L3 English).

***9.2.3 RQ3) “Are there Any differences in the lexical transfer of Arabic and French into English between Group B (L3 English) and Group C (L2 English)?”***

In order to claim that transfer occurred, it was necessary to show Group B outperforming Group C in the Yes & No Test (written). However, this did not occur. In other words, there was no evidence of PLT from the source languages (L1 Arabic & L2 French) into the target language (L3 English). A single exception was the word “quintessential”. In contrast, this study did provide evidence of NLT from L2 French into L3 English in the Yes & No Test (written).

In the Yes & No Test (aural), Group B scored equivalent to, or higher than, Group C. These results provide evidence of both PLT and NLT from the source languages (L1 Arabic & L2 French) into the target language (L3 English). The following summarizes the occurrence of lexical transfer from the most frequent to the least: 1) PLT from French into English, 2) NLT from French into English, 3) PLT Arabic into English, and 4) PLT from French into English. This study found that PLT and NLT from French into English was evident among French-English true cognate words and French-English false cognate words that are frequently used in French but infrequently used in English. PLT from Arabic into English was also evident in the Arabic-English true cognate words that are infrequently used in English. The infrequently used

words in French are those that do not belong to the 5,000 most frequently used words in the French language (Lonsdale & Le Bras, 2009). The infrequently used words in English are those that do not belong to the 5,000 most frequently used words in the English language (Davies & Gardner, 2013).

The amount of lexical transfer in the Yes & No (aural) Test surpassed that recorded in the Yes & No (written) Test. A possible explanation is that students relied primarily on their lexis of the target language when they had time to make responses in the written test. In contrast, students drew on the lexis of the source languages namely, L1 Arabic and L2 French when forced to respond rapidly in the aural test.

### **9.3 The theoretical contributions the research has made.**

#### ***9.3.1 Theoretical contribution on grammatical transfer in TLA***

Despite the typological distance between Arabic and English, both PGT and NGT were more evident from L1 Arabic into L3 English than from L2 French into L3 English. This suggests that the L2 may not always be the main source of transfer as reported in previous studies (see., Bardel & Falk, 2007; Bardel & Falk, 2012). Although prior research has demonstrated the occurrence of grammatical transfer from L1 into L3 where participants were early learners of English (Hermas, 2014), this study indicates it can also happen when English proficiency is relatively advanced (i.e. B2).

The OEITM results showed that the participants' L2 French was the main source of transfer into L3 English, irrespective of their level of proficiency. Previous studies have only demonstrated this transfer in cases where participants' L3 proficiency was at early stages (Bardel & Falk, 2007, 2012). An additional theoretical claim can be made in my study which is that a high level of L3 proficiency cannot fully guarantee the non-occurrence of NGT from

L2 into L3 in cases where L2 and L3 are typologically similar. In my study, participants' high level of English proficiency did not stop NGT from L2 French into L3 English. These findings contradict previous findings which have shown that a high level of L3 level of proficiency may inhibit transfer from a previously learned language into L3 (Herms, 2015).

Grammatical transfer was more evident in the OEITM than in the UGJT. Perhaps the design of the UGJT, which inadvertently permitted planned responses, made students count more on their L3 grammatical knowledge in their answers rather than on grammatical transfer from previously learned languages, i.e. L1 Arabic and L2 French. So, one interpretation of the results is that transfer is likely to occur when participants have the opportunity to reflect on their responses.

Overall, this study showed that PGT transfer from previously learned languages (Arabic & French) can contribute to the L3 English grammar. This was demonstrated in the answers of participants with a lower level of English proficiency (i.e., B1) more than in the answers of participants with a higher-level English proficiency (i.e., B2). Similarly, NGT from L1 Arabic and L2 French into L3 English was found to have a more negative impact on L3 English among participants with a lower level of L3 English proficiency (i.e., Group B1) than among those with a higher level of L3 proficiency (i.e., Group B2).

Bilinguals learning an L3 can benefit from both of the languages they know via positive grammatical transfer. PGT takes place when a precise linguistic feature in the L3 reveals grammatical similarity with its grammatical feature's counterpart in previously learned languages. For instance, both French and English follow the SVO rule. PGT of this grammatical feature can be evident in the L3 English production of a French speaker. Bilinguals learning an L3 can be subject to non-facilitative influences from previously learned

languages. NGT takes place when a precise linguistic feature in the L3 input reveals grammatical dissimilarity with its grammatical feature's counterpart in previously learned languages. For instance, unlike English that only permits use of the SVO word order, the Arabic language permits use of *both SVO and SOV* word order. NGT of SOV grammatical rule can be evident in the L3 English production of an Arabic speaker. This study also found that PGT and NGT from L1 Arabic into L3 English is related to the degree of markedness of the related grammatical feature in Arabic. That is to say, the unmarked features (basic primitive rules) are transferable into L3, whereas the marked features are not. This study also found several factors that influence grammatical transfer in TLA mainly among participants with less advanced L3 English proficiency, namely: 1) The high frequency of use of some grammatical rules in the source languages (L1 or L2), 2) the level of L3 English proficiency. Grammatical transfer was more evident in participants with lower L3 English proficiency. These findings, unlike the majority of previous studies, are not applicable in the initial stages of L3 acquisition, but rather are relevant to a more developed stage (e.g., Bardel & Falk, 2007; Falk et al., 2015; Garcia Mayo & Slabakova, 2015; Sánchez & Bardel, 2016)

### ***9.3.2 Theoretical contributions for lexical transfer in TLA.***

There was evidence of PGT and NGT in the results for the Yes & No Test (aural). In contrast, there was no evidence of PGT and NGT in participants' answers in the Yes & No Test (written). Perhaps in cases where students have the opportunity to plan their answers they rely on their L3 lexical knowledge. However, when participants are obliged to provide rapid answers they draw more on the lexis of previously learned languages.

The frequency of use of cognate words in the source languages (L1 Arabic & L2 French) played a role in lexical transfer into L3 English. The frequency of cognate word use in

the source languages is proportionate to the rate of lexical transfer to the later learned language/s. This is to say that true cognates that are more frequently used in the source languages are more transferable into the target language in TLA. Furthermore, this study found that when the participants dealt with less frequently used words in the target language (L3 English) they tended to count on the lexis of their previously learned languages. To sum up, true and false cognates used frequently in the source languages (Arabic & French) but infrequently in the target language (English), are the most transferable.

