

Processing and production of unique and non-unique-to-L2
syntactic structures: The case of English articles and tense-aspect

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Abstract

The L2 acquisition of English articles and tense-aspect (TA) have been popular research areas over the last two decades. Compared with the numerous applications of metalinguistic knowledge and oral production tasks, the use of online (real time) processing methods to investigate these morphosyntactic structures has been far less common. In perhaps the only eye-tracking study on L2 English article processing, Trenkic et al. (2014) showed that L1 Mandarin/L2 English learners are able to use articles in real time to resolve referent ambiguity in a similar manner to L1 English speakers. In one of the rare self-paced reading (SPR) studies on L2 English TA processing, Roberts and Liszka (2013) found that while L1 English and L1 French/L2 English speakers were sensitive to English present perfect violations, L1 German/L2 English speakers, whose first language grammaticalises tense but not aspect, were not. However, beyond these important findings, our understanding of the L2 online processing of these morphosyntactic structures remains limited.

To address these gaps, the present thesis tested 24 L1 Mandarin/L2 English, 22 L1 Croatian/L2 English and 24 L1 English participants on an SPR task and in oral production. The SPR task used novel article stimuli and TA items adapted from Roberts and Liszka (2013) to test (implicit) sensitivity to violations, while a grammaticality judgement task (GJT) on the same stimuli was used to ascertain participants' explicit knowledge. The comprehension data were triangulated with oral productions of English articles and tense elicited via an animated film retelling task.

A linear mixed-effects model analysis revealed that the participants' performance on both the SPR and oral production tasks was highly influenced by their L1. The findings lend support to the morphological congruency hypothesis (Jiang, Novokshanova, Masuda, & Wang, 2011) which posits that late L2 learners cannot fully acquire morphosyntactic features that are incongruent (realised differently or absent in the L1 and L2), which suggest several implications for further research.

Table of contents

Abstract	2
Table of contents.....	3
List of tables	8
List of figures	10
Acknowledgements.....	12
Author's declaration.....	13
Chapter 1: Introduction.....	14
1.1 The research context	14
1.2 The educational context	15
1.3 Outline of the thesis.....	17
Chapter 2: L2 acquisition of the English article system.....	19
2.1 Introduction	19
2.2 Nominal definiteness	19
2.3 Definiteness in English	21
2.3.1 Why does English need articles?.....	21
2.3.2 How many articles are there in English?.....	22
2.3.3 How does one choose the appropriate article?	23
2.4 Definiteness in Mandarin and Croatian	26
2.4.1 Does Mandarin have articles?	29
2.5 L2 acquisition of English articles	31
2.6 L1 Slavic learners of L2 English.....	34
2.7 L1 Mandarin learners of L2 English.....	36
2.7.1 Evidence from acquisition order studies	36
2.7.2 Evidence of L1 transfer	38
2.8 Accounting for variable L2 acquisition of articles	42
2.8.1 Prosodic Transfer Hypothesis	42
2.8.2 L1-L2 structural competition model	45
2.9 Limitations of previous studies into L2 article acquisition.....	47
2.10 Chapter summary	51
Chapter 3: L2 acquisition of English tense and aspect.....	52
3.1 Introduction	52
3.2 The encoding of time	53
3.2.1 Tense.....	54

3.2.2 Aspect	55
3.2.3 Present Perfect	59
3.3 L2 acquisition of tense-aspect	61
3.3.1 L2 acquisition of English past tense and present perfect	63
3.3.2 L1 influence	65
3.4 Limitations of previous research.....	69
3.5 Chapter summary	70
Chapter 4: Implicit and explicit knowledge.....	72
4.1 Introduction	72
4.2 Testing implicit knowledge	73
4.3 Testing explicit knowledge.....	76
4.4 L1 influence on L2 explicit/implicit knowledge.....	78
Chapter 5: Acquisition of unique-to-L2 syntactic structures	80
5.1 Introduction	80
5.2 L1 influence.....	81
5.3 Proficiency and immersion	85
5.4 Bottleneck Hypothesis	87
5.5 Summary	89
5.6 Rationale and research questions.....	89
5.6.1 Rationale for participant groups.....	90
5.6.2 Rationale for self-paced reading.....	90
5.7 Study 1: L2 online processing of English articles	91
5.8 Study 2: L2 online processing of English TA.....	92
5.9 Study 3: L2 spontaneous oral production of English articles.....	94
5.10 Study 3: L2 spontaneous oral production of English TA	95
Chapter 6: Methodology and methods.....	96
6.1 Introduction	96
6.2 Ethical considerations	96
6.3 Participants	97
6.3.1 L1 English participants	97
6.3.2 L2 English participants	97
6.4 Design of the comprehension tasks.....	98
6.4.1 Self-paced reading task.....	98
6.4.1.1 Stimuli design.....	99
6.4.1.2 Piloting	102
6.4.1.3 Material presentation.....	104

6.4.1.4 Preparation for analysis	105
6.4.2 Grammaticality judgement task	107
6.5 Design of the oral production tasks	110
6.5.1 English articles	110
6.5.2 English tense	116
6.5.3 Scoring	116
6.5.3.1 Scoring articles	117
6.5.3.2 Scoring tense	118
6.5.4 Intra and inter-rater reliability	119
6.6 Statistical analyses	120
6.6.1 Generalised Linear Mixed-Effects Models (GLMMs)	120
6.6.1.1 Normality	122
6.6.1.2 Outliers	123
6.6.1.3 Analysis	124
6.6.1.4 Reporting	125
6.7 Procedures	126
Chapter 7: Results of articles SPR and GJT (Study 1).....	129
7.1 GJT results	129
7.1.1 Indefinite article	129
7.1.2 Definite article	131
7.2 SPR articles.....	133
7.2.1 Indefinite article.....	133
7.2.2 Definite article	137
7.3.1	
7.3.2	
7.3	Articles discussion
7.3.1	
7.3.3	GJT results discussion
7.3.4	
7.3.4	SPR results discussion
	Indefinite vs definite article
	L1 effects.....
Chapter 8: Results of tense-aspect SPR and GJT (Study 2)	147
8.1 GJT results	147
8.1.1 Past Simple.....	147
8.1.2 Present Perfect	148
8.1.3 Present Simple	150
8.2 SPR results.....	152
8.2.1 Past Simple.....	152
8.2.2 Present Perfect	155

8.2.3 Present Simple	157
8.3 TA discussion.....	160
Chapter 9: Results of oral production tasks (Study 3).....	166
9.1 Introduction	166
9.2 Articles results.....	166
9.3 Article discussion	169
9.3.1 Indefinite article.....	169
9.3.2 Definite article	170
9.3.3 Articles in Mandarin?	171
9.3.4 Prosodic Transfer Hypothesis (PTH)	172
9.4 Tense results	173
9.5 Tense-aspect discussion.....	175
9.6 Chapter summary	177
Chapter 10: General discussion.....	179
10.1 Introduction	179
10.2 Discussion of RQ1.....	179
10.2.1 Introduction	179
10.2.2 L1 influence.....	180
10.2.2.1 Articles in Mandarin.....	180
10.2.2.2 L1 effects.....	182
10.2.3 Effects of immersion	184
10.3 Methodological implications and limitations	189
10.3.1 Limitations of self-paced reading	189
10.3.1.1 SPR limitations in the present thesis	189
10.3.1.2 Limitations of types of violations tested	191
10.3.1.3 Location of violation tested	193
10.3.2 Limitations of grammaticality judgement tests.....	195
10.3.2.1 GJT limitations in the present thesis.....	195
10.3.3 Limitations of oral production tasks	195
10.4 Chapter summary	197
Chapter 11: Conclusion	199
11.1 Summary of the study.....	199
11.2 Summary of the findings.....	199
11.3 Limitations and future research.....	202
11.4 Contributions of the study	203
11.4.1 ...to our understanding of L2 acquisition of English articles.....	203

11.4.2 ...to our understanding of L2 acquisition of English TA	205
11.4.3 ...to our understanding of L2 acquisition of unique-to-L2 structures.....	206
11.4.4 ...to the wider field of SLA.....	207
Appendix A	208
Appendix B	210
Appendix C	212
Appendix D	220
Appendix E.....	227
Appendix F.....	229
Appendix G	230
Definitions	242
References.....	243

List of tables

Table 2.1 Noun types in English based on Greenbaum and Quirk (1990)	22
Table 2.2 Types of articles according to number and countability properties of the noun	23
Table 3.1 Interaction between verb type and semantic dimension	56
Table 3.2 Grammatical aspect in English, Mandarin and Croatian	59
Table 3.3 Past marking at two stages of proficiency.....	64
Table 6.1 Summary of the language learners' linguistic background	98
Table 6.2 Changes to the item with low agreement in pilot.....	103
Table 6.3 Sample of list randomisation	104
Table 6.4 Number of participants per experimental list	104
Table 6.5 Comprehension questions accuracy scores by group	106
Table 6.6 Summary of all piloted tasks and their characteristics.....	112
Table 6.7 Story 1 pilot results.....	114
Table 6.8 Mean and range of words produced per narration and per participant group	117
Table 6.9 List of alternative words the L2 participants used to refer to referents	117
Table 6.10 Interrater agreement for oral production tasks	120
Table 6.11 Conditions and segments compared for article SPR data	124
Table 6.12 Conditions and segments compared for TA SPR data	125
Table 6.13 Effect size interpretation chart (based on Cohen, 1988)	125
Table 7.1 Mean GJT rating of the indefinite article in each condition by group.....	129
Table 7.2 Results of the overall model and comparisons for indefinite article by group	131
Table 7.3 Mean GJT rating of the definite article in each condition by group.....	131
Table 7.4 Results of the overall model and comparisons for definite article by group	132
Table 7.5 Mean RTs for the indefinite article per condition and segment for each participant group (SD in parentheses).....	133
Table 7.6 Results of the linear mixed-effects model analysis for indefinite article	136
Table 7.7 Mean RTs for the definite article per condition and segment for each participant group (SD in parentheses).....	137
Table 7.8 Results of the linear mixed-effects model analysis for definite article	139
Table 8.1 Mean rating of each condition on the GJT by group for past simple	147
Table 8.2 Results of linear mixed-effects model analysis of GJT results for past simple	148
Table 8.3 Mean rating of each condition on the GJT by group for present perfect	149
Table 8.4 Results of linear mixed-effects model analysis of GJT results for present perfect ..	150

Table 8.5 Mean rating of each condition on the GJT by group for present simple	150
Table 8.6 Results of linear mixed-effects model analysis of GJT results for present simple ...	151
Table 8.7 Mean RTs for past simple per condition and segment for each participant group (SD in parentheses).....	152
Table 8.8 Results of linear mixed-effects model analysis for past simple per segment	154
Table 8.9 Mean RTs for present perfect per condition and segment for each participant group (SD in parentheses)	155
Table 8.10 Results of linear mixed-effects model analysis for present perfect per segment..	157
Table 8.11 Mean RTs for present simple per condition and segment for each participant group (SD in parentheses)	158
Table 8.12 Results of linear mixed-effects model analysis for present simple per segment...	160
Table 9.1 Average attempts, accuracy and type of determiner supplied for the indefinite article.....	167
Table 9.2 Average attempts, accuracy and type of determiner supplied for the definite article	167
Table 9.3 Average percentage of attempts and accuracy of oral production of tense per group	174
Table 10.1 L1 Croatian L2 English immersion participants' background information	186
Table 10.2 Accuracy on the oral production task by group	189

List of figures

Figure 2.1 Reproduced from Trenkic (2009, p. 118)	20
Figure 2.2 Prosodification of articles in English and Turkish.....	42
Figure 2.3 Examples of stimuli from Kim and Lakshmanan (2008, p. 108)	49
Figure 3.1 Representation of time as a straight line	53
Figure 3.2 Division of time by tense and aspect (Ayoun & Salaberry, 2008, p. 558)	56
Figure 6.1 Example of item presentation in E-prime	105
Figure 6.2 Screenshots from 'Partly Cloudy' (Pixar Animation Studios), used as oral production task stimuli	115
Figure 6.3 Scatter plot of indefinite article GJT data showing normally distributed residuals	123
Figure 7.1 GJT rating of each condition for the indefinite article by group (error bars = SE) ..	130
Figure 7.2 GJT rating of each condition for the definite article by group (error bars = SE)	132
Figure 7.3 RTs of L1 English group for indefinite article (error bars = SE)	134
Figure 7.4 RTs of L1 Mandarin L2 English group for indefinite article (error bars = SE)	135
Figure 7.5 RTs of L1 Croatian L2 English group for indefinite article (error bars = SE)	136
Figure 7.6 RTs of L1 English group for definite article (error bars = SE)	138
Figure 7.7 RTs of L1 Mandarin L2 English group for definite article (error bars = SE)	138
Figure 7.8 RTs of L1 Croatian L2 English group for definite article (error bars = SE)	139
Figure 8.1 GJT rating of each condition for past simple by group (error bars = SE)	148
Figure 8.2 GJT rating of each condition for present perfect by group (error bars = SE).....	149
Figure 8.3 GJT rating of each condition for present simple by group (error bars = SE).....	151
Figure 8.4 L1 English group RTs for past simple (error bars = SE).....	153
Figure 8.5 L1 Mandarin L2 English group RTs for past simple (error bars = SE).....	153
Figure 8.6 L1 Croatian L2 English group RTs for past simple (error bars = SE).....	154
Figure 8.7 L1 English group RTs for present perfect (error bars = SE)	155
Figure 8.8 L1 Mandarin L2 English group RTs for present perfect (error bars = SE)	156
Figure 8.9 L1 Croatian L2 English group RTs for present perfect (error bars = SE)	157
Figure 8.10 L1 English group RTs for present simple (error bars = SE)	158
Figure 8.11 L1 Mandarin L2 English group RTs for present simple (error bars = SE)	159
Figure 8.12 L1 Croatian L2 English group RTs for present simple (error bars = SE)	159
Figure 9.1 Accuracy of article production by article type and group (error bars = SE).....	168
Figure 9.2 Accuracy of oral production of tense by participant group (error bars = SE)	175
Figure 10.1 Indefinite article RTs for non-immersion L1 Croatian group (error bars = SE)	187

Figure 10.2 Indefinite article RTs for immersion L1 Croatian group (error bars = SE)	187
Figure 10.3 Definite article RTs for non-immersion L1 Croatian group (error bars = SE)	188
Figure 10.4 Definite article RTs for immersion L1 Croatian group (error bars = SE)	188

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Author's declaration

I declare that this thesis, including all data presented in it, is original work and that I am the sole author. This work has not previously been presented for an award at this, or any other, University. All data collection and analysis were carried out by the author, Jelena O'Reilly, with the assistance of David O'Reilly, who helped score a portion of the oral production narratives. All sources used are acknowledged as references.

Chapter 1: Introduction

1.1 The research context

Research into how second language learners acquire grammar has been popular for several decades. One of the main findings of such research has been that not all aspects of grammar are equally easy to acquire. However, what makes certain aspects of grammar more difficult to acquire than others is still subject to debate. One of the factors that has been found to either facilitate the acquisition of second language (L2) grammar or make it more difficult is the participants' first language (L1). Previous research has shown that when a grammatical structure in the L2 is similar to a structure in the speaker's L1 it will be easier to acquire than when the L2 structure is different or absent in the L1 (e.g., Hawkins & Liszka, 2003; Jiang et al., 2011; Roberts & Liszka, 2013).

In order to better understand the acquisition of such unique-to-L2 grammatical structures, researchers have been particularly interested in how unique-to-L2 grammatical structures are processed in real time using methods such as eye-tracking, self-paced reading (SPR) and event-related brain potentials (ERPs). It is thought that such methods tap into learners' incremental and implicit processing of sentences beyond the learners' awareness or conscious control.

English articles are one of the grammatical structures that have been well-known to pose issues for L2 learners, especially those whose L1 does not grammaticalise markers of definiteness but rather relies on lexical and pragmatic cues (for a review see Trenkic, to appear). Considering that articles are absent from the majority of world's languages, such as Chinese, Japanese, Urdu, and most Slavic languages, a large number of L2 learners trying to become fluent in English (nowadays often essential as a lingua franca) are bound to struggle with acquiring English articles. However, surprisingly little is known about how L2 learners process articles in real time. Only one study to date has investigated articles using the eye-tracking paradigm (Trenkic et al., 2014), a couple of studies have used the SPR method but neither have been published in peer-reviewed publications (K. Kim & Lakshmanan, 2008; S. Kim, 2017), and no study has used ERPs.

In order to bridge this gap, the present thesis sought to conduct an SPR study into L2 processing of English articles by two groups of late¹ L2 learners whose L1 is said not to grammaticalise articles, Mandarin and Croatian. To get a better understanding of whether

¹ Late L2 learners refers to learners who are not early bilinguals (the L1 was spoken at home since birth) and who mainly acquired the L2 through classroom exposure in their L1 country.

other unique-to-L2 grammatical structures pose as much of a problem for L2 learners as English articles, the SPR study also investigated another grammatical structure that is absent in the said languages, namely the English present perfect. In addition to data collected about the participants' implicit knowledge of English articles and tense with the SPR method, the participants' explicit knowledge of the same structures was tested using a grammaticality judgement task.

Furthermore, the present thesis also collected oral production data from the same participants, since no study to date has investigated whether there is any relationship between how L1 Mandarin/L2 English and L1 Croatian/L2 English speakers produce and process English articles and tense.

In summary, the present thesis conducted three individual studies which aimed to address the following research questions (RQs):

- 1) Can late L2 English learners effectively produce and process L2 morphosyntactic structures that are realised differently in the learners' L1?
- 2) Does explicit knowledge of English articles differ between L1 English, L2 English/L1 Mandarin and L2 English/L1 Croatian speakers?
- 3) Are L1 English, L2 English/L1 Mandarin and L2 English/L1 Croatian speakers sensitive to article violations on the SPR task?
- 4) Does explicit knowledge of English TA differ between L1 English, L2 English/L1 Mandarin and L2 English/L1 Croatian speakers?
- 5) Are L1 English, L2 English/L1 Mandarin and L2 English/L1 Croatian speakers sensitive to TA violations on the SPR task?
- 6) How accurately do L1 Chinese and Croatian L2 learners of English produce the indefinite and definite article in obligatory contexts compared to L1 English speakers in spontaneous oral production?
- 7) How accurately do the L1 Chinese and Croatian L2 English learners mark verbs for past tense compared to the L1 English group?

1.2 The educational context

The educational context of the present study is twofold and relates to: a) how L2 learners are taught (aspects of) English grammar in their home countries, and b) the impact of living and studying in the UK on the acquisition of grammar.

Firstly, the participants in both L2 groups (L1 Mandarin and L1 Croatian learners of English) in the present thesis were late L2 learners, meaning that they acquired their

advanced proficiency (at the time of testing) mainly through classroom exposure in their home countries. Learning the rules of grammar seems to feature quite strongly in both China and Croatia and is often seen as the main aim of language acquisition and testing. However, there is evidence to suggest that such teaching methods do not always result in full understanding of the rules of grammar and their application in real life for the students. For example, Chan (2016) reports the Chinese learners of English who responded to her questionnaire found the lack of understanding/knowledge of the rules regarding the use of articles in English to be their main problem. In addition to articles, the English present perfect is another grammatical structure that can be difficult to acquire for L2 learners whose L1 does not have a similar structure, and is also difficult to teach. Fuchs et al. (2016) comment that teachers of L2 English often overemphasise the use of temporal adverbials (e.g., *since*) with present perfect, which often has consequences on the learner production.

However, teaching is often informed by what is presented in text books. Most of the popular text books for teaching English to adults (such as the English File published by Oxford) seem to deal with both articles and tense in English in a way that is not fully in accordance with the theoretical literature. For example, articles are often taught in terms of the types of nouns that they typically occur with, despite the fact such categorisations are full of exceptions and, thus insufficient as they ignore the very concept of definiteness which articles primarily mark (Trenkic, 2002c). Present perfect is also often presented in text books in a way that does not fully match the reality of its use. It is introduced with other tenses, and the concept of tense as opposed to aspect is never mentioned in relationship to either present perfect or other tenses. It is not being suggested that learners should be introduced to complex abstract concepts such as definiteness and aspect, but it seems that text books should not fully ignore concepts which are central to understanding the use of difficult grammatical aspects such as articles and present perfect.

Secondly, many of the world's major languages do not grammaticalise articles (e.g., Chinese, Japanese, Urdu, most Slavic and Baltic languages) and many also do not have a dedicated grammatical structure that denotes a past event with present relevance as the English present perfect (e.g. Chinese, most Slavic languages). This means that a very large number of L2 English speakers are likely to struggle in acquiring English articles as well as present perfect. This is especially true of the L1 Mandarin speakers of L2 English in the present study, and thousands of other Chinese university students in the UK. The UK Council for International Affairs (2017) reports that in the academic year 2016/17 Chinese students exceeded any other non-UK nationality studying at a UK university (roughly 95, 090 Chinese

students) and this number has risen by 14% since 2012/13. Chinese students studying for a higher degree in the UK are expected to be of certain proficiency level and fluency. However, articles and present perfect are known to be persistent problems even at advanced proficiency levels. With the numbers of Chinese and students of other non-UK nationalities continuously on the rise, it is important to advance our understanding of how such difficult grammatical structures are processed and produced. It is also important to better understand, which conditions (e.g. immersion, proficiency) facilitate the full acquisition of difficult and unique-to-L2 grammatical structures.

1.3 Outline of the thesis

Chapter 2 presents a review and critique of the relevant literature on second language (L2) article acquisition. This critical review informs the design of this part of the thesis and forms the basis for the discussion of results in later chapters. The chapter first establishes what nominal definiteness is and how it is realised in English, Mandarin and Croatian. Next, typical patterns of L2 article acquisition by L1 Mandarin and L1 Croatian learners of English are presented, and the claim that Mandarin is on a path of grammaticalising some of its markers of definiteness is discussed. The chapter concludes with a summary of the limitations of previous research.

Chapter 3 presents the second literature review, which critiques research into L2 English tense-aspect (TA) acquisition, informs the design for this part of the thesis, and grounds the subsequent discussion of the results. The chapter looks at how tense and aspect are encoded in English, Mandarin and Croatian, and how differences between the three languages might pose a problem for the L2 English participants in the present thesis. Potential causes of L2 difficulty with the English TA system (e.g., L1 influence) are then discussed, and the chapter closes by drawing together the main limitations of previous research.

Chapter 4 presents the bigger issue addressed in the present thesis, namely how L2 learners acquire unique-to-L2 morphosyntactic features (in this case English articles and TA). The effects of L1 transfer, proficiency and immersion are discussed as potential factors in how well unique-to-L2 morphosyntactic features can be acquired by late L2 learners. The chapter concludes with the research questions for each of the three individual studies in the present thesis.

Chapter 5 presents the methodology, outlining the rationales for various decisions, such as the choice of participants and the design of the tasks. Detailed information is

provided about how the self-paced reading (SPR), grammaticality judgement task (GJT) and the oral production tasks were designed and prepared for administration and analysis. The chapter also includes other relevant information about how the data were analysed and reported.

Chapter 6 is the first of three results and discussion chapters and presents the results of the study into online L2 comprehension of English articles. In order to answer research questions 2 and 3, the results of the SPR and GJT tasks are reported and discussed in relation to previous literature. Chapter 7 presents the results of the SPR and GJT tasks into online L2 comprehension of English TA, which address research questions 4 and 5. Chapter 8 is the final results chapter and presents findings on the L2 oral production of English articles and tense, corresponding to research questions 6 and 7.

Chapter 9 presents the overall discussion of the results, first focusing on the methodological implications and limitations of the SPR, GJT and oral production tasks used. Next, the findings are discussed in relation to research question 1 (RQ1) which asked whether late L2 learners can fully acquire unique-to-L2 morphosyntactic features. Finally, the potential immersion effects are discussed. The thesis concludes with Chapter 10, which summarises the main findings, identifies several limitations, sets out potential directions for future research, and considers its key contributions to the field of second language acquisition research.

Chapter 2: L2 acquisition of the English article system

2.1 Introduction

To date, numerous studies have shown that the acquisition of the English article system poses a problem for second language (L2) learners of English whose first language (L1) does not grammaticalise definiteness in the form of articles as English does (Avery & Radisic, 2007; Ekiert, 2004; Li, Yang, & Haiyan, 2010; Snape, 2007; Trenkic, 2007; Trenkic & Pongpaioj, 2013). Although speakers of all languages have tools to express the definite status of a referent - a referent that is mutually manifest to the speaker and hearer at the time of utterance (Hawkins, 1991) - many languages do not require this to be grammatically marked, as it is in English.

L2 learners whose L1 does not have an overt article system, such as Mandarin Chinese (henceforth Mandarin) or Croatian, not only need to acquire the semantic meaning of articles (to mark definiteness) but also need to learn that certain noun phrases (NPs) have to be preceded by an article even when the article seems communicatively unnecessary. This dual role of English articles seems to be at the heart of the learnability problem for many L2 speakers of English (Trenkic, to appear).

This chapter first looks at how English, compared to Mandarin and Croatian, marks definiteness, and the role of determiners (including articles) in all three languages. Finally, common L2 learner errors in English article acquisition and production are discussed, and limitations of existing research are identified.

2.2 Nominal definiteness

Nominal definiteness (henceforth definiteness) refers to whether a referent is identifiable within discourse. A definite referent is one that the speaker intends to refer to but is also uniquely identifiable to the hearer (Hawkins, 1991; Trenkic, 2009) If the referent cannot be uniquely identified it is considered indefinite. To illustrate this, Trenkic (2009) uses the example of a speaker and a hearer standing in a kitchen making tea, for which they need mugs. There are several mugs available, one of which is red, but several mugs are blue. If an English speaker wanted a red mug they might say (p. 118):

1. Pass me *the red mug*, please.

Or if they wanted a blue mug:

2. Pass me *a blue mug*, please.



Figure 2.1 Reproduced from
Trenkic (2009, p. 118)

In (1), “the mug” is a definite referent because the speaker intends it, refers to it, and knows that the hearer will be able to uniquely identify it, because it is the only red mug that both the speaker and hearer can see in this situation. The definite status of the referent is marked with the definite article *the*. On the other hand, in (2) the conditions for definiteness have not been met since more than one object meets the referent specifications (there are several blue mugs), and therefore, any one of the blue mugs that the hearer passes to the speaker will do.

Definiteness can be inferred by various means: determiners, adjectives, visual environment, and world knowledge. Determiners are a word class which modify NPs, and the most common forms used for encoding definiteness are articles (*a/an, the*), and demonstratives (*this, that*) (Trenkic, to appear). One of the primary functions of determiners is to determine (hence the name) the type of reference a noun has. For example, in (3), below, the article signals a noun and its definiteness status, and in (4) the demonstrative establishes in what spatial relation the referent and the speaker are (*this mug* is spatially closer to the speaker than *that mug*).

3. A/the mug

4. This/that mug

Additionally, adjectives also help establish a referent. In (1) and (2) the adjectives expressing colour (red and blue) help the hearer identify the referent as quickly as possible. Reference can also be established through the visual environment, and the fact that the hearer can see either one red mug or several blue mugs will help them constrain referential domains in order to identify the referent without delay. Finally, our knowledge of the world also helps establish reference. In a sentence such as *The Queen of England likes tea*, the definite status of the referent *queen* is not only established through the definite article, but

also through our knowledge that usually there is only one queen per country (i.e., even without the definite article the definite status of the referent would be apparent).

Articles, therefore, are just one means of signalling the (in)definite status of a referent, and due to the multiple probabilistic cues available to speakers of a given language to identify a referent, most languages do not grammaticalise articles in order to express this semantic concept (Lyons, 1999). In purely pragmatic terms, articles are redundant (Trenkic, 2009).

The question that then arises is *why do some languages use articles (i.e., grammaticalise markers of definiteness), while other languages can do without them?* The next section first looks at how and why articles developed in English, and their usage, which is followed by an overview of how two article-lacking languages, Mandarin and Croatian, express definiteness and how this differs to English.

2.3 Definiteness in English

2.3.1 Why does English need articles?

According to Hawkins (2004) languages occasionally go through a process of grammaticalisation by which a lexical element progresses into a grammatical one, or one grammatical form shifts to another grammatical form. Such is the case in English with the definite article *the*, and the indefinite article *a*. Grammaticalisation entails a “weakening in both form and meaning” (Hawkins, 2004, p. 80) which is observable with English articles. The definite article *the* developed from demonstratives *this/that* and is phonologically reduced in comparison. Similarly, the indefinite article *a* is both a phonologically and form-wise reduction of its predecessor, the numeral *one*.

The need for articles in English is a result of a systematic loss of case inflection. In languages with rich inflections, as old English was, different types of meaning (mood, definiteness, relationships between words in a sentence) are expressed by changing the actual word (Crystal, 2005). Nowadays, English has lost many of its inflections, retaining only a few, such as plural *-s* (e.g., *cats*). As a result of loss of inflection, English has developed a rather strict word order.

The loss of case inflections, and as a result the more rigid word order, have made it less efficient to process NPs in a sentence, thus creating a need for articles. This need for articles has been further established because English vocabulary allows the option that the same word is a verb and a noun (*to book* vs. *a book*), so using articles signals that a noun will follow, allowing the comprehension to proceed without delays. In this way a hearer can

start processing a sentence (i.e., understand who/what it is about) before the end of the sentence, instead of having to wait for the speaker to finish the sentence (Trenkic, 2009). Therefore, in addition to signaling definiteness, the main role of articles is to signal a nominal phrase (Hawkins, 2004). However, whether a speaker’s choice will be the definite or the indefinite article, or to omit an article entirely, depends on a number of conditions. These are discussed in the next section.

2.3.2 How many articles are there in English?

Most grammar books classify English articles according to the noun type that they typically occur with. English distinguishes between common nouns, which can be countable or uncountable, and proper nouns as in Table 2.1 (Greenbaum & Quirk, 1990). Countable nouns are also called “unit words” and can take any article, while uncountable nouns are “mass words” which typically do not occur with the indefinite article or in plural form. Nouns in English can also be divided into generic and non-generic nouns, depending on whether they refer to all members of a group (generic) or individual members of a group (non-generic).

Table 2.1 Noun types in English based on Greenbaum and Quirk (1990)

Nouns	Common	countable	concrete (e.g., pig)
			abstract (e.g., difficulty, remark)
		noncount	concrete (e.g., butter, gold)
			abstract (e.g., music)
Proper (e.g., John, Paris)			

The authors distinguish three articles in English: definite *the*, indefinite *a(n)* and zero \emptyset . The definite article is said to mark an NP as definite which means that it is uniquely identifiable for the speaker and the hearer through their shared knowledge. It is not limited to countability and numbers, and is usually used with non-generic nouns, although exceptions exist (Master, 1997). The indefinite article is said to be used when a referent cannot be uniquely identified and thus, it commonly occurs with referents introduced into the discourse as new (Greenbaum & Quirk, 1990), usually occurs with singular countable nouns, and is the second most often means of describing a generic noun (a *type* of something) (Master, 1997).

Table 2.2 Types of articles according to number and countability properties of the noun

Number		Countability	
		Count	Noncount
Singular	definite	the book	the music
	indefinite	A book	music
plural	definite	the books	/
	indefinite	books	/

Chesterman (2005) proposes that the zero article is comprised of two distinct forms – the zero article and the null article. The zero article accompanies countable plural and mass nouns, while the null article comes with countable singular nouns.

The main criticism of this approach - classification of articles according to the noun type they most commonly occur with - has been that there are many exceptions to the rules. Thus, such approaches tend to fail in explaining the totality of article use, and instead provide a list of rules with an even longer list of exceptions (Trenkic, 2002c). Consequently, it is unsurprising that language learners are often unable to fully grasp when and why English articles are used.

The problems identified above suggest that a different approach is necessary to explain the conditions under which either the definite or the indefinite article should be chosen to signal referents in discourse.

2.3.3 How does one choose the appropriate article?

As demonstrated in the previous section, the approach of categorising nouns into classes from which the appropriate article can be chosen, seems to be fraught with exceptions and, thus, difficulties, especially for language learners. As Trenkic (2002c, p. 63) points out “nouns do not belong to classes, rather the contexts they appear in do. It is the likelihood of a noun appearing in certain contexts that classifies it as a proper and common, or count and noncount”. In other words, the decision about whether a referent requires a definite, indefinite or no article is not determined solely by the class of the noun. Rather, as Hawkins (1991) proposes, the definite or indefinite article is chosen based on whether an entity is uniquely identifiable within its pragmatically delimited set (P-set, discussed below).

Central to Hawkins (1991) notion of definiteness are the concepts of existence and uniqueness.

5. The professor is drunk.
6. A professor is drunk.

(examples from Hawkins, 1991, pp. 406-407)

In both examples (7) and (8), the conditions of existence are met since there is a professor, and both satisfy the requirement that the individual is drunk. But for the definite article to be used, the condition of uniqueness also has to be met (i.e., there is only *one* professor). The condition of uniqueness has been met in example 7, resulting in the choice of the definite article, while in example 8 the condition of uniqueness has not been met, since at least one individual needs to be drunk, but there could be more than one. Uniqueness of a referent is established “as long as the previous discourse set shared with the current interlocutor contains only one individual satisfying the description *professor*” (Hawkins, 1991, p. 408).

Uniqueness, in Hawkins’s account is relativised to the context of utterance, which consists of a number of pragmatically delimited sets (P-sets) which determine the boundaries of an entity (J. A. Hawkins, 1991; Trenkic, 2002c). In Hawkins’ words, they are “sets that define the pragmatic parameter for uniqueness of definite descriptions” (1991, p. 409). In other words, whether an entity denotes a definite context will be based on the relationship of that particular entity with other entities within a given P-set and other P-sets.

Uniqueness can also be established on the basis of shared mutual (world) knowledge. If one asks *who is the professor?* (Hawkins, 1991, p. 409), the choice of the definite article, even in first-mention situations, is justified because there is a shared understanding that all classes at university include a professor.

Another condition for the choice of the definite article is existence. A speaker might say (Hawkins, 1991, p. 408):

7. Pass me the bucket.

In this case, the physical location of the entity will define a clear context, meaning the hearer will know which bucket to give to the speaker and will not be confused by the existence of other buckets.

Furthermore, the definite article can be also used in situations when the P-set can be inferred from adding additional information to the NP. One way of adding information to the NP is by introducing a relative clause, as in (Hawkins, 1991, p. 410):

8. Pass me the bucket which is over there.

P-sets can also be extended to accommodate the introduction of new P-sets when

there is no prior shared knowledge between the speaker and the hearer (Hawkins, 1991, p. 410):

9. Go and get the dog in my car.

Although the hearer does not have previous knowledge of the dog in the car, the speaker nevertheless expects the hearer to accept the new entity and to extend the P-set in order to include it.

Hawkins (1991) also notes that the indefinite article is somewhat more ambiguous than the definite article, due to various possibilities of interpretation. *A/an* is not the direct opposite of *the*, but rather the choice of the indefinite article is also governed by whether *the* could have been used instead. When the criteria for *the* have not been met, the indefinite article is used instead. Consider (Hawkins, 1991, p. 417):

10. I met a professor yesterday.

The choice of the indefinite article seems to imply that *a/an* is used when an entity is not mutually manifest in the particular P-set in question.

Furthermore, interpretations of the indefinite article are claimed to be more flexible, in the sense that their meaning can be changed by adding additional information to the NP. This can be done by either altering the linguistic/situational context or by adding a clause that cancels out previous possible meanings. One might, for example, come across a sentence like this in an American newspaper (Hawkins, 1991, p. 418):

11. *A senator resigns.*

Although part of a specific P-set, *a senator* is still a non-unique entity within this set, due to the fact that a country usually has more than one senator and from this sentence it is not clear which particular senator it is. However, if the entity contained uniqueness within its P-set, the definite article would have to be used. We can expand the sentence in (13) by saying *A senator resigned, not a US one, but a senator in Japan*, thus eliminating the interpretation that it is a US senator that is being talked about.

Finally, the indefinite article is sometimes used to refer to a unique member of a P-set and such entities should normally be marked by the definite article. However, if indeed the definite (rather than indefinite) article is used instead, the meaning changes (Hawkins, 1991, p. 420):

12. England has a prime minister and America has a president.

13. England has the prime minister and America has the president.

The sentence with the definite article (rather strangely) implies that England has the prime minister of some other country, possibly against his or her will.

To summarise Hawkins' (1991) approach, the choice between the definite and the indefinite article depends on the interpretation of uniqueness. An entity is not unique when there is more than one of the same entity in a given P-set. In such a case when an entity is not unique within its P-set, the indefinite article will be used. On the other hand, when an entity is unique within its P-set, the definite article will have to be used.

One weakness of this account is that it predominantly concerns overt articles in English with very little reference to situations in which no article is required, and non-referential and generic uses of English articles. In response to this criticism, Trenkic (2002c) argues that there is no need for the zero and null article distinction (Chesterman, 2005; Greenbaum & Quirk, 1990; Master, 1997), since both the zero and null articles are not forms, but rather empty spaces. Instead Trenkic proposes that bare nominals in English (e.g., bare mass nouns, proper names) are, just like bare nominals in article-lacking languages, neither definite nor indefinite. These can be interpreted as either definite or indefinite based on the context.

2.4 Definiteness in Mandarin and Croatian

Unlike English, Mandarin and Croatian² belong to languages that do not overtly mark (in)definiteness through the use of an article system. Instead, these languages infer the status of the referent from context or use word order and other determiners, although these are not obligatory in the same way as in English. For example in Croatian, the status of a referent is inferred from context as in (16) (example from Trenkic, 2000, p. 66), where both the speaker and a hearer would understand that the bare NP *prozor* refers to one of the windows (unidentifiable) in the speaker's house, and is thus indefinite.

14. Moram brzo kući, ostavila sam otvoren prozor!
must-1SG quickly home left-1SG open window

² References to the Croatian language also include Serbian, Bosnian and Montenegrin – languages that are mutually intelligible and share very similar grammatical structures (the grammatical structures in question in this thesis are all identically realised in these languages).

'I have to rush home, I left a window open!'

As topic-prominent languages, both Mandarin and Croatian use word order to express (in)definiteness. Central to the use of word order as an expression of definiteness, is the notion of *theme* and *rheme*. A subject in the *theme* position appears in the first part of the sentence and represents what the sentence is about, while a subject in the *rheme* position appears in the final part of the sentence and comments on the *theme*. The *theme* carries the given information, while the *rheme* carries new information. Thus, the preverbal theme is interpreted as definite, while the postverbal rheme is interpreted as indefinite (Díez-Bedmar & Papp, 2008; Hedberg, 1996; Pranjko, 2000; Zergollern-Miletić, 2014). In the Croatian example in (17) the noun *žena* is in the theme position and is interpreted as definite, while in (18) *žena* is in the rheme position and is interpreted as indefinite (Trenkic, 2000, p. 92).

15. žena je izašla iz kuće.
 woman is came from house
 'The woman came out of the house. '

16. Iz kuće je izašla žena.
 from house is came woman
 A woman came out of the house.

However, this word order is not obligatory and it is very easy to find examples of indefinite interpretations in theme positions and vice versa, which suggests that word order cannot be taken as a reliable cue for differentiating (in)definite referents in Croatian (Trenkic, 2004).

In Mandarin, a bare noun in the object position (*rheme*) can be both definite and indefinite, while NP sequences in which the noun in the object position is preceded by a classifier-noun (CI-N) or a numeral-CI-N are interpreted as indefinite (Hall, 2016). By contrast, a noun in the preverbal subject position (*theme*) is restricted to definite interpretations. Such nouns can appear bare (19a) or with a demonstrative (19b), which is interpreted as unambiguously definite in this position (Hall, 2016, p. 32).

17. a. gou chi-le dangao
 dog eat-LE cake
 'The dog ate the cake'

b. nei-zhi gou chi-le dangao
 that-CL dog eat-LE cake
 'That dog ate the cake'

Furthermore, both languages make use of various determiners to express (in)definiteness. In Croatian, the indefinite pronouns (*no one, anybody*, etc.) signal indefiniteness, and also include the numeral *one (jedan)* as in (20) (PranjkoVIC, 2000, p. 347).

18. Jucer sam sreO (*jednu*) zenu.
 yesterday am met (one) woman
 'Yesterday I meet one/a woman.'

Similarly, in Chinese the numeral *one (yi)* can also serve as a marker of indefiniteness (Chen, 2004, p. 1160).

19. Zhe jian shi wo zuotian qing le (*yi*) ge ren lai.
 this CL issue I yesterday invite PFV (one) CL person come
 'For this issue I invited one/a person here yesterday.'

In Mandarin the numeral *one (yi)* is usually accompanied by a classifier, and this combination can serve as both a pronominal and a determiner. Chen (2004) claims that the combination serves all major function of the English indefinite article, as well as other uses not usually found in English.

Furthermore, demonstratives (type of determiners) such as *this* and *that* can be used to express definiteness, as in Croatian (22) and Mandarin Chinese (23).

20. Daj mi tu knjigu.
 'Give me the/that book.' (Zergollern-Miletić, 2014, p. 158)

21. Qing ba zhe/na zhang yizi ban dao na jian fangjian qu
 Please BA this/that CL chair move to that CL room go
 'Please move this/that chair to that room.' (Chen, 2004, p. 1151)

In Mandarin, the use of the demonstratives is less restricted than in English, and demonstratives are also used in contexts in which in English only the definite article would be allowed (Chen, 2004). However, the primary function of demonstratives is not to mark definiteness (neither in Croatian nor Mandarin), and demonstratives are not obligatory and cannot be considered equivalent to English articles (Trenkic, 2004).

In addition, in Croatian, but not in Mandarin, it is also possible to use adjectival aspect to express (in)definiteness (Znika, 2006). The definite adjective is realised through the suffix *-i* (25) while the indefinite adjective remains suffix free (24) (Silic & Pranjko, 2007, p. 134):

- 22. Visok stol
 a high table

- 23. visok-*i* stol
 the high table

The definite adjective answers the question *which one?* as opposed to the indefinite adjective which answers the question *what is it like?*. Therefore, the indefinite aspect of adjectives provides information about transient/temporary properties of nouns (e.g., a nice day), while the definite aspect of adjectives is used to differentiate between several referents with different stable properties (Baric et al., 1997). However, like with all other markers of definiteness in Croatian, adjectival aspect is not obligatory. In fact, research has shown that adjectival aspect has been lost in modern Croatian, and does not seem to have any communicative value anymore (Zergollern-Miletić, 2014).

In summary, like all languages, both Mandarin and Croatian have a variety of tools to express the (definite) status of a referent in discourse, but none of them are obligatory.

2.4.1. Does Mandarin have articles?

In Croatian, all markers of definiteness carry only semantic meaning and are syntactically optional, and as such cannot be considered an equivalent of the English article system (Trenkic, 2004; Zergollern-Miletić, 2014). In Mandarin, on the other hand, there is an ongoing debate as to whether the demonstratives *zhèi* (*this*) and *nèi* (*that*), and the numeral *yī* (*one*) are beginning to take on some functions of the English definite and indefinite articles respectively (Crosthwaite, 2014; Díez-Bedmar & Papp, 2008; Hedberg, 1996; Huang, 1999).

In terms of definiteness marking, several studies have identified that in modern Mandarin Chinese, the demonstratives *zhèi* (26) and *nèi* (27) have started to take on some functions of the English definite article (Li & Thompson, 1987). According to Chen (2004), these demonstratives have started on a path of grammaticalisation, but the process is far from finished.

24. zhèi - *ge ren*
 this - CL person
 ‘this person’

25. nèi - *zhang zhi*
 that - CL paper
 ‘that sheet of paper’

In addition, Huang (1999) claims that the distal demonstrative *nage* functions as a marker of definitiveness, especially when it occurs in a non-topic position in a sentence.

26. Shangdi ye fenguang *nage* Lisu jianghua
 God also crazy that PN talk

Example 28 is a part of a conversation in which the speaker says “Yeah. And then all the time he wanted Xuejie to copy the way Lisu talks in the film *God is crazy*.” (Huang, 1999, pp. 83–84). Here the speaker assumes the referent Lisu introduced by the distal *nage* is familiar to the hearer, through either shared knowledge or the fact it has already been evoked. In support of this claim, Huang (1999) reports that in her analysis of ten conversations and radio interviews with L1 Mandarin speakers, 46.7% of all lexical NPs were marked with *nage* to signal identifiability.

In terms of indefiniteness markers, there is also some evidence that the numeral *yi* (*one*) + classifier (29) severs some of the functions of the indefinite article in English (Chen, 2004; Hedberg, 1996).

27. yi - ke shu
 one - CL tree
 ‘a tree’

This construction serves all major functions of the English indefinite article, but it also has several other uses beyond the English indefinite article. According to Crosthwaite (2014), discourse new information can be marked by this construction, and although optional, it is preferred for introducing discourse new referents and the construction is frequently used for this purpose.

Furthermore, Jenks (2018) claims that demonstratives play a central role in expression of definiteness and anaphoric NPs must include a demonstrative determiner as illustrated in example (28) (Jenks, 2008, p. 510). In (28) once the boy and girl have been

introduced in the first part of the narrative, not using the determiner (in bold) when referring to the boy again would be considered infelicitous.

28. Jiaoshi li zuo-zhe yi ge nansheng he yi ge nusheng.
 classroom inside sit-PROG one CLF boy and one CLF girl
 'There are a boy and a girl sitting in the classroom.'
 Wo zuotian yudao #(na ge) nansheng.
 I yesterday meet that CLF boy
 'I met the boy yesterday.'

However, Mandarin does accept bare nouns as definite if they are interpreted as unique as in example (29) (Jenks, 2018, p. 506).

29. **Guo** yao guo malu.
 dog want cross road
 'The dog(s) want to cross the road.'

This means that Mandarin accepts bare nouns in contexts where English would require a definite article.

In summary, there are contexts in Mandarin in which an article or a determiner is not necessary and bare nouns are acceptable. However, certain elements are being used with higher frequency to premodify nouns and according to some authors have started on a path of grammaticalization.

2.5 L2 acquisition of English articles

The acquisition of English articles by L2 learners from article-lacking backgrounds has been shown to have several typical characteristics.³ Firstly, it has been well documented in the literature that L2 learners of English often produce the definite article better than the indefinite article,⁴ and secondly, that the definite article is overused in the indefinite context. Thirdly, such learners tend to omit articles frequently, and the omission errors are higher in certain contexts.

³ The present thesis is only concerned with non-generic referential use of articles specifically focusing on countable singular nouns. Therefore, only the literature focusing on such nouns will be discussed in the coming sections. L2 article use with other types of nouns may be mentioned in passing, particularly in relation to studies that focused on L2 article use with multiple noun types.

⁴ The asymmetry in the accuracy between the indefinite and definite article has also been found with L2 learners whose L1s have articles, and sometimes even with native speakers.

Better production of the definite compared to the indefinite article has been observed with both L1 Slavic and L1 Asian speakers of English on metalinguistic tasks as well as in written and oral production. For example, Ekiert (2004) tested 20 Polish English as a Foreign Language (EFL) and English as a Second Language (ESL) learners on fill-in-the-gap task in which the participants were asked to insert an article as necessary. Both groups supplied the articles with higher accuracy in the definite as opposed to the indefinite context. Swiatek (2013) also tested Polish learners of English (60 learners divided into three proficiency groups) on a gap-fill task, and found first mention referents (indefinite) were significantly less accurately supplied than second or subsequent referents (definite).

Studies using translation tasks have observed the same pattern. Three studies, Trenkic (2002b), Ekiert and Han (2016), and Zugic (2013) employed a translation task in which the participants were asked to translate a story (or several stories) from their L1 into English. Trenkic tested L1 Serbian learners of English at four proficiency levels (beginner to advanced), while Ekiert and Han tested advanced participants of mixed Slavic L1s, and Zugic tested advanced Montenegrin university students. All three studies found their participants to supply the definite article more consistently than the indefinite article. In addition, Trenkic, as well as Zugic, observed that the definite article tended to be overused, often appearing in contexts where a(n) or zero article is required, also referred to as '*the flooding*'.

Furthermore, Lee (2013) and Pylypenko and Alexopoulou (2018) discovered the same pattern in written production. Lee tested L1 Korean learners at three different proficiency levels who were asked to write a personal narrative. The results show that all three proficiency groups produced the indefinite article less accurately. Pylypenko and Alexopoulou (2018) also utilised the written paradigm, but analysed corpus data of 80 essays written by L1 Russian learners at different proficiency levels. Although the aim of the study was to analyse the use of articles with both generic and non-generic nouns, the overall results suggest that the definite article was more accurately produced across all proficiency levels.

Finally, support for the observed asymmetry is also found in studies testing oral production of articles. Avery and Radisic (2007) asked five advanced L1 Serbian learners of English to tell a story based on a series of pictures. The findings showed that the definite article was supplied far more correctly than the indefinite article. Also, the results of the map task from Trenkic (2000) with L1 Serbian learners of English at different proficiency levels show that even the highest proficiency group (advanced) tested in the study had few problems supplying the definite than indefinite article. Similar findings were also observed

in Snape (2009) who tested L1 Mandarin learners of English on a picture description task.

In addition to better suppliance of the definite article, another pattern of L2 article production that has been observed in the literature is the overuse of the definite article in indefinite contexts, also called ‘flooding’. Several studies show that the indefinite article tends to be less frequently omitted but is rather often substituted by the definite article. This has been found especially in production of target forms, but also in responses to metalinguistic tasks. Trenkic (2002a) tested L1 Serbian learners of English on a translation task and found that *the* flooded the indefinite context, especially with concrete singular nouns. A similar pattern was found in Leroux and Kendall’s (2018) interview corpus data of L1 Chinese L2 English learners. Leroux and Kendall (2018) suggest that the reason for the flooding pattern is a strategy on the part of the learners for increasing their accuracy rates of articles in production. The definite article has a wider use and as such can be interpreted as accurate with more noun types than the indefinite article. Thus, using it even when one is uncertain gives the learner a better chance of the article being accurate.

Finally, L2 learners from article-lacking backgrounds also frequently omit articles. This has been observed with both L2 English learners from Slavic L1 backgrounds (for a more in-depth discussion of L1 Slavic learners see next section) and L1 Asian L2 English learners, including Korean (Lee, 2013), Japanese (Snape, 2007), and a mix of languages (Murakami & Alexopoulou, 2016). However, these patterns of omission are not random, as omission errors tend to be more frequent in structurally more complex NPs (for a review see Trenkic, to appear). Thus, for example, there are higher omission rates with nouns that are premodified by an adjective (Sharma, 2005; Trenkic, 2002a, 2004, 2007) and with subsequent mentions of a referent (Avery & Radisic, 2007; Pongpairroj, 2015; Robertson, 2000; Trenkic, 2000). Trenkic (2009; to appear) explains that such referents are more salient (activated) and as such are perceived to be more obviously definite, making them more pragmatically redundant in discourse. This, in turn, lowers the need for such referents to be marked as definite in discourse, which leads to more omissions. This notion of referent salience is further discussed within the scope of the structural competition model in section 2.8.2.

While Slavic learners of L2 English consistently show the patterns illustrated above, there is evidence that L1 Mandarin learners do not always show patterns of article acquisition similar to L1 Slavic learners or other L1 Asian languages such as Korean or Japanese. Section 2.6 discusses typical pattern of article acquisition of L1 Slavic L2 English learners in more detail, while section 2.7 explores the ways in which L1 Mandarin L2 English

learners differ in their article acquisition and the implications of such differences.

2.6 L1 Slavic learners of L2 English

L2 English learners from Slavic⁵ L1 backgrounds tend to show persistent patterns of article omission, and lower overall accuracy of article suppliance, especially when compared to learners from L1 backgrounds with an article system (Chrabaszcz & Jiang, 2014; Schönenberger, 2014). These patterns have been observed on metalinguistic measures (Ekiert, 2004; Schönenberger, 2014; Świątek, 2013; Zugic, 2016), as well as in written production (Trenkic, 2002b; Zugic, 2013) and oral production (Avery & Radisic, 2007; Trenkic, 2007). Although learners' accuracy of article suppliance seems to improve with proficiency, omission errors remain characteristic of this population (Ekiert, 2004; Schönenberger, 2014; Świątek, 2013; Trenkic, 2007; Zugic, 2013, 2016).

As mentioned above, L2 English learners from a variety of Slavic L1 backgrounds show persistent problems with article omission. Firstly, this is observed in studies testing participants' metalinguistic knowledge. Ekiert (2004) and Świątek (2013) tested L1 Polish learners of English (beginner, intermediate and advanced proficiency) on a gap-fill task. The tasks in both studies consisted of sentences from which the article was removed, and were developed based on similar tasks in Goto Butler (2002), Liu and Gleason (2002) and Master (1994). The participants were asked to supply either *the*, *a(n)* or *zero* article as appropriate. The results of both studies showed that article omission (no article was supplied when it was required) was the most common error even at advanced proficiency.

Using a similar type of task, a written forced-choice elicitation task, Schönenberger (2014) also reported high omission rates with her L1 Russian L2 English learners despite their high proficiency. By contrast, the German group in the same study (a language that has an article system) performed at about 90% accuracy and did not show such patterns of article omission. Similarly, the highly proficient Montenegrin participants in a study by Zugic (2016) also tended to frequently omit articles on the multiple-choice cloze task.

Article omission errors seem to be high in written production as well. The 44 Montenegrin university students in Zugic's study (2016) tended to omit articles frequently on a translation task. The indefinite article tended to be omitted more with the first mention

⁵ I have chosen to give an overview on research conducted on L2 learners from various Slavic L1 backgrounds, as there are only a handful of studies that specifically focus on article acquisition by L1 Croatian learners.

of the referent, while the definite article was omitted more in anaphoric reference (referring back to an already introduced referent). Pylypensko and Alexopoulou's (2018) analysis of written corpus texts by Brazilian, L1 Portuguese (has articles) and L1 Russian (no articles) speakers revealed a lower rate of accurate article suppliance by the L1 Russian group. While the Brazilian group performed with similar accuracy on *a* (81%), *the* (89%) and *zero* (88%) article, the L1 Russian group showed an asymmetry in their article suppliance. The indefinite article was produced least consistently (63%), followed by the definite article (72%), while the zero article was produced correctly almost all of the time (94%). It is hard to tell whether these results imply that the L1 Russian group had truly mastered the zero article that well (especially compared to the other two types) or were observed because omission errors are so frequent with L1 Slavic learners that they end up being correct some of the time purely by chance.

Support for the claim that omission errors are frequent with Slavic learners of English, also comes from studies on articles in oral production. Trenkic (2007) tested L1 Serbian L2 English learners (17-year-old secondary school students of roughly B2 proficiency⁶) on a map task in which two participants need to share information in order for one of the participants to complete the map which is not complete. The results showed that articles were omitted in about 26.5% of all produced countable singular NPs where they were required. Similarly, on a picture describing task, Avery and Radisic (2007) report high omission rates among their five L1 Serbian participants. Finally, a corpus analysis of L2 English learners' oral exam scripts from the Cambridge English Language Assessment exams (Murakami & Alexopoulou, 2016) showed that articles were supplied with lower accuracy by learners from article-lacking L1s in the corpus (Japanese, Korean, Russian and Turkish).

Finally, there is also evidence that L1 Slavic learners have problems with omission on tasks that, at least to some extent, tap into implicit knowledge. Chrabaszcz and Jiang (2014) used an oral elicited imitation task to investigate whether there were any differences in how accurately L2 English learners with L1 Spanish (articles) and L1 Russian (no articles) supply articles. In the elicited imitation task, the participants were asked to repeat sentences which are either correct or incorrect in some aspect. The expectation was that learners would subconsciously transfer their knowledge of (L1) grammar by either correcting the incorrect sentences or incorrectly repeating correct sentences. The results of the study showed that while the L1 Spanish group was almost native-like in their repetition of sentences, the L1

⁶ According to the Common European Framework of Reference for Languages (CEFR) available at <https://www.coe.int/en/web/common-european-framework-reference-languages/level-descriptions>

Russian group omitted the article significantly more frequently than either the L1 Spanish or L1 English group (control), even in correct sentences. The authors took the results as an indication of strong L1 effects even with advanced learners of English, since the L1 Spanish group were able to use their L1 knowledge of articles to help them repeat the L2 sentences correctly, while the L1 Russian group produced bare NPs with higher frequency, in line with what is allowed in their L1.

2.7 L1 Mandarin learners of L2 English

While L2 English learners from Slavic L1 backgrounds acquire and produce English articles in a pattern consistent with other learners from article-lacking L1s, L1 Mandarin speakers have been observed to show a different pattern. This is arguably due to Mandarin being on a path of grammaticalising some of its markers of definiteness.

This notion that Mandarin is on the path of grammaticalising some of its markers of (in)definiteness is also supported by studies that show that L1 Mandarin performance on measures of L2 English article acquisition tend to differ compared with the performance of L2 English learners from other article-lacking L1 backgrounds. The next two sections discuss evidence in support of this notion, based on a range of research on various aspects of L1 Mandarin L2 English article acquisition employing a range of data elicitation methods.

2.7.1 Evidence from acquisition order studies

Master (1990, 1997) predicts that L2 learners of English acquire English articles in a different order depending on their L1. Thus, L2 learners from article-lacking L1s are thought to acquire the zero article first, followed by the definite and finally indefinite article ($0 > the > a$). On the other hand, L2 learners whose L1 grammaticalises articles are expected to first acquire the definite article, followed by the zero and indefinite article ($the > 0 > a$). However, although Mandarin Chinese is traditionally grouped with article-lacking languages, several studies into the acquisition order of English articles seem to suggest that L1 Mandarin learners of L2 English acquire the English articles in a different order to that predicted by Master for learners from article-lacking L1s (Li & Yang, 2010; Lu, 2001; Zhou, 2015).

Both Li and Yang (2010) and Lu (2001) asked their participants to fill in the blanks with the appropriate article (*the*, *a(n)* or *zero*) in a cloze test based on Master (1994). The studies included 121 and 55 L1 Mandarin L2 learners of English respectively, divided into three proficiency groups (beginner, intermediate, advanced). The data were analysed by

counting both the TLU (Target-like Use) and UOC (Used in Obligatory Contexts)⁷. The results of both analyses showed that L1 Mandarin learners of L2 English appear to acquire the definite article first, followed by the indefinite article and finally the zero article. These findings are also corroborated by Zhou (2015) who, similarly to the two previously mentioned studies, tested 129 L1 Mandarin L2 learners of English (divided into three proficiency groups). Zhou employed a gap-fill test (slightly different contexts than used in the other two studies) and used a different accuracy measure by which the number of articles omitted, substituted or overused in obligatory contexts were counted. The author also found the acquisition order for L1 Mandarin learners to be *the > a(n) > O*.

These findings are in contrast with the *O > the > a* order proposed by Master (1997). However, this proposed initial omission of both articles, is especially found in L2 English learners from Slavic languages (e.g., Polish, Russian, Croatian). Ekiert (2004) found that omission errors were common with all three proficiency levels (low, intermediate and high ability) for L1 Polish L2 English learners, but especially with the low ability group. Zugic (2016), who tested Montenegrin participants on three proficiency levels as Ekiert did, found a similar tendency for all learners to omit articles more frequently than to substitute them. More information on the acquisition of English articles by Slavic learners is provided in Section 2.6.

An important caveat is in order when it comes to the acquisition of the zero article. In the studies discussed above, there is no strong evidence that the zero article is omitted with a purpose (e.g., because the learner knows the article is not required with a particular noun). What seems more likely is that the learners were simply omitting the article in line with their L1, which allows a bare NP, and with time and exposure may learn that certain NPs commonly occur with articles. Nevertheless, this pattern of omission at the initial stages of learning is very significant in terms of L1 transfer. An acquisition order in which the zero or no article is “acquired” first makes sense for L2 learners from article-lacking L1s, because the bare NP is what the learners encounter in their L1 and at lower proficiency levels, suggesting they might not have had enough exposure to the L2 to replace the L1-licensed bare NP with an L2-licensed NP with an article. On the other hand, if certain features of

⁷ The SOC (Supplied in Obligatory Contexts) has been the main method of analysing spoken data on articles but has recently come under criticism for inflating accuracy rates. When using SOC the researcher counts how many times an article has been used correctly in the obligatory context while disregarding how many times the same article was used inappropriately in other contexts, thus potentially making it seem that the speaker has used a particular article more correctly than they actually have. The TLU (Target-like Use) method has been created to combat that problem, and more recent studies either count both SOC and TLU, or just use TLU. For more details see Chapter 5, section 5.5.2.

Mandarin Chinese are taking on the functions of English articles, we could expect Mandarin L2 learners of English to transfer their L1 article components in their L2 article acquisition, that is, they would not show the initial omission of articles but would correctly transfer the article + NP mapping into L2 English.

2.7.2 Evidence of L1 transfer

There is further evidence from studies into L2 article acquisition which show that L1 Mandarin learners often perform differently to learners of other article-lacking L1 backgrounds on a variety of tasks (metalinguistic, production and online). Such differences are mainly evident in the following areas:

- L1 Mandarin L2 English speakers have been found to perform with high accuracy on metalinguistic tests and in oral productions, and often perform more accurately than speakers from other article-lacking L1s (Crosthwaite, 2016; Feng, 2019; Snape et al., 2006; Snape, 2009).
- L1 Mandarin L2 English speakers tend to substitute articles more often than omit them, which is in contrast with studies on other learners from article-lacking L1s who consistently omit articles at very high frequencies (Snape, 2009).
- Xu and Snape (2016) report that their L1 Mandarin L2 English participants supplied the indefinite article more accurately than the zero article on a measure of metalinguistic knowledge of articles. This finding is in contrast with other studies on L2 English learners from article-lacking L1s which report the omission of articles to be one of the most common features of their participants' English.
- L1 Mandarin L2 English learners seem to be able to use the indefinite article effectively to introduce non-inferable referents in spoken production very early on in their learning process (Crosthwaite, 2014). In addition, there is evidence from eye-tracking that the same population is able to use articles effectively to interpret reference more effectively (Trenkic et al., 2014).

All of the atypical features of L1 Mandarin English when compared to speakers from article-lacking L1s can be explained with positive L1 transfer, meaning that the learners' L2 acquisition of a particular structure is aided by a similar structure in their L1. The studies mentioned in the bullet points above, and the claim that L1 Mandarin L2 English learners

perform differently due to positive L1 transfer are discussed next.

Firstly, it seems that L1 Mandarin L2 English speakers perform with rather high accuracy both on metalinguistic tasks and in oral production. Snape (2009) tested fifteen L1 Mandarin learners of English (living in Canada at the time of testing and of high proficiency) using a picture description task in which the participants were asked to construct a story from a set of pictures they were given. The aim of this task was to elicit singular countable NPs with either the indefinite or definite article in oral production. A control group of native speakers of English was given the same task and performed with 100% accuracy. Interestingly, the L2 group also performed with high accuracy, achieving 98% accuracy for the definite article, and slightly lower with the indefinite article (89%). Furthermore, the same study found that the L1 Mandarin participants made very few omission errors, and the more common error was substitution. This is in contrast with studies that look at L2 English learners from other article-lacking L1s, who find that their participants omit articles more frequently than substitute them.

A corpus analysis by Crosthwaite (2016) is in line with the above findings. Crosthwaite analysed written texts of L1 Mandarin, Korean and Thai L2 learners of English (all three L1s said not have articles) at four proficiency levels obtained from the International Corpus Network of Asian learners of English, and calculated the Target-Like Use (TLU) of articles in those texts. The L1 Mandarin groups struggled with article accuracy far less than the other two group as their TLU performance was consistently better. By contrast, the L1 Korean and Thai L2 English learners struggled with articles in all contexts and at all proficiency levels, never achieving more than 50% accuracy for each article form on the TLU count.

Furthermore, Xu and Snape (2016) tested 90 L1 Mandarin learners of L2 English on two different proficiency levels (intermediate and advanced). The participants were tested on a forced choice elicitation task based on Ionin et al. (2004), in which they were asked to supply the definite, indefinite or the zero article in a number of short dialogues. The most interesting finding for the purposes of the present study, is that L1 Mandarin learners (both proficiency groups) performed similarly to L1 English speakers when using the definite article in anaphoric contexts. A possible explanation is that L1 Mandarin learners having frequently seen demonstratives *zhei*, *nei* and *nage* accompany NPs in their L1, are able to more quickly map the semantic features of articles to their morphological realisation in the L2.

Another interesting finding from Xu and Snape (2016) is that the L1 Mandarin

learners of L2 English were more accurate at supplying the indefinite article than the zero article on a task of metalinguistic knowledge. This is in contrast with the trend observed with L2 English speakers from article-lacking L1 backgrounds who most frequently omit articles, and the accuracy with the indefinite article is usually quite low (especially compared to the definite article). The authors interpret this finding as potential positive transfer from their L1 since the numeral *yi* (*one*) is frequently used in Mandarin to introduce new referents (Crosthwaite, 2014).

L1 Mandarin L2 English learners (Feng, 2019) also outperformed L1 Korean L2 English learners (Cho, 2017) on an acceptability judgement task (AJT) testing their knowledge of the use of English articles in anaphoric and non-anaphoric bridging conditions. Cho (2017) tested L1 Korean L2 English learners on the above mentioned AJT and found that the learners rated felicitous NPs higher than infelicitous but only in anaphoric (definite) conditions, which is in line with what is afforded in their L1. Feng (2019) replicated Cho's study with L1 Mandarin L2 English learners. They found that the advanced participants were able to correctly differentiate between acceptable definite NPs and unacceptable indefinite NPs regardless of anaphoricity. Although both Korean and Mandarin are considered to be lacking articles, only L1 Mandarin L2 English learners were able to perform similarly to the L1 English speakers on the AJT in question.

Finally, L1 Mandarin L2 English speakers seem to have the ability to effectively use articles to either effectively introduce a new referent or resolve reference ambiguity. Crosthwaite (2014) compared the accuracy of article suppliance of L1 Mandarin and L1 Korean L2 learners of English (both languages classed as lacking articles) on an oral production task in which the participants were asked to describe a series of pictures. The results showed that the L1 Mandarin group used the indefinite article to introduce non-inferable referents into discourse already from A1 (beginner) proficiency level. This feature was acquired by the L1 Korean group at a much later proficiency stage. This potentially indicates that the L1 Mandarin learners were aided by a similar construction in their L1, namely nouns preceded by a numeral + classifier. Although not obligatory, this construction is preferred by native speakers of Mandarin, and is used with high frequency.

The only study to date to use the eye-tracking paradigm to investigate article acquisition by L1 Mandarin speakers of L2 English (or any other language for that matter) showed that L1 Mandarin learners are able to use articles effectively in online comprehension to resolve reference more quickly (Trenkic et al., 2014). The L1 Mandarin L2 English participants saw a picture and simultaneously heard sentences as in the examples

below:

30. The pirate will put the cube inside the can.

31. The pirate will put the cube inside a can.

The picture matched the sentence either by token of there being only one open can that could receive the cube (30), or there being two open cans either of which could receive the cube (31). The pictures and sentences also appeared in mismatched conditions. The participants' eye movements were recorded to determine how efficiently they could use English articles in real time to resolve the reference. The L1 English control group were expected to look towards the competitor faster in the matched conditions than in the mismatched ones. The results showed that, although slower than L1 English participants, the L1 Mandarin participants were also able to use the articles to move their gaze faster to the competitor in matched conditions. This finding is rather surprising considering that L2 learners from article-lacking L1 backgrounds are traditionally not expected to behave like speakers from languages with articles, especially not on online measures which restrict the use of explicit knowledge. It would be important for future research to investigate whether the same results would be replicated with learners from other article-lacking L1 backgrounds. If L2 learners from other article-lacking L1 backgrounds do not show the same ability, it would be further evidence that Mandarin Chinese should perhaps not be treated as fully article-lacking. Due to some positive transfer from Mandarin, L1 Mandarin L2 English learners are expected to perform better on measures of English articles than L2 learners from fully article-lacking L1 backgrounds.

In summary, there is strong evidence from previous studies that L1 Mandarin learners of L2 English do not appear to acquire and use English articles in quite the same way as learners with other L1 backgrounds. That is not to say that L1 Mandarin L2 English speakers process and use English articles in the same manner as L1 English speakers or speakers of other languages with articles. Evidence from some studies suggest that when compared to speakers of languages with articles (e.g., Spanish), L1 Mandarin L2 English learners perform statistically differently (Díez-Bedmar & Papp, 2008). The fact that Mandarin is on a path towards grammaticalising some of its demonstratives and numerals to mark definiteness, does not mean that this is equivalent to a full article system, or that it will ever be. However, future research should bear in mind that L1 Mandarin learners of English do not appear to acquire and use English articles in quite the same way as learners from other article-lacking languages. More research is needed to determine the L1 effects

of Mandarin on the acquisition of L2 English, and caution is necessary when including this particular population in studies on L2 English speakers from article-lacking languages. The present study aims to contribute to this debate.

2.8 Accounting for variable L2 acquisition of articles

2.8.1 Prosodic Transfer Hypothesis

One of the proposals as to why learners of L2 English show variable article production is the Prosodic Transfer Hypothesis (PTH) (Goad and White, 2004). The PTH proposes that the problems with L2 article production can be caused by learners' L1 and L2 having different ways of prosodifying L2 functional material. If the required prosodic structure for particular functional material is not available in the L1, learners may delete such material in L2 production or transfer non-targetlike structures from the L1 into the L2 (Trenkic, 2007). Such is the case with English articles, which Goad and White (2004) use to illustrate the PTH. The authors report spoken data from an L1 Turkish end-state learner of L2 English who still showed persistent issues with correctly supplying English articles in obligatory contexts.

In English, articles and unstressed determiners prosodify as free clitics, which means that they do not attach to a word but rather a phrase as in Figure 2.2 (a) below. (Goad and White, 2004, p. 9).

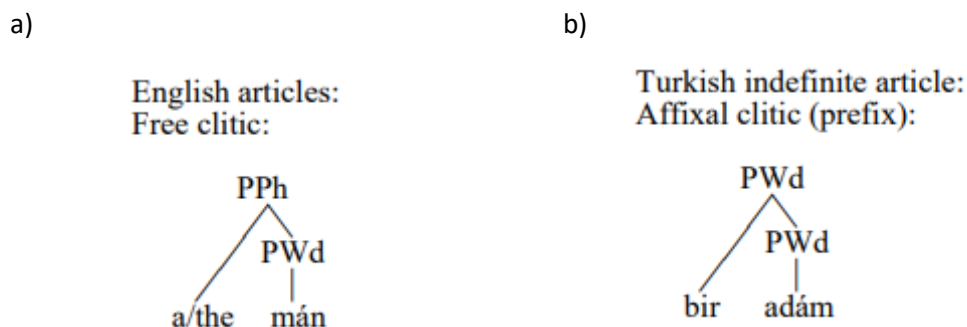


Figure 2.2 Prosodification of articles in English and Turkish

Turkish, on the other hand, does not have a definite article but the unstressed numeral *bir* (one) is often considered to be an indefinite article or a quasi-article (Trenkic, 2007). The unstressed *bir*, however, prosodifies as an affixal clitic (Figure 2.2, (b)). The unstressed *bir* precedes the noun and cannot be separated from it by an adjective because it is prosodically dependent on the noun (example 32 a and b). By contrast, the stressed version of *bir* (numeral) is an independent prosodic word which means it can be separated

from the noun (example 32c) (Goad and White, 2004, p. 10).

32. a. iyi bir adám
good a man
'a good man'
- b. *bir iyi adám
- c. bír iyi adám
one good man
'one good man'

Therefore, L1 Turkish learners of L2 English have no way of associating articles with the phonological phrase (PP) as English requires, which in turn may lead to variable production of L2 English articles and articles may be deleted especially in more complex phrases such as when the noun is modified by an adjective (art + adj + N) as opposed to a simpler (art + N) constructions.

Indeed, Goad and White (2004) found that the L2 English speaker (abbreviated SD) in their case study produced the definite article with about 72% accuracy and the indefinite article with 60% accuracy despite being considered an end-state learner and being immersed (living in Canada at the time of testing).

In a follow-up study, Kupisch and Snape (2010) analysed SD's production data using Praat phonetic analysis software. The analysis showed that SD used a number of stressed definite and indefinite articles, and the articles in art + adj + N constructions were more likely to be stressed. The authors take the findings as support for the claim that SD lacks 'corresponding structure in her interlanguage grammar to represent articles as free clitics' (Kupisch & Snape, 2010, p. 545).

Goad and White (2008) extend the predictions of PTH to Mandarin Chinese as well. In contrast to L1 Turkish L2 English learners, L1 Mandarin learners of L2 English are predicted to not delete articles as they are expected to transfer their L1 prosodic structures of articles which are similar to those in English. Although Mandarin is considered to be an article-lacking language, some researchers claim that structures such as *nage* and *nei* have started taking on features of the definite article (for a full discussion of this see Chapter 2, section 2.4). This suggests that Mandarin allows the free clitic structure for articles, like English does.

Goad and White (2008) tested fifteen L1 Mandarin learners of L2 English living in

Canada at the time of testing, who were divided into three proficiency groups (low-intermediate, intermediate, and high-intermediate). The participants were asked to construct and tell a story based on a sequence of pictures. The participants, especially the higher proficiency group, were found to delete articles with low frequency, which suggests that they were sensitive to the requirement of an overt article in English.

The predictions of the PTH for L1 Mandarin L2 English learners were also tested by Snape (2009) who asked 38 L1 Mandarin learners of English (living in Canada at the time of testing) to take part in an elicited picture description task. The task consisted of a series of pictures from which the participants were asked to construct a story about the main character. The results showed very few omission errors, which is in line with the predictions of the PTH.