#### **9.4 Practical and pedagogical contributions.**

In countries where multilingualism is the core of their identity, culture, social, and economic progress, it is important to improve the understanding of the nature of third language acquisition. The ultimate goal is to develop teaching and learning approaches to maximise language and literacy skills in TLA students. The following is an illustration of how this study's findings can inform the development of pedagogical approaches applicable to TLA.

##### ***9.4.1 Implementation a programme to give support to L3 lexical development.***

In multilingual societies such as Lebanon, Tunisia, Morocco, and member states of the European Union, teaching English as a second or foreign language must take into consideration the grammatical and lexical knowledge of students' previously learnt language(s). My research has provided evidence of the influence of previously learnt languages on the lexical development of the newly acquired language, especially among participants with less advanced

L3 English proficiency (i.e., B1). For instance, in the case of L3 lexical development, one can count on the French language to build English lexis from the early stages. It is worth noting that students in Lebanon possess an advanced knowledge of French resulting from eight years instruction in French from the time they start learning English as their second foreign language (i.e., at 12 years old). Early learning of French lexis allows permanent storage, fast recall, and effective word use (Antoniou, 2019; Baddeley, 2010). Also, the number of French-English true cognate words is large. The English-French Cognate Dictionary covers a word list of 10,993 cognates (Hammer & Monod, 1976). Accordingly, in Lebanon, Tunisia, Algeria, France and many other countries where French is the native language or the first foreign language, the teaching of English should encourage the use of these French-English true cognate words at the initial stage of L3 English vocabulary teaching. This will enable students to count on PLT from previously learnt language/when learning English, facilitating the learning process and providing students with a considerable amount of L3 lexis to use when communicating in L3 English. Students should learn English spelling and pronunciation of these French-English true cognate words to be able to use them in verbal and written communication and be able to recognise them upon hearing or reading them. The same teaching approach should be used to avoid the misuse of French-English false cognate words. Teachers should also introduce Arabic-English true cognate words, though the number of these words is very limited (n=230). Teachers of English as a foreign language for immigrants with L1 or L2 French should also consider encouraging lexical transfer in vocabulary teaching. It is very motivational and useful for multilingual immigrants who want to learn the language of the country to which they immigrate at a late stage in their life to know that they already possess a large vocabulary that can be used in their learning of the new language.

There are only a couple of studies that have considered the role of lexical transfer in simultaneous interpreting (for a summary of these studies see., Bartłomiejczyk, 2006). As a reminder to the reader, in this study, participants undertook the Yes & No Test (aural) with time pressure conditions; this resembles the condition interpreters experience in their simultaneous interpreting tasks, namely, translating the source language into the target language within a short amount of time; usually at the speed of the speaker's speech. It is worth noting that the recognition of the meaning of words in the source language is the first essential step of simultaneous interpreting preceding verbal translation. Similarly, in the Yes & No Test (aural) participants are asked to recognise aurally presented words.

English medical terminology comprises a considerable amount of French-English true cognate words. There is a concrete influence of Latin upon the origin and development of English and French medical terminology (Bujalkova & Dzuganova, 2015). Approximately 95% of the medical terms in English originate from Latin and Latinised Greek (Bieliaieva et al., 2017). Many Arab students enrolled in a Bachelor of Arts interpreting (Arabic-English) in their local universities or aboard are trilingual speakers with an L2 French. This chiefly relates to students who are from Arabic speaking countries with a French bilingual educational system such as Lebanon, Tunisia, Morocco and Algeria. In these countries, schools use French as the medium of instruction for scientific subjects such as biology, chemistry, and physics. This enables the development of L2 scientific lexis knowledge among these students who also learn L3 English as a school subject from around the age of 12 onwards for approximately 4 hours per week. When these trilingual students undertake their Bachelor of Arts in interpreting (Arabic-English), a degree that includes a medical interpreting unit, they should be introduced to the list of medical terminology in their three languages, namely Arabic, French and English.

This will allow them to select the French-English true cognate medical words and make use of PLT from French into English in L3 English recognition and comprehension. PLT from French into English of these French-English true cognate words will assist students in understanding, memorising and recognising the English words, and hence further facilitate the interpreting task.

It is worth noting that many of these trilingual students enrol for this degree in English speaking countries as this provides them with international accreditation in their profession once graduated. These universities provide degrees of interpreting in the following languages: Arabic-English, French-English, Chinese-English, Portuguese-English (e.g., Sydney University, University of Western Sydney). The academic institution where they are enrolled should allow and encourage these trilingual Arabic students to attempt both; the French-English medical interpreting class designated for French speakers enrolled in French-English BA of Arts interpreting and the Arabic-English medical interpreting classes designated for Arabic speakers enrolled in Arabic-English BA of Arts interpreting. This strategy will enhance trilingual Arabic students' use of PLT from L2 French into L3 English and help them to recognise and understand L3 English. One has to understand a given word in the source language in order to be able to translate it into a target language.

#### ***9.4.2 Implementation of a programme to give support to L3 grammatical development.***

The occurrence of PGT in students' answers suggests the need to re-consider monolingual instructional assumptions (i.e., that learning grammar in a new language should be undertaken in complete separation from the influence of grammatical knowledge of previously learned languages). The following are examples of how to teach students by means of trilingual instructional strategies that enhance PGT in TLA.

**Comparative grammar.** The use of comparative grammar will contribute to reducing NGT from L1 Arabic and L2 French into L3 English. Comparative grammar is mainly concerned with the analysis and comparison of the grammatical features of related languages (Leonard, 2011). Comparative grammar samples provide students with examples of PGT and NGT. A detailed explanation of grammatical transfer, accompanied with examples, will help students develop an understanding of grammatical transfer in TLA. More precisely, comparative grammar assists students' comprehension of the similarities and dissimilarities between multiple languages. It guides students to pay attention to PGT from L1/L2 and apply it in their TLA. It also trains students to avoid NGT from L1 and L2 into L3. This is why comparative grammar in TLA should occupy an important place in L3 grammatical teaching.