However, there have been several criticisms of the PTH. Firstly, Trenkic (2007) points out that since both the indefinite and definite article have the same free clitic prosodic structure, the case study participants SD (Goad and White, 2004) should have deleted both articles at a similar rate. However, SD produced the definite article more accurately (72%) than the indefinite article (60%). The same asymmetry in the production of the definite and indefinite article has been found in Snape (2007) with L1 Japanese L2 English learners on a story re-call task. In fact, the more accurate production of the definite article compared to the indefinite article has been observed in a number of studies with different L1s (for a summary see Chapter 2, section 2.5).

Secondly, while the predictions of the PTH have been supported with data from L1 Turkish and L1 Mandarin learners of English, the production of L2 English articles by L1 Serbian learners does not align with PTH predictions. Serbian, overall an article-lacking language, has elements that are like determiners (such as possessive or demonstrative determiners in English) which can precede a noun but are not obligatory (Trenkic, 2007). When these elements are disyllabic, they are treated as an independent prosodic word, while the monosyllabic ones are included in the phonological phrase. Thus, needed prosodic structures for articles in L2 English exist in L1 Serbian and the PTH predicts that learners should show low rates of deletion even in more complex art + adj + N structures. The L1 Serbian learners of L2 English in Trenkic's (2007) study, however, showed persistent patterns of article omission on an oral production task in which participants had to share information to complete a task on map. Moreover, the omission rates were higher with adjectivally premodified nouns (art + adj + N).

Thirdly, Trenkic (2007) observed the same patterns of article omission described

above, in both oral and written (translation task) production. While PTH can potentially account for patterns of article error in oral production, it cannot explain why the same patterns are observed in other forms of production (such as written production).

In summary, while the PTH seems to be able to account for some patterns of article use in the oral production of L2 English (especially with learners whose L1 is Turkish or Mandarin), it fails to account for a) the asymmetry in the production of the definite and indefinite articles, b) production of articles in learners from different L1s (such as Japanese and Serbian), and c) the observation of the same patterns in written production.

2.8.2 L1-L2 structural competition model

A model that appears to be better suited to explain the variable success L2 English learners have with articles, not only in written and oral production but also on offline and online measures, is the L1-L2 structural competition model.

The L1-L2 structural competition model, developed by Trenkic and colleagues (Austin, Pongpairaj, & Trenkic, 2015; Trenkic et al., 2014; Trenkic & Pongpairaj, 2013), is based on the notion of simultaneous L1/L2 activation. The model proposes that in a bilingual brain, grammatical structures afforded by both languages (L1 and L2) are simultaneously activated even when only one language is being used and are in competition with each other, thus “fighting” for selection. To use the “mug” example again (examples 1 and 2), for a learner from an article-lacking L1, both the L1-licensed [mug] and the L2-licensed [a/the mug] would be activated, and the learner needs to select the appropriate L2 structure and suppress the inappropriate L1 structure. The L1-licensed structure, being more entrenched/activated, wins over the L2-licensed structure some of the time leading to untargetlike production (in the case of articles this would be bare NPs).

So far, the L1-L2 structural competition model appears to be the most robust model proposed to account for variable article acquisition as it adequately accounts for several patterns of L2 article acquisition and production observed in research. The most important patterns that this model accounts for can be summarised as follows:

1. L2 learners from article-lacking L1 background are particularly prone to supplying bare NPs (omission errors).
2. The more proficient the learner, the more accurately they will produce articles in obligatory contexts.
3. L2 learners from L1s with articles produce articles more accurately (and much sooner in their learning) than L2 learners from article-lacking L1 backgrounds.

4. Articles are more likely to be omitted with structurally more complex NPs (e.g., with nouns preceded by an adjective, or when required to supply an article with a plural noun).

Numerous studies on L2 learners of English from article-lacking L1 backgrounds have demonstrated that such learners frequently supply a bare NP in situations in which standard English requires the NP to be preceded by an article, also called omission errors (Chrabaszcz & Jiang, 2014; Ekiert, 2004; Schönenberger, 2014; Świątek, 2013; Zugic, 2016). The L1-L2 structural competition model proposes that omission errors arise due to simultaneous activation of the L1-licensed bare [NP] and the L2-licensed [Art + NP] structures which compete for selection, and each structure wins some of the time, sometimes leading to errors.

Studies have also shown that the number of errors decreases with proficiency, meaning that more proficient learners tend to be more accurate in their article production than less proficient learners (Li & Yang, 2010; Schönenberger, 2014; Trenkic, 2007; Zhou, 2015). According to the L1-L2 structural competition model, the reason is that at lower proficiency levels, the activation of the L2-licensed structures is much weaker than the L1-licensed bare NP, leading to more errors. As proficiency increases, and the learner is exposed to more L2 input, the activation of the L2-licensed structures becomes stronger and is more likely to be selected in the competition between the two structures.

It has also been observed that errors in article production are more common with learners from article-lacking L1 backgrounds than with learners from L1s with articles, and what is more, the second group seem to achieve higher accuracy earlier in their L2 learning (Chrabaszcz & Jiang, 2014; Díez-Bedmar & Papp, 2008; Snape, García Mayo, & Gürel, 2013; Zergollern- Miletić, 2017). The L1-L2 structural competition model is once again compatible with these findings, as it predicts that for learners from L1s with articles the activated structure for both the L1 and the L2 would be [Art + NP], thus leading to correct article suppliance more often than when the L1 and L2 have different structures.

Finally, research has demonstrated that articles tend to be more frequently omitted with structurally more complex NPs. For example, Trenkic (2008) has observed that her L1 Serbian learners of L2 English tended to omit articles more with adjectivally premodified nouns (*the mug* vs. *the green mug*). Similarly, Austin et al. (2015) found that articles were omitted more when the learners had to supply both an article and a plural noun (*the mugs*) than when they only had to supply the article (*the mug*). Such findings are consistent with the L1-L2 structural competition model in that the structurally more complex NPs burden the working memory more, thus leaving fewer resources for the inappropriate L1-licensed

structure to be suppressed.

However, the L1-L2 structural competition model required further research using designs and methods that more clearly show the parallel activation of two languages (for example see Jiang et al., 2011, 2017). Another suitable (neurolinguistic) research method would be the ERPs, which have already been successfully used so far to demonstrate parallel activation of both languages while processing sentences in the L2 (Luque-Ferreras & Morgan-short, 2017; Sanoudaki & Thierry, 2014). This seems like a logical next step in further testing the model.

2.9 Limitations of previous studies into L2 article acquisition

It is important to point out that, despite the high quantity of studies into L2 article acquisition, the methods used in those studies have not been very diverse, thus making our knowledge of this subject incomplete. Firstly, a large number of studies into L2 article acquisition have employed metalinguistic tasks such as gap-fill (Ekiert, 2004; Ko et al., 2009; Swiatek, 2013; Zugic, 2010). In addition, there is a particular absence of studies testing participants' implicit knowledge in online domains in particular such as eye-tracking and self-paced reading, which, by contrast, have been very common in other areas of SLA in recent years (for reviews see Marsden, Thompson, & Plonsky, 2018; Roberts, 2016). Secondly, studies testing participants' oral production of articles have been infrequent compared with metalinguistic tasks, and among the studies that do exist there is a lack of consistency in how accuracy is measured (Avery and Radisic, 2007; Snape, 2009; Trenkic, 2002).

One of the limitations of previous research into L2 article acquisition is that mainly metalinguistic tasks (such as forced-choice elicitation or cloze tasks) have been used. Although the findings from such studies have been very beneficial to our understanding of explicit article knowledge in particular, they definitely do not present a full picture. The use of tests of metalinguistic knowledge is further made problematic by the fact that many of the studies employing such tests (Butler, 2002; Ionin et al., 2004; Liu & Gleason, 2002) have replicated the tests developed by either Ionin et al. (2004) or Master (1997), without addressing the issues that have been observed with the design of these tests (e.g., see Trenkic, 2008 for a discussion on issues with the task design in Ionin et al., 2004).

Furthermore, the field of L2 article acquisition (of English in particular) has been very slow to use online processing methods. The only eye-tracking study to date

investigating L2 article processing by Trenkic et al. (2014) has yielded compelling results. See section 2.7.1 of Chapter 2 for findings and discussion of this study. There are two studies that have been conducted using self-paced reading (SPR), but these suffer from serious methodological issues meaning that their results have to be interpreted with caution. Nevertheless, the two studies in question and their shortcomings are discussed briefly below.

In an SPR study, the participants are presented with a series of sentences (stimuli) which appear one word at a time on a computer screen. With a click of a designated key on the keyboard, the participant controls how quickly they switch from one word to another, and the computer measures in milliseconds their reading speed as a reaction time (RT). The stimuli usually consist of a number of correct sentences (33a) and a number of sentences with a specific violation (33b).

33. a. Yesterday I made *a cake* for my birthday. (correct)

b. Yesterday I made *X cake* for my birthday. (violation – article missing)

The idea is that the violations will take longer to process than correct sentences, thus resulting in longer RTs (for more information on SPR design see Chapter 5).

One study that employed the SPR paradigm, by Kim and Lakshmanan (2008), tested a total of 18 L1 Korean L2 English participants divided into two proficiency groups (intermediate and advanced) with nine participants each. The SPR stimuli were designed to manipulate specificity setting in [- definite] contexts. Each stimulus consisted of a sentence containing the article, and a follow up sentence providing context. A stimulus appeared either in a match condition with the indefinite article, or a mismatch condition containing the definite article as illustrated in the example below.

- (8) Sample experimental items in the [-definite, -specific] condition
- a. [-definite, -specific *a*] item
 I'm looking for a hotel. → contains the indefinite article *a*
 Any cheap hotel is fine. → provides the [-definite, -specific] condition
- b. [-definite, -specific *the*] item
 I'm looking for the hotel. → contains the definite article *the*
 Any cheap hotel is fine. → provides the [-definite, -specific] condition

- (9) Sample experimental items in the [-definite, +specific] condition
- a. [-definite, +specific *a*] item
 I met an actor. → contains the indefinite article *a*
 You'll never guess which actor I met. → provides [-definite, +specific] condition
- b. [-definite, +specific *the*] item
 I met the actor. → contains the definite article *the*
 You'll never guess which actor I met. → provides [-definite, +specific] condition

Figure 2.3 Examples of stimuli from Kim and Lakshmanan (2008, p. 108)

The results⁸ showed that both the L1 English and advanced L1 Korean group took longer to read the mismatch [-specific, *the*] than the match [-specific, *a*] items. However, these differences were not statistically significant. On the offline acceptability judgement task employed to measure the participants explicit knowledge of articles, both groups rated the mismatch sentences significantly lower than the match sentences.

Although noteworthy as one of rare article acquisition study that employed the SPR paradigm, the study raises several (mainly methodological) questions/concerns. The authors chose to analyse the raw reading times (RTs), despite a long tradition in SPR research to analyse residual RTs that accounts for the differences in word length between in experimental items (for a discussion on residual RTs see Chapter 6, section 5.6.2). In addition, instead of comparing RTs word by word, the authors computed the total mean reading times for the critical item sentence (in this case the second sentence in each stimulus) and compared them between participants. This is not actually unusual, given that it is the second sentences in each experimental stimulus that provides the contexts which makes the article in the first sentence either correct or incorrect. However, the design in which the manipulation is in the first sentence but it is resolved by reading a subsequent sentence is highly unusual.

Finally, the sample sizes of the participant groups, especially of the two non-native speaker groups are rather small, which the authors do not address or discuss, in terms of how this could have impacted the findings.

The second study to employ the SPR task is a master's dissertation by Kim (2017) in which in design appears to adhere to usual conventions, however, the presentation of the

⁸ The findings of the intermediate L1 Korean group are not discussed here as they are not directly relevant for the purposes of the present study.

stimuli is unusual. Instead of each word being presented on its own, the target noun (i.e., the critical segment) is presented with the article in the same window, but all other nouns that are preceded by an article in the same sentence are presented separately as in the example below:

34. Anna bought a car with the money she got for her birthday.
(all words were presented separately apart from a car which was essentially presented as one word)

Such a design could have primed the participants to react differently when they saw the article and noun appearing together as opposed to when they appeared separately. Thus, it is very difficult to conclude whether the observed sensitivity reported in the findings is due to priming or a real sensitivity to the stimulus.

Research into L2 oral production of English articles has shown that the indefinite article tends to be supplied less accurately than the definite article (Avery & Radisic, 2007; Ekiert & Han, 2016; Kang, 2008; Snape, 2009). However, this has not been observed consistently across studies, and some studies found that the definite article is supplied more correctly. For example, Zergollern-Miletic (2017) found the exact opposite as her participants omitted articles slightly more frequently with the indefinite article with countable singular nouns (e.g., a book). By contrast, Zugic (2016) and Schonberger (2014) found that their participants supplied both articles with similar accuracy.

This inconsistency in findings from studies utilising oral production tasks is perhaps not surprising. As previously mentioned there has been a debate as to how to best count article accuracy on such tasks. The SOC (Supplied in Obligatory Contexts) method which has been used traditionally in a number of studies has been criticised for inflating accuracy, and the TLU (Target-like Use) method has been preferred as it accounts for both instances when the article was used correctly in the obligatory context and instances when it was misused in other contexts. However, it is unfortunate that several of the studies exemplified above either use SOC (without addressing its possible ramifications on the results) or do not report the method they used at all as is the case with, for example Ekiert (2004) and Świątek (2013). Therefore, it is highly likely that the somewhat contrasting findings as to whether the indefinite or definite article is produced more accurately in oral production is a result of inconsistent methodology across studies.

Finally, research so far into L2 article acquisition and use has been relatively homogenous in the choice of participant populations. The studies so far have usually

compared (a) a group of learners from a particular L1 background at certain proficiency level(s) or (b) L2 learners from two different L1 backgrounds of same proficiency. The second combination is usually an article-lacking L1 (e.g., Russian) and an article L1 (e.g., Spanish) or two article-lacking L1s (e.g., Japanese and Korean). However, a participant combination of one group from a Slavic L1 background and the other group from an Asian L1 background, is a comparatively rare combination. There is an assumption in the field that all learners from article-lacking L1s will acquire English articles in the same way, even when they are from fundamentally different L1s such as Slavic and Asian, but this has not yet been empirically tested. Ionin and colleagues have used L1 Korean and L1 Russian L2 English learners in their research, but they investigated article use either with generic nouns or in order to test the predictions of the Fluctuation Hypothesis. Thus, our knowledge of article use by L1 Asian and Slavic L2 English learners from those studies is rather limited. In addition, L1 Mandarin L2 learners tend to be used as an article-lacking population, despite a small body of research that suggests that L2 learners from Mandarin L1 background acquire and produce articles differently to learners from other article-lacking L1 backgrounds (Crosthwaite, 2014).

2.10 Chapter summary

From the critical overview given in this chapter, it is clear that research into English article acquisition has aroused a lot of interest and has been very fruitful in terms of particular findings. However, previous research has several limitations. Firstly, there is a need for expansion of research techniques (such as eye-tracking and self-paced reading) in line with the developments in the rest of the field of SLA. Secondly, there is also a need for more studies into (spontaneous) oral production of English articles, with more uniform design and accuracy measures. Finally, it is also necessary to compare L1 Mandarin learners of English with other learners from article-lacking backgrounds in order to further investigate whether Mandarin is on a path of grammaticalising some of its markers of definiteness, which might explain why L1 Mandarin learners tend to show different patterns of article acquisition.

The present study aims to address these limitations by comparing the performance of two L2 groups that come from different article-lacking L1 backgrounds (Mandarin and Croatian) in oral production and online comprehension.

Chapter 3: L2 acquisition of English tense and aspect

3.1 Introduction

Another feature of morphosyntax that, similarly to the article system discussed in the previous chapter, is realised in different ways across languages, and as such poses a difficulty for language learners, is temporality. Temporality, or the locating of a situation in time, is a universal notion, and all languages use a variety of devices to encode it (Klein, 2009), ranging from morphosyntactic or lexical means to pragmatic inference (Slabakova, 2015). The two most prominent devices of expressing temporal relations, especially in English, are tense and aspect. Both tense and aspect are concerned with time, but in rather different ways – tense situates events in time between a reference point and the time of speaking, while aspect allows us to view an event or a situation from a particular perspective (Bardovi-Harlig, 1992). For example, the sentences *Sam cooks* and *Sam cooked* both express a difference in tense, with the former event occurring in the present and the second one in the past, relative to the time of speaking. On the other hand, *Sam cooked* and *Sam was cooking* are both in the past tense, but express a different aspect since the second sentence, in comparison to the first one, is an event of a certain duration in the past.

While English grammaticalises its two main expressions of temporality, tense and aspect, some languages such as Mandarin do not require their speakers to overtly mark time, but rather, use other devices to locate events in time (e.g., adverbials such as *soon* or *yesterday*) (Klein, 2009).

When temporality is expressed by one configuration in the L1 and another in the L2 of a speaker, this creates a morphosyntax-semantics mismatch between languages, which has been known to cause significant difficulty for language learners (Gabriele & Martohardjono, 2005; Hawkins & Lszka, 2003; Roberts & Lszka, 2013; Sabo, 2014; Yang & Huang, 2004).

This chapter examines how tense and aspect are encoded in three different languages – English, Mandarin and Croatian – and how differences in the learners' L1 (Mandarin and Croatian) influence the acquisition of tense and aspect in their L2 (English).

3.2 The encoding of time

Time can be visually imagined as a straight line, with the past usually on the left and future on the right as shown in Figure 3.1 below (Comrie, 1985, p. 2). Situations such as events, processes and states can occur on this timeline and be of various durations (e.g., punctual, habitual, continuous, etc.)

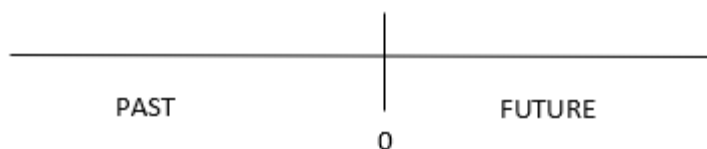


Figure 3.1 Representation of time as a straight line

Comrie (1985) identifies two main ways in which one can relate a situation (event/process/state) to the timeline:

- a) a situation can be located on the timeline in relation to another situation or a specified point on the line, and as such all situations are relative to each other;
- b) a situation can be located on the timeline by its internal temporal contour, for example whether it is viewed as a specific point on the line or a stretch of time.

All languages have ways of expressing and locating time, and although there are a variety of ways in which this is done, the main expressions of locating time across languages can be divided into two main categories. Firstly, time can be located using lexical items, whether words (e.g., *yesterday*, *today*) or expressions (e.g., *five minutes later*). Secondly, time can be located through the use of grammatical categories such as tense and aspect. It is the use of grammatical categories, tense and aspect in particular, that is of interest in the present study.

Unlike tense, aspect is not relational but, rather, is concerned with the “internal temporal consistency of a situation” (Comrie, 1976b, p. 5) described by the verb. Examples (35) and (36) below show two sentences both in the past tense, but that differ in aspect. In (35), the situation is presented as a whole, with a beginning, a middle and an ending (also referred to as perfective aspect), while (36) refers to an internal segment of Sarah’s eating without any explicit reference to a beginning or an end of the action (referred to as imperfective aspect).

35. Sarah ate an apple.

36. Sarah was eating an apple.

So far, tense and aspect have been presented in terms of abstract temporal relations, which are expressed in a variety of ways across languages. Although some languages (e.g., English) grammaticalise both tense and aspect, others (e.g., Mandarin) have no overt tense marking, and time reference is (usually) expressed through lexical items and pragmatic cues. The rest of this section looks into what tense and aspect are as grammatical categories, and how English, Mandarin and Croatian encode these relations.

3.2.1 Tense

On a conceptual level, tense is a deictic (relating time to a reference point) and relational category which expresses a temporal relation as occurring either after, at the same time or simultaneously between two time spans (Klein, 1994). Thus, according to Klein, time can be said to be organised as the TIME OF SITUATION (T-SIT) in relation to the TIME OF UTTERANCE (TU). The example below (37), being in the past tense, tells us that T-SIT precedes the TU.

37. Peter was cheerful (Klein, 1994, p. 142)

Thus, based on Klein's notions of T-SIT and TU we can conceptualise the three main tenses as follows:

FUTURE	T-SIT after TU
PRESENT	T-SIT including TU
PAST	T-SIT before TU

In English, the three main temporal relations or tense (past, present and future) are realised by different (morphological) means as illustrated in the examples below (based on Li & Thompson, 1981, p. 184):

38. I proposed a toast.

39. I propose a toast.

40. I will propose a toast.

In (38), the English suffix *-ed* on the verb *propose* tells us that the act took place before TU (past), while in (39) the lack of the suffix on the verb locates the act or the situation at the TU (present). In (40) the addition of the auxiliary verb *will* locates the act of proposing at some point after the TU (future). Thus, the three main tenses are realised in

different ways. The past requires a morphological marking on the verb, while the present and future have no such marking. The present is identified by the absence of any marking (except for the third person -s inflection) while the future is constructed by adding an additional element, namely, the auxiliary verb.

Croatian is similar to English, as it distinguishes between past, present and future tenses which are grammatically encoded. However, Croatian has richer inflectional morphology than English as the inflections do not only contain information about tense but also gender and number. In example (41) the past tense, also called *Perfekt* in Croatian, is composed of the verb *to be* and the main verb in the past participle. It is considered to be a finite past, similarly to the English past simple (TU before T-SIT). In addition to the main verb expressing tense, the ending -o (napisao) gives information that the subject (Ivan) is male. A female subject, by contrast, would be marked with -a (napisala). The present tense in (42) is composed of the main verb, which is also inflected for third person singular. The future in (43) is created with the infinitive of the main verb as well as the present of the verb *to want*.

41. Ivan je jučer napisao pismo.

Ivan is yesterday wrote letter

'Ivan wrote a letter yesterday.'

42. Ivan piše pismo.

Ivan write letter

'Ivan writes a letter.'

43. Ivan će napisati pismo.

Ivan want write letter

'Ivan will write a letter.'

Although verbs in English and Croatian are grammatically marked for tense, Mandarin Chinese has no such markers but rather, uses other devices, such as aspect, to signal the relationship between the T-SIT and the TU.

3.2.2 Aspect

Aspect allows language users to view an event or a situation from a particular perspective, and (in English) can be expressed lexically or grammatically (Figure 3.2). The former is referred to as lexical aspect, while the latter is called grammatical aspect (Salaberry & Shirai,

2002).

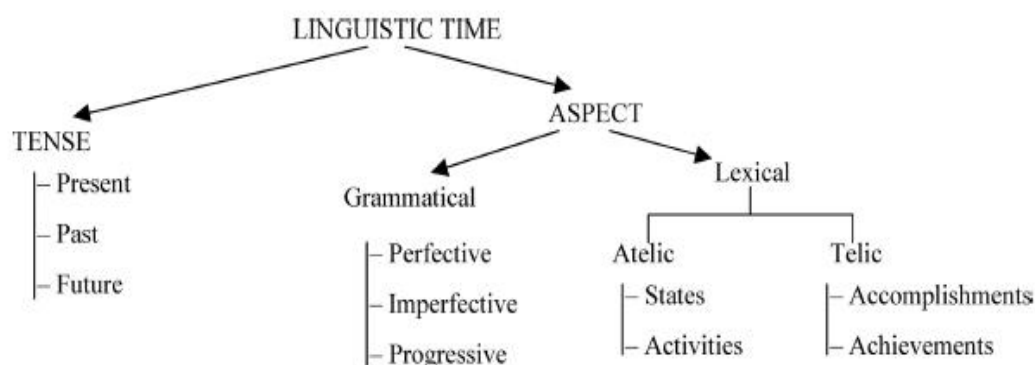


Figure 3.2 Division of time by tense and aspect (Ayoun & Salaberry, 2008, p. 558)

Lexical aspect (also “situation type”), is expressed by the lexical semantics of the verb. This type of aspect is inherent in the sense that it is not encoded morphologically, but rather, is an inherent part of the word that expresses a particular situation (Andersen, 1991). Four semantic types of verbs tend to be distinguished: states, activities, accomplishments, and achievements (Salaberry & Shirai, 2002). A state verb, such as *have*, expresses a situation that will continue to exist until changed by an outside force/event. An activity verb such as *run*, is dynamic and durative, and is viewed as having an arbitrary endpoint (i.e., the running will stop when the runner decides to do so). Similarly, accomplishment verbs, such as *make a chair*, are also durative and dynamic but have a natural endpoint (eventually the chair will be made). Finally, achievement verbs, such as *arrive*, are instantaneous, and can be pinpointed to a specific time (Shirai, 2008).

Comrie (1976a) further distinguishes verbs on the basis of three semantic dimensions: dynamicity, durativity, and telicity. The interaction between verb types and semantic dimensions is presented in Table 3.1.

Table 3.1 Interaction between verb type and semantic dimension

Verb type	Semantic dimension		
	<i>durative vs. punctual</i>	<i>dynamic vs stative</i>	<i>telic vs atelic</i>
States	Durative	Stative	Atelic
Activities	Durative	Stative	Atelic
Accomplishments	Durative	Dynamic	Telic
Achievements	Punctual	Dynamic	Telic

The durative and punctual verb distinction refers to the event either happening at once at a certain point in time, or lasting for some time. Dynamic verbs usually describe an

action that can be taken, while stative verbs refer to a state or condition that is not likely to change. The final telic/atelic distinction tells us whether an event has an inherent endpoint (telic) or not (atelic). The notion of telicity, which refers to the aspectual nature of events at the lexical level, is closely related to the concept of boundedness at the level of grammatical aspect discussed below (Salaberry & Shirai, 2002).

The second type of aspect is grammatical aspect which is expressed morphosyntactically through verbal inflection. It is also called viewpoint aspect, as it describes a situation of which the speaker has a full or partial view, and it indicates the internal temporal consistency of a situation.

The two main distinctions of grammatical aspect are perfective and imperfective, and some authors also add the progressive aspect to these two distinctions (Ayoun & Salaberry, 2008), while others see the progressive versus the non-progressive distinction to be a part of the imperfective aspect (Comrie, 1976b). In addition, there is also the perfect aspect, which deserves a discussion on its own, since its status, especially in English, is rather complex, and many (somewhat incorrectly) refer to it as a tense (i.e., as the present perfect tense).

The main distinction between perfective and imperfective aspect lies in whether the event is viewed as a whole, or it refers to its internal structure. In English, in (44) the verb *came in* indicates that the speaker views the situation as complete without separate phases, and this is called the perfective aspect. The situation is also bounded, as it is seen to have a beginning and an end.

On the other hand, the verb *was reading* refers to the internal structure of the situation, presenting it as ongoing and durative without a specific endpoint, thus making it unbounded, and as such is called the imperfective aspect.

44. Rosco was reading when I came in. (Li & Thompson, 1981, p. 184)

In the same way as telicity is used to describe the aspectual nature of events at the lexical level, boundedness describes the properties of grammatical aspect (Salaberry & Shirai, 2002).

In addition, in English there is also the progressive versus non-progressive aspectual distinction. The progressive aspect expresses a situation of some duration as in (45), while its counterpart, the non-progressive, expresses habitual (present) and completed (past) interpretations as in (46).

45. Maria was/is sleeping. progressive

46. Maria sleeps/slept. non-progressive

(examples from Roberts & Liszka, 2013, p. 416)

In English, both the perfective and progressive aspect are marked by the verb *to be* and the *-ing* suffix on the verb, while its simple counterparts, imperfective and non-progressive aspect are marked by the present and past tense depending on their temporal relations.

Like English, Mandarin also employs perfective and imperfective aspect to express temporal relations. Perfectivity is expressed using the aspectual marker *-le* and it describes an event that is viewed in its entirety and is bounded as in example (47) (Li & Thompson, 1981, p. 186). Although often used with completed actions, *-le* does not per se signal that an action is completed.

47. wǒ zài nàlǐ zhù – le liǎng – ge yuè
I at there live – PFV two – CL month
I lived there for two months.

By contrast, *zài* (word) and *-zhe* (suffix) are used to signal imperfectivity or, in other words, events of durative and ongoing nature. The markers *zài* and *-zhe* typically occur with activity verbs as in example (48) (Li & Thompson, 1981, p. 217) and posture verbs (denoting physical disposition).

48. Zhāngsān zài liàn pǎo
Zhangsan IMPF practice run
Zhangsan is practicing running.

In addition to (im)perfective aspect, Mandarin also distinguishes experiential aspect. The experiential aspect marker *-guo* in example (49) (Li & Thompson, 1981, p. 226) suggests that an event has been experienced or that an event has occurred before (Yang & Huang, 2004), and can carry additional meaning of present perfect (e.g., in English: *I have been to China*) (Slabakova, 2015).

49. Wǒ chī – guo Rìběn fàn
I eat – EXP Japan food
I have eaten Japanese food (before).

Just like English and Mandarin, Croatian also distinguishes between perfective and

imperfective aspect (Geld & Zovko Dinković, 2007). Perfectivisation is mainly accomplished by means of prefixes and suffixes, while imperfectivisation can only be achieved through suffixisation as in example (50) (Martinot, Andel, & Sunar, 2003, p. 135). If perfectivisation is achieved by adding a prefix to the verb, then the verb expresses additional information about how the action is performed, and this is referred to as *Aktionsart*.

50. *puštati* (IMPF) – *pustiti* (PERF)
 (releasing) (release)

However, unlike English, Croatian does not grammatically distinguish habituality from progressivity, but such meanings are rather expressed through lexical information such as adverbials (e.g., *svaki dan* – every day).

Table 3.2 below summarises features which are marked through grammatical aspect in each of the three languages.

Table 3.2 Grammatical aspect in English, Mandarin and Croatian

Type of grammatical aspect	English	Mandarin	Croatian
Perfective	Yes	Yes	Yes
Imperfective	Yes	Yes	Yes
Progressive	Yes	Yes	no
Non-progressive	yes	Yes	No
Perfect	Yes	Partial (Experiential)	No

3.2.3 Present Perfect

An additional feature of English TA that has been known to cause problems for L2 learners, is the present perfect, a combination of tense and aspect which relates a past event to the present time. Although relating the past to the present is possible in both Mandarin and Croatian, only English has a dedicated grammatical structure for this (i.e., the present perfect).

In example (51) the use of the present perfect (*have cut*) suggests that although the finger was cut in the past, it has some consequence on the present, such as that the cut has not healed yet. Whereas in (52) the finger was cut in the past and we can assume the finger to be healed and no longer posing a problem for the speaker in the present.

51. I have cut my finger.

52. I cut my finger.

Both sentences above are expressing a past event but we do not know the precise moment at which the event occurred – it could have been three days or three weeks ago – the event certainly occurred before TU. In addition, present perfect can be used to indicate an experience at some unspecified point in time as in example (53), and, although the person is no longer physically in China (their trip has ended), they have the experience of having been there.

53. I have been to China.

The present perfect is often associated with adverbial phrases that indicate a time span, such as *since*, *for four years*, *already* and *yet*.

There is an ongoing debate as to whether the English present perfect is a tense or aspect. Some grammars classify it as a tense (Radden & Dirven, 2007), while other classify it as aspect (Comrie, 1976b; Greenbaum & Quirk, 1990). For the present purposes it will be treated as tense for two reasons. Firstly, since the distinction between aspect and tense is not usually taught to L2 learners, it is most likely that learners conceptualise and treat it as a tense. Secondly, treating present perfect as a tense allows for better comparison with the other two tenses (past and present simple) tested in the present study, which investigated whether L2 learners are sensitive to violations between aspect adverbials and tense. The examples below (54-56) are based on the stimuli used in the present study to investigate TA violations. The adverbial phrase is marked in bold, while the tense is italicised. It is observable that by treating present perfect as a tense, we get a neat comparison between the adverbials and tenses in the stimulus.

54. **Last year**, I *lived* in London.

55. **Since January**, I *have lived* in London.

56. **At the moment**, I *live* in London.

As mentioned above, Mandarin does not have an equivalent of present perfect, but the experiential aspect marker *-guo* can be interpreted as referring to an event that has already been experienced once before, evoking a part of the perfect reading.

Similarly, Croatian also does not have a dedicated tense equivalent to the English present perfect tense, but it does have a concept of “finite present” which describes an action that occurred in the past but has present relevance as in example (57) (Barić et al., 2005, p. 410):

57. Ispružila se u naslonjaču. (i tako leži)

Stretched out in armchair. (and she is lying down)

'She has stretched out in the armchair.'

However, the verb itself in (57) (*ispružila se*) is in the past tense form.

In summary, although all three languages have devices to locate events in time and express temporal relations, only English and Croatian do so through grammaticalised tenses, but all three languages grammaticalise aspect. In addition, all three languages have devices to denote a past event with present relevance, but only English does so through a dedicated tense, while Mandarin and Croatian use other aspectual and lexical interpretations. Thus, the L2 learners in the present study have had different tasks when it comes to acquiring the complex English TA system. On the one hand, L1 Croatian L2 English learners already have a somewhat grammaticalised TA system in their own L1, which arguably facilitates the acquisition of the English system. However, not all tenses and aspectual distinctions in English have their equivalent in Croatian, as is the case with present perfect. The perfect aspectual distinction is something that is expressed through lexical means in Croatian, while it is grammaticalised in English, and this feature of English has been known to pose problems from L1 Croatian L2 English learners. On the other hand, L1 Mandarin L2 English learners have no grammaticalised tense system in their own L1 to fall back on when acquiring English tenses. Mandarin, does however have grammaticalised aspectual markers of im/perfectivity. In addition, just as in Croatian, the perfect aspectual distinction is not grammaticalised, but Mandarin has the experiential aspect marker which shares some similarities with the present perfect (experience meaning).

Therefore, both L2 groups in the present study would be expected to have some problems with acquiring the English TA system. The next section discusses the typical problems in L2 acquisition of TA identified in previous research.

3.3 L2 acquisition of tense-aspect

When acquiring the English TA system, or indeed the TA system of any other language, learners are faced with a complex task (Bardovi-Harlig, 1992; Housen, 2002):

1. First, learners need to correctly map form to form. For example, in English, they have to learn that the past tense of the verb *have* is *had* and not *haved*. Once they have correctly acquired the appropriate morphology they also need to learn the particular order in which these elements occur in combination (for example *have been learning* and not *been have learning*).

2. Secondly, learners also need to learn how inherent properties of a verb expressed by lexical aspect interact with grammatical aspect. For example, in English the state verb *have* (lexical aspect) cannot generally be used with progressive grammatical aspect as in *I am having a house*.⁹
3. Finally, learners need to map the form to the appropriate function. In English, they would, for example, need to learn that the *-ing* inflection on the verb does not only express progressivity, but can also express continuity, and futurity.

Thus, this complex task requires learners to appropriately map form to form, and form to meaning (use). These two mapping tasks, although linked, do not necessarily occur together, and research so far has provided evidence that form is acquired before meaning.

In their 1989 study, Bardovi-Harlig and Bofman reported that in written compositions, their advanced learners of English showed a tendency to inappropriately use verb forms in context, even though they made relatively few errors with the forms themselves. More precisely, the learners were 7.5 times more likely to make an error in usage than in the form of the verb.

Building on this study, Bardovi-Harlig (1992) tested 135 adult learners of English from various L1 backgrounds and of different proficiency levels on a cloze task and written compositions, and found that the learners were aware of grammatically correct English verb forms, but were significantly less able to use them appropriately in context.

More recent research also provides some support for the form before meaning debate. The L1 Japanese advanced L2 learners of English in Gabriele and Martohardjono's (2005) study performed significantly better on the morphology preference task, which requires learners to choose the appropriate verb from a selection (focusing on identifying the correct form), than on the interpretation task, which required the learners to assess the appropriateness of forms in context. Similarly, the L1 Croatian high school learners of L2 English in Sabo's (2014) study produced the present perfect tense more accurately on the receptive than on the productive task.

Liszka (2004), whose three groups of advanced L2 English learners from different L1 background did not produce the present perfect tense in a target-like manner, proposes that learners who lack a complete representation of the English present perfect tense might need to rely more on memory to produce a form which collocates with adverbials typically associated with this tense, such as *since* or *already*. This would indicate that the learners

⁹ There are some exceptions with state verbs to express vividness and temporariness. These include expressions such as "I'm thinking that he might be wrong, I'm lovin' it."

have acquired the correct morphology for the present perfect tense and its associated adverbials, but have not yet fully mapped the form onto the appropriate use in context.

3.3.1 L2 acquisition of English past tense and present perfect

Studies looking at the acquisition of the English past (simple) tense and present perfect have found that the distinction between those two forms is difficult for L2 learners. For example, the L2 English learners from Arabic, Japanese, Korean and Spanish L1 backgrounds in Bardovi-Harlig's (1997) study tended to associate the meaning of present perfect with the meaning of other tenses such as the past simple or present simple. Similarly, the L1 Japanese L2 learners of English tested by Collins (2004) on a 25-passage rational cloze test tended to overuse present perfect in past simple contexts. This points to an overlap in the interpretations of the two forms. It appears that the problem for learners is not only mastering the formal and functional features of present perfect, but also learning to distinguish the present perfect from its "semantically close neighbour" (Bardovi-Harlig, 1997, p. 376) the past simple.

There is also evidence that present perfect emerges later in the learner language, and is more susceptible to proficiency and task effects. Fuchs et al. (2016) analysed oral and written corpus data of L1 German learners of English (whose L1 does not encode aspect) at different proficiency levels, and found that the present perfect emerged relatively late in the learners' narratives since only the advanced learners were able to use it effectively. In addition, the authors also found that the younger the participants were when they started learning English as a second language and the more formal instruction they had, the better they were at using present perfect. Finally, the authors also found task effects, since the present perfect was more accurately used in written rather than oral narratives. It, therefore, appears that tasks which allow for greater control of the language produced (such as written narratives) facilitate more accurate use of present perfect. Similar findings were also observed in a study by Sabo (2014) with 46 secondary school L1 Croatian L2 learners of English on a translation task.

Finally, the inherent lexical aspect seems to, at least to some extent, be implicated in the L2 acquisition of past simple and present perfect. The role of lexical aspect in TA acquisition has mainly been studied through the lens of the aspect hypothesis (Andersen & Shirai, 1994). The aspect hypothesis proposes that at initial stages of TA acquisition, learners will encode inherent semantic aspectual distinctions with verbal morphology, and that these initial stages are restricted to lexical aspectual verb classes, such as states, activities,

accomplishments and achievements. The aspect hypothesis is rooted in the prototype theory which postulates that each linguistic category has its prototypical members and peripheral members which are nonprototypical, sharing fewer characteristics with other members. The acquisition of any linguistic category is said to begin with the prototypical members, and only later extends to the peripheral members. For example, the progressive aspect in English is associated with semantic features [+dynamic, -telic], and if learners have a strict representation of the progressive which only includes these features, verbs which do not share these features will not be marked with the progressive (Li & Shirai, 2000). This may explain the observation that at the beginning stages, L2 learners use the progressive marking only with activity verbs (Gabriele, Martohardjono, & McClure, 2005).

Thus, the aspect hypothesis predicts that learners will initially associate and use TA markers with prototypical linguistic categories, only expanding to peripheral contexts as proficiency increases (Collins, 2004). If we take the English past simple tense as an example, this would mean that telic verbs would be marked first, then activities, and states last (Table 3.3). Furthermore, in languages that distinguish between the perfective and imperfective, as English does, the perfective marker will be developed before imperfective markers. The learners are expected to first use imperfective markers with states, and only later with the other three verb categories (Gabriele et al., 2005). As for progressive marking, it will first be used with activities, and only later with accomplishments and achievements, but it will not be incorrectly extended to states (Ayoun & Salaberry, 2008).

Table 3.3 Past marking at two stages of proficiency

Marker	Verb type encoded at initial stages	Verb type encoded at later stages
Perfective/past	Achievements, accomplishments (atelic)	States, activities (telic)
Progressive	Activities (telic)	Accomplishments, achievements (atelic)
Imperfective	States (telic)	Activities, accomplishments, achievements (atelic)

In terms of past simple, findings from Collins (2002, 2004) largely support the aspect hypothesis since her L1 French and Japanese learners of L2 English supplied the English past tense more accurately with telics than with activities or states. However, Ayoun and Salaberry (2008) replicated Collins' results on the cloze task (similar to the one used by Collins), but the results of their written narrative task did not support the predictions of the aspect hypothesis. On the narrative task, their L1 French learners of English tended to mark

state verbs more consistently than telics, which is the opposite of what the aspect hypothesis predicts. Similarly, Bardovi-Harlig and Bergstrom (1996), who also used written narratives to elicit data from their L2 English participants, found no support for the aspect hypothesis. Gabriele et al. (2005) tested their L1 Japanese L2 English speakers on an interpretation task, in which participants were given two sentences and were asked whether the second sentence could be a continuation of the first, and found that the participants were less accurate with the past progressive marking than with past simple irrespective of verb type, thus not supporting the predictions of the aspect hypothesis.

Similarly, there is only partial support for the aspect hypothesis and the role of lexical aspect from studies investigating the L2 acquisition of present perfect. Uno (2014) characterises the two meanings of present perfect as either encoding perfective or imperfective aspect. The experiential use of the present perfect (*I have visited China*) is said to encode perfective aspect as it a completed action (i.e., *the travelling is finished*). The imperfective aspect is said to be encoded in the meaning of present perfect which “designates situations as leading up to the time of utterance” (Uno, 2014, p. 34) (e.g., *I’ve studied here for years*). Therefore, we would expect to see the present perfect used with verb types associated with either aspect (Table 3.3). To investigate this, Uno (2014) tested advanced L1 Japanese learners of English on a cloze task. The results showed that the use of present perfect was restricted to atelic verbs in contexts with durative adverbs, somewhat contrary to the aspect hypothesis predictions. A study by Teran (2014) reported partially contrasting results. The author administered a forced-choice elicitation task to 85 L1 Spanish learners of English of intermediate and advanced proficiency. Similarly to Uno, the results showed that both groups tended to use the meaning of present perfect characterised as imperfect with atelic verbs, but unlike in Uno’s study, the perfective meaning (experiential) was associated with telic verbs.

In summary, there is only partial evidence that lexical aspectual classes of verbs have a major influence on the acquisition of the English past tense and present perfect. Therefore, other factors that have an impact on the acquisition of the English TA, such as L1 influence, must be considered.

3.3.2 L1 influence

Due to a long-standing focus on testing the predictions of the aspect hypothesis (which does not predict any L1 influence) and overuse of metalinguistic tasks, the role that learners’ L1 plays in the acquisition of TA has been somewhat neglected (Slabakova, 2002), and only a

limited number of studies have addressed L1 influence directly. However, there is ample evidence, from both studies that do or do not directly account for L1 influence in their design, that L1 is a major factor in the L2 acquisition of TA. These L1 effects have been observed on a variety of tasks such as metalinguistic tasks, in production and in online processing.

There is evidence of L1 transfer from metalinguistic tasks, in which learners have more access to explicit knowledge of TA (Collins, 2004; Gabriele & Martohardjono, 2005; Liszka, 2004; Yoshimura, Nakayama, Fujimori, & Sawasaki, 2014). Collins (2004) tested L1 French and L1 Japanese learners of English on a 25-passage rational cloze task in which the participants were asked to complete sentences by putting given verbs into the appropriate tense. The results showed that the French, but not the Japanese group, supplied the past simple tense less accurately due to the overuse of present perfect. The author ascribed the results of the French group to L1 transfer, as the rough equivalent of the English present perfect tense in French is similar to English in form, but not in function.

Similarly, Liszka (2004) tested three groups of L2 English participants (L1 German, Japanese and Chinese) on a task which required the participants to listen to definitions of different verbs and then put the verbs into the past simple tense in sentences. The author reports that all three groups had trouble producing the present perfect tense in a target-like manner but each had different error patterns, which could be linked to the participants' L1. The L1 German group had difficulties in establishing the reference time and showed a strong preference for preterit marking in non-present perfect contexts, while the Japanese and Chinese groups alternated between the present and preterit marking. Finally, findings from Yoshimura et al.'s (2014) study investigating whether the durative nature of events has an impact on the use of English past tense also found L1 effects. The authors tested 121 L1 Japanese L2 English learners at three proficiency levels (low, intermediate and advanced) on a truth value judgement task in which the participants read a short paragraph and had to decide whether the corresponding sentence is an appropriate depiction of the paragraph. In English the past simple tense is specified for durativity (i.e., it denotes events of certain duration) but in Japanese the marker of past tense *-ta* (similar to English *-ed*) is unspecified for durativity and can occur with events which are specific and/or lasted for some time. In line with their L1, the learners extended the form *-ta* to the English past tense. However, the L1 transfer improved with proficiency, and was less pronounced with the advanced group.

Studies investigating L2 oral production of the English TA have also reported that

the participants' performance was highly influenced by their L1 (Chen, 2016; Hawkins & Liszka, 2003; Liszka, 2015). Hawkins and Liszka (2003) asked two L1 Chinese, five L1 Japanese and five L1 German L2 English speakers to retell a short extract from a silent film and to recount a personal happy experience. They found that the participants' performance was highly influenced by their L1 with the Chinese participants (whose L1 does not overtly mark tense) performing differently to the L1 Japanese and L1 German groups (both languages grammaticalise tense as in English). The L1 Chinese participants produced uninflected regular verbs in over one third of all cases in contexts that unambiguously required the verb to be marked for past tense. In addition, Liszka (2015) tested five L1 French learners of English (highly advanced and immersed) on a video retelling tasks. The focus of the study was the production of the present simple and progressive. The participants were observed to fluctuate between the present simple and progressive in contexts requiring progressive interpretations, with accurate use of the progressive being around 60%. Finally, Chen (2016) asked her L1 Turkish, L1 Korean and L1 Mandarin learners of English (and a control group of L1 English speakers) to complete a set of eight stories with given verbs. Turkish and Korean, like English, encode tense morphologically, while Mandarin does not. The L1 Mandarin/L2 English group were significantly less accurate in inflecting verbs for tense than the other L2 groups as well as the L1 English group, which indicates that the lack of tense morphology had a negative impact on the L1 Mandarin/L2 English group's performance.

In recent years there has been a growing interest not only in the metalinguistic knowledge and the production of TA, but also in how TA is processed online. A small body of studies, which have investigated online processing of TA using the self-paced reading paradigm, also report L1 effects (Chan, 2012; Eriksson, 2016; Roberts & Liszka, 2013).

For example, Chan (2012) tested L1 English speakers and L2 English speakers from Korean, German and Chinese L1 backgrounds. English, Korean and German mark tense morphologically while Chinese has no overt tense marking. However, Chinese (like English) has grammatical markers of aspect. Chan conducted an SPR experiment testing the participants' sensitivity to TA violations. The violations were both grammatical and semantic as shown in example 58 (Chan, 2012, p. 53).

- 58.
- a. Yesterday several large snakes escaped from their cage at the zoo.
 - b. *Yesterday several large snakes escape from their cage at the zoo.
 - c. *Tomorrow several large snakes escaped from their cage at the zoo

The sentence in (58a) is well-formed since the adverbial *yesterday* matched the verb *escaped* which is inflected for past tense. According to Chan, the sentence in (58b) is a grammatical violation because the adverbial *yesterday* does not match the verb which is present tense. The sentence in (58c) is claimed to be a meaning violation because the tense is correct but the adverbial *tomorrow* is impossible with a verb in past tense. However, it is difficult to see how (58b) is a grammatical violation but (58c) is not, because both consist of the same error - a mismatch between the adverbial and the tense. The results of Chan's (2012) study show that the L1 English group read match sentences faster than mismatch with both grammar and meaning violations. However, the p-values for grammar violations are close to indicating non-significance (e.g., $p = 0.028$ on the verb, and $p = 0.033$ on the second segment following the verb) and had a Bonferroni adjustment been used the significance would disappear. The significance values for the meaning violations are more convincing, but this does not prove that the participants were more sensitive to meaning as opposed to grammar violations. At best it reveals that the violation in (58c) is more unacceptable for participants than the violation in (58b). Thus, although Chan's study is a much needed attempt at investigating TA processing with learners from various L1 backgrounds, the methodological issues with the stimuli make the results somewhat difficult to interpret.

Similarly, Roberts and Liszka (2013) used SPR to investigate L2 online comprehension of the English past simple and present perfect with L1 French and L1 German learners of English (and a control group of L1 English speakers). In addition, the participants were also given an Acceptability Judgement Task (AJT) to determine their explicit knowledge of the above-mentioned structures. Although both L2 groups demonstrated explicit knowledge of past simple and present perfect, only the L1 French group was significantly sensitive to mismatches of both tense, while the L1 German group showed no sensitivity to either tense. The authors explain the results in terms of L1 transfer. While all three languages grammaticalise tense, only French, like English, has grammatical markers of aspect. In addition, French also has a compound past which encodes both past simple and present perfect. On the other hand, German has no overt grammatical marking of aspect and relies heavily on adverbs. Roberts and Liszka suggest that the L1 French group was sensitive to present perfect because it combines both aspect and tense, and since French marks aspect (albeit differently) this was enough for positive transfer to occur. The L1 German group, whose L1 does not encode aspect, was not sensitive to the same structure. However, what is slightly puzzling is why only the L1 French group was sensitive

to past simple. German also marks tense grammatically so the L1 German participants too should have been able to transfer their L1 morphosyntax into English, like the L1 French group.

It is also interesting to note that in this study, the native speakers of English were only significantly sensitive to present perfect but not past simple violations. The authors ascribe this finding to the changing nature in which present perfect is being used. In American English, it would be perfectly acceptable to say *I didn't read it yet*, whereas British English would traditionally have required a sentence with the present perfect tense *I haven't read it yet*. However, the American use is being more frequently used in British English nowadays.

Eriksson (2016) conducted a semi-replication study of Roberts and Liszka (2013) with advanced L1 Russian learners of L2 English, and found that while native speakers behaved similarly to the L1 participants in the original 2013 study, the L1 Russian learners did not appear to be sensitive to violations of either tense, much like the L1 German learners in Roberts and Liszka's study. This is evidence against Roberts and Liszka's (2013) hypothesis that as long as the L1 of the learner encodes aspect grammatically, learners should be able to transfer this to their L2. L1 Russian L2 English learners, whose language grammatically encodes the imperfective/perfective aspectual distinction, should have shown sensitivity to at least present perfect, like the L1 French learners in Roberts and Liszka's study. In addition, Eriksson (2016) claims that most verbs in Roberts and Liszka's stimuli were atelic, thus creating an imbalance. The stimuli in Eriksson's study were balanced for telicity/atelicity and found that the telicity of the verb affected the performance of the L1 English group in particular. With present perfect, the L1 English speakers showed a greater processing cost with atelic than telic verbs, while with past simple they showed sensitivity to TA violations only with atelic verbs but not telic verbs.

3.4 Limitations of previous research

One criticism of previous research has been that it has not sufficiently and systematically accounted for the role the learners' L1 plays in L2 TA acquisition (Jiang et al., 2011; Slabakova, 2002). This can be mainly attributed to two reasons. Firstly, much of the previous research into L2 TA acquisition has focused on testing predictions of the aspect hypothesis (briefly discussed in section 3.3.1), which does not predict that L1 transfer will play a significant role (Gabriele et al., 2005). In addition, it seems that previous research has overly utilised data elicitation methods which mainly assess the learners' explicit knowledge of

morphosyntax, such as various cloze type tasks. The issue with such methods is that learners have been shown to perform more accurately on measures of explicit knowledge of morphosyntax than on, for example, online production measures (Hopp, 2009; Sabo, 2014), thus yielding only a partial picture of L2 acquisition of TA. As demonstrated in section 3.3.2, the L1 of the learners has a large impact on TA acquisition, and more research is needed that systematically controls for L1 differences and effects.

Furthermore, just as with research into English articles, the majority of previous research has investigated L2 acquisition of TA using metalinguistic and oral production tasks. We are only beginning to build a picture of how TA is processed online, and more studies using online processing methods are needed.

Finally, particularly relevant to the present study is the L1 background of the learners. With studies into L2 article acquisition there has been quite an interest in the L1 Mandarin L2 English population, while this group is particularly underrepresented in TA research, which has largely focused on European languages (French, German, etc.), and with Asian languages most often on Japanese. In addition, studies investigating the TA acquisition of L1 Slavic L2 English learners are also scarce. Therefore, the present study aims to expand the populations tested in relation to the L2 acquisition of TA by testing L1 Croatian (Slavic) and L1 Mandarin (Asian) L2 English learners.

3.5 Chapter summary

The acquisition of the English TA remains a difficult task for L2 English learners, even more so with complex structures such as the present perfect. Previous research has shown that learners often confuse the meaning of present perfect with the meaning of other tenses such as the past simple, especially due to the overlap between the two structures which both encode anteriority. However, in addition to anteriority, the present perfect also connects the past to the present. This connection between two time spans appears to be especially difficult to acquire for L2 learners whose L1 does not have equivalent structures (e.g., Croatian, Russian, German, etc.). Present perfect is also said to appear later in the learner language than other simple tenses (e.g., past or present simple) and requires more awareness and control as it has been found to be produced more accurately on tasks which allow time and greater control.

The majority of previous research has focused on the role of explicit knowledge and oral production of the English TA, with only a modest interest in online processing. However just like with research into (English) articles, it is paramount that more studies using online

processing methods are conducted. Online processing studies provide a window into the learners incremental processing of sentences and helps us to better understand how sentences are comprehended in the L2.

Finally, previous studies show that the L1 of the learners has a bearing on how TA is used and processed in the L2. However, there is a need for more studies that directly investigate L1 effects in both L2 TA use and processing.

Chapter 4: Implicit and explicit knowledge

4.1 Introduction

The distinction between implicit and explicit knowledge and learning has been largely accepted with the field of SLA and has been supported by a variety of behavioural but also neurobiological studies (Godfroid et al., 2015). This chapter starts with a brief overview of the differences between implicit and explicit knowledge as well as learning and their importance in SLA. The next two sections discuss the most commonly used methods of testing implicit and explicit knowledge and their individual advantages and drawbacks. Finally, the chapter concludes with a discussion of previous literature that has investigated the influence of a speaker's L1 on their L2 use of implicit and explicit knowledge.

Implicit knowledge is a type of linguistic knowledge that is unconscious, cannot be verbalised (R. Ellis, 2009) and is inaccessible to conscious introspection (Mitchell, Myles, & Marsden, 2013; Rebuschat, 2013). In other words, implicit knowledge is applied without conscious effort and individuals are not aware that they have this knowledge (Godfroid et al., 2015). Examples of implicit knowledge include being able to walk or knowing how to ride a bicycle, or in linguistics, knowing how and when to use the past simple tense without much effort or awareness.

Explicit knowledge, as opposed to implicit knowledge, is a type of linguistic knowledge that relies on awareness and usually can be verbalised (R. Ellis, 2005). Individuals are aware of what they know, and the knowledge can be applied consciously (Godfroid et al., 2015).

It is important to distinguish between knowledge and learning. According to R. Ellis (2009) learning refers to the *process* by which we learn while knowledge is the *product* of that learning. Implicit learning 'proceeds without making demands on central attentional resources (R. Ellis, 2009, p. 3). On the contrary, explicit learning poses considerable demands on the attentional resources and relies on the memorisation of a series of fact (R. Ellis, 2009).

L1 speakers of a language are said to use their language implicitly and remain largely 'unaware of the learning that has taken place (R. Ellis, 2009, p. 3), whereas L2 learners usually need to apply some degree of awareness and explicit learning in the process of acquiring the L2. However, it is possible for L1 speakers to reflect on and become aware of

the implicitly acquired knowledge which allows them to develop explicit knowledge as well. For example, an L1 speaker of English who teaches English in a secondary school will probably need to develop explicit knowledge and understanding of sentences containing a relative clause in order to be able to teach the same structure to their students.

Furthermore, explicit knowledge is thought to aid L2 acquisition in numerous ways: a) accelerates creation of links between form and meaning; b) supplements implicit knowledge in linguistic problem solving; and c) is thought to aid implicit learning (see Gutiérrez, 2013 for detailed summary).

More specific to late L2 learners (who are the focus of the present thesis), there is behavioural and neurological evidence that late L2 learners benefit more from explicit instruction than from learning under implicit conditions (Batterink & Neville, 2013; Morgan-Short, Steinhauer, Sanz, & Ullman, 2012; Norris & Ortega, 2000). However, the relationship between explicit and implicit knowledge has been a highly debated topic in the field of second language acquisition. More specifically, it is still unclear whether explicit knowledge can become implicit knowledge. For example, VanPatten (2016) claims that explicit knowledge cannot become implicit knowledge in L2 learning and what the observed improvement with increased proficiency is automatised explicit knowledge, while DeKeyser (2003) argues that even if it is automatised explicit rather than implicit knowledge those two are functionally the same.

4.2 Testing implicit knowledge

Most commonly used methods to investigate the use of implicit knowledge in sentence processing are online methods which “gather information about sentence interpretation as each word or phrase is read or heard in real time” (Keating & Jegerski, 2015, p. 2), and are believed to best tap into implicit knowledge by limiting the use of explicit knowledge. Although there are numerous online methods, most studies investigating L2 sentence processing deal with sentence comprehension using either eye-tracking, event-related brain potentials (ERPs), or self-paced reading (SPR). Online processing is particularly interesting and relevant because it is comparatively less is known about how L2 learners process the L2 online than about other aspects of language acquisition and use which have usually been supported by data collected via offline methods such as judgement and comprehension tasks (Marinis, 2003). In addition, Roberts (2012) comments that one of the reasons online techniques have become so popular in the last decade or so, is because researchers have become more aware ‘that acquiring the target language involves both the

accumulation of second language (L2) knowledge and the ability to put that knowledge to use during real-time processing' (Roberts, 2012, p. 113).

Furthermore, online techniques enable us to contribute to two central debates in SLA. Firstly, whether the persistent problems with morphosyntax that L2 learners experience even at advanced proficiency are due to a representational deficit or a processing problem (Roberts, 2012). Secondly, whether there are fundamental differences between how native speakers and L2 users process language (Roberts, 2012).

The present thesis utilised the SPR paradigm, and therefore, the rest of this section focuses on the critical overview of this particular method of tapping into participants' implicit knowledge'. During an SPR experiment, participants read sentences one word at a time, and the words usually appear in the middle of a computer screen (depending on the design). When a participant wants to see the next word, they press a designated key, and the process continues until the whole sentence has been read. Reading times (RTs) in milliseconds are obtained for each word. Of particular interest to researchers are instances when the participants slow down while reading a sentence (i.e., the RTs are higher), as this usually indicates "the moment where difficulty (processing cost) arises" in sentence comprehension (Marsden et al., 2018, p. 865) One of the reasons why a processing difficulty might occur, is because a sentence contains a violation of some sort (e.g., is ungrammatical) (Roberts, 2016). In SPR studies participants are usually presented with both grammatical and ungrammatical sentences, and the assumption is that if the grammatical knowledge of the structure in question is available to learners in real-time, they will be slowed down by the ungrammatical element in the sentence (Roberts, 2016).

SPR has been a popular method in L2 research, especially from 2010 onwards, for investigating tense-aspect agreement and the so-called garden-path sentences (Marsden et al., 2018, Roberts, 2016). However, despite its popularity, the SPR method needs further empirical validation – in terms of whether it actually taps into participants' implicit online processing as well as in terms of best practice (standardisation) in study design (Marsden et al., 2018).

Marsden et al. (2018) conducted a methodological synthesis of 74 SPR studies in L2 research and found that although the main rationale for using SPRs was to investigate automatic/implicit learner knowledge and/or processing mechanisms, none of the studies discussed in depth the nature of such knowledge/processing. This is potentially problematic considering that there is some evidence that tasks that are written and not time-constrained are usually more suitable for tests which seek to allow access to awareness and

explicit knowledge¹⁰. One way forward could be incorporating measures such as retrospective subjective measure or knowledge source judgement into SPR studies which would enable researchers to investigate the level of awareness that is present during an SPR task (Marsden et al., 2018; Rebuschat, 2013).

The current lack of discussion (consensus even) on the potential role of awareness and attention in SPRs is not their only weakness, but there is also a lack of standardisation of SPR study design. The methodological synthesis by Marsden et al. (2018) found that the inconsistencies in study design range from sample sizes and stimuli design to statistical analysis used. For example, the sample sizes across subgroups (a whole sample of a study divided into proficiency or L1 groups) ranged from 10 to 69 participants with the average of 26.91. Furthermore, out of the 36 studies that compared multiple groups, only 14 had the same sample size across groups. Unequal sample sizes are not immediately a problem, but if the variation is considerable it is usually necessary to account for that by using different statistical methods for analysis (which does not necessarily appear to be the case with the studies analysed in the synthesis). Another area of study design which needs empirical validation, is the ratio of critical items compared to noncritical items required, since having too many critical items in an experiment can raise participants' awareness of the target features being investigated. So far there has been no research into the effects of this ratio on the results. The data cleaning procedures would also benefit from standardisation. At present the guidelines by Keating and Jegerski (2015) recommend removing extreme RTs per word and per participant, but there is a variety of cut off points chosen in studies. Some studies remove all RTs below 200 and above 2000ms, while others use more conservative lower cut off of 100ms and a more liberal upper cut off of 250ms. This is important as any data cleaning results in data loss and can affect the power of the subsequent analysis.

Finally, the majority of studies analysed in the above-mentioned methodological synthesis of SPRs used ANOVAs to identify within and between subject effects. In recent years the widely spread use of ANOVAs instead of other (potentially more suitable analyses such as multiple regression) has been questioned (for a review see Plonsky & Oswald, 2017). Another potential issue with the use of ANOVAs is their use with artificially created groups, such as dividing a group of participants into those who read faster and those who read more slowly. In addition, despite the fact that most SPR studies perform several analyses on the same data (usually comparisons across different segments), the advisable Bonferroni

¹⁰ Recent (yet unpublished) work by Godfroid et al. (2018) provide evidence that SPRs can be considered measures of implicit knowledge compared to other methods, such as the GJTs.

adjustment for multiple testing is rarely used. Finally, reporting effect sizes has not become a convention yet despite its many benefits. For one, reporting effect sizes (or at least reporting means and standard deviations so that effect sizes could be calculated) would help with conducting meta-analyses and methodological syntheses. Secondly, it would help with interpreting the significance of p-values, especially in the absence of the Bonferroni adjustment. Thirdly, it would help us depart from the dichotomous interpretations of results (e.g., absence versus presence of an effect) and move towards a more informative magnitude of the effect.

Despite the need for more empirical validation and methods standardisation (Marsden et al., 2018), SPR as a measure of online processing is a useful method and has been widely used in the last decade in second language research to investigate incremental parsing and reanalysis in a variety of morphosyntactic phenomena (Hopp, 2006; Jiang, 2004; Pliatsikas & Marinis, 2013; Roberts & Felser, 2011; Song, 2015). However, it has not yet been widely used for investigating the comprehension and processing of articles. The present study aims to fill this gap by using SPR to test sensitivity to violations of English articles.

4.3 Testing explicit knowledge

Over the years, several methods of testing explicit knowledge have been developed which include grammaticality judgement tests (GJTs), rule verbalisation tasks (e.g., Green & Hecht, 1992; Hu, 2002), gap-filling tests (e.g., Macrory & Stone, 2000), and tests of metalinguistic knowledge (Bowles, 2011; Ellis, 2005).

Considering that SPRs are thought to provide a window into knowledge and/or processing operating below the level of consciousness, they are usually administered in combination with a test that is considered a measure of explicit knowledge, most commonly GJTs (Marsden et al., 2018). However, the validity of GJTs and which type of knowledge they actually tap into has been debated (N. Ellis, 2005; Ellis, 1991; R. Ellis, 2005; Gutiérrez, 2013; Vafaei et al., 2016).

In the past, GJTs were considered a measure of explicit knowledge exclusively, but this notion has been contested in more recent studies which suggested that GJTs measure both implicit knowledge and explicit knowledge depending on the type of test (timed or untimed) and/or type of sentence (grammatical or ungrammatical). One of the first studies that set out to empirically test how well different types of GJTs measure explicit knowledge and implicit knowledge respectively was carried out by Ellis (2005). According to Ellis' factor analysis the timed and the untimed GJT loaded onto two distinct factors, confirming his

hypothesis that the untimed and the timed GJTs are a measure of explicit knowledge and implicit knowledge respectively. This two-factor model was also supported and further developed in later studies (Bowles, 2011; Ellis & Loewen, 2007; Gutiérrez, 2013).

The view that timed GJTs restrict access to explicit knowledge is also supported by eye-tracking data. Godfroid et al. (2015) collected data from 20 L1 English speakers and 40 L2 English speakers (from various L1 backgrounds) using the eye-tracking paradigm. The participants' eye movements were tracked as they read 68 English sentences (with or without a grammatical error) in both untimed and timed conditions. The results showed that while the L1 English speakers remained largely unaffected by the manipulation (timed or untimed), the L2 English speakers did not have enough time to access their explicit knowledge and engage in controlled processing during the timed task.

However, Vafaei et al. (2016) contested the idea that different types of GJTs can be seen as distinct measures of explicit knowledge and implicit knowledge, and the authors developed new sets of GJTs in order to measure performance on the timed/untimed and grammatical/ungrammatical tasks, and also compared the results to the performance of the same participants on two online processing measures (self-paced reading tasks and word-monitoring task). The results did not support the claim that untimed GJTs can be seen as a distinct measure of explicit knowledge and timed GJTs a distinct measure of implicit knowledge. The authors posit that GJTs of any type focus the participants' attention on form, and there is no guarantee that a time limit will prevent them from drawing on their explicit knowledge. Explicit and implicit knowledge are seen as a continuum, and online processing tasks such as self-paced reading are thought to be further on the implicit continuum, while GJTs are further on the explicit continuum.

However, even if GJTs are assumed to measure only explicit knowledge, researchers cannot always be sure that they are measuring the explicit knowledge of the desired structure/feature. For example, although told to make judgements about grammaticality of the sentence, we cannot be sure that the participants can effectively distinguish between grammar, semantics and even pragmatics of a sentence. The issue of what the participants are actually rating on a GJT task also seems to be problematic in the use of GJTs in SPR studies. The stimuli used in the GJT task are usually identical to the SPR stimuli, consisting of at least two sentences (critical item sentence and a follow up sentence). However, judging by the stimuli provided in previously published SPR studies, the participants are often asked to simply judge whether each stimulus is correct or not, without taking into consideration that a stimulus is comprised of (at least) two sentences which need to be

judged, and the researcher is relying on the participants to “know” which sentence to judge. One possible solution would be to clearly identify the grammatical structure the participants are asked to judge, by for example underlining it. Another solution is provided by Gass and Mackey (2011) who suggest that along with judging the sentences, the participants should also be asked to correct the error(s) in the sentences they are judging as ungrammatical to ensure they are, in fact, judging the target form chosen by the researcher.

4.4 L1 influence on L2 explicit/implicit knowledge

However, what has not been consistently considered in investigations of the relationship between explicit and implicit knowledge is the role of the L1 and its impact vis a vis different training conditions. For example, it is not clear whether explicit training has equal gains for similar and unique-to-L2 structures. A recent study by Umeda et al. (2017) found that L1 Japanese learners of English benefited from explicit instruction on English articles only short-term but not long term (one year after instruction), which the authors interpret in support of VanPatten’s (2016) claim that explicit knowledge does not become implicit knowledge. What is important to note is that Japanese is a language without an overt article system, which means that the structure under investigation was unique to the L2. It would be interesting to see in future research whether long-term gains of explicit article instruction would be observable with a group of participants whose L1 grammaticalises articles. This would enable us to further test whether explicit training has equal gains on similar and unique morphosyntactic structure, and whether explicit knowledge can become implicit when similar structures are in question.

The present thesis used what are thought to be measure of both explicit (GJT) and implicit (SPR, oral production) measures. The results of the present thesis indicate that the L2 participants had explicit/metalinguistic knowledge of the morphosyntactic structures tested (English articles and TA), and they were able to process/produce some aspects of those structures (but not others) with high accuracy or in a similar manner to the L1 English group. However, the results cannot specifically comment on whether the aspects of the structures tested that the L2 participants processed/produced in a targetlike manner was a result of the participants’ use of automated explicit or implicit knowledge. The results can arguably suggest that the L2 participants had the ability to use some of their explicit/metalinguistic knowledge of English articles and TA in a more fluent/automated way, but this was highly influenced by their L1. The L2 participants seemed to have greater (unconscious) control over the processing and production of morphosyntactic structures

that were congruent in their L1 and L2 (e.g., articles for the L1 Mandarin L2 English participants, and tense for the L1 Croatian L2 English participants) than over structures that were incongruent (tense for the L1 Mandarin L2 English participants, and articles for the L1 Croatian L2 English participants). Therefore, the results from the present thesis yield some support to the above suggestion that L1 effects should be teased apart in studies investigating the role and relationship of explicit and implicit knowledge.

Chapter 5: Acquisition of unique-to-L2 syntactic structures

5.1 Introduction

Research into adult L2 acquisition and processing shows that certain features of morpho-syntax, such as articles, are more difficult to acquire than others, and the problems are observable in both production and comprehension, even at advanced proficiency levels (Hopp, 2009). The reasons as to why some structures are more difficult to acquire than others, and, ultimately, whether late L2 learners can acquire such structures to a native-like level are still under debate. On the one hand, some researchers argue that late L2 learners are able to acquire full representations of morphosyntax, and that the variable acquisition is a result of the extent to which this acquisition has been automatised. This view is often collectively referred to as the performance deficit approach. In other words, although a morpho-syntactic feature might have been acquired, there may be a delay before it is fully controlled, and as a result, learners may have problems with accessing, retrieving and controlling a particular feature (Jiang, 2004).

One of the models proposed under the performance deficit approach is the missing surface inflection hypothesis, which assumes that inflection is absent on the surface morphological level rather than it being a representational deficit (Prévost & White, 2000). Main support for the missing surface inflection hypothesis comes from studies investigating tense marking. Lardiere (1998) investigated spontaneous oral production of a highly proficient L2 speaker of English from a Chinese L1 background who had been living in the USA for 18 years at the time of the testing. Although Patty achieved low accuracy with past tense and third person marking, she had no problems with nominative case assignment (e.g., subject pronouns) and was aware that English verbs do not raise. The author interpreted the findings as evidence that Patty's problems are due to morphological marking rather than a deeper representational deficit. Similarly, Prévost and White (2000) collected longitudinal oral production data from two learners of L2 French (L1 Arabic) and two learners of L2 German (L1 Spanish and Portuguese). The results give support to the missing surface inflection hypothesis since the participants were able to distinguish between finite and non-finite morphology.

On the other hand, researchers in support of the representational deficit approach assume an underlying representational deficit in functional features resulting in incomplete

acquisition of target-like representations (Chen, 2016). The learners are said to possess knowledge of the rules of grammar, but this has not been fully integrated for automatic use (Jiang, 2004). One of the hypotheses which assumes a representational deficit is the failed functional features hypothesis proposed by Hawkins and Chan (1997). Building on the work of Smith and Tsimpli (1995), the authors propose that functional features are subject to maturational constraints and that beyond that critical period such features can no longer be acquired or modified. When the features differ significantly between the L1 and L2, they cannot be successfully integrated into the L2 grammar and will remain untargetlike. Therefore, late L2 learners will either treat their L2 as if it were their L1, or they will develop an interlanguage which neither resembles the L1 nor the language of native speakers.

Several other models also argue for a critical L1 influence on L2 acquisition, but unlike the failed functional features hypothesis, they do not see the deficit as a result of maturational constraints but rather problems in activation. This is discussed in the next section.

5.2 L1 influence

The L1 seems to have a substantial influence on how well certain grammatical structures will be acquired by late L2 learners. Numerous studies have found that when late L2 learners acquire a grammatical feature that is similarly instantiated in their L1, the acquisition is easier and more felicitous than when the feature in question does not exist in their L1 or is realised in a completely different way (Jiang, 2004; Jiang, Hu, Chrabaszcz, & Ye, 2017; Jiang et al., 2011; Rankin, Grosso, & Reiterer, 2015). L1 effects have been observed with a wide variety of structures (e.g., past tense marking, articles, number agreement) and with different methodologies (oral production, sentence comprehension, ERPs).

One of the early models that has attempted to account for L1 effects in L2 acquisition is the competition model for L2 learning (MacWhinney, 1997, 2005). The competition model posits that a learner's L1 is entrenched in the learner's mind due to extensive exposure and use of the L1. As a result, when learning an L2, learners are highly subject to the influence of this entrenched L1. Thus, it is likely that the L1 morphosyntactic system will have a big impact on L2 comprehension and production (of morphosyntax) through transfer. The transfer that occurs can be either positive or negative. When features of morphosyntax are similar in the L1 and L2, learners will be able to rely on their L1 processing mechanisms, which usually aids and even speeds up L2 acquisition of a similar feature. This is also referred to as positive transfer. By contrast, when a feature is realised differently in

the L1 and L2, negative transfer occurs as learners may erroneously transfer aspects of the feature from the L1 into the L2. In addition, negative transfer might give rise to competition between the L1 and L2 licensed structures as a result of both languages being activated in a bilingual learner's brain. Which structure wins, L1 or L2, depends on the strength of the linguistic cues (Van Hell & Tokowicz, 2010).

When it comes to structures that are unique to the L2, namely, that do not exist in the L1 but do in the L2 (e.g., English has a grammaticalised article system, whereas Mandarin does not), the competition model predicts that the L2 learner will neither profit nor suffer from competition or negative transfer (Tolentino & Tokowicz, 2011). In fact, learners may acquire a unique-to-L2 structure more easily and quickly since there is no transfer or competition to control (Foucart & Frenck-Mestre, 2012).

There is ample evidence in support of the competition model predictions of L1 transfer and simultaneous activation of both languages during L2 processing from behavioural (Jiang, 2004; Jiang et al., 2011; Roberts & Liszka, 2013) and neurolinguistic studies (Luque-Ferreras & Morgan-short, 2017; Sanoudaki & Thierry, 2015). However, a major weakness of the competition model is its treatment of unique-to-L2 structures, since findings from a number of studies suggest that L2 learners do not acquire unique-to-L2 structures easily. In fact, it is highly debatable whether such structures can be acquired at all to a native-like level.