**Language transfer in the context of creating dual-grammar language books.** Teachers should be encouraged to use grammar books designed to illustrate similarities and dissimilarities in grammar between related languages. Trilingual Grammarians should be encouraged to write these types of books. These publications should be used in places that provide trilingual education in schooling, as they enhance the use of PGT from previously learned languages into the newly acquired language and inhibit NGT. In Lebanon for instance, having a French-English dual grammar book and an Arabic-English dual grammar book would be of great benefit to L2/L3 English teaching.

## **9.5 Limitations.**

### ***9.5.1 Technological issues***

The OEITM was intended to provide a measure of implicit knowledge by eliciting unmonitored, automatic responses. However, it is doubtful whether it succeeded in doing so. Due to the Coronavirus (COVID-19) pandemic, this study was administrated by an IT professional in Lebanon and monitored online by the researcher from Australia. During the data collection period, and up to today, a profound economic and political crisis has enveloped Lebanon, resulting in the absence of basic life services such as reliable Internet speeds of at least 8 Mbps. This is the minimum speed needed to run the online digitalised OETM. The speed available in Lebanon was between 2 Mbps and 6 Mbps, the former speed being the most available. The current situation of Lebanon is still, until now, unstable and insecure and there was/is no solution for this problem. Thus, the OEITM was unable to function as intended.

### ***9.5.2 The operationalisation of constructs***

In this study, ELK was operationalised in two tests, namely the UGJT, and the Yes and No Test (written) Test. ILK was operationalised in the OEITM and the Yes & No Test (aural). Ideally, a greater number of lexical tests, and grammatical tests added to the battery of tests, would have strengthened the study. Isemonger (2007) indicated that “constructs should be operationalised in as many ways as possible” (p. 110). Nevertheless, the resources available did not allow for additional extensive testing. Also, one should also be aware of practical limitations concerning the number of tests participants can reasonably be expected to complete comfortably.

### ***9.5.3 Number of items***

In the Yes & No Test (aural), and Yes and No Test (written), the number of words/items employed to monitor lexical transfer from French into English (N=150) was greater than the number of words/items employed to monitor lexical transfer from Arabic into English (N=45). The only reason for this was the shortage of cognate words in Arabic and English. The difference in the number of items selected to monitor language transfer from Arabic into English, compared to those selected to monitor language transfer from French into English, affects the internal validity of the Yes and No Tests and makes group comparisons problematic.

### ***9.5.4 Limited number of participants in B1***

When examining results for grammatical transfer, the researcher divided Group B into two sub-groups. Group B1 had a lower level of English proficiency ( $n=6$ ) and Group B2 a higher English proficiency ( $n=29$ ). Again, comparisons of B1 and B2 may have been affected by a sample size that was too small as this can increase the margin of error.

## **9.6 Suggestions for future research.**

### **9.6.1 Investigation lexical transfer separately from grammatical transfer**

As mentioned previously, the two constructs (ILK vs ELK) must be operationalised in as many ways as possible. I suggest that investigating the effect of ILK and ELK in grammar

and lexis requires separate studies so that more tests for each can be developed. In Ellis et al. (2009) Marsden project, ILK was operationalised in three grammaticality tests, ELK was operationalised using two grammar tests, and this battery of tests was found to be effective in differentiating implicit and explicit knowledge of L2 grammar (Ellis et al., 2009). Accordingly, for lexical transfer in TLA, we suggest that ILK should be operationalised by at least three tests and ELK by at least three tests. The same number of tests for each type of knowledge (ILK vs ELK) should be employed when investigating transfer in TLA.

### ***9.6.1 Language transfer and automatised linguistic knowledge.***

Future research must also be aware of a third type of linguistic knowledge, namely automatic linguistic knowledge that allows fast recall of declarative linguistic knowledge. Automatic declarative knowledge can be considered a form of ELK and distinct from ILK. Future research in TLA should investigate grammatical and lexical transfer in learners' automatic declarative knowledge. This can be achieved in designing grammar and vocabulary tests that provide separate measures of automatic declarative knowledge.

### ***9.6.2 Multidirectional transfer.***

This study examined forward linguistic transfer. There is also a phenomenon referred to as Reversal Linguistic Transfer, which refers to linguistic transfer from the last learned language (L3) to the previously learned languages (L1 and L2). Another type of transfer pertains to language transfer across and between all existing languages in the mind of a trilingual, known as multidirectional transfer. Future studies should monitor positive and negative language transfer across related languages and the effect on L1, L2 and L3 language

production. Tests that measure participants' knowledge of all three languages are needed in order to examine positive and negative language transfer among the three languages

### ***9.6.3 Understudied factors impacting language transfer in TLA***

More research of language transfer in TLA is still needed; especially regarding the following under-investigated areas: a) heritage speakers and b) children. Concerning typology, studies targeting different combinations of Indo-European and Non-Indo-European languages can progress our understanding of grammatical transfer in TLA. It is also worth stating that only a couple of studies have examined the relationship between the phonetic properties of a source language (i.e., L1 and L2) and language transfer in TLA, more research on this topic is needed.

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## Appendices

The appendices comprise the following:

- A. The C-Test in English/French (instrument)
- B. Language History Questionnaire (instrument)
- C. The Yes and No Test (written)
- D. The Yes and No Test (aural)
- E. The UGJT
- F. The OEITM
- G. Statistical results investigating participants' grammatical transfer for UGJT, UGJT grammatical and UGJT ungrammatical
- H. Statistical results investigating participants' grammatical transfer for OEITM, OEITM grammatical and OEITM ungrammatical
- I. Chi Square Tests for grammatical tests

### Appendix A. The C-Test in English and French

#### *C-test instructions and five selected paragraphs.*

Below are four short passages in English and one short passage in French. Some of the words in each passage are not complete. A dash (\_\_\_) shows the words that are not complete. Please note that the length of the dash does not indicate the number of letters needed to complete a word. Sometimes you will need only one or two letters to complete a word but at other times you will need several letters. Please try to complete all the words in all five passages. If you are unable to complete a word, just go to the next word.

### C-Test English: The four English texts selected

**Extract 1.** One cool autumn evening, Bob L., a young professional, returned home from a trip to the supermarket to find his computer gone. Gone! All so\_\_\_ of cra\_\_\_ thoughts ra\_\_\_ through his mind: H\_\_\_ it be\_\_\_ stolen? H\_\_\_ it be\_\_\_ kidnapped? H\_\_\_ searched h\_\_\_ house f\_\_\_ a cl\_\_\_ until he noticed a sm\_\_\_ piece of printout pa\_\_\_ stuck un\_\_\_ a mag\_\_\_ on his refrigerator do\_\_\_. His heart sank as he read this simple message: CAN'T CONTINUE, FILE CLOSED, BYE.