Another theoretical model that is similar in its predictions of L1 influence to the competition model and the L1-L2 structural competition model is the morphological congruency hypothesis developed by Jiang and colleagues (Jiang, 2004; Jiang et al., 2017, 2011). The morphological congruency hypothesis sees languages as either (morphologically) congruent or incongruent. According to Jiang et al. (2011), two languages are considered congruent when they morphologically grammaticalise and mark meaning, while languages are considered incongruent when a grammatical morpheme is present in only one of the languages. Just like with the competition model and the L1-L2 structural competition model, congruency between languages is thought to aid acquisition of morphosyntax, and the morphological congruency hypothesis posits that highly proficient L2ers will show patterns of morphosyntactic acquisition and processing similar to that of native speakers. By contrast, acquisition and processing of incongruent structures will always remain untargetlike. Support for the morphological congruency hypothesis is ample.

Studies comparing L2 learners from congruent and incongruent L1s show that congruent L2 learners almost always outperform the incongruent L2 learners (Hawkins &

Liszka, 2003; Jiang et al., 2011). Hawkins and Liszka (2003) tested a small number of L2 English learners from L1 Chinese, German and Japanese backgrounds on an oral production task in order to investigate how accurately the participants mark verbs for past tense. The results showed that the Chinese group produced uninflected verb forms significantly more frequently than the other two groups. The authors take the results to be evidence of L1 transfer since both German and Japanese grammaticalise tense and Chinese does not. Learners from congruent L1s outperform those from incongruent L1s on elicited imitation tasks as well. For example, Charabaszcz and Jiang (2014) investigated L2 acquisition of English articles by testing L1 Spanish (articles) and L1 Russian (no articles) L2 English learners on an elicited imitation task. The results showed that when asked to repeat sentences they had just heard, the L1 Russian group omitted articles significantly more frequently than the L1 Spanish group or L1 English controls, even when they were asked to repeat a sentence in which the article was correctly used. By contrast, the L1 Spanish group performed similarly to the L1 English group. Studies using the self-paced reading paradigm point to similar congruency effects. Jiang and colleagues (2011) tested whether advanced L1 Russian and L1 Japanese L2 learners of English were sensitive to plural marking violations using SPR. The L1 differences between Russian, which has grammatical markers of plural, and Japanese, which does not, were evident in the results since the L1 Russian group, but not the L1 Japanese group, were statistically sensitive to plural violations. Another study by Jiang et al. (2015) which used the reaction time paradigm tested L1 Russian and L1 Chinese L2 learners of English. However, unlike with SPR in which the participants' reactions times are measured as they read sentences word by word, this study measured the participants' reaction times to pictures which either matched or did not match a sentence the participants heard. The feature being investigated was the English number agreement, which is similarly realised in Russian (morphologically), but not in Chinese. Both the L1 English controls and the L1 Russian L2 English group took significantly longer to respond to mismatch than match items, while the L1 Chinese L2 English group showed no such effect.

Jiang, Charabaszcz and Ye (2017) explain the morphological congruency effects as a result of certain grammatical meaning not being automatically activated in the mind of an L2 speaker. Languages differ in what meanings are grammaticalised, and a meaning that is grammaticalised in both the L1 and L2 is already automatically activated in the speaker's mind, and they only need to learn to apply it to the L2 meaning. By contrast, when a meaning is grammaticalised in the L2 but not the L1, the speaker has no automatic activation in the L1 to fall back on and has to learn to automatically activate that meaning

in the L2 only. Jiang et al. (2017) tested their hypothesis in a series of experiments. One of the experiments tested 26 L1 Russian and 28 L1 Chinese L2 English learners of advanced proficiency who were living in the USA at the time of testing. The participants were shown pictures with three objects and then a sentence which described the relationship between the objects, and they were required to say whether the picture and the sentence were a match. The relationship between the objects was physical (e.g., spatial position), but there was also a hidden manipulation of number as some sentences contained a number match and others a number mismatch. The results showed that the L1 Russian participants, whose L1 grammaticalises the singular/plural distinction, were significantly sensitive to the number mismatch. But the L1 Chinese participants, whose L1 uses lexical means to indicate plurality, showed no sensitivity. The authors take the results to suggest that singular/plural distinction is automatically activated for the L1 Russian L2 English speakers and helps them in sentence processing.

Jiang et al. (2017) extended the experiment further to investigate whether the lack of grammatical number in Chinese means that for Chinese speakers the lexicalised singular/plural meanings would be automatically activated. They tested 26 L1 Chinese L2 English speakers (in immersion) on a similar task as described above, except these stimuli contained words such as *several* in addition to a plural noun. The results showed that the participants were significantly sensitive to the lexical number mismatches, which is taken to indicate that such meanings are automatically activated for the participants. However, what is not clear is why L1 Russian L2 English speakers, or even L1 English speakers, were not tested on this task as well. English, as well as Russian (and probably most languages), uses lexical means to express number but may do it less frequently than languages without the additional grammatical means. Therefore, it is likely that L1 Russian and L1 English speakers would also be sensitive to a lexical number mismatch.

In summary, it is clear that a learner's L1 plays a crucial role in the acquisition of L2 grammar, with incongruent morphosyntactic features (those that exist in the L2 but not in the learner's L1) presenting a particular challenge. Some of the theoretical models which aim to account for variable L2 acquisition due to L1 influences discussed above predict that adult L2 learners' performance on structures which do not exist in their L1 will always remain variable. However, the biggest challenge of such hypotheses is that there is evidence of L2 speakers who show production and/or processing in the L2 that is almost undistinguishable from that of L1 speakers (e.g., Hopp, 2010). It seems that the syntactic impairment or the representational deficit does not apply to all L2 structures and to all L2

participants. There may be conditions (e.g., immersion, very advanced proficiency) which can overcome the impairment/deficit and lead to ultimate attainment¹¹. This is further discussed in the next section.

5.3 Proficiency and immersion

In addition to the L1 of the learners, proficiency and immersion arguably play a role in how well an L2 structure is acquired. The variable amounts and quality of input that learners are exposed to can play a significant part in the outcome of the acquisition of the target L2 (Munoz, 2008). Munoz (2008) defines two types of L2 learning environments -naturalistic and classroom. Naturalistic learning occurs when the learner is immersed in the L2 environment and is usually frequently exposed to the target language. By contrast, foreign language learning occurs through formal learning in the classroom, where learners may experience different levels of exposure to and use of the target language. Also, the quality of the target language may vary as this will depend on the teacher's proficiency and fluency. Although there seems to be an implicit assumption that learning a language in immersion will lead to better outcomes than learning in a classroom, the research supporting this assumption is scarce. In fact, several studies suggest that it is proficiency, rather than type of exposure, that facilitates the acquisition of morphosyntax.

In one of the rare studies that directly controlled for the type of exposure, Pliatsikas and Marinis (2012) found that immersion played no role in the acquisition of English past tense by L1 Greek learners. The authors tested two groups of highly proficient Greek learners of English who differed in the type of exposure they had to the L2. Both groups had learned English in a classroom setting for a mean of 8.5 years, but one group continued to live in Greece, while the participants in the other group moved to the UK and were living there for a mean of 6.6 years. The participants took part in a self-paced reading task which allowed the authors to investigate how the learners processed (ir)regular verbs in English at sentence level. The results revealed three interesting findings. First, the native speakers processed regular verbs more slowly than irregular verbs, which the authors found to be in

¹¹ The expression *ultimate attainment*, as well as *native-like acquisition/processing* have been debated in recent years since they imply that L2 acquisition, processing and/or production are somehow deficient in comparison to monolingual speakers. L2 acquisition and processing, although different from L1, are not necessarily deficient and native-like attainment is not always the goal or necessary for proficient (or even native-like) use of the language. However, this debate is beyond the scope of this PhD (for a discussion on multilingualism see Ortega, 2017). For the purposes of the present study, the term *ultimate attainment* refers to the ability of late L2 learners to produce and process the L2 in a way that is qualitatively similar (or the same) as that of L1 speakers of a particular language.

support of Ullman's dual system model (2004) which posits that irregular verbs are retrieved directly from memory while regular verbs are computed online. According to their explanation, computing the *-ed* rule for regular verbs online requires the process of decomposition, which has greater processing costs and is why slower reaction times with regular verbs were observed. Second, the L2 participants showed a similar pattern in reaction times to the native speakers since they were also slowed down by the regular verbs. Finally, both groups of L2 speakers showed similar effects regardless of whether they had only had classroom exposure or additional naturalistic exposure. Therefore, it seems that immersion in the L2 is not necessary for the past tense rules to become automatized, and a similar effect can be achieved with classroom exposure only. It is important to note that the results of this study could also be explained by L1 effects. The structure tested was congruent in the L1 and L2, which might have facilitated the L2 acquisition regardless of the type of exposure.

However, several studies investigating the acquisition of English articles as a unique-to-L2 structure used immersion participants, although the aim of these studies was not to directly investigate effects of immersion. For example, the study by Chrabaszcz and Jiang (2014), discussed in more detail in section 4.2. of this chapter, used advanced L1 Spanish and L1 Russian participants who had been living in the U.S. for a number of years at the time of testing. If immersion was a crucial factor in the native-like acquisition of unique-to-L2 structures, we would have expected the L1 Russian group (no articles) to perform similarly to the L1 Spanish group and the L1 English controls. Instead, the authors found that the participants' performance on an elicited imitation task was dependent on their L1 such that the L1 Spanish group performed like the L1 English group, while the L1 Russian group performed differently to the other groups. Similarly, three L1 Serbian L2 English participants in Avery and Radisic (2007) who were of advanced proficiency and had been living in Canada for several months at the time of testing showed highly variable article production (see Chapter 2, section 2.6 for more details). This indicates that immersion has had no considerable impact on the participants' ability to produce English articles.

Both of the studies discussed above tested advanced learners, but Hopp (2006, 2010) claims that native-like acquisition of unique-to-L2 structures is possible only at near-native proficiency (equivalent to C2 on CEFR). Hopp (2006, 2010) conducted two studies with two groups of L2 German learners who had been living in Germany for years (immersion) but one group was of advanced proficiency while the other one was of "near-native" proficiency. Hopp (2006) investigated sensitivity to case and subject-verb

agreement in L2 German using the self-paced reading paradigm. The participants were L1 English and L1 Dutch learners of German who were at two proficiency levels, advanced and near-native, and had been living in Germany for a number of years at the time of testing. The results of the SPR showed that the near-native, but not the advanced group, showed reading patterns very similar to that of the L1 German control group. Similarly, Hopp (2010) investigated the processing of subject-object ambiguities in L2 German, also utilising the SPR method. The participants were divided into the same proficiency groups and immersion experience as in the previous study, with the addition of an L1 Russian group. The groups differed as to word order in their L1 (English and Russian are SVO languages, while Dutch is SOV). Again, the results indicated a strong effect of proficiency rather than L1 as all participants that were at near-native proficiency level showed reading patterns similar to that of the L1 German controls. This was not observed with the advanced participants. Thus, based on the results of both studies Hopp concludes that ultimate attainment of unique-to-L2 morpho-syntactic structures by later L2 learners is possible, but only at near-native like proficiency.

Despite compelling and consistent results, it is important to note that Hopp did not fully tease apart proficiency and immersion experience, and it is inconclusive whether the same degree of native-like attainment would also be observed with near-native learners who acquired the language in purely classroom settings. This also begs the question whether near-native proficiency can be acquired through classroom exposure only.

5.4 Bottleneck Hypothesis

The Bottleneck Hypothesis (BH) is a generativist perspective on the comparative difficulty of acquiring different features of the L2 (Jensen et al., 2019; Slabakova, 2009, 2016). The BH posits that functional morphology is the bottleneck of L2 acquisition. Functional morphemes can be broadly categorised into bound morphemes such as verbal inflections (e.g., past tense *-ed*) and free morphemes such as articles in English (e.g., *a*, *the*). Functional morphology is seen as the bottleneck of L2 acquisition for two reasons. Firstly, the hypothesis relies on the Borer-Chomsky Conjecture which posits that the differences among languages are located within the functional morphology while core syntax and semantic operations are executed in the same way in all languages (Jensen et al., 2019). Secondly, functional morphology “bundles a variety of semantic, syntactic and morphophonological features that have an effect on the acceptability and the meaning of the whole sentence” (Slabakova, 2016, p. 2).

One of the recent studies that has found support for the BH (Jensen et al., 2019), tested 60 L1 Norwegian L2 English learners divided into two age groups (11-12 and 15-18) on an acceptability judgement task. The task contained grammatical and ungrammatical sentences testing participants' knowledge of Subject Verb (SV) agreement (representing functional morphology) and word order in declarative sentences (representing core syntax). English and Norwegian differ in those two structures since SV agreement (3rd sing. -s) is obligatory in English but does not exist in Norwegian. Similarly, Subject-Verb-Object is the typical word order in English but is usually not allowed in Norwegian with declarative sentences. The results showed that learners had fewer problems in accurately rating ungrammatical sentences containing word order errors than rating ungrammatical sentences with SV agreement. Furthermore, the authors also found an interaction between proficiency and condition (tested structure) which they take to suggest that accuracy on word order movement (i.e., verb movement) develops more quickly than SV agreement. Overall, the results are taken to confirm the BH.

However, the results of the study by Jensen et al. (2019) do not necessarily require a generativist approach such as the BH to be interpreted. Firstly, the participants mean proficiency was 27.3 out of possible 40 points on a proficiency test. While explicit information is not provided on what level of proficiency this constitutes it can be inferred to fall somewhere in the range of upper-intermediate proficiency according to CEFR. Therefore, the students still have some way to go in developing proficiency and the results observed could be attributed to verb movement being developed sooner than SV agreement. However, from the results, it is difficult to conclude that this equates to SV agreement being more difficult to acquire than verb movement. As the proficiency develops, both structures have the possibility of developing to similar rates of success.

Secondly, it is possible that verb movement develops faster not because it is easier to acquire than SV agreement, but because it is more necessary in communication. Presumably, wrong word order in a sentence would cause more communication problems than simply omitting -s at the end of a verb.

Finally, it is difficult to generalise findings from two particular structures to all of functional morphology and core syntax. Even within functional morphology and syntax there are structures that are harder or easier to acquire than others, and this is often modulated by the learners' L1, proficiency and immersion experience (see sections 5.2 and 5.3).

5.5 Summary

The first part of this chapter presented research which shows that the learners' L1 determines how well a morphosyntactic structure can be acquired with evidence that unique-to-L2 structures often escape ultimate attainment. In addition, a small body of research suggests that immersion does not have a particular effect on the L2 acquisition of unique-to-L2 structures (Pliatsikas & Marinis, 2013), but that highest levels of proficiency facilitate ultimate attainment of unique-to-L2 structures (Hopp, 2006, 2010). However, more research is needed to determine whether immersion is necessary in order to acquire such high levels of near-native like proficiency.

5.6 Rationale and research questions

This section first outlines the overall research question, followed by a discussion of each individual study and the (sub) research questions specific to each study. The overall aim of the present study was to contribute to our understanding of how L2 learners of English produce and process syntactic structures that are unique to their L2, that is, those that do not exist or are not realised in the same way in their L1. Therefore, the main research question of the present study can be formulated as:

RQ1: Can late L2 English learners effectively produce and process L2 morphosyntactic structures that are realised differently in the learners' L1?

In order to answer the three research questions above, three separate studies were conducted:

Study 1: L2 online processing of English articles violations

Study 2: L2 online processing of English TA violations

Study 3: L2 spontaneous oral production of English articles and tense

The online processing of syntactic structures was tested using the SPR paradigm, while spontaneous oral production was tested through an animated film task (details of the task design are presented in Chapter 5). The participants groups consisted of L1 English, L1 Mandarin/L2 English and L1 Croatian/L2 English speakers. The L1 Mandarin and L1 Croatian L2 English learners were chosen specifically, because both languages do not operationalise definiteness (articles) or tense-aspect in the same manner as English does.

The reasons why these particular participant groups and methods were chosen are discussed next, followed by the research questions specific to each study.

5.6.1 Rational for participant groups

When investigating L2 article and/or TA acquisition it is common to use participants from different L1s, with one L1 having the particular morphosyntactic feature being investigated, while the other L1 does not (Chrabaszcz & Jiang, 2014; Díez-Bedmar & Papp, 2008). Much less common, is a group pairing of two L1s that both have or do not have a particular L2 morphosyntactic structure. Thus, we are operating on an assumption that learners from (often completely) different L1s that share a common missing L2 morphosyntactic feature will behave the same or similarly on tests, despite the fact that this assumption has not been tested enough. There is evidence that, for example, L1 speakers of Asian languages (e.g., Korean, Japanese) have similar problems with article acquisition (Kang, 2008; Lee, 2013; Snape, 2007), and the same has been observed among L1 speakers of Slavic languages (e.g., Serbian and Polish) (Ekiert, 2004; Świątek, 2013; Trenkic, 2000). However, studies that have empirically examined the similarities and differences in L2 article acquisition between L1 speakers of Asian and Slavic languages are scarce.

In addition, there is evidence that Mandarin Chinese might be different with regard to article acquisition compared to other Asian languages. Chapter 2, section 2.7. discussed the possibility that Mandarin is on path of grammaticalising some of its markers of definiteness, which would make it somewhat resemble English in this respect. Thus, including Mandarin in the group of article-lacking Asian languages might be problematic, especially without further empirical testing.

Therefore, the present study investigates online processing and oral production of English articles and TA system by two groups that have not been paired together so far.

5.6.2 Rational for self-paced reading

Only a handful of studies have examined the L2 acquisition of both the English article and TA systems using online processing methods, such as self-paced reading (SPR) or eye-tracking. L2 article acquisition has been investigated using the SPR task in two studies (Kim & Lakshmanan, 2008; Kim, 2017), but the design in both studies did not follow the prescribed methodology (e.g., Keating & Jegerski, 2015) – the former analysed the sum of all RTs for each sentence instead of comparing individual segments (words) in each sentence, while the latter presented the critical segment and the article together (in all other cases of noun preceded by an article, the article and the noun were presented separately) thus potentially priming the participants. The only other study to have used an online processing paradigm is the study by Trenkic, Mirkovic and Altman (2014), whose eye-

tracking data show that even at intermediate proficiency level L1 Mandarin learners of English are able to use articles to resolve referent ambiguity faster in real-time.

A handful of L2 online processing studies of TA using SPR (Chen, 2012; Eriksson, 2016; Roberts & Liszka, 2013), showed that the participants' L1 plays a role in their sensitivity to tense-aspect agreement violations. In addition, both Roberts and Liszka (2013) and Eriksson (2016) found that their L1 English speakers did not show significant sensitivity to violations with the past simple tense, indicating that the use of the past simple tense in British English is influenced by the perfect interpretations observed in American English. It is important to note that the L1 English speaker findings are to some extent expected to be similar between the two studies considering that Eriksson's study was a replication of Roberts and Liszka's study.

Thus, there is a clear need for L2 morphosyntax acquisition to be investigated more systematically using online processing measures. The present study employed the SPR task to investigate online processing of both the English article and TA. The part of the SPR task focusing on online processing of English articles is novel and methodologically attempts to adhere to the task design requirements put forward by Keating and Jegerski (2015). The part of the SPR task focusing on online processing of English TA agreement violations, is a semi replication of Roberts and Liszka (2013). The stimuli from their study were adapted to match the article stimuli in sentence length and, whereas Roberts and Liszka (as well as Eriksson) tested sensitivity to past simple and present perfect mismatches, the present study also tested participants' sensitivity to present simple violations.

5.7 Study 1: L2 online processing of English articles

Study 1 of the present thesis into L2 online processing of English articles aimed to investigate whether L2 learners of English, whose native language does not grammaticalise articles and who show persistent problems with this morphosyntactic structure, are sensitive to semantic and syntactic violations of English articles. Two groups of L2 speakers from the article-lacking Mandarin and Croatian were tested, and their performance was compared to L1 English speakers on a self-paced reading task and a grammaticality judgement test in order to answer the research questions (RQs) below.

First, a GJT was used to test whether the participants had explicit knowledge of English articles (RQ2). It was predicted that both the L1 English group and the two L2 groups will show explicit knowledge of the English article system in line with previous research which utilised metalinguistic tasks, e.g., forced-choice elicitation (Ionin et al., 2004; Trenkic,

2008).

RQ2: Does explicit knowledge of English articles differ between L1 English, L2 English/L1 Mandarin and L2 English/L1 Croatian speakers?

Prediction:

- a. Both L2 groups and the L1 English group will demonstrate explicit knowledge of the English article system.

Second, an SPR task was used to test participants' sensitivity to violations of English articles, as this method is thought to provide a window into L2 online processing (RQ3).

RQ3: Are L1 English, L2 English/L1 Mandarin and L2 English/L1 Croatian speakers sensitive to article violations on the SPR task?

Predictions:

- a. L1 English speakers will be sensitive to both substitution and omission violations.
- b. L1 Chinese and Croatian L2 learners of English will be sensitive to substitution violations.
- c. L1 Chinese and Croatian L2 learners of English will not be sensitive to omission violations.

Based on Trenkic et al. (2014), who found that their L1 Mandarin Chinese L2 English participants of intermediate proficiency were sensitive to semantic information signalled by articles in real-time and were able to use it to resolve reference more efficiently, it was expected that the participants in the present study would also be sensitive to semantic violations of English articles (i.e., substitution errors). By contrast, not much is known about whether L2 English speakers possess the same sensitivity to syntactic violations such as omission, but based on the predictions of the structural competition model (see Chapter 4), it was expected that both L2 groups would not to show sensitivity to omission errors. However, if Mandarin is on a path of grammaticalising some of its markers of definiteness, it is possible that L1 Mandarin L2 English learners will show a different pattern of sensitivity to L1 Croatian L2 English speakers.

5.8 Study 2: L2 online processing of English TA

The present study was based on Roberts and Liszka (2013) and aimed to (a) replicate the findings from Roberts and Liszka who investigated participants' sensitivity to TA violations of past simple and present perfect, and b) extend the findings by additionally testing

participants' sensitivity to violations of present simple. Furthermore, different L1 groups were used in order to compare participants from a Slavic L1 (Croatian) and an Asian L1 (Mandarin), a participant combination which has not been frequently tested so far. Both Croatian and Mandarin (somewhat) differ in their use of tense and aspect to English. Like English, Croatian marks both tense and aspect grammatically albeit in different ways, while Mandarin has morphological markers of aspect but not of tense. In addition, neither Croatian nor Mandarin have the equivalent of the English present perfect.

Just as with Study 1 into online processing of English articles, Study 2 employed a GJT task to ascertain that the participants had explicit knowledge of the English TA system (RQ4). Based on previous research (Eriksson, 2016; Roberts & Liszka, 2013), it was predicted that both the L1 English group and the two L2 groups would demonstrate explicit understanding of the English TA system.

RQ4: Does explicit knowledge of English TA differ between L1 English, L2 English/L1 Mandarin and L2 English/L1 Croatian speakers?

Prediction:

- a. Both L2 groups and the L1 English group will demonstrate explicit knowledge of the English TA system.

In order to test the participants' online sensitivity to TA violations, an SPR task was used (RQ5).

RQ5: Are L1 English, L2 English/L1 Mandarin and L2 English/L1 Croatian speakers sensitive to TA violations on the SPR task?

Predictions:

- a. L1 English speakers will be sensitive to violations of the present perfect but not past simple tense.
- b. L1 Mandarin L2 English speakers will not be sensitive to violations with any of the tenses.
- c. L1 Croatian L2 English speakers will not be sensitive to violations with any of the tenses.

Based on findings from Roberts and Liszka (2013) and Eriksson (2016), it was predicted that L1 English speakers will be significantly sensitive to violations of present perfect violations, but not violations of the past simple tense. Furthermore, considering that Mandarin Chinese lacks tense marking, L1 Chinese/L2 English learners were predicted

not to be sensitive to TA violations with any of the three tenses tested. Although Croatian marks verbs morphologically for the past and has grammatical aspect, the L1 Croatian/L2 English learners were not expected to be sensitive to violations with any of the tenses tested. This prediction is based on previous research which showed that L2 English speakers from L1 background that mark tense morphologically (L1 German in Roberts and Liszka, 2013; and L1 Russian in Eriksson, 2016) were not sensitive to TA violations of past simple and present perfect.

5.9 Study 3: L2 spontaneous oral production of English articles

The first aim of Study 3 into L2 oral production of English articles was to compare the article suppliance patterns of two L2 groups whose L1s do not have an overt article system as in English, to the article suppliance patterns of L1 English speakers (RQ6).

RQ6: How accurately do L1 Chinese and Croatian L2 learners of English produce the indefinite and definite article in obligatory contexts compared to L1 English speakers in spontaneous oral production?

Predictions:

- a. L1 English speakers will produce both articles with high accuracy.
- b. Both L2 groups will produce the indefinite article less accurately than the definite article.
- c. L1 Chinese/L2 English learners will substitute articles more often than omit them.
- d. L1 Croatian/L2 English learners will frequently omit both articles.

The participants were asked to watch an animated film and retell the story as it was happening. Then, the stories were transcribed and accuracy of the suppliance of predefined countable singular nouns in both the indefinite and definite contexts was computed. Somewhat different predications were postulated for the indefinite and definite article.

Previous studies have reported that the indefinite article is often produced more accurately than the definite article (e.g., Ekiert, 2004; Świątek, 2013), and the present study expected to find the same pattern (prediction a). Also in line with previous research (Snape, 2009), the L1 Mandarin L2 English speakers were predicted to substitute the indefinite article more than omit it, while the L1 Croatian L2 English speakers were expected to show the opposite pattern and omit the indefinite article more than substitute it. In addition, both L2 groups were predicted to omit the definite article more than substitute it, since

previous research has shown that more salient referents (i.e., because they have been previously mentioned in the discourse) are omitted more frequently than less salient referents (e.g., indefinite referents that are new in the discourse) (Trenkic, 2009).

5.10 Study 3: L2 spontaneous oral production of English TA

The second purpose of the oral production task in the present study was to investigate how accurately and consistently L1 Chinese and L1 Croatian L2 English learners mark verbs for past tense compared to L1 English speakers.

RQ7: How accurately do the L1 Chinese and L1 Croatian L2 English learners mark verbs for past tense compared to the L1 English group?

Predictions:

- a. L1 English speakers will consistently mark verbs for past tense.
- b. The L1 Mandarin group will produce uninflected verbs more frequently than the L1 Croatian group.

L1 Mandarin learners of English have been found in previous research to have problems with tense morphology compared to L2 learners whose L1 has morphological markers of tense (Chen, 2016; R. Hawkins & Liszka, 2003). Although similar research on L1 Croatian learners of English is lacking, research on other L2 English learners whose L1 has tense morphology shows that this helps them in being able to inflect verbs for tense in L2 English with high accuracy. Therefore, the prediction of the present study is that L1 Croatian learners, whose L1 has tense morphology, will also be able to inflect verbs for tense with high accuracy in their L2 English.

Chapter 6: Methodology and methods

6.1 Introduction

The aim of the present study was to test two syntactic structures that are used differently in the participants L1 than in their L2 English (English articles and tense/aspect agreement) in both online comprehension and oral production. Online comprehension was tested with the use of the self-paced reading paradigm, but also offline data were collected with a grammaticality judgement task. Spontaneous oral production was tested using an animated film that the participants were asked to narrate as they watched.

This chapter first provides information about ethics and the participants. Next the design of both the comprehension and production tasks are discussed. The chapter concludes with information about the statistical analyses and procedures carried out.

6.2 Ethical considerations

Even though all participants in the present study were adults, and the experiment did not involve disclosure of any sensitive information, certain steps were taken to ensure that the participants understood what they were agreeing to by participating in the study, and that their identity was kept confidential. Firstly, to ensure anonymity, each participant was assigned a participant ID (a number) which was used in all parts of the experiment. Their name was only kept in one spreadsheet with other relevant information, such as their age and contact information, to which only the researcher had access. Secondly, all measures were taken to minimise the time required to complete the tasks, and all participants were given a small reward for their participation.

Before starting the experiment, the participants were asked to read an information sheet about the study and sign a consent form (Appendix A). The information sheet contained information about the four tasks in which the participants were asked to partake, the duration of the experiment and the reward they would receive for their time. The consent form asked the participants to confirm that they had read and understood the information provided in the information sheet, that they had only spoken English (or Mandarin/Croatian in case of L2 participants) at home before the age of five, and that they have not been diagnosed with dyslexia. In addition, the L2 speakers were asked to confirm that they had never lived in an English-speaking country before the age of 18. The consent form was approved by the Ethics Committee of the Department of Education at the University of York.

6.3 Participants

The present study tested a total of 70 participants: 24 Chinese L2 learners of English, 22 Croatian L2 learners of English, and a control group of 24 L1 English speakers. More information about each participant group is provided below.

6.3.1 L1 English participants

All L1 English participants were born and schooled in the United Kingdom, and their age varied from 18 to 40 (mean age 22). Considering that the study contained tasks that, apart from testing articles, also test sensitivity to violations of tense/ aspect agreement with the present perfect and past simple tenses, it was not deemed appropriate to test speakers of other varieties of English since speakers of American English have slightly different rules for the use of the above-mentioned tenses. For example, in American English as opposed to British English, it is more acceptable to produce sentences such as *I just saw John*, instead of *I have just seen John* (Crystal, 1986), and such variations could potentially have affected the data.

All participants were recruited from the University of York by sending a call for participants through different departments, and snowball sampling. The participants were not early bilinguals (they had not spoken any language other than English at home before the age of five), and were not, to their knowledge, dyslexic. They were offered a £5 reward for their participation.

6.3.2 L2 English participants

Prior to the testing all L2 participants were asked to fill in a background questionnaire (Appendix B) to gather information about their gender, age, etc., and self-reported proficiency and language learning experiences.

L1 Mandarin participants

The Mandarin participants were all students at University of York at the time of testing and had been living in the UK for an average of 3 months at the time of testing (Table 6.1). Prior to coming to the University, all participants achieved an average IELTS (standardised language exam commonly used by European universities to ascertain a required proficiency level) score of 7 which is considered to be advanced proficiency (C1) according to the Common European Framework of Reference (CEFR). The participants were also given the Oxford Quick Placement Test (QPT) at the time of testing, on which they scored an average

score of 49 (1.41) which confirmed their advanced proficiency level. The participants were late bilinguals who started learning English in formal education at the age of nine and continued to learn it in school for about ten more years.

Table 6.1 Summary of the language learners' linguistic background

	Chinese participants <i>M (SD)</i>	Croatian participants <i>M (SD)</i>
Age	24 (1.41)	34 (5.03)
Gender	All female	6 male
Age of onset of English lessons	9 (2.43)	8 (0.39)
Years of learning English in formal education	10 (3.53)	10 (0.21)
Residency in the UK (months)	3 (0.81)	NA
Daily use of English in		
<i>Speaking (%)</i>	56 (17.12)	31 (11.46)
<i>Writing (%)</i>	53 (21.03)	28 (14.66)
Self-rating in		
<i>Speaking English (1-10, 1=poor)</i>	6 (1.12)	7 (0.85)
<i>Writing English (1-10, 1=poor)</i>	6 (1.29)	6 (0.70)
<i>Listening English (1-10, 1=poor)</i>	7 (0.98)	8 (0.66)
<i>Reading English (1-10, 1=poor)</i>	7 (0.98)	8 (0.78)
QPT score (advanced range 48-54)	49 (1.41)	53 (2.19)

L1 Croatian participants

The Croatian participants were recruited to be of similar proficiency as the Chinese participants as measured by the QPT score of 53 (2.19) which also puts them at advanced proficiency. The participants in this group were all native speakers of Croatian who were living in Croatia at the time of testing and, unlike the Chinese participants, had never lived in an English-speaking country. The Croatian participants were matched with the L1 Mandarin participants in the age of onset of English lessons in formal education and years spent learning English in formal education (Table 6.1.)

Considering that the L1 Mandarin group had had immersion experience of three months at the time of testing, this could have given them an advantage over the L1 Croatian group. Based on the results of the study there is no evidence of immersion effects but this is discussed in more detail in Chapter 9, section 9.3.3.

6.4 Design of the comprehension tasks

6.4.1 Self-paced reading task

The present study utilised an SPR task in order to investigate sentence comprehension in real time, and more information about SPR and the task design is provided next.

6.4.1.1 Stimuli design

The present study aimed to investigate two grammatical structures, English articles and tense/aspect agreement. Therefore, for the purposes of the present study, a total of 96 stimuli were created, each consisting of a brief scenario followed by two sentences which appeared one word at a time in the middle of the computer screen and contained the critical regions for analysis. Out of the 96 stimuli, 48 items were designed to test sensitivity to violations of English articles (Appendix C), 24 items tested sensitivity to tense/aspect violations (Appendix D) which served as distractors but the data were used for an additional study, and 24 noncritical items which served as fillers (Appendix E). Finally, 24 meaning-based comprehension questions (Appendix F) were randomly inserted after some of the items, to ensure that the participants were paying attention.

The article, TA and filler stimuli were designed in the same way. Each stimulus started with a scenario (2-3 sentences) which provided a context and remained at the top of the screen throughout the trial. The scenario was followed by a sentence containing the critical item, and a short follow-up sentence which were read one word at a time. Each critical item sentences contained exactly six words after the critical segment in order to catch any potential spill-over effects.

Articles stimuli

The articles experimental items tested one independent variable (grammaticality) with three levels (match, mismatch substitution and mismatch omission). There was a total of 48 experimental items each appearing in three conditions; the article matched the scenario, the article was substituted or it was omitted. 24 items appeared in the definite context, while the other 24 items appeared in the indefinite context. All experimental items included a scenario which provided a context because in order to establish whether an article is a match, or it has been substituted depends on context. For example:

Definite context

59. Frank's been saving money to buy a ring for his girlfriend. He finally bought it yesterday at a fancy jewellery shop. (scenario)
- a. He'll give her **the** ring as a surprise at dinner tonight. She'll surely like it.
(match)
 - b. He'll give her **a** ring as a surprise at dinner tonight. She'll surely like it.
(substitution)
 - c. He'll give her **x** ring as a surprise at dinner tonight. She'll surely like it.

(omission)

Indefinite context

60. Frank's been saving money to buy a necklace for his girlfriend's birthday. When he finally went to buy it, the shop assistant told him that the necklace had been sold.

(scenario)

a. *Instead, he bought **a** ring to surprise her at dinner tonight. She'll surely like it. (match)*

b. *Instead, he bought **the** ring to surprise her at dinner tonight. She'll surely like it. (substitution)*

c. *Instead, he bought **x** ring to surprise her at dinner tonight. She'll surely like it. (omission)*

The noun in each critical sentence was considered to be the critical region (in the examples above that would be the noun *ring*) and it was always followed by exactly six more words to catch any potential spill-over effects. Also, each critical item sentence was followed by a short follow-up sentence in order to provide a clear ending of the scenario. Furthermore, all nouns used as critical items were concrete singular nouns in direct object positions. It was made sure that no nouns were cognates, meaning words that share meaning, spelling and pronunciation in English and Mandarin/Croatian.

TA stimuli

The TA stimuli were adapted from Roberts and Liszka (2013) but were expanded and changes were introduced so that the TA stimuli matched the articles stimuli in presentation. In their study Roberts and Liszka examined whether learners were sensitive to discrepancies between the past simple/present perfect tense and a matched adverbial phrase (examples 61 and 62).

61. Past Simple

a. **In 2005**, Mary **lived** in London in a nice neighbourhood. She liked London a lot. (match)

b. **Since 2005**, Mary **lived** in London in a nice neighbourhood. She liked London a lot. (violation)

62. Present Perfect

c. **Since 2005**, Mary **has lived** in London in a nice neighbourhood. She likes London a lot. (match)

- d. **In 2005**, Mary **has lived** in London in a nice neighbourhood. She likes London a lot. (violation)

In the present study, short scenarios were added to each item, and, where needed, the sentences were changed to contain exactly six words after the critical item (the main verb), which exactly matched the design of the items for testing sensitivity to violations of English articles. Also, follow up sentences were added. Furthermore, Roberts and Liszka were interested in TA violations of the present perfect and past simple, whereas the present study also aimed to test sensitivity to TA violations of present simple. Therefore, the original scenarios were extended to include two more sentences with TA violations of the two above mentioned tenses. For example:

63. Present Perfect

- a. Since **2005**, Mary **has lived** in London in a nice neighbourhood. She likes London a lot. (match)
- b. **In 2005**, Mary **has lived** in London in a nice neighbourhood. She likes London a lot. (violation)

64. Past Simple

- c. **In 2005**, Mary **lived** in London in a nice neighbourhood. She liked London a lot. (match)
- d. **Since 2005**, Mary **lived** in London in a nice neighbourhood. She liked London a lot. (violation)

65. Present Simple

- e. **At the moment**, Mary **lives** in London in a nice neighbourhood. She likes London a lot. (match)
- f. **Since 2005**, Mary **lives** in London in a nice neighbourhood. She likes London a lot. (violation)

Once again, each participant saw the same short story but only one of the six possible sentences (either a match or a violation).