**Answers:** sorts, crazy, raced, had, been, had , been, he, his, house , for , clue, small, piece, paper, under, magnet, door,

Note , this text was taken from Dörnyei and Katona (1992, p. 205)

**Extract 2.** There is a third factor besides farming and herding in the spread of man-made deserts: deforestation. The progre\_\_\_ destruction o\_\_\_ the Th\_\_\_ World's st\_\_\_ of tr\_\_\_ is damaging not on\_\_\_ in d\_\_\_ regions: every\_\_\_ it occurs it c\_\_\_ accelerate t\_\_\_ decay o\_\_\_ the so\_\_\_ and re\_\_\_ its capa\_\_\_ to fe\_\_\_ people. It can reduce rainfall and lead to drought.

**Answers:** progressive, of, the, third, stock, tree, only, dry, everywhere, can, the, of, soil, reduce, capacity, feed.

Note , this text was taken from Dörnyei and Katona (1992, p. 205)

**Extract 3.** There are certain things which no student can do without and others which may not be as necessary as you thought. It m\_\_\_ be wo\_\_\_ considering so\_\_\_ small hi\_\_\_. You m\_\_\_ find your\_\_\_ in ne\_\_\_ of elect\_\_\_ appliances su\_\_\_ as li\_\_\_ bulbs, adap\_\_\_ or plugs. These c\_\_\_ be obta\_\_\_ from ma\_\_\_ places. GILL i\_\_\_ a go\_\_\_ hardware sh\_\_\_ and try\_\_\_ to fi\_\_\_ it is a chal\_\_\_. It is hidden in a little alley leading off High Street called Wheatsheaf Yard.

**Answers:** may, worth, some, hints, may, yourself, need, electrical, such, light, adapters, can, obtained, many, is, good, shop, trying, find, challenge.

Note , this text was taken from Dörnyei and Katona (1992, p. 205)

**Extract 4.** The private conscience of the leader - rather than his public responsibilities - becomes the focal point of politics. Internal crit\_\_\_ - possession o\_\_\_, devotion t\_\_\_, and stan\_\_\_ up f\_\_\_ private prin\_\_\_ - become t\_\_\_ standards o\_\_\_ political judg\_\_\_. Constituents disa\_\_\_, and w\_\_\_ are left with a poli\_\_\_ leader deter\_\_\_ policy o\_\_\_ the ba\_\_\_ of compa\_\_\_ with h\_\_\_ private princ\_\_\_. From this perspective we can better understand why Goldwater voted against the Civil Rights Act of 1964.

**Answers:** criteria, of, to, standing, for, principles, the, of, judgment, disapproval, we, political, determining, on, the, basic, compatibility, his, principles.

Note , this text was taken from Dörnyei and Katona (1992, p. 205)

## The C-Test in French: The French text selected

*Extract 5. (The French passage).* Donner du sang, c'est donner la vie. Un festival haut en couleurs était organisé au Collège Notre-Dame de Jamhour pour la première collecte de sang scolaire avec le sourire et en musique.

La pr\_\_\_ 2019 du Col\_\_\_ Notre-Dame de Jamhour (CNDJ) e\_\_\_ la pr\_\_\_ donneuse de sa\_\_\_ anonyme au se\_\_\_ d'une éc\_\_\_ « C'est u\_\_\_ première mon\_\_\_ au niv\_\_\_ scolaire », affirme Dany Tinawi, éd\_\_\_ au CNDJ, qui a org\_\_\_ cette opération av\_\_\_ la bénédiction de la dir\_\_\_ et le soutien de l'ONG Donner sang compter (DSC). Au co\_\_\_ de la fête du Co\_\_\_, les 4 et 5 M\_\_\_, 117 un\_\_\_ de sang ont é \_\_\_ collectées d\_\_\_ bacheliers po\_\_\_ donner du sa\_\_\_, de parents et d'éd \_\_\_ « Depuis 20 a.., je caressais le rê\_\_\_ de tra\_\_\_ une promo de ba\_\_\_ en une pre\_\_\_ donneuse de sa\_\_\_ », avoue Dany Tinawi. Le rê.. de cet édu..... qui do...lui-mê.. du sa.. anonymement dep... 40, s'est en\_\_\_ réalisé. Dany est également coach de DSC fondée par Yorghy Teyrouz depuis 9 ans.

*Answers:* promo, collège, première, sang, sein, une, niveau, éducateur, organisé, avec, direction, cours, Collège, mai, unités, été, des, pouvant, sang, d'éducateurs, ans, *rêve*, transformer, bacheliers, première, sang, rêve, éducateur, donne, même, sang, depuis, enfin, enfin,

Note, the French text is taken from (Pascalidies, 2019)

**Appendix B. Language History Questionnaire (Version 1.0)**

Contact Information:

Name: \_\_\_\_\_ Email: \_\_\_\_\_

Telephone: \_\_\_\_\_ Today's Date: \_\_\_\_\_

Please answer the following questions to the best of your knowledge.

**PART A**

1. Age (in years):
  
2. Sex (circle one): Male/Female
  
3. Education (degree obtained or school level attended):
  
4. (a). Country of origin :  
(b). Country of Residence:
  
5. If 4(a) and 4(b) are the same, how long have you lived in a foreign country where English language is spoken? If 4(a) and 4(b) are different, how long have you been in the country of your current residence?
  
6. What is your native language? (if you grew up with more than one language, please specify).

7. Is English your second language or third language?

a) My second language \_\_\_\_\_

b) My third language (if you answered NO, you need not to continue this form)

8. Please specify the age at which you started to learn English

In the following situations (write age next to any situation that applies).

a) At home \_\_\_\_\_

b) In school \_\_\_\_\_

c) After arriving in an English speaking country (in case he travelled to an English speaking country before coming back to Lebanon ) \_\_\_\_\_

9. How did you learn English up to this point? (check all that apply)

a) Mainly through formal classroom instruction \_\_\_\_\_

b) Mainly through interacting with people \_\_\_\_\_

c) A mixture of both \_\_\_\_\_

d) Other \_\_\_\_\_

10. List all foreign languages you know in order of most proficient to least proficient. Rate your ability on the following aspects in each language. Please rate according to the following scale (write down the number in the table):

Very poor, Poor, Fair, Functional, Good, Very Good, Native-like

1\_ \_ \_ 2\_ \_ \_ 3\_ \_ \_ 4\_ \_ \_ 5\_ \_ \_ 6\_ \_ \_ 7\_ \_ \_

Language	Reading Proficiency	Writing proficiency	Speaking proficiency	Listening ability

11. Providing the age at which you were first exposed to each foreign language in terms of speaking, reading, and writing and the number of years you have spent on learning each language.

Language	Age first exposed to the			Number of years
	Speaking	Reading	Writing	

12. Do you have a foreign accent in the languages you speak? If so, please rate the strength of your accent on a scale from 1 (not much of an accent) to 7 (very strong accent).

Language	Accent (circle one)	Strength

	Y N	
	Y N	
	Y N	

**PART B**

13. What language do you usually speak to your mother at home? (if not applicable for any reason, write N/A )

14. What language do you usually speak to your father at home? (if not applicable for any reason, write N/A )

15. What languages can your parents speak fluently? (if not applicable for any reason, write N/A)

a) Mother:

b) Father:

16. What language or languages do your parents usually speak to each other at home? (if not applicable for any reason, write N/A)

17. Write down the name of the language in which you received instruction in school, for each schooling level:

Primary/elementary school

Secondary/Middle School High School

College/University

18. Estimate, in terms of percentages, how often you use your native language and other languages per day (in all daily activities combined):

a) Native language %

b) Second language %

c) Other language % (specify :)

(Total should equal 100%)

19. Estimate, in terms of hours per day, how often you watch TV or listen to radio in your native language and other languages per day.

a) Native language (hrs.)

b) Second language (hrs.)

c) Other languages (specify the languages and hrs.)

20. Estimate, in terms of hours per day, how often you read newspaper, magazines, and other reading materials in your native language and other languages per day.

a) Native language (hrs.)

b) Second language (hrs.)

c) Other languages (specify the languages and hrs.)

21. Estimate, in terms of hours per day, how often you use your native language and other languages per day for work or study related activities (e.g., going classes, writing papers, talking to colleagues, classmates, or peers).
- a) Native language (hrs.)
  - b) Second language (hrs.)
  - c) Other languages (specify the languages and hrs.)
22. In which languages do you usually :
- a) Add, multiply, and do simple arithmetic?
  - b) Dream?
  - c) Express anger or affection?
23. When you are speaking, do you ever mix words or sentences from the two or more languages you know? (If no, skip to question 25)
24. List the languages that mix and rate the frequency of mixing in normal conversation with the following people, on a scale from 1 (mixing is very rare) to 5 (mixing is very frequent). Write down the number in the box.

<b>Relationship</b>	<b>Languages mixed</b>	<b>Frequency of mixing</b>
Spouse/family members		
Friends		
Co-workers		

25. In which language (among your best two languages) do you feel you are usually better?

Write the name of the language under each condition.

At home

At work

- a) Reading
- b) Writing
- c) Speaking
- d) Understanding

26. Among the languages you know, which language is the one that you would prefer to use in these situations?

- a) At home
- b) At work
- c) At a party
- d) In general

27. If you have lived or travelled in other countries for more than three months, please indicate the name(s) of the country or countries, your length of stay, and the language(s) you learned or tried to learn.

28. If you have taken a standardised test of proficiency for languages other than your native language (e.g., Toe FL or test of English as foreign Language), please indicate the scores you received for each.

Language	Scores	Name of the Test
_____	_____	_____
_____	_____	_____
_____	_____	_____

29. If there is anything else that you feel is interesting or important about your language background or language use, please comment below.

Note, LHQ is provided by Li et al. (2006, pp. 207-209).

### Appendix C. The Yes and No Test (written)

You (participants) will be sequentially shown a list of 217 words (target items) of the test on a screen. Each word presented will appear in the middle of the screen, and you will be required to indicate whether you recognise them and know their meaning. You will be given all the time you need to answer. After completing this step, you will be shown a list of the words you were able to recognise and asked the following question: “Can you provide the meaning of the recognised words by defining them using any language(s) you know?”. Following this, you will be asked the following question: “Did you recognise this word in English because you knew its cognate in a previously learned language(s)?” You have to answer this question by clicking on the “yes” or “no” digital buttons. The following tables will present the items used in this test.

**Table 1**

*List of Frequent French-English True Cognate Words*

number	List of frequent words
1.	Affirmation
2.	Accusation
3.	Antique
4.	Archive
5.	Artisan
6.	Aspiration
7.	Attitude
8.	Attribution
9.	Audition

10.	Column
11.	Arrange
12.	Generalise
13.	Transaction
14.	Extremity
15.	Penal
16.	Banking
17.	Calendar
18.	Paradise
19.	Transparent
20.	Tourism
21.	Demonstration
22.	Infraction
23.	Arrangement
24.	Pardon
25.	To collaborate
26.	To proclaim
27.	Dominant
28.	Peril
29.	Preference
30.	Vain
31.	monopoly

32.	Proximity
33.	Inherit
34.	Elementary
35.	Entity
36.	Clandestine
37.	Objection
38.	Vocation
39.	Luxury
40.	Nomination
41.	Publicly
42.	Comparable
43.	Sympathies
44.	Align
45.	Absorb
46.	Companion
47.	Operational
48.	Poem
49.	Basin
50.	Ministerial
51.	Rage
52.	Registration
53.	Systematically
54.	Enormously
55.	Dictatorship
56.	Equip

57.	Source
58.	Respect
59.	Crime
60.	Precedent
61.	Install
62.	Impression
63.	Federal
64.	Attitude
65.	Imagine
66.	Practice
67.	Pressure
68.	Access
69.	Common
70.	Resource
71.	Promise
72.	Motion
73.	Concentrate
74.	Exactly
75.	Compose

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**Table 2***List of French-English Infrequent True Cognate Words*