Along with the 48 article items and 24 tense/aspect items, additional 24 filler items were adopted from Roberts and Liszka (2013). Half of the filler items were correct and the other half had a lexical or syntactic violation but not of either articles or tense/aspect. For example:

66. James is very sporty. He prefers comfortable clothes. (scenario)

He does not like wear suits, although he has to for his work. (gerund violation)

In order to ensure that the participants were paying attention, they had to answer 24 randomly assigned yes/no comprehension questions, as illustrated in (66). The questions required equal numbers of “yes” and “no” responses and appeared in the centre of the screen at the end of an experimental item. The participants were asked to say ‘yes’ or ‘no’ outloud and the researcher recorder the answer on an answer sheet.

67. The company had been trying very hard to get a celebrity to come to their annual fundraiser. They were successful in the end. (scenario)

The host proudly announced the arrival of the special guest. It was Brad Pitt.

Did Brad Pitt come to the fundraiser? (comprehension question)

Out of a total of 24 comprehension questions, nine followed an article item, six followed a tense/aspect item, and nine followed a filler item.

There was an issue with the comprehension question number 18 which was not detected during the pilots and, therefore, had to be removed from the final analysis. The question was posed in such a way that for half of the items it elicited a clear ‘yes’ but for the other half of the items it was ambiguous. The comprehension question *Did Frank buy a gift for his girlfriend’s birthday?* corresponds to the information provided in the first stimulus below (68) which mentions a girlfriend and a birthday but this information is not included in the second stimulus (69) making the question ambiguous and forcing the participant to infer/guess the answer.

68. Frank's been saving money to buy a necklace for his girlfriend’s birthday. When he finally went to buy it, the shop assistant told him that the necklace had been sold.

Instead, he bought a ring to surprise her at dinner tonight. She'll surely like it.

69. Frank's been saving money to buy a ring for his girlfriend. He finally bought it yesterday at a fancy jewellery shop.

He'll give her the ring as a surprise at dinner tonight. She'll surely like it.

6.4.1.2 Piloting

There were two piloting stages. In the first stage, the articles items were checked by L1 English speakers to ensure that they elicited the target articles, while in the second stage all

stimuli were piloted in E-prime to ensure that the experiment would run smoothly.

During the first stage, the articles items were piloted on 17 native speakers who were presented the items in a cloze test. There were two versions of the cloze test, and the participants in each group saw 24 sentences with a blank space where the article would normally be (before the critical region) and were asked to choose one option from four provided answers, as in the example (70) below.

70. Last week Emma bought a car for a very reasonable price. She liked ____ car because of its bright red colour. She was excited.

- a. *the*
- b. *a*
- c. *Either “the” or “a” is fine*
- d. *None of the above*

24 items appearing in the definite and 24 appearing in the indefinite context were mixed so that each group only saw the sentences either in the definite or indefinite context. If there was 70% or above agreement on the choice of article, a sentence was deemed suitable. In the first group, agreement among participants fell below 70% only for sentence number 2, while in the second group there was >70% agreement on all sentences. The affected sentence was then revised to more strongly elicit the target (definite) article (Table 6.2).

Table 6.2 Changes to the item with low agreement in pilot

	Pilot cloze test	Revised version
Sentence 2	There is probably a mouse in the kitchen. We heard the cat bring it in last night. We eventually found ____ mouse hidden under the big fridge. We caught it.	We heard the cat bring in a mouse last night. It was making a lot of noise in the kitchen. We eventually found <u>the</u> mouse hidden under the big fridge. We caught it.

In the second stage, the stimuli were entered into the E-Prime software, and the experiment was piloted on L1 and L2 speakers to ensure that any problems were detected before main data collection (Mackey & Gass, 2005). The pilots uncovered several “bugs” in the programme, such as that the text was not displayed properly, which were easily corrected. Also, the pilots ensured that the instructions given were clear to the participants.

6.4.1.3 Material presentation

The total number of experimental lists was calculated based on the number of versions of the items (Keating & Jegerski, 2015), which resulted in six experimental lists.

Table 6.3 Sample of list randomisation

Type of stimuli	List number					
	List 1	List 2	List 3	List 4	List 5	List 6
Articles	12b	12c	12d	12e	12f	12a
Filler	F	F	F	F	F	F
TA	7a	7b	7c	7d	7e	7f
TA	13c	13a	13e	13d	13f	13b
Articles	2a	2c	2d	2b	2e	2f

Article stimuli labelled a-c were in the definite context, while stimuli labelled d-f were in the indefinite context. TA stimuli a-b were in past simple, c-d in present perfect and e-f in present simple. This means, for example, that a participant seeing List 1 (Table 6.3) would have seen the following stimuli:

12b – article definite context substitution violation

Filler

7a – past simple match

13c – present perfect match

2a – article definite context match

The list continued to be randomly populated with stimuli until all 72 items were exhausted. Each participant per group was assigned to one list so that four participants per group saw each list (Table 6.4). Because the L1 Croatian/L2 English group had 22 participants (compared to 24 in the other two groups), this meant that lists 5 and 6 were seen by three participants each instead of four.

Table 6.4 Number of participants per experimental list

	List number						Total number of participants per group
	List 1	List 2	List 3	List 4	List 5	List 6	
Number of participants per list	4	4	4	4	4	4	24 (L1 English)
	4	4	4	4	4	4	24 (L1 Mandarin/L2 English)
	4	4	4	4	3	3	22 (L1 Croatian/L2 English)

Although Keating and Jegerski (2014) suggest pseudorandomising the items in

order to avoid the same type of item appearing in succession (e.g., three items testing violations to articles in a row) so as not to tip the participants off to the true purpose of the experiment, the items in the present study were randomised. There were three sets of stimuli (articles, distractors and fillers) testing various semantic and syntactic structures which made it very hard for the participants to guess the purpose of the experiment, and no observable pattern was noticed to indicate that they have done so.

Once the items were created, the experiment was designed using the E-Prime software package which allows the presentation of stimuli and collects, among other things, reaction time data which are recorded in milliseconds (Spapé, 2014). The stimuli for the present experiment were designed so that the scenario appeared first at the top of the screen and remained there until the end of a particular stimulus. Next, the two sentences appeared one word at a time in the centre of the screen, and the participants controlled how quickly they moved from one word to another by pressing the SPACE key.

In the example (Figure 6.1) from E-Prime, the word 'instead' in the middle of the screen will be replaced by the next word once the participant presses the SPACE key.

Frank's been saving money to buy a necklace for his girlfriend's birthday. When he finally went to buy it, the shop assistant told him that the necklace had been sold.

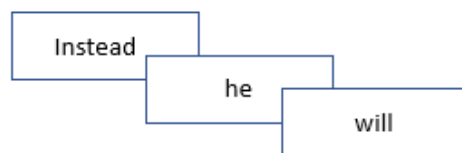


Figure 6.1 Example of item presentation in E-prime

6.4.1.4 Preparation for analysis

Before conducting the analyses, several steps need to be taken to ensure that the data are ready and “clean”. It is standard practice in SPR studies to first remove trials with incorrect responses to comprehension questions, then to trim the data and identify outliers, and, finally, to calculate residual reading times (Keating & Jegerski, 2015).

Comprehension questions

Keating and Jegerski (2015) suggest that trials with incorrect responses to comprehension questions should be eliminated because incorrect responses usually indicated a lack of attention. However, a slightly different approach was adopted in the present study. Only a

third of all experimental items was followed by a comprehension question, which meant that by eliminating trials with incorrect responses would not ensure that the participants paid attention in all trials. Instead, an individual overall accuracy score for all participants was calculated, and if a participant failed to supply the correct answer to the comprehension questions less than 80% of the time, the participant was eliminated and replaced by another participant who matched the criteria.

Table 6.5 Comprehension questions accuracy scores by group

Group	List	Average out of 23 (SD)	% accurate
L1 English	List 1	22 (0.81)	96
	List 2	21 (0.95)	93
	List 3	23	100
	List 4	22 (0.81)	96
	List 5	22 (1.25)	95
	List 6	22 (0.81)	96
L1 Mandarin L2 English	List 1	22 (0.95)	95
	List 2	22 (1)	94
	List 3	21 (2.3) ¹²	91
	List 4	22 (1.15)	96
	List 5	21	91
	List 6	22 (0.95)	97
L1 Croatian L2 English	List 1	21 (0.57)	94
	List 2	22 (0.57)	94
	List 3	21	91
	List 4	22 (0.5)	97
	List 5	22 (1.41)	96
	List 6	22 (0.95)	97

Table 6.5 shows the accuracy scores on comprehension questions for both the L1 English group and the two L2 groups for all participants who scored above the 80% cut-off point. The L1 English participants all scored above 80% on the comprehension questions, and their scores ranged from 87% accuracy to 100%. The L1 Mandarin L2 English participants showed similar accuracy scores to native speakers on the comprehension questions, but one participant scored below the 80% cut-off point. This participant was removed and replaced by another participant who matched the criteria. The L1 Croatian participants also all scored above the required 80% with a range of 91 to 97% accuracy.

Residual reading times

Considering that every experimental item appears in several conditions, variations in word

¹² The standard deviation is high here because there were two participants in this list who had an accuracy score of 82%, which was still above the 80% cut-off point.

length that exist between conditions might make the results difficult to interpret. Additionally, all participants (native speakers included) read at different speeds which can affect the computation of group means (Keating & Jegerski, 2015). To control for sentence length, word length and interparticipant variability, residual RTs are calculated and used in the analysis. Sentences with more words will be read longer than sentences with fewer words, and equally sentences of same length but with longer words will be read longer than sentences of same length with shorter words. In addition, there is variation among individual participants in how quickly they read. Calculating residual RTs helps us overcome these biases. Residual RTs are obtained by conducting a regression analysis in which raw RTs are plotted against the number of characters per word for each participant (Trueswell, Tanenhaus, & Garnsey, 1994). The result of this regression is a line of best fit which represents the average reading speed of each participant depending on word length. Next, the calculated values (i.e., the line of best fit) are subtracted from the raw values and the residual RTs are the difference between those values.

Data trimming

The data were trimmed according to procedures carried out in previous SPR studies in order to ensure that all unusually low or high values are removed. Firstly, all individual reading times (RTs) below 100 ms were removed which is in line with previous studies (Marsden et al., 2018). Next, the same was done with high values, and all individual RTs above 2000ms were removed as well. Considering that each participant produced about 1119 RTs, this means that removing the values below 100ms affected 0.025 percent of all trials, and removing values above 2000ms affected 0.18 percent of all trials. Additionally, RTs that were 3 standard deviations away from the individual mean per segment were identified as outliers and removed.

6.4.2 Grammaticality judgement task

The present study tested the participant's implicit knowledge of morphosyntactic structures, namely the English article system and tense aspect agreement, in a self-paced reading task outlined above. In order to complement the data on implicit knowledge of those structures, the participants were also asked to do a grammaticality judgement test (GJT) to capture their explicit knowledge of the the morphosyntactic structures being tested. The GJT was administered after the SPR task (see section 6.7 for procedures).

In grammaticality judgement tests (GJTs), participants are asked to look at a number of stimuli, which are usually comprised of grammatical and ungrammatical sentences, and

judge whether the sentences are grammatically acceptable/correct or not. GJTs are said to measure explicit knowledge, and have been widely used to test explicit knowledge of grammatical structures, especially in combination with self-paced reading (Hopp, 2006; Jiang, Novokshanova, Masuda, & Wang, 2011; Pliatsikas & Marinis, 2013; Roberts & Liszka, 2013).

Material design

Considering that the offline task was to be used in combination with the self-paced reading task (SPR), it was crucial that the stimuli in both tasks were exactly the same. Therefore, in the offline task the participants saw the same 72 items¹³ they had just seen in the self-paced reading task, and each participant saw one out of six possible lists (versions) of the stimuli which corresponded to the stimuli list they were assigned to in the SPR task. For example, a participants that was assigned to List 1 in the SPR task, would have also seen the stimuli from the same list in the GJT.

Although Gass and Mackey (2011) suggest giving participants 50-60 sentences to judge in order to avoid unreliable judgements due to participants fatigue, it was not possible to decrease the number of sentences in the GJT because the same stimuli as in the SPR task were used. However, the whole task duration was around fifteen minutes which did not seem to pose a burden on the participants. In addition, the participants were told that they could take a break during the task should they need one.

Finally, one of the biggest considerations was whether to make the task timed or untimed. Despite the fact that recent research suggests that both timed and untimed GJTs tap into participants' explicit knowledge (Vafaei, Suzuki, & Kachisnke, 2016), a larger body of previous research claims that untimed GJTs are a better measure of EK than timed GJTs (Bowles, 2011; Ellis, 2005; Ellis & Loewen, 2007; Gutiérrez, 2013). Therefore, it was decided that it would best to employ an untimed GJT in the present study to ensure that the participants were maximally stimulated to draw on their explicit knowledge in this task.

Material presentation

The stimuli were presented on a desktop computer one after the other, and the participants were instructed to judge how grammatically acceptable each sentence is for them on a 6-point scale, with one being completely unacceptable and six being fully grammatically acceptable. A single stimulus contained a brief scenario, the main sentence containing the critical item, and a short follow-up sentence, and the main sentence that the participants

¹³¹³ Full list of items/stimuli can be found in Appendix G.

were asked to judge was presented in bold so that the participants could clearly identify which sentence they were asked to judge. For example¹⁴:

71. Jack lives by himself and only has a dog to keep him company. He lets it sleep on his bed and gives it only the best food.

He often takes the dog for long walks in the park. Jack is often lonely.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The main critique of GJTs has been that it is not entirely clear what the participants are judging; there is no guarantee that they are judging the intended target structure (Ellis, 2005; Gass & Mackey, 2011). This is especially true in tasks, like the present one, where there is more than one sentence presented to the participant in a single stimulus. Therefore, it was important to visually distinguish the sentence the participants were asked to judge from the rest of the stimulus.

However, by presenting only one sentence in bold there was the risk that the participants would only read that sentence and not the rest of the scenario, which was an issue for the articles stimuli. In sentence where the article was omitted, the participant could make a judgement based on the sentence alone, because regardless of the context an article should accompany a singular countable noun in English. However, for the sentences that either were grammatically correct or contained a substitution error, the only way for a participant to make a judgement would be by reading the whole stimuli (i.e., the scenario). In such cases, reading only the sentence in bold, and not the whole stimulus, could potentially lead to erroneous judgements. To minimise the impact of this potential issue, the participants were given clear instructions to read the entire stimulus before making a judgement.

Another common pitfall of GJTs is that participants often confuse whether a sentence makes sense with whether it is grammatically acceptable, and also often confuse grammar with spelling, and sentence style (Mackey & Gass, 2005). At the beginning of the task, the participants were presented with an example and once they made a judgement about the grammaticality of the example sentence, the researcher asked the participant to explain their choice. This served as a good opportunity for the researcher to ensure that the

¹⁴ An example of a full GJT task is provided in Appendix G.

participants fully understood the task, and to give further clarifications as to what “grammaticality” entails.

6.5 Design of the oral production tasks

6.5.1 English articles

The present study used a structured narrative task with little planning opportunity in order to investigate how accurately the participants produced English articles. Firstly, the aim was for the participants to produce complex language with larger chunks of speech in order to provide ample opportunity to introduce and keep track of referents as well as tense. Previous research into oral production has shown that structured tasks, those that tend to have a clear timeline and a conventional story pattern, usually result in speech that is more complex and fluent (Tavakoli & Skehan, 2005). In addition, research into oral production of articles indicates that in order to produce larger chunks of speech and full sentences (thus arguably more complex), one should avoid dialogic tasks. For example, Trenkic (2007) and Robertson (2000) both looked into L2 article production using a type of a referential communication task. Trenkic used a map task to research article oral production of Serbian L2 learners of English. The map task required two participants to exchange information that was only partially shared to complete the task. Similarly, Robertson used a diagram completion task, which also requires participants to communicate in order for one participant to reconstruct the diagram of the other participants by following instructions. Although both tasks have put learners in a somewhat realistic situation and both elicit relatively spontaneous speech, a potential issue is that instruction giving usually produces broken off sentences as is evidenced in both of these studies.

72. Trenkic (2007, p. 306)

A: there are a lot of trees

B: ok

A: dark forest and you go through the forest

B: yes

A: and you go round it and you come to wooden bridge

B: mhm

A: and you go over the bridge

73. Robinson (2000, p. 136)

A: Yeah. Draw, er, without, draw, er, double line but without the, the bottom. Triangle, er

(okay), meets at the bottom.

B: Okay.

A: But, er, the right, right one, right line you should use blue pen and left, left line is red.

B: Left line is red?

Using instructive language that has a clear practical purpose (complete the map or diagram) does not require participants to produce full sentences which adhere to standard grammar rules in order to complete the task, thus potentially making articles, but also other syntactic forms, redundant (see in example 73 that in the last line the participant does not use a proper question structure to ask whether the left line is red).

Secondly, considering that both groups of L2 participants were of advanced proficiency, a task was required that would limit access to explicit knowledge thus allowing any variability in their production to be better captured. In order to limit access to explicit knowledge it is important to limit the participants' time for task planning. It has been shown that how much planning for the task is available also has a positive or detrimental effect on the quality of the production (see Ellis, 2009 for a review). Oral production conditions that allow for no planning time are carried out within a time limit and are said to be pressured thus allowing very little (if any at all) access to explicit knowledge. On the other hand, planning conditions (pre-task planning and online planning) allow more access to explicit knowledge and control and monitoring of the language produced. Pre-task planning refers to a condition in which learners are given a certain amount of time to prepare their production before the task, typically resulting in the greatest amount of control and quality of language produced, especially in the case of fluency. Perhaps less obvious are the effects of online planning on oral production, because this type of planning, as the name says, happens online while the task is being carried out. This is not to be confused with online research methods in sentence processing which are used with the aim to limit access to explicit knowledge and directly tap into participants' implicit knowledge. In contrast, in oral production, the term "online" refers to the type of planning which occurs when no time limit in which the task needs to be completed is imposed on the speaker. By not imposing a time limit, a speaker is free to apply as much control and monitoring to their language as they want and has time to access their explicit knowledge.

Thirdly, narrative tasks seem to be particularly suitable for investigating the accuracy of article production with new and subsequent referents. Tarone and Parrish (1988) tested 20 L2 learners of English on three different tasks: a grammaticality judgement test, oral interview and oral narrative (retelling of a picture story). The results showed that

according to Huebner's (1983) classification, the participants produced an equal proportion of Type 1 (generic), Type 2 (unique, subsequent) and Type 3 (1st mention) NPs in interviews, while Type 4 (specific) NPs were rarely produced. On the other hand, the narrative task elicited Type 2 NPs about 70% of the time, Type 3 was produced less frequently, and Types 1 and 4 were barely produced at all. This is presumably due to the fact that in a narrative task the speaker usually has to keep track of existing referents and effectively introduce new ones in order for the story to be understandable to the hearer.

Finally, an additional benefit of a narrative tasks is that by having each participant narrate the exact same story, such a task limits, to some extent, the amount of variability of language produced among participants to allow for meaningful comparison.

Task design

In order to design an oral narration task that would best meet the criteria of the present study, three different oral narration tasks were designed and piloted. The first task designed and piloted was a picture story retelling task, which was unsuitable because it was not complex enough and it did not consistently elicit target NPs. The second task was a fairytale retelling task, which addressed the complexity issue, but did also not consistently elicit target NPs. Finally, the animated film story retelling task met all the criteria and was used in the study. Table 6.6. summarises the tasks, their characteristics and the pilot results. Next, each task and pilot results are discussed in more detail.

Table 6.6 Summary of all piloted tasks and their characteristics

Task	Structured task	Complex task	Elicits indefinite NPs	Elicits definite NPs (2nd mention)	Elicits chosen NPs consistently across participants
Task 1 (short stories)	Yes	Somewhat	Yes	Yes	No
Task 2 (fairytales)	Yes	Yes	Yes	Yes	No
Task 3 (animated film)	Yes	Yes	Yes	Yes	Yes

Oral production task 1 (pilot)

The first oral production task was designed to satisfy the above-mentioned criteria, and to resemble the comprehension task stimuli as closely as possible. To that end, short stories were created that resembled the comprehension task as much as possible but were not identical or similar in content. To make the task more complex, the stories were designed

to contain seven pictures each. Each story was designed to elicit both the indefinite and definite article with countable singular nouns.

Three stories were developed, drawn, and piloted on 24 native speakers. Each picture was presented to the participants in a PowerPoint presentation one picture at a time. The reason why the pictures were presented one at a time was that there were some difficulties in consistently eliciting the indefinite article for characters introduced for the first time in the first picture. When the pictures were present all at once, the participants commented that they referred to the newly introduced character with the definite article (as opposed to the expected indefinite article) because they could see from the other pictures that this was the main character in the story. If the stories were presented one picture at a time, the participants did not know whether the referent in the first picture would appear again in subsequent pictures and were able to treat it as an indefinite referent where appropriate.

Below, I illustrate the task design and issues with the task on an example story.

Story 1

Brief summary of the story: A mum and a boy are seen standing in front of a zoo. They go in, and see a lion. They see a zebra, and in the next picture they see the same zebra being fed by a zoo keeper. Next they see an elephant, and then they see the same elephant being washed by the zoo keeper. Finally, they go for an ice-cream.

Although the task seemed to “tick all the boxes”, it did not, however, produce the desired results. There was too much variability in the noun phrases (NPs) elicited by these stories, meaning that a large number of NPs was not elicited with the intended article or was not elicited at all. Table 5.7 shows all target referents and how many times they were successfully elicited. The table also shows all instances when the target article was not elicited because the opposite article was used (e.g., the intended context was indefinite but the participant used a definite article), and instances in which the target NP was not elicited at all. If the participants used a non-target article or the NP was not elicited those two values were added up to calculate the sum of unusable NPs for a particular referent. For example, out of 19 references to a woman/mother five or 20.83% were unusable unusable. 20% was used as a cut off point at which a target referent is not reliably elicited. As can be seen from Table 6.7, out of a total of fourteen target referents, seven (in bold) were not consistently and reliably elicited because the participants either substituted the article (misunderstood the intended context) or did not produce the target NP at all.

Table 6.7 Story 1 pilot results

Target referent (8 indef; 7 def)	Target article elicited	Not target article	Not elicited	Sum of unusable NPs	Percentage unusable NPs
a woman/mother	19	2	3	5	20.83
a boy	18	0	6	6	25.00
the boy	22	2	0	2	8.33
a lion	22	2	0	2	8.33
the boy	21	2	1	3	12.50
a zebra	22	2	0	2	8.33
a zoo keeper	15	9	0	9	37.50
the zebra	13	11	0	11	45.83
the boy	23	1	0	1	4.17
an elephant	21	3	0	3	12.50
the zoo keeper	17	7	0	7	29.17
the elephant	18	6	0	6	25.00
the woman/mother	21	2	1	3	12.50
an ice-cream	20	1	4	5	20.83

In sum, due to the inability of this task to reliably elicit indefinite and definite referents, a new task was designed and piloted.

Oral production task 2 (pilot)

In the second attempt at designing the oral production task, a fairytale story retelling task was used. The idea was that the participants would see a series of pictures depicting a famous fairytale, such as Cinderella or Little Red Riding Hood. The decision to use well known fairytale stories was based on several criteria:

- They allow participants to produce larger chunks of free speech.
- Participants are already familiar with the story so it is more likely that they will produce similar stories when retelling (new stories may be interpreted in different ways by different participants) which would ensure greater consistency between participants, and eliminate some issues encountered with task 1.
- Participants could refer to the pictures if they lost their train of thought while retelling.

To test the suitability of this task, a pilot study was conducted. Two native and three highly advanced non-native speakers (living in the UK at the time of testing) took part in the pilot. The participants were presented with two familiar children's stories (10-12 pictures each) - Cinderella and Little Red Riding Hood.

The native speaker participants performed as expected, and the non-native speakers performed very accurately as well with only occasional errors of substitution and/or omission, mainly later in the story. However, although the participants were familiar

with the fairytales, the produced speech still varied greatly between participants, and target NPs were not consistently elicited. In addition, having a well-known plot meant that the task was fully structured which is said to pose less of processing burden on the participants and, thus, can allow access to explicit knowledge (and the one of the aims of the task was to limit access to explicit knowledge as much as possible). Thus, this task was discarded as well, and a third and final task was developed.

Oral production task 3 (final task)

The first two tasks designed were deemed unsuitable because they either did not elicit elaborate and complex enough speech (task 1), were too structured thus potentially allowing participants to overly rely on their explicit knowledge (2), or did not reliably produce the desired NPs (task 1 and 2).

The third (and final) task was designed as an animated film retelling task, as this design seemed to overcome some of the above-mentioned concerns. The participants were asked to watch a 6-minute animated film by Pixar called *Partly Cloudy* (freely available on YouTube), and were asked to describe the action as it unfolded. The film tells the story of storks that deliver baby bundles of various species (humans, dogs, cats, etc.) which are made by clouds (Figure 6.2). After this short introduction, the story focuses on one lonely grey cloud which makes rather dangerous baby animals, such as alligators and electric eels, and a dishevelled stork that has to carry those animals. Every interaction between the stork and the cloud consist of the stork coming to the cloud, receiving a new animal, then some incident with the animal occurs (e.g., the alligator bites the stork on the head), and finally the stork carrying away the animal.

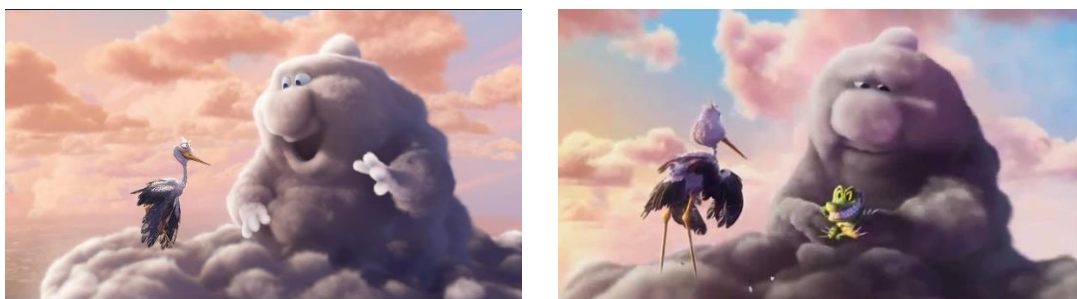


Figure 6.2 Screenshots from 'Partly Cloudy' (Pixar Animation Studios), used as oral production task stimuli

Firstly, the plot of the film in which the participants are introduced to new characters (various animals) but also repeatedly see some of the characters again (stork and cloud) meant that the participants were required to produce a certain number of indefinite

and definite NPs respectively. In addition to keeping track of new and subsequent referents, the participants also had to tell the story in a particular tense which meant that verbs had to be inflected. Even if the participants chose to retell the story in the present tense, considering that all characters have to be referred to in third person meant that the verbs would have to be inflected for third person -s.

Secondly, the task was fairly structured and lasted for about six minutes which is a decent amount of complex and spontaneous speech for analysis. The participants were not given any information about the story beforehand, were not allowed to (pre)plan their production and were asked to retell the story as they watched. According to previous research this should limit conscious control that the participants have over the accuracy of the speech that they produce.

The task was first piloted on a mix of five native and non-native participants. The results of the pilot confirmed that the task met all the criteria. In addition, the results of the pilot informed the steps in the administering the task and the instructions that the participants received, which will be discussed in the context of the section on the procedures (section 5.7).

6.5.2 English tense

In order to investigate the accuracy of tense suppliance in oral production, the same data from the animated film described above were used but instead for articles were analysed for tense. The next two sections describe how the articles and tense data were scored. Section 5.5.4 reports the results of intra and interrater reliability for both oral production tasks.

6.5.3 Scoring

Before the analysis, all narrations/stories were transcribed using an online transcribing tool called oTranscribe (freely available on the internet). Considering that only a chosen set of utterance were analysed to establish the accuracy of article suppliance, the narration before the introduction of the main cloud and the stork (approximately first 1 minute of the animated film) were neither transcribed nor used in the analysis of either articles or tense. The tense data could have been transcribed from the beginning of the film, but the same transcripts as for articles were used to ensure consistency between the tasks. Table 6.8 below shows a summary of mean word count and a range that each participant group produced per story.

Table 6.8 Mean and range of words produced per narration and per participant group

	L1 English	L1 Mandarin	L1 Croatian
Mean word count (SD)	447.08 (113.62)	324.91 (89.19)	351.9 (89.15)
Range (number of words)	230-672	178-556	188-539

6.5.3.1 Scoring articles

In order to ensure consistency, only target NPs referring to the main (grey) cloud, stork or the baby animals that appear during their interactions were included in the analysis of the animated film narration task. The chosen NPs were all concrete countable nouns (as in the SPR task) appearing in both the indefinite and definite context. However, the participants did not always produce the target NP but if they produced another concrete countable noun of similar meaning, such utterances were accepted as well. Table 6.9 below shows all words used by participants to refer to target NPs.

Table 6.9 List of alternative words the L2 participants used to refer to referents

Target NP	Native speakers (other options)	Chinese participants (other options)	Croatian participants (other options)
cloud	cloud monster	Bear, snowman, man, grandpa	creature, god creature
stork	bird, crane, pelican, hawk	Bird, sparrow, baby carrier, eagle	bird
crocodile	alligator, fish	Dragon, monster, dinosaur	Alligator
ram	sheep goat, billy goat, deer, antelope	Goat, sheep, lamb, dog	Goat, Capricorn, unicorn, sheep
hedgehog	porcupine	sheep	-
shark	shark-shaped cloud	Shark-shaped cloud	-
feather	-	Fur, plumage	-
eel	fish, tadpole	(lightning, thunder) fish, dolphin, dinosaur, worm, sea creature, snake	Electric fish, fish

Several measures of assessing the correctness of article production have been used in the past. One of the first measures developed was SOC (Supplied in Obligatory Context), by which the number of correctly supplied NPs with articles is counted and this number is then divided by the number of obligatory NPs that should have occurred with the article.

$$\text{SOC} = \frac{\text{number of correct supplings in obligatory contexts}}{\text{number of obligatory contexts}}$$

However, SOC has been criticised for inflating the accuracy of article suppliance as it does not account for article overuse, and TLU (Target-like Use) has been found to be a more reliable measure (H. Li et al., 2010; Lu, 2001).

$$\text{TLU} = \frac{\text{number of correct suppliances in obligatory contexts}}{(\text{number of obligatory contexts}) + (\text{number of suppliances in non-obligatory contexts})}$$

TLU takes into account article overuse, namely, how many times the article was supplied correctly but also how many times it was supplied in non-obligatory contexts. For example, we know from previous research that L2 English learners from article-lacking L1s tend to overuse *the* instead of *a* (Trenkic, 2002b), which means that substitution errors with the indefinite article would be quite high. Therefore, the present study employed the TLU calculation to analyse the articles oral production data.

6.5.3.2 Scoring tense

Once transcribed, the data were analysed for both the type of tense used and how accurately the intended tense was formed. Firstly, all instances of past simple, present perfect, and present simple were identified in each narration. Secondly, once the tenses were identified, it was determined whether the form of each verb in a target tense was correct. A use of past simple was considered correct if the verb was inflected with *-ed* or a correct form of an irregular verb (e.g., *went*) was used. Present perfect was considered correctly formed if it contained the auxiliary verb *have* and the past participle of the verb (e.g., *gone*). Instances in which the adverb *just* was used with a verb in past simple (and not present perfect) were not scored as wrong but were rather removed from the analysis. Constructions of *just* + past simple are relatively common in American English, and are also used in British English, and therefore, cannot be considered a clear violation of present perfect formation and use. Present simple is generally not formed through inflection or auxiliary verbs, except in 3rd person singular which has the *-s* inflection (*she loves*). Therefore, to determine how accurately the participants formed present simple, only 3rd person singular instances were identified and scored.

Only instances of active use of the three tenses were coded, and any passive uses were disregarded because a) they were not the structures of interest, and b) they are constructed differently (and potentially more complex) than the active.

6.5.4 Intra and inter-rater reliability

The researcher coded and scored a total of 140 scripts of oral production data (70 for articles and 70 for tense analysis). Considering that the numerical scoring of participants' narratives was based on the researcher's scoring of qualitative data, it was important to ensure a consistent approach to the scoring protocol by checking both intrarater and interrater reliability (Mackey & Gass, 2005).

To check intrarater reliability the researcher coded again a portion of a total of 140 scripts two months after the initial scoring. The only major change that happened as a result of checking intrarater reliability, was the researcher's decision regarding the inclusion of repeated NPs in the analysis. Initially the researcher had included instances in which a participant referred to a referent twice in succession as two separate NPs, such as *the cloud made an alligator, crocodile*. In the first round of scoring this would have been coded as two separate NPs (alligator and crocodile) with one correct use of article and one omission of the article in an obligatory context. After rescored and careful consideration, the researcher decided to not include the second NP (in the example above *crocodile*) because such utterances were common even among L1 English speakers and it was quite likely that the article was omitted with the second NP (in succession) as a result of repetition and not a lack of acquisition of the article system. Once the decision was made not to include the second mentioned NP in succession, all remaining scripts were checked and the scores adjusted.

To check interrater reliability, a second marker (L1 English speaker) was recruited and trained to score a subset of the data. The subset contained two¹⁵ scripts per group for articles, and two scripts per group for tense, with a total of 12 scripts. The scripts were randomly chosen and anonymised so that no information about the participants' identity or their L1 was available to the second marker. After the second marker was trained, they scored a practice script together with the researcher. Table 6.10 shows the number of decisions that were made and the interrater agreement.

¹⁵ The subset aimed to contain roughly 10% of scripts from each group. Both L1 English and L1 Mandarin groups had 24 participants, and 10% of 24 scripts is 2.4 scripts which was rounded off to 2 scripts per group. The L1 Croatian group had 22 participants, and 10% of 22 scripts is 2.2 which was also rounded off to 2 scripts per group.

Table 6.10 Interrater agreement for oral production tasks

L1	Participant ID	Number of decisions	Type of decision	Agreement
English	402	53	articles	full
English	417	34	articles	full
English	421	45	tense	full
English	404	34	tense	full
Mandarin	115	49	articles	full
Mandarin	124	44	articles	1 disagreement
Mandarin	123	26	tense	2 disagreements
Mandarin	103	29	tense	full
Croatian	202	39	articles	full
Croatian	218	64	articles	full
Croatian	214	39	tense	full
Croatian	205	24	tense	full

Interrater agreement score was calculated using Cohen et al.'s (2011, p. 201) equation:

$$\frac{\text{Number of actual agreements}}{\text{Number of possible agreements}} \times 100$$

The number of actual agreements was 477 out of 480, which gave the interrater agreement score of 99%. Mackey and Gass (2005) advise that 75% agreement is good and 90% agreement is ideal. Therefore, due to the high agreement between the two raters in the present study, the scores were deemed reliable.

6.6 Statistical analyses

6.6.1 Generalised Linear Mixed-Effects Models (GLMMs)

A simple linear model (or linear regression) predicts the unknown parameters (response variable) as a linear combination of a set of observed value or predictors which are normally distributed (McCulloch, 2008). In other words, a change in the predictor leads to a change in the response variable. The Generalised Linear Model (GLM) is a flexible generalisation of the simple linear regression as it allows for non-normally distributed response variables.

In most analysis we are interested in explaining the variability in our data by attributing it to various categories. For example, in the present study we are interested to see whether the participants' L1 is a potential source of their variable performance. Categories such as L1, gender or age are called factors, and each factor can have more than one level (e.g., gender has two levels: male and female). The GLM looks at 'the extent to

which different levels of a factor affect the variable of interest' (McCulloch, 2008, p. 3), and this is called an effect. We have two types of effects: fixed and random. Winter (in press) defines fixed effects as a systematic influence on the the dependent variable, and they are constant across experiments which makes them repeatable. In the context of the present study, this means that we could test the same effect (definite/indefinite article) again with different participants or with different stimuli. In addition, fixed effects usually have a small number of levels (e.g., definite or indefinite article) and are not sampled. By contrast, the influence of random effects on the data are not systematic and contain a larger number of sampled levels than fixed effects. Usually, the study in question only represent a sample or a subset of the levels. For example, in the present study there are three groups of participants participants based on their L1, but each group only represents a sample of the population and not the entire population of L1 English, L1 Mandarin or L1 Croatian speakers of English.

As we have seen above, a GLM aims to express a relationship between variables as a simple formula, in which we have a dependent variable which is predicted by a so-called fixed effect. However, things in the real world are rarely that simple, and there are influences on our dependent variable apart from the fixed effects. To account for these influences we add epsilon to our formula. Epsilon represents everything in our experiment, and thus formula, that affects our dependent variable for which we have not controlled. Things in our experiment that we have not controlled for, are called random effects. Combining fixed and random effects in a single model is referred to as as linear mixed-effects modelling (GLMM) – the type of analysis used in the present study.