Number	Words
1.	Absolution
2.	Affiliation
3.	Ambivalence
4.	Avalanche
5.	Badminton
6.	Camouflage
7.	Charlatan
8.	Coalition
9.	Conciliation
10.	Constitution
11.	Consolidation
12.	Contraception
13.	Corruption
14.	Contemplation
15.	Coroner
16.	Diminution
17.	Drainage
18.	Duplication
19.	Effervescence
20.	Embargo
21.	Enviably
22.	Exaltation

23.	Excavation
24.	Extradition
25.	Extravagance
26.	Gestation
27.	Glorification
28.	Gesticulation
29.	Herbicide
30.	Herbivore
31.	Imminent
32.	Impeccable
33.	Impertinence
34.	Imperceptible
35.	Implacable
36.	Impudent
37.	Incandescent
38.	Incessant
39.	Intrigue
40.	Jurisprudence
41.	Lassitude
42.	Lamentation
43.	Locomotive
44.	Luminescence

45.	Machination
46.	Marinade
47.	Mystification
48.	Nasal
49.	Navigable
50.	Nomenclature
51.	Notation
52.	Occlusion
53.	Oppression
54.	Ossification
55.	Ovulation
56.	Pantomime
57.	Pigmentation
58.	Placebo
59.	Proclamation
60.	Quintessence
61.	Ramification
62.	Rumination
63.	Sabotage
64.	Sanatorium
65.	Spectacle
66.	Tangible
67.	Transcription
68.	Turbulence
69.	Ultraviolet

70.	Urinal
71.	Vacant
72.	Vassal
73.	Vaudeville
74.	Vendetta
75.	Vigilance

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**Table 3***List of French-English False Cognate Words*

Number	English word	French false friend
1.	Attend	Attendre
2.	Bras	Bras
3.	Brassiere	Brassière
4.	Blessed	Blessée
5.	Bottom	Bouton
6.	Deception	Déception
7.	Envy	Envie
8.	Grape	Grappe
9.	Journey	Journée
10.	Library	Librairie
11.	Location	Location
12.	Pass	Passer

13.	Preservative	Préservative
14.	Pain	Pain
15.	Point	Point
16.	Habit	Habit
17.	Coin	Coin
18.	Piece	Pièce
19.	Location	Location
20.	Actually	Actuellement
21.	Eventually	Eventuellement
22.	Deception	Déception
23.	Rest	Rester
24.	Sale	Sale
25.	Adept	Adapter
26.	Affair	Affaire
27.	Affluence	Affluence
28.	Agreeable	Agréable
29.	Allure	Allure
30.	Amity	Amitié
31.	Arose	Arroser

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**Table 4***List of Arabic-English True Cognate Words*

Number	List of English words Arabic origin
1.	Alchemy
2.	Alcohol
3.	Algebra
4.	Algorithm
5.	Alkaline
6.	Almanac
7.	Average
8.	Azimuth
9.	Cipher
10.	Elixir
11.	Nadir
12.	Soda
13.	Zenith
14.	Zero
15.	Admiral
16.	Adobe
17.	Alcove
18.	Amber
19.	Arsenal

20.	Assassin
21.	Caliber
22.	Candy
23.	Check
24.	Cork
25.	Coffee
26.	Cotton
27.	Gauze
28.	Guitar
29.	Hazard
30.	Lazuli
31.	Mascara
32.	Matters
33.	Monsoon
34.	Mummy
35.	Racquet
36.	REAM
37.	Safari
38.	Sash
39.	Satin
40.	Sofa
41.	Talcum
42.	Swahili
43.	Zircon
44.	Tariff

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#### ***Appendix D. The Yes and No Test (aural)***

In the Yes and No Test (aural) a list of the same 217 words used in the written version will be sequentially presented to you (participants). You have to declare whether you recognise each presented word by clicking on the designated “yes” button (i.e., right arrow) or “no” button (i.e., left arrow). You will be given 1.5 seconds to decide your answer on each presented word. If you are unable to decide on a word within 1.5 seconds, the programme will automatically display the subsequent word.

Nota bene: At the end of the Yes and No Test (aural), you will be presented with a list of French-English false cognate words you have recognised; then you will be asked to answer the following request command: “Recall the first meaning that comes into your mind when encountering these words. Please indicate if your comprehension of it is based on French or English”. To the right of each word, there will be two letters, F (for French) and E (for English). You will be required to click on the letter that represents your answer (F vs E) and the digitalised test will register the answer.

#### ***Appendix E. The UGJT.***

Sentences will be sequentially randomly presented in writing, one at a time on a computer screen in the. You will be asked to indicate if each sentence is grammatically correct or ungrammatical by selecting a designated box, G or UG for each sentence. Thirdly, you will be asked to indicate the degree of certainty of your decisions by choosing from a scale of one

to five, where five is “very certain”, four is “certain”, three is “quite certain”, two is “uncertain” one is a “complete guess”. Fourth, you will be asked to specify if your decision was based on “feel” or “rule”. Finally, you will be asked to correct a sentence if you judged it to be ungrammatical. The computerised UGJT will store your answers automatically.

The items used for this test are presented in the following table.

Nota bene: As a reminder to the reader, the same items used in the UGJT was used in OEITM.

*Items employed in the UGJT and OEITM***Table 5***Sentences Reflecting on the Potential of Negative Syntactic Transfer from Arabic into English*

Settings/Arabic Language Features	Ungrammatical sentences	Grammatical sentences
1) Verb precedes subject	1. I am encouraged because a good grade I had on the math exam. 2. Billions of comments I had on my Facebook post. 3. I am excited because positive corrective feedback I had on my article.	4. I am encouraged because I had a good grade on the math exam. 5. I had billions of comments on my Facebook post. 6. I am excited because I had positive corrective feedback on my article

- 
- |  |   |   |
|--|---|---|
| 2) Pronoun object included in relative clauses | 7. The Mercedes-Benz car that I drive it is 7000 years old.     | 10. The Mercedes-Benz car that I drive is 7000 years old.     |
|  | 8. The book that I am reading it is written by a famous writer. | 11. The book that I am reading is written by a famous writer. |
|  | 9. My girlfriend whom I love her lives in Berlin, Germany.      | 12. My girlfriend whom I love lives in Berlin, Germany.       |
- 
- |  |  |   |
|--|--|---|
| 3) The non-use of the verb “to be” when describing things in the present | 13. He happy because his father bought him a new pair of shoes                                 | 16. He is happy because his father bought him a new pair of shoes.                                |
|  | 14. They upset, because they forgot their backpack in the hotel in their last trip to the sun. | 17. They are upset because they forgot their backpack in the hotel on their last trip to the sun. |
|  | 15. She content, because her mother bought for her a new bicycle.                              | 18. She is content because her mother bought her a new bicycle.                                   |
-