Adding random effects in a model becomes particularly important when we deal with data sets that are not dependent, as it is the case in repeated measures designs. The data points in a repeated measures design are not independent because each participant contributes more than one data point to the data set. In the present study on online processing of articles, for example, each participant contributed data (RTs) on three conditions (match, substitution, omission). By adding random effects to our model we account for the individual variation each participant brings into our data. In addition to accounting for by-subject variation, it is also possible to add by-item variation into the model. Thus, GLMMs are a very flexible too for investigating the variation in more complex data sets.

In the present study the aim was to find out whether the two L2 groups performed similarly to the L1 English group, but also how each group performed on different measures

within itself. For example, an analysis was run to see whether the L2 groups read match sentences differently to violation sentences to the L1 English group, but also whether each group read match and violation sentences differently. The same analyses were also conducted for all GJT data, all SPR data and oral production data.

6.6.1.1 Normality

Like any parametric test, GLMs and GLMMs require certain assumptions to be met in order for the analysis to be generalisable. The assumptions of a linear mixed-effects models are the same as for any linear model. The most important assumptions to be met are a) linearity, b) independence, and c) homoscedasticity.

Firstly, GLMs assume that we are modelling a relationship that is linear, hence the name (Field, Miles, & Field, 2012). This means that our dependent variable needs to be a product of a linear combination of our independent variables (fixed effects). Visually, we would expect to see a straight line on a plot. Secondly, GLMs assume that we are dealing with independent data because violations of this assumptions seriously increase the chance of Type 1 error (Winter, in press). Independence of data assumes that each participant has contributed only one observation/value to the data set. However, with repeated measure designs this assumption is violated, and to deal with such violations it is necessary to employ a linear mixed-effects model, which in addition to fixed effects also includes random effects (see above). Thirdly, homoscedasticity assumes that the residual terms of each predictor should have the same variance; in other words, that residual terms remain constant across predictors (Field et al., 2012). In addition, GLMs assume that the residual values are normally distributed, but Winter (2013) claims that this is the least important assumption as linear models are generally robust enough against such violations.

In the present study, the assumptions of the GLM were assessed by creating scatter plots of fitted and residual values for each data set. A plot that has a random pattern (the dots do not form a particular pattern but are randomly scattered around) is indicative of a data set which meets the assumptions of linearity, randomness and homoscedasticity (Field et al., 2012). Below is an example of a normally distributed scatter plot (Figure 6.3).

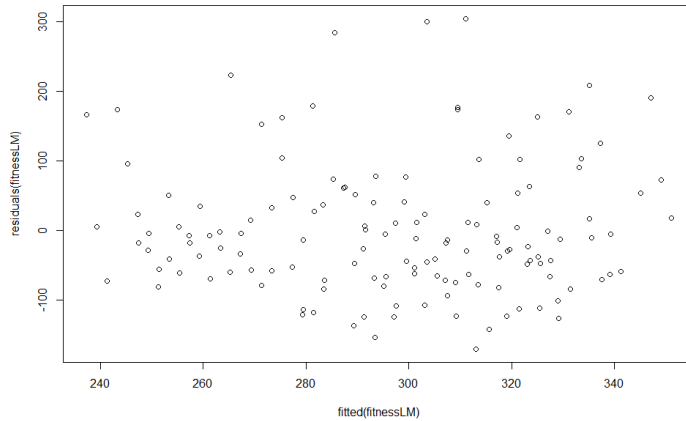


Figure 6.3 Scatter plot of indefinite article GJT data showing normally distributed residuals

6.6.1.2 Outliers

Outliers are defined as points or observations which deviate markedly from the rest of the data in the sample (Larson-Hall, 2010). Although there is an ongoing debate whether outliers should be excluded prior to analysis or not, the decision for the present study was to keep outliers (i.e., not delete them or replace them with a different value) for several reasons. Firstly, removing outliers is a relatively subjective process, in that the cut off value which determines an outlier can vary between researchers. For example, one can define an outlier as a value that is anywhere between 1 and 3 standard deviation points from the mean. Thus, some outlier calculations are more conservative than others.

Secondly, once an outlier is removed that is not the end of the story. Very often, removing one outlier does not necessarily achieve normality, but rather just creates a different outlier. If we continue on this path, we might end up losing a lot of data. This is very dangerous with small sample sizes, which seem to be the norm in much of second language research.

Finally, and maybe most importantly, removing data that we “do not like” does not reflect the real-world situation. Data gathered from participants are often messy in the sense that there is a lot of individual variation among participants. Let us say that a participant reads much faster than the rest of the participant group. This would usually result in the mean reading times of that participant to be identified as an outlier compared to the mean of the rest of the group. Thus, by discarding that participant’s reading times from the data set, we lose valuable and realistic data. There has been a call from prominent researchers recently to, not only look at group results, but also pay more attention to

individual differences of participants (Morgan-Short, 2017) in order to gain a better understanding of the full spectrum of second language acquisition.

Therefore, no outliers were removed prior to any of the analyses carried out in the present study, but the SPR data were cleaned according to the standard practice in similar studies that utilised this method (see section 5.4.1.4).

6.6.1.3 Analysis

This section discusses the analyses carried out depending on the task. The GJT data for both articles and TA were analysed using linear mixed-effects models. Each L2 group was compared against the L1 English group in the overall model. In addition, comparisons were run within each group to determine whether the violation conditions were rated differently to the match conditions. For articles, two models were built, one for the indefinite context and another for the definite context. For TA, three models were built, one for each tense (past simple, present perfect, and present simple).

The SPR data for both articles and TA were analysed in a similar manner to the GJT data, but each analysis had to be repeated seven times for each segment analysed. The linear mixed-effects model analysis of the SPR data for articles was run for the indefinite and definite contexts, and within each context the violations (omission or substitution) were compared against the match condition (Table 6.11). Each of the comparisons was carried out on a total of seven segments.

Table 6.11 Conditions and segments compared for article SPR data

Context	Conditions compared	Segments analysed						
Indefinite	Omission vs Match	Noun (N)	N +1	N +2	N +3	N +4	N +5	N +6
	Substitution vs Match	Noun (N)	N +1	N +2	N +3	N +4	N +5	N +6
Definite	Omission vs Match	Noun (N)	N +1	N +2	N +3	N +4	N +5	N +6
	Substitution vs Match	Noun (N)	N +1	N +2	N +3	N +4	N +5	N +6

The linear mixed-effects model analysis of the SPR data for TA were run for each tense, and within each tense the mismatch sentences were compared against match sentences. Each comparison was carried out on seven segments (Table 6.12).

Table 6.12 Conditions and segments compared for TA SPR data

Context	Conditions compared		Segments compared					
			V +1	V +2	V +3	V +4	V +5	V +6
Past Simple	Match vs mismatch	Verb (V)	V +1	V +2	V +3	V +4	V +5	V +6
Present Perfect	Match vs mismatch	Verb (V)	V +1	V +2	V +3	V +4	V +5	V +6
Present Simple	Match vs mismatch	Verb (V)	V +1	V +2	V +3	V +4	V +5	V +6

The analysis of the oral production data required slightly less complex linear models since each context or tense did not have match and violation conditions. For articles, each L2 group was compared against the L1 English group, and each individual group was analysed for differences between the indefinite and definite article. Similarly, for TA each L2 group was compared against the L1 English group, but the tenses were not compared against each other.

6.6.1.4 Reporting

In addition to reporting the standard p-values, effect sizes were reported as well. There are several benefits of reporting effect sizes along p-values. First, an effect size calculation such as Pearson's *r* or Cohen's *d* 'divide an unstandardised measure of effect size by a statistic that measures variation in the sample' (Winter, in press, p. 98). In other words, they measure signal over noise, meaning that they are larger when the signal is large or when the noise is smaller (Winter, in press). The good thing about effect sizes is that they are not affected by the size of our sample and thus, a larger effect size can be obtained even with small samples sizes. Thus, in addition to the p-value, effect sizes are a good indicator of how large the effect is. The effect size used in the present study was Pearson's *r* and Table 6.13 offers interpretations of the values.

Table 6.13 Effect size interpretation chart (based on Cohen, 1988)

Effect size	Effect size threshold			
	<i>Small</i>	<i>Medium</i>	<i>Larger</i>	<i>Very large</i>
<i>r</i>	.10	.30	.50	.70

Furthermore, the significance of p-values reported in the present study has been adjusted for multiple testing. Any given p-value assumes that the data were analysed only

once, and when multiple analyses are conducted the chances of us finding at least one significant result become increased, and this is called a ‘family-wise error rate’. In other words, “the ‘family-wise error rate’ is the probability of obtaining at least one Type I error for a given number of tests.” (Winter, 2020, p. 175). The error rate can be expressed with the formula below, in which k stands for the number of tests carried out at the specified alpha value (Winter, 2020).

$$FWER = 1 - (1 - 0.05)^k$$

This means that for only two tests the probability of Type I error increases to 10%, and it continues increasing rapidly with each additional test.

In order to control for the family-wise error, the Bonferroni correction procedure should be used, which sets the alpha value to a new threshold. The new cut of point for the p-value is calculated by dividing the alpha value 0.05 by the number of tests conducted. Particularly for the SPR data in this study, this means that the 0.05 alpha value was divided by seven (the number of segments analysed) which meant that the new cut of for significance was 0.007.

However, the Bonferroni adjustment is not without criticism, and some researchers find it too conservative (Field et al., 2012). By trying to minimise the Type II error (concluding that there is an effect when, in fact, there is no effect), some claim that the Bonferroni adjustment runs the risk of inflating the chances of Type I errors (concluding that there is no effect when there actually is one). Nevertheless, many researchers and statisticians recommend using the Bonferroni adjustment (e.g., Plonsky, 2013; Winter, in press) but advise for significance testing results to be also interpreted in light of other measures, such as confidence intervals and effect sizes.

6.7 Procedures

The participants were tested in a dedicated quiet room on an individual basis. They were given the consent form to sign and had a chance to ask questions and were encouraged to keep the information sheet they were given. In addition, non-native speakers were asked to first complete the Oxford quick placement test (pen and paper version). All participants were offered a £5 reward for their time.

In the first part of the experiment, the participants were first shown a short Pixar animated film and were asked to retell the story as they were watching. They were given written and verbal instructions and were asked to adjust the laptop screen how it best suited them. During this production task the participants and the researcher were allowed

to pause the task if it was deemed necessary. This part of the experiment lasted approximately 10 minutes.

In the second part of the experiment, the comprehension tasks were undertaken. Once again the participants were given both written and oral instructions for both tasks. The self-paced reading task came first and the participants were told that this part of the experiment would last up to 30 minutes and they were allowed to take short breaks during the experiment as required. However, they were asked not to take a break when the sentences were being shown one word at a time, the reason being that their RTs were measure (the participants were not told the reason). They were also told that yes/no questions about what they had just read would appear randomly, and were instructed to tell the research their answer for it to be recorded on an answer sheet. Care was taken so that participants were not able to see the answer sheet because during the pilot testing participants who saw the questions on the answer sheet were more likely to develop reading strategies and pay attention only to stimuli with key words that they had seen in a question. Also, they were asked to do the task with their dominant hand (the one they write with) because the task measured reaction times in milliseconds and there was a possibility that performing the task with their non-dominant hand might result in minute, but possibly detectable, slower reaction times. Before commencing the task, the participants had a chance to familiarise themselves with the task in two practice rounds.

Finally, the participants took part in the offline grammaticality judgement test on a desktop computer which lasted between 10 and 15 minutes. The test was conducted on a desktop computer, as opposed to all other task which were conducted on a laptop, so that participants had a larger screen and a mouse which made it easier and faster to navigate through the questions. Before the test stimuli, the participants were presented with examples so as to ensure that they understood the task.

The task order was such that the least structured tasks were performed first (production tasks) and the most structured and constrained one last (acceptability judgement task). In that way the participants would not be able to guess what the experiment was about and become desensitised to the stimuli. Also, since the purpose of the production tasks and the self-paced reading task was to tap into the participants' implicit knowledge of the tested structures, it was very important that they do not become aware of the structures the tasks were testing. The acceptability judgement task was administered last since it requires the participants to access their explicit knowledge of the tested structures.

The oral production task was part of a total of 5 tasks. Prior to the testing, each participant was sent a link to a background questionnaire and their suitability was assessed based on their answers. Then, a testing slot was scheduled with each participant in which they completed the other four tasks in the following order: language placement test, animated film retelling task, self-paced reading task, and finally the grammaticality judgement task. The participants were tested in a dedicated room one participant at a time, and each session lasted up to one hour for native speakers and up to one hour and 30 minutes for non-native speakers. The oral production task took approximately six minutes to complete. Participants' narrations were recorded using a voice recording app on an iPhone, and were later transcribed.

The rest of this section deals only with the procedures related to the oral production task (for a more in depth discussion see the Methodology and Methods section on article comprehension tasks).

The participants watched the animated film on a 12.5" laptop screen, and were told to adjust the screen to suit their needs. Next, the participants were asked to describe the story as they were watching, and to pause the film by pressing the SPACE key if they felt the film was moving along too quickly and they had not finished their sentence. During the pilot stage of this task, some participants were reluctant to pause the film, so it was decided that the researcher would also stop the recording when it was necessary. Another important consideration was ensuring that the indefinite and definite NPs were elicited consistently by limiting the participants' use of pronouns, which would be expected in natural speech (Gass & Mackey, 2011). The researcher did not want to tell the participants prior to commencing the task to avoid pronouns because this could have given away that the researcher was eliciting articles. However, when participants used a pronoun instead of an article during the task, the researcher prompted them to supply the desired grammatical structure. The prompts consisted of a sentence such as "Who gave what to whom?", in order to elicit utterances such as "The cloud gave the crocodile to the stork.", instead of "He gave it to the stork". It was ensured that the researcher did not use the desired structures in the prompts (e.g., What did *the cloud* give?) so as not to prime the participants' utterances.

Chapter 7: Results of articles SPR and GJT (Study 1)

The present thesis is comprised of three individual studies, and this is reflected in the organisation of the next four chapters. Chapter 6 presents the results and discussion of Study 1 into L2 online processing of English articles, followed by the results and discussion of Study 2 into 2 online processing of English TA in Chapter 7. The results and discussion of the oral production tasks (Study 3) are presented in Chapter 8. Finally, Chapter 9 is dedicated to the general discussion of the results.

Chapter 6 reports the results and discussion of Study 1 into L2 online processing of English articles which consisted of a GJT and an SPR task (for details see Chapter 5, section 5.4). The data were analysed using linear mixed-effects models with group as random effects, and type of article as fixed effects (for details on the analysis conducted see Chapter 5, section 5.6). The results of the GJT are presented first, followed by the results of the SPR task and a discussion.

7.1 GJT results

The participants read the same sentences they had seen in the SPR task and were asked to rate how grammatically acceptable they thought each sentence was. The sentences were rated on a six-point scale with 1 being completely ungrammatical and 6 being completely grammatical.

7.1.1 Indefinite article

All three groups rated omission errors as least grammatically acceptable compared to match sentences. Substitution errors were also rated as less acceptable than match sentences, but this difference was not as large as between omission and match sentences, indicating that omission violations of English articles are considered more grammatically unacceptable than substitution violations (Table 7.1).

Table 7.1 Mean GJT rating of the indefinite article in each condition by group

Group	Condition		
	omission	substitution	match
L1 English	2.968 (1.249)	4.142 (1.057)	5.131 (0.680)
L1 Mandarin L2 English	3.947 (1.137)	4.826 (1.064)	5.152 (0.594)
L1 Croatian L2 English	4.178 (1.069)	4.571 (1.259)	4.801 (0.887)

The overall linear mixed-effects model revealed a modest effect of group, $\chi^2(2) = 6.561, p = 0.037$, but fixed effects comparisons did not confirm this as both L2 groups rated the sentences in a similar pattern to the L1 English group (i.e., omission was rated as least and match as most grammatical). The fixed effects comparisons further confirmed that substitution and omission violations were rated differently compared to the match. Omission sentences were rated significantly differently compared to match sentences, $b = -0.731, t(136) = -8.796, p = 0.000$, with a rather larger effect size $r = 0.602$. On the other hand, substitution violations were rated similarly to match sentences, $b = -0.101, t(136) = 1.224, p = 0.222, r = 0.104$.

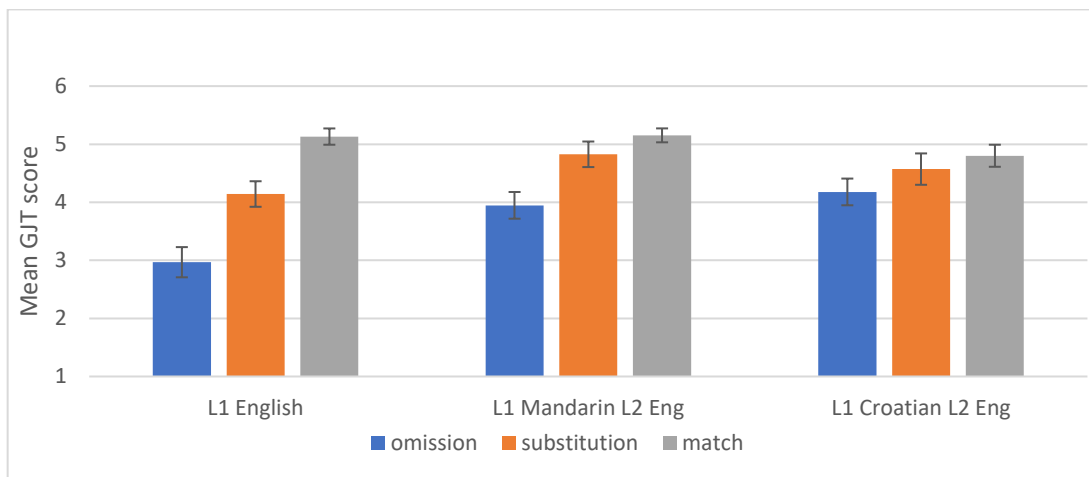


Figure 7.1 GJT rating of each condition for the indefinite article by group (error bars = SE)

When looking at within group differences, the same pattern is observed. All three groups rated omission violations statistically significantly lower than match sentences but did not rate substitution violations statistically significantly lower than match sentences (Table 7.2).

Table 7.2 Results of the overall model and comparisons for indefinite article by group

Group	Overall model	Comparisons	
		Omission vs match	Substitution vs match
L1 English	$\chi^2(2) = -101.226$, $p = 0.000$	$b = -1.112$, $t(46) = -7.206$, $p = 0.000$, $r = 0.728$	$b = 0.061$, $t(46) = 0.397$, $p = 0.692$, $r = 0.058$
L1 Mandarin L2 English	$\chi^2(2) = -92.540$, $p = 0.000$	$b = -0.694$, $t(46) = -5.611$, $p = 0.000$, $r = 0.637$	$b = 0.184$, $t(46) = 1.486$, $p = 0.143$, $r = 0.214$
L1 Croatian L2 English	$\chi^2(2) = -80.658$, $p = 0.011$	$b = -0.338$, $t(40) = -2.877$, $p = 0.006$, $r = 0.510$	$b = 0.054$, $t(40) = 0.460$, $p = 0.647$, $r = 0.072$

7.1.2 Definite article

The GJT results for the definite article are fairly similar to the results for the indefinite article. All three groups rated the sentences in which the article was omitted as least grammatical and the match sentences as most grammatical. In addition, sentences in which the article was substituted were rated only slightly less acceptable than match sentences (Table 7.3 and Figure 7.2). These differences are the clearest with the L1 English group, while the L2 groups rated all sentences rather similarly.

Table 7.3 Mean GJT rating of the definite article in each condition by group

Group	Condition		
	omission	substitution	match
L1 English	2.645 (1.253)	3.511 (0.935)	5.177 (0.685)
L1 Mandarin L2 English	3.75 (1.218)	4.232 (1.268)	4.739 (1.303)
L1 Croatian L2 English	4.313 (1.171)	4.421 (1.602)	5.095 (0.960)

The overall linear mixed-effects model revealed an effect of group, $\chi^2(2) = 77.198$, $p = 0.000$, which was the result of the significantly different ratings of the L1 Croatian L2 English group compared to the L1 English group, $b = 0.359$, $t(66) = 2.409$, $p = 0.018$, $r = 0.284$, although this finding should be taken with caution as the effect size is relatively small. This suggests that whatever difference there is, it is not very big. The L1 Mandarin L2 English group did not rate the sentences statistically differently from L1 English speakers, $b = 0.051$, $t(66) = 0.356$, $p = 0.722$, $r = 0.044$.

There was also an effect of condition, $\chi^2(2) = 8.937$, $p = 0.011$, because the omission sentences were rated significantly lower than match, $b = -0.691$, $t(136) = -7.242$, $p = 0.000$,

$r = 0.528$, while the substitution sentences were not, $b = -0.134$, $t(136) = -1.408$, $p = 0.161$, $r = 0.014$.

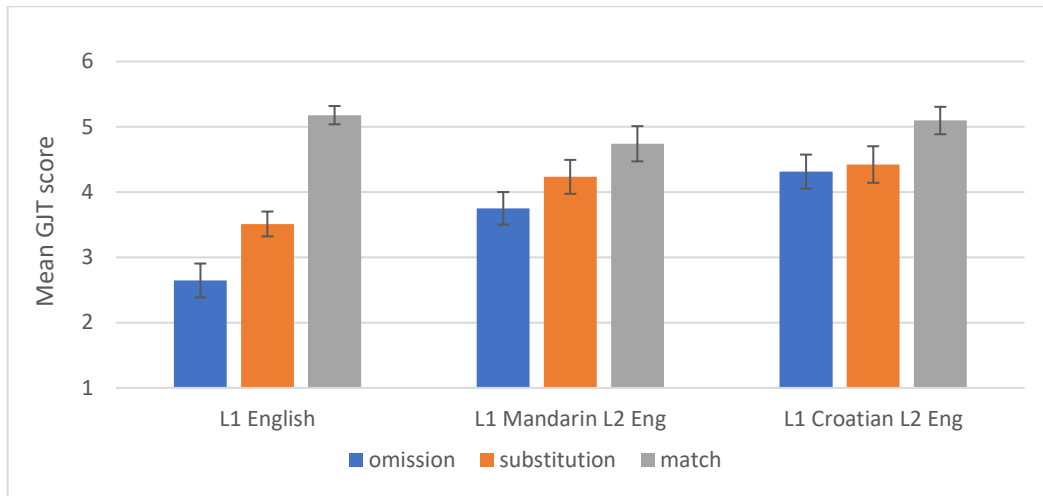


Figure 7.2 GJT rating of each condition for the definite article by group (error bars = SE)

As with the indefinite article, the within-group differences follow the same pattern as revealed by the group analysis - all three groups rated the omission sentences as significantly lower but did not find the substitution sentences to be as unacceptable compared to the match (Table 7.4).

Table 7.4 Results of the overall model and comparisons for definite article by group

Group	Overall model	Comparisons	
		Omission vs match	Substitution vs match
L1 English	$\chi^2(2) = 56.333$, $p = 0.000$	$b = -1.32$, $t(46) = -6.988$, $p = 0.000$, $r = 0.718$	$b = -0.266$, $t(46) = -1.647$, $p = 0.106$, $r = 0.236$
L1 Mandarin L2 English	$\chi^2(2) = 12.909$, $p = 0.001$	$b = -0.490$, $t(46) = -3.235$, $p = 0.002$, $r = 0.431$	$b = -0.008$, $t(46) = -0.053$, $p = 0.957$, $r = 0.008$
L1 Croatian L2 English	$\chi^2(2) = 14.208$, $p = 0.000$	$b = -0.418$, $t(40) = -2.938$, $p = 0.005$, $r = 0.420$	$b = -0.127$, $t(40) = -0.897$, $p = 0.374$, $r = 0.14$

In summary, all three groups found omission errors to be least grammatically acceptable and sentences in which the article matched the context the most grammatical, and this difference was statistically significant. By contrast, the substitution sentences were rated as slightly less acceptable than match sentences, but these differences were not statistically significant for any group. The same pattern was observed with both the

indefinite and definite article. This indicates that participants in all three groups are aware of the grammatical rule that bare NPs are not acceptable in English, but do not regard situations in which the article does not semantically match the context to be fully ungrammatical.

7.2 SPR articles

The participants saw the same sentences as in the GJT but they were presented one word at a time in the middle of the screen and the participants controlled how quickly they switched from one word to another by pressing the space key on a keyboard. Sentences used in the analysis each contained a countable singular noun which was considered the critical segment involving the experimental manipulation – it was either preceded by an appropriate article, an article that was substituted or no article (omission). In each sentence the critical segment was followed by exactly six words, which resulted in seven statistical comparisons (see Chapter 5, section 5.6.1.3 for more information).

The results of the indefinite article are presented first, followed by the definite article.

7.2.1 Indefinite article

Table 7.5 shows the mean reading times of the speed at which each participant group read each of the three conditions (omission, substitution, match) across six segments¹⁶ (determiner, the noun which was the critical segment, and four segments following the noun).

Table 7.5 Mean RTs for the indefinite article per condition and segment for each participant group (SD in parentheses)

Group	Condition	Segment					
		Det (determiner)	Noun (N) (critical segment)	N +1	N +2	N +3	N +4
L1 English	Omission	N/A	-31.64 (76.62)	28.75 (113.71)	-19.53 (43.06)	-22.32 (46.42)	-2.56 (82.29)
	Substitution	-23.84 (62.79)	-46.84 (29.8)	-33.09 (29.71)	-27.15 (30.56)	-27.11 (45.08)	-23.55 (30.35)
	Match	-21.14 (41.22)	-16.69 (79.06)	-30.48 (47.55)	-15.41 (60.34)	-24.77 (42.75)	-1.62 (63.36)

¹⁶ Although seven segments were compared in the analysis, the data for only the six five segments are presented throughout the thesis for readability and because nothing of statistical or descriptive importance happened after the sixth segment.

	<i>Omission</i>	N/A	-52.46 (68.22)	10.26 (113.64)	28.41 (46.18)	-5.41 (85.96)	6.8 (69.53)
Chinese L2 English	<i>Substitution</i>	-33.87 (78.26)	-37.99 (83.29)	-5.78 (76.33)	-19.2 (71)	-28.63 (56.17)	0.91 (58.06)
	<i>Match</i>	-5.97 (82.84)	-26.24 (81.75)	5.72 (100.39)	-25.65 (53.66)	-29.3 (50.27)	-11.998 (64.01)
	<i>Omission</i>	N/A	-29.36 (50.42)	-47.86 (55.46)	-20.09 (64.99)	-23.76 (71.01)	-26.47 (54.87)
Croatian L2 English	<i>Substitution</i>	30.25 (116.35)	-2.23 (81.69)	34.94 (167.5)	4.82 (103.44)	-8.88 (37.2)	16.01 (88.22)
	<i>Match</i>	1.93 (95.57)	-26.02 (66.51)	17.72 (87.75)	7.14 (89.71)	6.36 (99.63)	5.92 (104.19)

Overall, the L1 English group showed a somewhat predictable reading pattern in that sentences with an omission error were read more slowly than sentences with a substitution error or sentences that were a match (Table 7.5 and Figure 7.3) On the first segment following the noun (N+1) there was an increase in reaction times for omission sentences, indicating that the participants were experiencing a delay in processing of the sentences as a result of the omission error. Interestingly, sentences in which the article was substituted were read slightly faster throughout than sentences in which the article matched. Substitution errors of the indefinite article do not seem to pose a particular processing cost for L1 English speakers compared to match sentences.

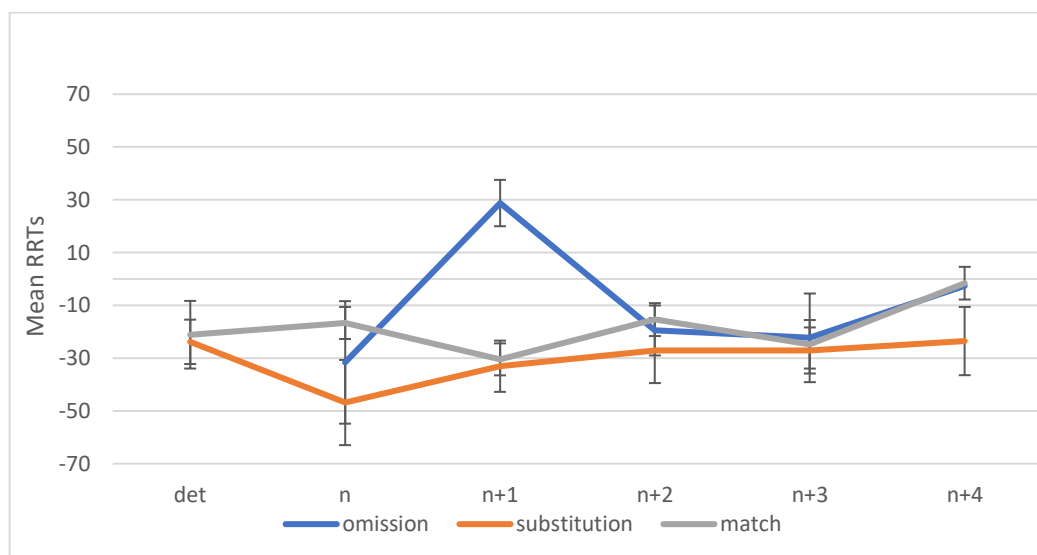


Figure 7.3 RTs of L1 English group for indefinite article (error bars = SE)

By contrast, the L1 Chinese L2 English participants showed somewhat different reading patterns. On the determiner, the substitution sentences were read slightly faster than sentences that were a match. On the first segment following the noun the reading of all three conditions is somewhat delayed as evidenced by the spike in reading times (Figure 7.4). On the third segment following the noun the substitution and match sentences are read at a similar speed, while sentences containing an omission violation are read at a slower speed. This slow-down is also observed with the L1 English group, however two segments sooner on the first segment following the noun.

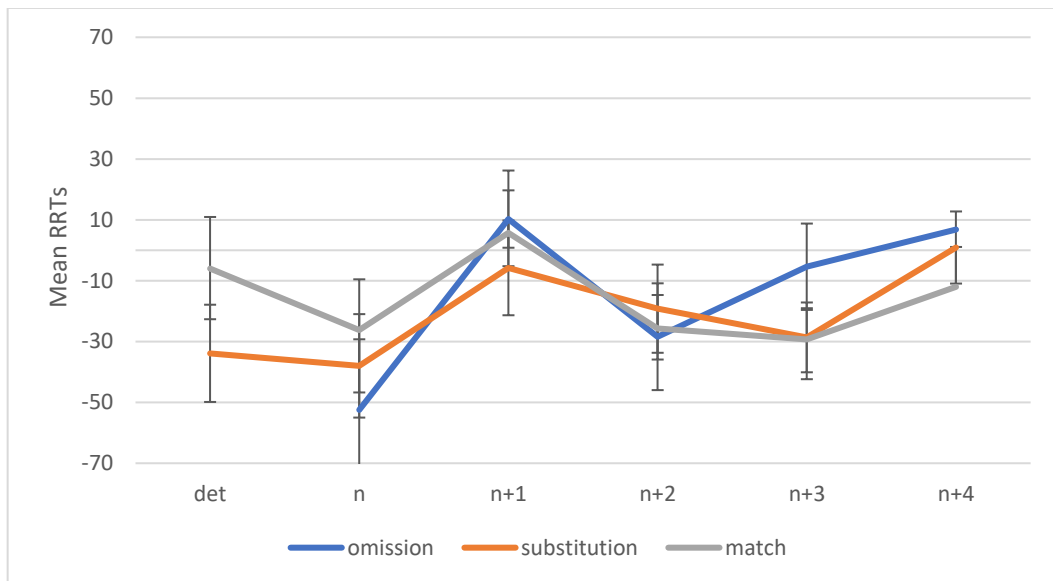


Figure 7.4 RTs of L1 Mandarin L2 English group for indefinite article (error bars = SE)

The L1 Croatian group demonstrated reading patterns that were dissimilar to both the L1 English and L1 Mandarin groups. The substitution and match sentences are read in a similar pattern over the first three segments (Figure 7.5) with substitution sentences being read somewhat faster. Sentences containing an omission violation, however, were read faster than either substitution or match sentences. It seems that the lack of an article enabled the participants to read the sentences even faster and did not pose a processing burden.

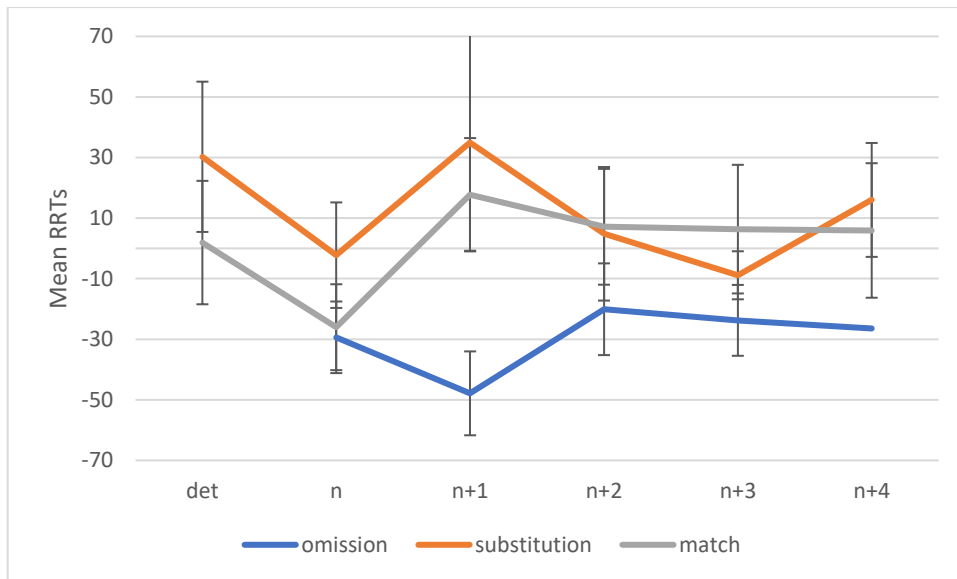


Figure 7.5 RTs of L1 Croatian L2 English group for indefinite article (error bars = SE)

The results of the statistical analysis for each of the five segments are presented in Table 7.6, but only the segment(s) that revealed statistical significance are discussed. None of the segments revealed statistical significance apart from the first segment following the noun (the critical segment). On the first segment following the noun (N+1), the L1 English group was significantly slowed down when reading omission sentences compared to match sentences, $b = 40.361$, $t(46) = 3.4.6$, $p = 0.001$, $r = 0.45$. The same participants were not significantly slowed down when reading substitution sentences, $b = -21.484$, $t(46) = -1.813$, $p = 0.076$, $r = 0.258$.

Table 7.6 Results of the linear mixed-effects model analysis for indefinite article

Segment	Effect		
	Group	Condition	Group:Condition
Det	$\chi^2(2) = 6.263$, $p = 0.099$	$\chi^2(1) = 6.250$, $p = 0.043$	$\chi^2(4) = 9.034$, $p = 0.060$
Noun (N)	$\chi^2(2) = 2.641$, $p = 0.450$	$\chi^2(2) = 0.919$, $p = 0.337$	$\chi^2(4) = 4.933$, $p = 0.176$
N+1	$\chi^2(2) = 1.012$, $p = 0.907$	$\chi^2(1) = 1.006$, $p = 0.604$	$\chi^2(4) = 16.968$, $p = 0.009$
N+2	$\chi^2(2) = 5.455$, $p = 0.243$	$\chi^2(1) = 4.378$, $p = 0.112$	$\chi^2(4) = 6.375$, $p = 0.382$
N+3	$\chi^2(2) = 2.700$, $p = 0.609$	$\chi^2(1) = 2.368$, $p = 0.306$	$\chi^2(4) = 7.243$, $p = 0.298$
N+4	$\chi^2(2) = 0.734$, $p = 0.946$	$\chi^2(1) = 0.576$, $p = 0.749$	$\chi^2(4) = 7.289$, $p = 0.294$

In summary, the L1 English group showed statistically significant sensitivity to omission violations on the first segment following the noun but did not show statistically significant sensitivity to substitution violations. The two L2 groups did not show statistically

significant sensitivity to either violation on any of the segments analysed.

7.2.2 Definite article

The results for the definite article are in many ways similar to the results for the indefinite article. Table 7.7 summarises the mean reading times which indicate how quickly each participant group read each of the three conditions across six segments.