**Table 6**

*Sentences Reflection on the Potential of Negative Syntactic Transfer from French into English.*

Settings/French Language Features	Ungrammatical sentences	Grammatical sentences
1) Wrong placement of object pronoun	19. I him asked to put the food on the round table in the kitchen.	22. I asked him to put the food on the round table in the kitchen.
	20. I him failed in the exam because all his answers were irrelevant.	23. I failed him in the exam because all his answers were irrelevant.
	21. I them admire because they donate money for poor people living on the moon.	24. I admire them because they donate money for poor people living on the moon.
2) A definite article is sometimes used for the proper noun of places.	25. I love the Switzerland because I spent my best vacation in Zurich.	28. I love Switzerland because I spent my best vacation in Zurich.

---

	26. I live in the Australia where the kangaroos are of 70 meters high.	29. I live in Australia where the kangaroos are 70 meters high.
	27. I admire the England because it is a friendly society.	30. I admire England because it is a very friendly society.
3) Wrongly using present perfect	31. Yesterday he has played baseball with his friends at the park	34. Yesterday, he played baseball with his friends at the park.
	32. One year ago my oldest uncle has bought a car 8000 years old.	35. One year ago, my oldest uncle bought a 8000 years old car.
	33. Last night I has sold my old guitar for two thousand dollars	36. Last night, I sold my old guitar for two thousand dollars.

---

***Appendix F. The OEITM.***

In this study you will be listening to sentences one at a time. a word of each sentence will be shown in the middle of the screen, and you (participants) are requested to click on the right arrow of the keyboard as quickly as possible upon hearing the word in the presented sentence. You will have a two-second gap between reading the word on the screen and hearing the sentence. Immediately after hearing the sentence, a question appeared in the middle of the screen: “Was the sentence you heard factually, correct?” you have to click the right arrow of the keyboard to indicate that the sentence presented is semantically correct and the left arrow to show that the sentence is semantically incorrect. You will be given three seconds to reach a decision. A countdown from three to one appeared in the centre of the screen. You will be asked to imitate the presented sentence within four seconds. Another countdown from four to one appeared in the centre of the screen. Your responses will be audio recorded. If you fail to produce the imitation in four seconds, the screen immediately will go blank, with the computerised OEITM moving onto the next sentence.

**Appendix G. Statistical results for grammatical transfer in UGJT, UGJT grammatical and UGJT ungrammatical**

Table 7 investigates participants’ grammatical transfer in UGJT, UGJT grammatical and UGJT ungrammatical

**Table 7**

*Results Investigating Participants’ Grammatical Transfer for UGJT, UGJT Grammatical and Ungrammatical*

UGJT	Scores on items designed to investigate PGT from Arabic into English (M; SD)			Scores on items designed to investigate NGT from Arabic into English (M, SD)			Scores on items designed to investigate PGT from French into English (M, SD)			Scores on items designed to investigate NGT from French into English (M, SD)		
	G A	GB	GC	G A	GB	GC	G A	GB	GC	G A	GB	GC
	(96.6; 9.6)	(81.9;15.7)	(83.17;16.2)	(96.66;5.3)	(87.3;10.1)	(93;12)	(88.8;17.3)	(71.1;14.8)	(87.3;13.7)	(86.6;13.6)	(77.7;16.8)	(84.4;15.6)
The Kruskal Wallis results: $H(2) = 34.4, p < .001$												
Mann-Whitney test Scores												
A vs B	$U=70.5, z=-2.9, p=0.003, d=1.13.$			$U=81, z=-2.7, p=0.006, d=1.16.$			$U=64.5, z=-3.09, p=0.002, d=1.1$			$U=117, z=-1.6, p=0.10, d= 0.58.$		
A vs C	$U=88.5, z=-2.4, p=0.013, d=1.01$			$U=158.5, z=-0.54, p=0.589, d=0.39.$			$U=153.5, z=-0.619, p=.536, d= 0.1.$			$U=166, z=796, p=0.79, d= 0.15$		
B vs C	$U=579.5, z= -0.39, p=0.690, d=0.07$			$U=384.5, z= -2.86, p=0.004, d=0.51.$			$U=264, z=-4.19, p < .001, d=1.13.$			$U=436, z= -2.21, p=0.03, d=0.41.$		

UGJT grammatical	Scores on items designed to investigate PGT from Arabic into English (M; SD)			Scores on items designed to investigate NGT from Arabic into English (M; SD)			Scores on items designed to investigate PGT from French into English (M; SD)			Scores on items designed to investigate NGT from French into English (M; SD)		
	GA	GB	GC	GA	GB	GC	GA	GB	GC	GA	GB	GC
	96.6, 9.6	81.9;15.7	83.17;16.2	-----	-----	-----	-----	-----	-----	88.88;17.3	71.11;14.8	87.3;13.7
The Kruskal Wallis results: $H(2) = 21.7, p < .001$												
Mann-Whitney test Scores												
A vs B	$U=70.5, z=-2.9, p=0.003, d=1.13.$			-----			$U=64.5, z=-3.09, p=0.002, d=1.1$			-----		
A vs C	$U=88.5, z=-2.4, p=0.013, d=1.01$			-----			$U=153.5, z=-0.619, p=.536, d=0.1$			-----		
B vs C	$U=579.5, z=-0.39, p=0.690, d=0.07$			-----			$U=264, z=-4.19, p < .001, d=1.13$			-----		
UGJT ungrammatical	Scores on items designed to investigate PGT from Arabic into English (M; SD)			Scores on items designed to investigate NGT from Arabic into English (M; SD)			Scores on items designed to investigate PGT from French into English (M; SD)			Scores on items designed to investigate NGT from French into English (M; SD)		
	GA	GB	GC	GA	GB	GC	GA	GB	GC	GA	GB	GC



## Appendix H. Statistical results for grammatical transfer in OEITM, OEITM grammatical and OEITM ungrammatical

Table 8 investigates participants' grammatical transfer for OEITM, OEITM grammatical and OEITM ungrammatical

**Table 8**

*Results Investigating Participants' Grammatical Transfer for OEITM, OEITM Grammatical and OEITM Ungrammatical*

OEITM	Scores on items designed to investigate PGT from Arabic into English (M; SD)			Scores on items designed to investigate NGT from Arabic into English (M; SD)			Scores on items designed to investigate PGT from French into English (M; SD)			Scores on items designed to investigate NGT from French into English (M; SD)		
	GA	GB	GC	GA	GB	GC	GA	GB	GC	GA	GB	GC
	90;12.2	58.4;17.3	87.9;11.5	96.7;7.4	78;15.3	82.8;16.2	93.3;14	58;18	69.2;19.2	88.88;11.7	53;11.7	88.2;10
The Kruskal Wallis results: $H(2) = 106.4, p < .001$												
Mann-Whitney test Scores												
A vs B	$U=25.5, z=-4.1, p < .001, d=2.1.$			$U=51, z=-3.4, p < .001, d=1.55$			$U=25.5, z=-4.1, p < .001, d=2.19$			$U=6.5, z=-4.6, p < .001, d= 3.0.$		
A vs C	$U=154, z=-0.6, p=0.545, d=0.18.$			$U=70, z=-2.9, p=0.003, d= 1.1$			$U=415, z=-2.3, p=0.019, d= 0.6$			$U=165.5, z=-0.27, p=0.785, d=0.06$		
B vs C	$U=107.5, z=-6.05, p < .001, d= 2.$			$U=508, z=-1.2, p=0.206, d=0.3.$			$U=415, z=-2.3, p=0.019, d= 0.6.$			$U=11.5, z= -7.1, p < .001, d= 3.23$		

OEITM	Scores on items designed to investigate PGT from Arabic into English (M; SD)			Scores on items designed to investigate NGT from Arabic into English (M; SD)			Scores on items designed to investigate PGT from French into English (M; SD)			Scores on items designed to investigate NGT from French into English (M; SD)		
grammatical	G A	GB	GC	G A	GB	GC	G A	GB	GC	G A	GB	GC
Scores	90;12.2	58.4;17.3	87.9;11.5	-----	-----	-----	93.3;14	58;18	69.2;19.2	-----	-----	-----
The Kruskal Wallis results H (2) =52.02, p <.001												
<i>Mann-Whitney test Scores</i>												
A vs B	U=25.5, z=-4.1, p <.001, d=2.1.			-----			U=25.5, z=-4.1, p <.001, d=2.19			-----		
A vs C	U=154 z=-0.6, p=0.545, d=0.18.			-----			U=415, z=-2.3, p=0.019, d= 0.60			-----		
B vs C	U=107.5, z=-6.05, p <.001, d= 2.0			-----			U=415, z=-2.3, p=0.019, d= 0.60.			-----		
OEITM	Scores on items designed to investigate PGT from Arabic into English (M, SD)			Scores on items designed to investigate NGT from Arabic into English (M, SD)			Scores on items designed to investigate PGT from French into English (M, SD)			Scores on items designed to investigate NGT from French into English (M, SD)		
ungrammatical	G A	GB	GC	G A	GB	GC	G A	GB	GC	G A	GB	GC
	-----	-----	-----	96.7;7.4	78;15.3	82.8;16.2	-----	-----	-----	88.88;11.7	53;11.7	88.2;10
The Kruskal Wallis results: H (2) =52.02, p <.001												
<i>Mann-Whitney test Scores</i>												
A vs B	-----			U=51, z=-3.4, p <.001, d=1.55			-----			U=6.5, z=-4.6, p <.001, d= 3.0.		
A vs C	-----			U=70, z=-2.9, p=0.003, d= 1.10			-----			U=165.5, z=-0.27, p=0.785, d=0.06		
B vs C	-----			U=508, z=-1.2, p=0.206, d=0.30.			-----			U=11.5, z= -7.1, p <.001, d= 3.23		

**Appendix I. Chi Square tests for grammatical tests**

**Table 9**

*Chi Square Tests for Grammatical Tests*

	Grammatical structures reflecting on the potential grammatical transfer from										Grammatical structures reflecting on the potential grammatical transfer from																			
	<i>Arabic into English</i>										<i>French into English</i>																			
	Verb precedes subject		Pronoun object included in relative clauses			The non-use of the verb “to be” when describing things in the present					Wrong placement of object pronoun			A definite article is sometimes used for the proper noun of places.			Wrongly using present perfect													
	<i>TS</i>	<i>TS</i>	<i>df</i>	$\chi^2$	<i>P</i>	<i>TS</i>	<i>TS</i>	<i>df</i>	$\chi^2$	<i>P</i>	<i>TS</i>	<i>TS</i>	<i>df</i>	$\chi^2$	<i>P</i>	<i>TS</i>	<i>TS</i>	<i>df</i>	$\chi^2$	<i>P</i>	<i>TS</i>	<i>TS</i>	<i>df</i>	$\chi^2$	<i>P</i>					
	(B)	(C)				(B)	(C)				(B)	(C)				(B)	(C)				(B)	(C)								
UGJT	142	174	4	22.7	.000	170	194	3	16.2	.001	188	200	4	5.5	.23	165	192	5	10.5	.06	171	172	4	5.2	.26	163	184	5	9.1	.1
UGJT	96	98	1	0.32	.56	84	94	2	8.8	.012	94	101	2	3.2	.19	81	89	2	3	.22	92	81	4	3.2	.35	83	92	3	2.6	.44
gram																														
UGJT	44	76	3	19.5	.000	86	100	2	9.02	0.011	93	99	2	2.1	.346	84	103	2	18.6	.000	79	91	3	9	.028	80	92	2	4.1	.124

ungram

OEITM	113	135	4	6.5	.159	158	163	5	5.19	.393	157	182	4	7.3	.119	128	180	4	29.4	.000	125	183	4	33	.000	98	191	5	52.3	.000
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OEITN gram	87	89	1	.229	.632	81	82	3	1.84	.605	77	90	2	5.4	.066	67	92	2	22.6	.000	72	89	3	8.8	.31	27.9	96.2	3	10.3	.016
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OEIM	26	46	3	5.85	.119	77	81	3	1.17	.758	80	92	2	.59	0.74	61	88	3	13.4	.004	53	94	2	36.8	.000	70	94.8	3	23	.000
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