Table 7.7 Mean RTs for the definite article per condition and segment for each participant group (SD in parentheses)

Group	Condition	Segment					
		Det	Noun (N)	N +1	N +2	N +3	N +4
L1 English	Omission	N/A	-30.97 (55.33)	25.56 (118.81)	-11.74 (47.72)	-20.58 (31.73)	-9.93 (45.77)
	Substitution	-32.45 (44.38)	-37.26 (51.22)	-22.51 (45.61)	-17.67 (54.59)	-14.41 (45.16)	-7.2 (45.85)
	Match	-31.78 (37.37)	-46.69 (41.09)	-32.02 (39.56)	-33.14 (50.32)	-30.62 (46.94)	-14.71 (86.41)
Chinese L2 English	Omission	N/A	-51.39 (69.85)	4.34 (97.24)	-19.43 (38.77)	-13.38 (70.1)	-2.91 (52.48)
	Substitution	-17.7 (52.47)	-34.61 (68.65)	-26.53 (30.19)	-14.26 (51.29)	11.21 (103.34)	3.57 (66.67)
	Match	-52.22 (44.94)	-57.78 (44.72)	-27.58 (77.35)	-18.44 (63.37)	-19.63 (52.81)	6.69 (59.24)
Croatian L2 English	Omission	N/A	14.15 (78.86)	16.66 (88.89)	-8.18 (55.59)	-6.93 (67.16)	38.59 (99.61)
	Substitution	2.07 (59.25)	-23.11 (49.17)	1.73 (69.39)	30.04 (116.03)	-6.46 (71.98)	12.67 (89.9)
	Match	-6.22 (74.9)	-11.95 (76.24)	15.2 (89.21)	-13.08 (66.74)	2.78 (80.33)	-21.46 (79.76)

Similar to the results with the indefinite article, the L1 English group showed a predicted pattern – the participants read the match sentences the fastest and showed sensitivity to omission errors mainly on the two segments following the noun suggesting that the omission errors caused a processing delay (Figure 7.6). However, with the indefinite article the substitution sentences were read slightly faster than match sentences on most segments, but with the definite article the L1 English group read the substitution sentences read more slowly than match sentences albeit not as slowly as omission sentences. This arguably suggests that substitution of the definite article may pose a bigger processing cost in the definite rather than indefinite context.

In the definite context a substitution would mean that *a* is used instead of *the*, and

this could be more difficult to process than when *the* substitutes *a* because the definite article can be a match in more contexts than the indefinite article.

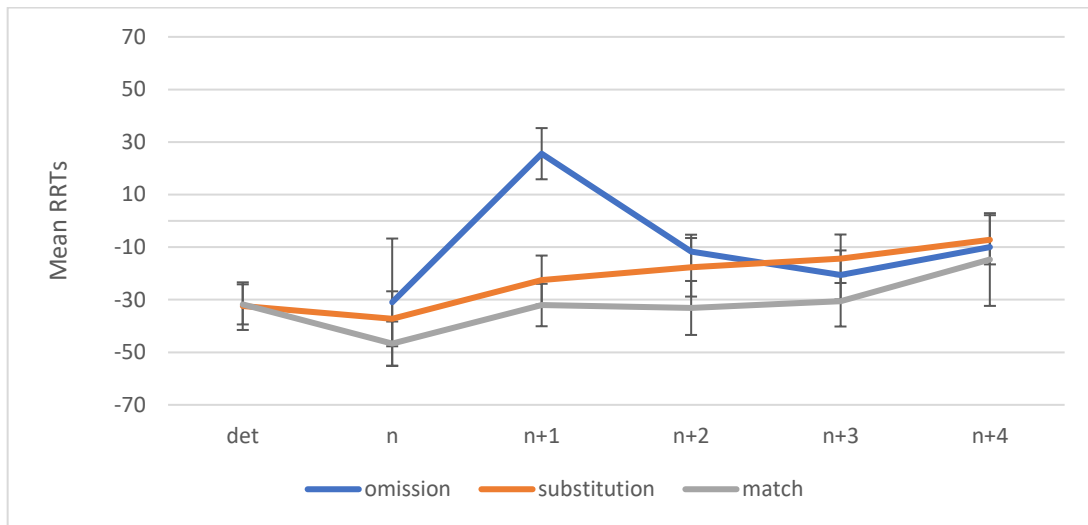


Figure 7.6 RTs of L1 English group for definite article (error bars = SE)

The L1 Mandarin L2 English group appear to be slowed down when reading the omission sentences on the first segment following the noun (Figure 7.7), and a similar pattern was observed with the L1 English group (Figure 7.6). By contrast, substitution and match sentences were read at a similar speed.

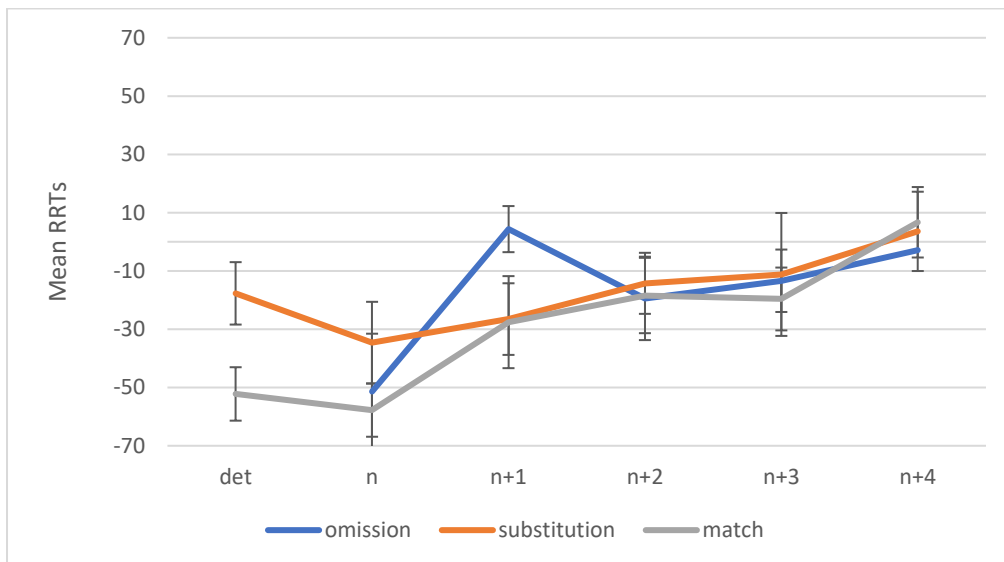


Figure 7.7 RTs of L1 Mandarin L2 English group for definite article (error bars = SE)

In contrast to both the L1 English and L1 Mandarin L2 English groups, the L1 Croatian L2 English group again showed a different reading pattern (Figure 7.8). The omission sentences are read slightly slower than match sentence on the critical segment

(the noun) and again on the fourth segment following the noun. Substitution sentences, however, are read at a similar speed as match sentences except on the second segment following the noun when we see a slow-down in substitution reading times.

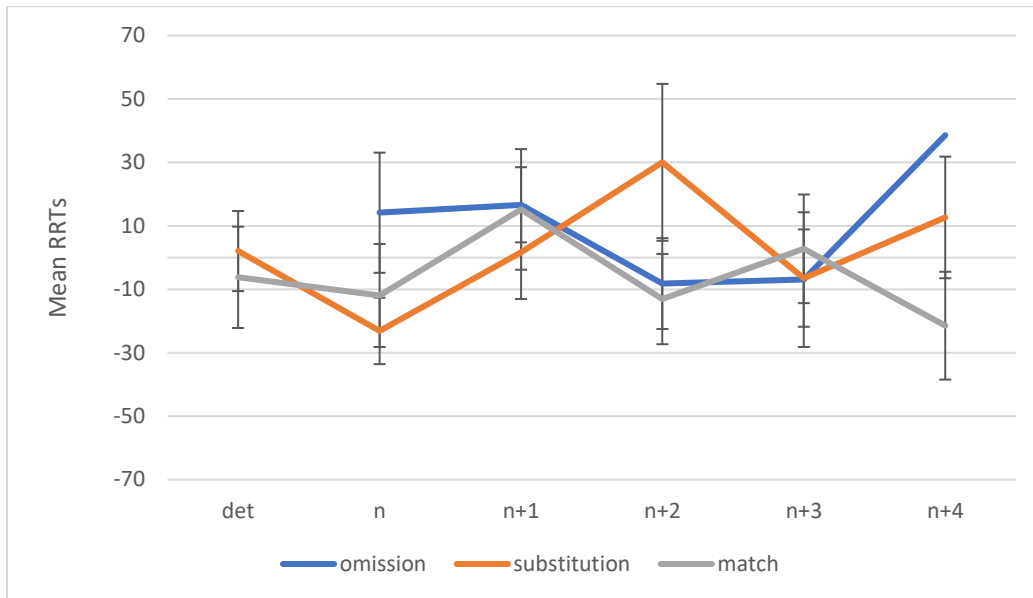


Figure 7.8 RTs of L1 Croatian L2 English group for definite article (error bars = SE)

The results of the statistical analysis for each segment are presented in Table 6.8. Just as with the indefinite article, the L1 English speakers reading the omission sentences in the definite context significantly more slowly than the match, $b = 35.216$, $t(46) = 2.746$, $p = 0.008$, $r = 0.375^{17}$. The two L2 groups did not read any of the conditions significantly differently on this or any other segment.

Table 7.8 Results of the linear mixed-effects model analysis for definite article

Segment	Effect		
	Group	Condition	Group:Condition
Det	$\chi^2(2) = 12.506, p = 0.005$	$\chi^2(2) = 9.947, p = 0.006$	$\chi^2(4) = 12.958, p = 0.011$
Noun (N)	$\chi^2(2) = 18.878, p = 0.000$	$\chi^2(2) = 16.654, p = 0.000$	$\chi^2(4) = 21.494, p = 0.001$
N+1	$\chi^2(2) = 11.732, p = 0.019$	$\chi^2(2) = 4.554, p = 0.102$	$\chi^2(4) = 7.537, p = 0.274$
N+2	$\chi^2(2) = 8.855, p = 0.064$	$\chi^2(2) = 5.010, p = 0.081$	$\chi^2(4) = 9.432, p = 0.151$
N+3	$\chi^2(2) = 4.671, p = 0.322$	$\chi^2(2) = 3.078, p = 0.214$	$\chi^2(4) = 5.535, p = 0.477$
N+4	$\chi^2(2) = 5.107, p = 0.276$	$\chi^2(2) = 2.965, p = 0.227$	$\chi^2(4) = 9.167, p = 0.164$

Additionally, there were significant group differences on two of the segments. On the determiner, the L1 English and L1 Croatian L2 English groups read the substitution and

¹⁷ The p-value (0.008) is just above the cut off point of 0.007 after Bonferroni adjustment for multiple testing. However, because the effect size is decent this indicates that there probably is an effect.

match sentences in a significantly different pattern, $b = 20.973$, $t(46) = 3.211$, $p = 0.002$, $r = 0.365$. On the critical segment (noun) both L2 groups read the three conditions in different patterns compared to the L1 English group (L1 English vs. L1 Mandarin: $b = -16.859$, $t(67) = -2.861$, $p = 0.005$, $r = 0.330$; L1 English vs. L1 Croatian: $b = 24.100$, $t(67) = 4.002$, $p = 0.000$, $r = 0.439$).

In summary, the results for the definite article are similar to the results for the indefinite article. Only the L1 English group showed a statistically significant sensitivity to omission violations on the first segment following the noun but did not show sensitivity to substitution violations. Neither L2 group showed statistically significant sensitivity to either violation on any of the analysed segments.

7.3 Articles discussion

The results of the GJT task are discussed first, followed by a discussion of the SPR results. The section concludes with a discussion of the differences in findings between the indefinite and definite article and the role of the L1 in article processing.

7.3.1 GJT results discussion

The articles GJT task aimed to answer the second research question:

RQ2: Does explicit knowledge of English articles differ between L1 English, L2 English/L1 Mandarin and L2 English/L1 Croatian speakers?

Prediction:

- a. Both L2 groups and the L1 English group will demonstrate explicit knowledge of the English article system.

The findings the GJT task only partially support prediction (a) of RQ2 that all participant groups will demonstrate explicit knowledge of the English article system. As predicted, all three groups rated sentences in which the article was omitted as statistically significantly less grammatical than match sentences. However, although the substitution sentences were rated less grammatically acceptable than match sentences, the differences were not statistically significant for any group. This is particularly unexpected of the L1 English group and the L1 Mandarin L2 English group, as both groups have been shown to be sensitive to the information carried by articles in online comprehension in an eye-tracking study (Trenkic et al., 2014).

Therefore, the findings of the present study suggest that when the article is omitted altogether, it is considered a clear violation of English grammar as evidenced by a

statistically significant difference in the ratings of omission compared to match sentences. On the other hand, although considered a violation, substitution of an article is much less of a problem for both L1 and L2 English speakers and the differences between the substitution and match sentences are not large enough to be statistically significant. This potentially indicates that a syntactic violation (omission) is considered as more ungrammatical and unacceptable than a semantic violation (substitution). The reasons for more acceptable ratings of sentences in which the article was substituted could also be methodological. There is an argument to be made that in this type of GJT task it is not always completely clear what the participants were rating, and if the materials were not forcing the preferred readings strongly enough the participants could have focused on rating other aspects of the sentences.

The results of the SPR task mirror the GJT findings and are discussed next.

SPR results discussion

7.3.2 The article SPR task aimed to answer research question three:

RQ3: Are L1 English, L2 English/L1 Mandarin and L2 English/L1 Croatian speakers sensitive to article violations on the SPR task?

Predictions:

- a. L1 English speakers will be sensitive to both substitution and omission violations.
- b. L1 Chinese and Croatian L2 learners of English will be sensitive to substitution violations.
- c. L1 Chinese and Croatian L2 learners of English will not be sensitive to omission violations.

The findings of the SPR task partially support predictions (b, c, d) of RQ3. The L1 English speakers were statistically significantly sensitive to omission violations in both contexts (in support of prediction a) but were not sensitive to substitution violations in either context contrary to prediction a. As mentioned before, the lack of sensitivity to substitution violations in the L1 English group is rather surprising given the findings of Trenkic et al. (2014) but is in line with the results of the GJT. The results of both tasks (GJT and SPR) suggest the same; that L1 English speakers on this task have more difficulty processing article omission than substitution.

Neither L2 group was sensitive to article omission as predicted (prediction c). However, contrary to prediction (b) neither group was also sensitive to article substitution. Although contrary to a prediction based on previous research by Trenkic et al. (2014), the

lack of sensitivity to article substitution among the L2 participants in the present study is not altogether surprising given the GJT results. On the GJT neither group rated substitution as significantly less acceptable than a match condition. Thus, it would be unusual to find significant sensitivity to substitution violations in the SPR task from participants who did not seem to find substitution to be very ungrammatical on a metalinguistic test such as the GJT. There are also potential methodological reasons for the findings of the present study which are discussed in section 10.3.2 of Chapter 10.

By contrast the lack of sensitivity to article omission is not in line with the GJT results, since the L2 participants rated omission sentence significantly less grammatically acceptable than match sentences. But the lack of sensitivity to article omission is in line with the predictions of the L1/L2 structural competition model (Trenkic et al., 2014), which proposes that variable L2 article production is a result of the competition between two languages. For an L2 English speaker from an article-lacking background both the “Art + NP” form and bare NPs are activated and compete for selection. This means that both forms map onto one representation in English and are easily activated, resulting in little sensitivity to grammatical violations (omission) of articles. However, it is important to note that in descriptive terms the L1 Mandarin L2 English group was slowed down by omission violations in both contexts although this was not statistically significant compared to match sentences. It is possible that with a larger sample size these differences would become statistically significant. By contrast the L1 Croatian L2 English group behaved more in line with the predictions of the structural competition model since these participants read omission and match sentences at a similar speed indicating no sensitivity to article omission. A potential reason for different reading patterns of the two L2 groups is the process of grammaticalising definiteness that Mandarin is said to be undergoing (this is discussed in more detail in Chapter 10, section 10.2.2.1).

Similarly, the morphological congruency hypothesis (Jiang et al., 2011) would also predict that L2 English speakers from article-lacking L1 backgrounds would not be sensitive to violations of English articles (especially omission) since articles are not obligatory in the speakers’ L1 but are in the L2, thus creating a morphological incongruency. However, contrary to the structural completion model, Jiang et al. (2017) postulate that the morphological congruency effect is a result of a lack of automatic activation of a particular morphosyntactic structure that is absent in the L1 of the L2 speaker. The L2 speaker might have explicit knowledge of the structure but its activation has not been automatised enough to be readily and consistently available in online comprehension and production. The results

of the article SPR and GJT tasks are in support of the explanations put forward by the morphological congruency hypothesis. The L2 speakers in the present study seem to have explicit knowledge of English articles as evidenced by the GJT results, that is, they know that countable singular nouns need to be preceded by an article in English. However, this knowledge does not seem to be automatised enough to be effectively used in online processing since the participants were not significantly sensitive to omission violations.

In addition to statistical results, it is also important to look at descriptive patterns of article processing. Two processing patterns emerge when looking at the descriptive data within each group: a) the indefinite and definite articles are processed differently by all groups, and b) L1 Mandarin L2 English participants show processing patterns more similar to the L1 English than the L1 Croatian L2 English group. These descriptive patterns are discussed next.

Indefinite vs definite article

7.3.3 The findings of the present study suggest that all groups read sentences containing the indefinite and definite articles differently. Firstly, sentences in the definite context were read in a more predictable pattern than sentences in the indefinite context. This is especially true for the L1 English and L1 Mandarin L2 English groups, as the participants in these two groups read the match sentences faster than mismatch sentences. Firstly, the participants in both groups read omission more slowly than substitution sentences. Secondly, both groups show an increase in RTs for omission on the first segment following the noun, but the difference was only statistically significant for the L1 English group. In addition, the L1 English group read substitution sentences about 40ms slower than match sentences on all four segments following the noun, and a similar pattern was observed with the L1 Mandarin L2 English group. The L1 Croatian L2 English group, on the other hand, read all sentences at a similar speed, except on the second segment following the noun (N + 2) where there is a slight slow down for substitution.

By contrast, the reading patterns of the indefinite article show a lot more variation. The L1 English group showed the predicted increase in RTs for omission errors but seem to have read substitution and match sentences at a similar speed, with substitution sentences being overall read slightly faster than match sentences. The L1 Mandarin L2 English group show an unusual increase RTs for all sentence types on the first segment after the noun but do eventually reach a reading pattern similar to the L1 English group. The L1 Croatian L2 English group show a completely different pattern to the other two groups, as they read

match and substitution sentences at a similar speed but read sentences in which the article was omitted faster.

This asymmetry in processing of the indefinite and definite articles is in line with previous finding from studies on written and oral production of English articles. Numerous studies, including the present one (see Chapter 9, section 9.2), have observed that the definite article is produced more consistently in obligatory contexts (Avery & Radisic, 2007; Snape, 2009; Trenkic, 2007). Thus, it is not surprising that the patterns of online processing of the definite article would be more consistent and predictable than of the indefinite article. In addition, previous research has also shown that substitution errors tend to be more common with the indefinite article, while omission errors are more characteristic of the definite article; in other words, *the* tends to be overused in the indefinite context (Ionin et al., 2004; Snape, 2007; Trenkic, 2007). Therefore, it is possible that since the participants are exposed to the definite article being substituted for the indefinite article in the input around them, that when reading indefinite sentences in which the definite article was incorrectly used, this was not as surprising and unacceptable as grammar rules would predict. Furthermore, on a narrative task in Tarone and Parrish (1988) the participants tended to produce the definite article more accurately than the indefinite article, and the authors suggest that omission of the indefinite article poses less of a problem than omission of the definite article in effective storytelling. Although not a narrative per se, the SPR stimuli in the present study could be considered mini stories, as they have an introduction, a middle, and a final follow-up sentence (end). Thus, it is possible that in order to follow the story effectively keeping track of definite referents was more important and that is why we see an increase in RTs with omission errors with all three groups in the definite but not necessarily in the indefinite contexts.

L1 effects

Even though neither L2 group showed statistically significant sensitivity to either violations, the L1 Mandarin and L1 Croatian L2 English groups read the sentences in arguably different patterns. Overall, the L1 Mandarin L2 English group showed reading patterns similar to those of the L1 English group in both contexts. In the indefinite context, the L1 Mandarin L2 English group started off by reading all sentence types at a similar speed, but after the second segment following the noun the sentences containing omission violations were read slower than either substitution or match sentences. Thus, we see a similar patten as with the L1 English group just delayed by two segments. Although the delay in processing is not

significantly different compared to the match sentences, there is nevertheless a visually noticeable processing delay for omission sentences in the indefinite context. In the definite context, the L1 English group read omission and substitution sentences at a slower rate than match sentences (although substitution sentences were read faster than omission), thus indicating that both types of violations delayed processing of the sentences, but only the difference between omission and match sentences was found to be statistically significant. The L1 Mandarin L2 English group show a similar pattern, especially for omission violations which are read more slowly than match sentences on the same segment (N+1) as in the L1 English group. The substitution sentences are also read more slowly by the L1 Mandarin L2 English group, but the effect (although not statistically significant) is delayed and appears on the third segment following the noun (N+3).

By contrast, the L1 Croatian L2 English group show no reading patterns similar to those of the L1 English group. In both contexts for the most part, the L1 Croatian L2 English group read the match sentences faster than either violation. In the indefinite context especially, substitution sentences appear to be read the fastest.

This unusual finding of reading the match sentences at a slower pace than violation was also observed in another study which utilised the SPR paradigm to investigate L2 article processing (for a discussion on the limitations of this study see Chapter 2, section 2.6). Kim (2017), investigated whether adult advanced L1 Korean L2 English learners were sensitive to violations of English articles in online comprehension. The stimuli were designed based on Huebner's (1983) classification of four types of articles, but only the participants performance on type 2 (referential definite) and type 3 (referential indefinites) is relevant for the present study and reported here. Kim found that L1 Korean learners of English showed an unusual pattern of reading acceptable sentences longer than the unacceptable ones with type 2 and 3 nouns. These findings somewhat mirror the findings of the L1 Croatian L2 English group in the present study.

In summary, despite the lack of statistical significance, it seems that L1 Mandarin and L1 Croatian learners of English do not process articles in a comparable manner. One likely reason for this could be L1 transfer. Several researchers claim that Mandarin has begun on a path of grammaticalising some of its determiners to take on the role of English articles. In particular, the demonstratives *zhei* (this) and *nei* (that) are thought to be taking on functions of the definite article, while the numeral *yi* (one) functions as the indefinite article (Chen, 2004; Crosthwaite, 2014; Díez-Bedmar & Papp, 2008; Hedberg, 1996; Huang, 1999; Li & Thompson, 1981). If this is true, then one would expect L1 Mandarin L2 English

learners to be more sensitive to violations of English article, omission in particular, than L2 English learners from truly article-lacking L1 backgrounds.

The findings of Study 1 into online processing of English articles seem to be in support of the claim that Mandarin is on a path of grammaticalising articles, since the L1 Mandarin L2 English participants showed reading patterns somewhat similar to that of the L1 English group, and arguably somewhat different from that of the L1 Croatian L2 English group. The L1 Croatian L2 English group, on the other hand, showed some unusual reading patterns also observed in the only comparable SPR study on articles to date which also tested learners from an article-lacking L1 background (Kim, 2017).

Chapter 8: Results of tense-aspect SPR and GJT (Study 2)

Chapter 7 presents the results and discussion of Study 2 into L2 online processing of English tense-aspect (TA) which consisted of a GJT and an SPR task (for details see Chapter 6, section 6.4). The data were analysed using linear mixed-effects models with group as random effects, and type of condition (match or mismatch) as fixed effects (for details on the analysis conducted see Chapter 6, section 6.6). The results are presented by tense - past simple results are discussed first, followed by present perfect and finally, present simple. For each tense the GJT results are discussed first, followed by SPR results. The chapter concludes with a discussion of the TA results.

8.1 GJT results

The participants read the same sentences they had seen in the SPR task and were asked to rate how grammatically acceptable they thought each sentence was. The sentences were rated on a six-point scale with 1 being completely ungrammatical and 6 being completely grammatical.

8.1.1. Past Simple

On the GJT task, all three groups rated sentences containing a violation (mismatch) as less acceptable than match sentences (Table 8.1 and Figure 8.1), which shows that they were able to distinguish between correct and incorrect uses of the past simple tense on a GJT.

Table 8.1 Mean rating of each condition on the GJT by group for past simple

Group	Condition	
	<i>match</i>	<i>mismatch</i>
L1 English	5.25 (0.655)	3.684 (0.988)
L1 Mandarin L2 English	5.354 (0.718)	3.212 (1.54)
L1 Croatian L2 English	5.13 (0.973)	4.412 (1.259)

The overall linear mixed-effects model revealed an effect of group, $\chi^2(2) = 61.381$, $p = 0.000$, however fixed effects comparisons did not find a significant difference between the L1 English group and either L2 group (L1 Mandarin L2 English group: $b = -0.254$, $t(66) = -1.810$, $p = 0.074$, $r = 0.217$; L1 Croatian L2 English group: $b = 0.279$, $t(66) = 1.923$, $p = 0.058$, $r = 0.230$). It is possible that the group effect was found due to a difference between the

scores of the two L2 group which was not compared in the analysis.

The interaction between group and condition was significant, $\chi^2(2) = 18.749$, $p = 0.000$ indicating that there was a difference in how the three groups rated each condition. This most likely the result of the difference between the match and mismatch conditions being smaller for the L1 Croatian L2 English group than for the other two groups. It seems that although the L1 Croatian participants are sensitive to mismatches of past simple, they are less sensitive than the other two groups.

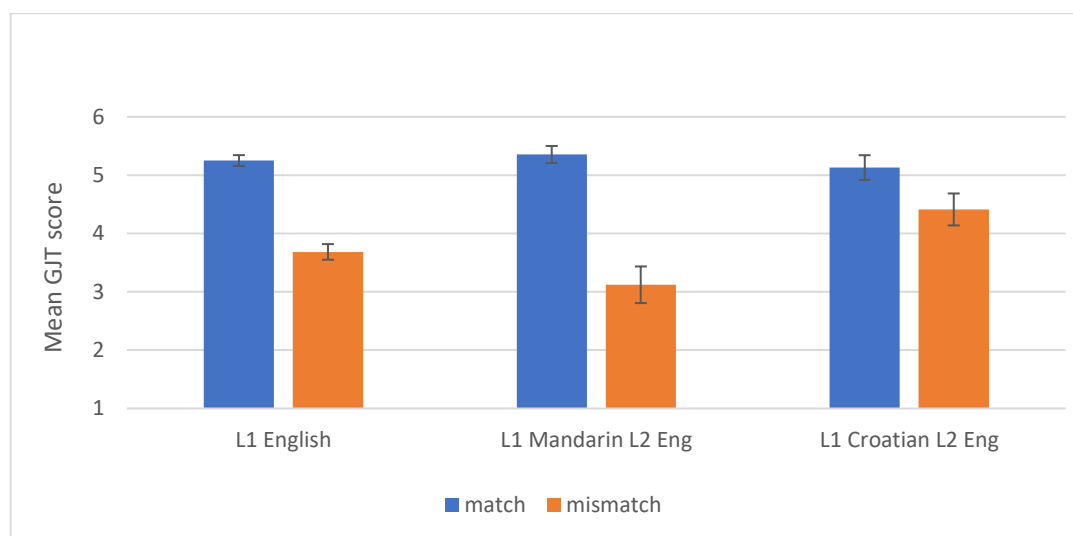


Figure 8.1 GJT rating of each condition for past simple by group (error bars = SE)

The within-group analysis revealed that all three groups rated match sentences as significantly more acceptable than mismatch sentences (Table 8.2).

Table 8.2 Results of linear mixed-effects model analysis of GJT results for past simple

Group	Overall model	Comparisons
		match vs mismatch
L1 English	$\chi^2(2) = 31.411$, $p = 0.000$	$b = 0.782$, $t(23) = 6.896$, $p = 0.000$, $r = 0.821$
L1 Mandarin L2 English	$\chi^2(2) = 31.081$, $p = 0.000$	$b = 1.116$, $t(23) = 6.800$, $p = 0.000$, $r = 0.817$
L1 Croatian L2 English	$\chi^2(2) = 7.579$, $p = 0.005$	$b = 0.359$, $t(20) = 2.948$, $p = 0.007$, $r = 0.550$

8.1.2. Present Perfect

Similar to the GJT results with past simple, the participants in all three groups were able to

distinguish between sentences in which the tense and aspect matched the present perfect context and sentences in which there was a mismatch (Table 8.3).

Table 8.3 Mean rating of each condition on the GJT by group for present perfect

Group	Condition	
	match	mismatch
L1 English	5.031 (0.791)	2.402 (0.995)
L1 Mandarin L2 English	4.760 (0.825)	2.836 (1.608)
L1 Croatian L2 English	4.892 (1.035)	4.087 (1.019)

The overall linear mixed-effects model revealed an effect of group, $\chi^2(2) = 79.669$, $p = 0.000$. A fixed effects comparison showed that the L1 Croatian L2 English group rated the sentences significantly differently to the L1 English group, $b = 0.488$, $t(66) = 3.221$, $p = 0.002$, $r = 0.369$. The L1 Mandarin L2 English group did not rate the sentences significantly differently to the L1 English group, $b = -0.203$, $t(66) = -1.387$, $p = 0.169$, $r = 0.168$.

There was also an effect of condition, $\chi^2(1) = 10.032$, $p = 0.006$, indicating that match and mismatch sentences were read differently. In addition, the interaction between group and condition was also significant, $\chi^2(2) = 30.784$, $p = 0.000$, indicating that all groups read the sentences in the two conditions differently.

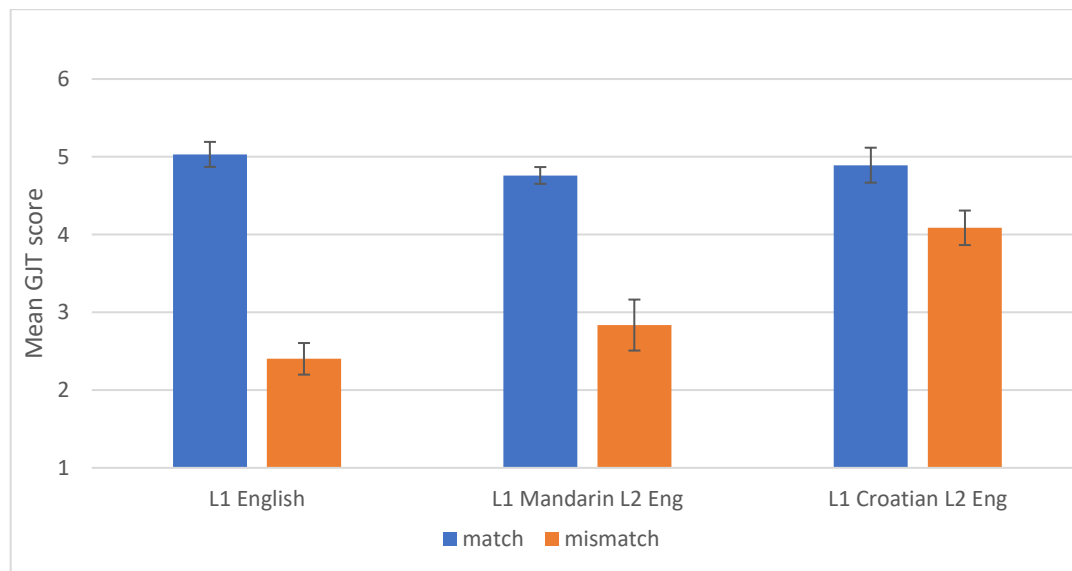


Figure 8.2 GJT rating of each condition for present perfect by group (error bars = SE)

The within groups analysis corroborates the above results, in that all groups rated the match sentences as significantly more acceptable than mismatch sentence. The results of the within group comparisons are summarised in Table 8.4 below.

Table 8.4 Results of linear mixed-effects model analysis of GJT results for present perfect

Group	Overall model	Comparisons
		<i>match vs mismatch</i>
L1 English	$\chi^2(2) = 56.516, p = 0.000$	$b = 1.314, t(23) = 10.705, p = 0.000, r = 0.913$
L1 Mandarin L2 English	$\chi^2(2) = 25.908, p = 0.000$	$b = 0.961, t(23) = 6.591, p = 0.000, r = 0.809$
L1 Croatian L2 English	$\chi^2(2) = 8.652, p = 0.003$	$b = 0.402, t(20) = 3.193, p = 0.004, r = 0.581$

8.1.3. Present Simple

The GJT results for present simple mirror the above presented results for past simple and present perfect. Present simple sentences in which the tense and aspect matched were rated higher than sentences in which they did not match (Table 8.5).

Table 8.5 Mean rating of each condition on the GJT by group for present simple

Group	Condition	
	<i>match</i>	<i>mismatch</i>
L1 English	5.086 (0.576)	2.419 (0.921)
L1 Mandarin L2 English	5.427 (0.529)	2.880 (1.228)
L1 Croatian L2 English	5.063 (0.870)	3.803 (1.421)

There was an overall effect of group, $\chi^2(2) = 111.627, p = 0.000$. This difference, just like with present perfect, stems from the differences between the L1 Croatian L2 English and L1 English groups ($b = 0.319, t(66) = 2.421, p = 0.018, r = 0.286$). However, the size of that effect is relatively small, so the results should be interpreted with caution.

The analysis also revealed an effect of condition, $\chi^2(1) = 8.899, p = 0.011$, confirming that the differences in means observed in Table 8.5 were also statistically significant.

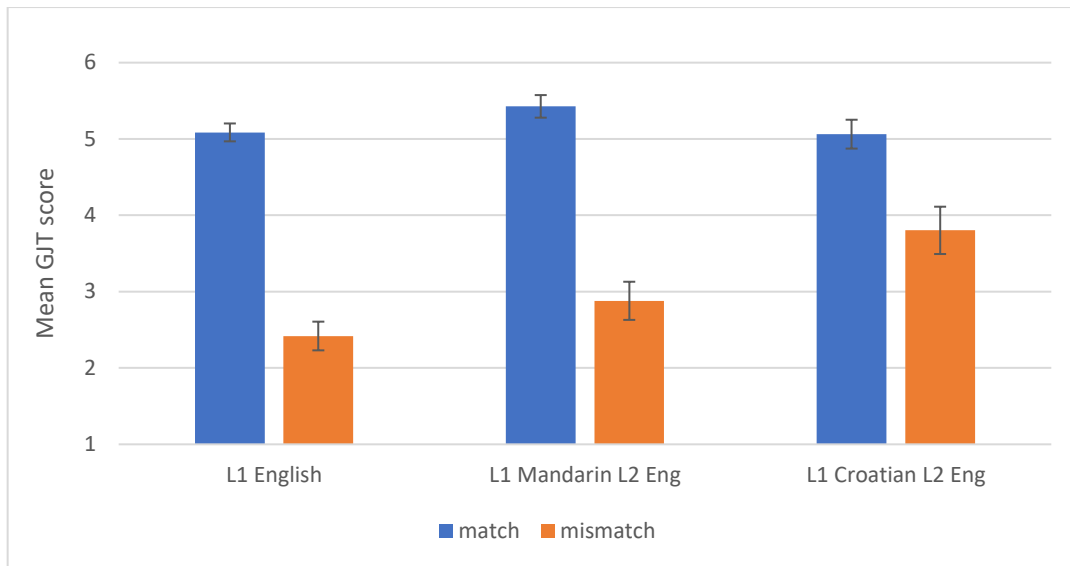


Figure 8.3 GJT rating of each condition for present simple by group (error bars = SE)

The within group comparisons corroborate the finding that all groups rated match sentences as significantly more acceptable than mismatch sentences, as summarised in Table 8.6 below.

Table 8.6 Results of linear mixed-effects model analysis of GJT results for present simple

Group	Overall model	Comparisons
		<i>match vs mismatch</i>
L1 English	$\chi^2(2) = 68.267, p = 0.000$	$b = 1.333, t(23) = 12.199, p = 0.000, r = 0.931$
L1 Mandarin L2 English	$\chi^2(2) = 46.948, p = 0.000$	$b = 1.273, t(23) = 8.755, p = 0.000, r = 0.877$
L1 Croatian L2 English	$\chi^2(2) = 14.854, p = 0.000$	$b = 0.630, t(20) = 4.535, p = 0.000, r = 0.712$

In summary, all three participant groups appear to have the explicit knowledge to distinguish between sentences in which the tense and aspect match and those in which they do not. This is true for all three tenses tested. However, it is worth noting that the mismatch conditions were not always rated equally unacceptable across the three tenses. The L1 Mandarin L2 English relatively consistently rate the mismatch condition with all three tenses with just under three points on a 6-point Likert scale. The L1 Croatian L2 English group show a similarly consistent trend with slightly higher ratings of about four points. The L1 English group, however, rated mismatch sentences with the present perfect and present simple tense quite low at about two points, while their ratings for mismatch sentences in the past

simple tense are comparatively higher at almost four points. In fact, the L1 English group rated past simple mismatch sentences slightly higher than the L1 Mandarin L2 English group. This observation will help with interpreting the results of the SPR task further below.

8.2 SPR results

The participants saw the same sentences as in the GJT task but they were presented one word at a time in the middle of the screen and the participants controlled how quickly they switched from on word to another by pressing the space key on a keyboard. Sentences used in the analysis each contained a verb that either matched or did not match the aspectual adverbial at the start of the sentence. Sentences appeared either in the past simple, present perfect or present simple tense. In each sentence the critical segment was followed by exactly six words, which resulted in seven statistical comparisons.

The results for past simple are reported first, followed by present perfect and present simple.

8.2.1 Past Simple

Table 8.7 shows the mean reading times of each participant group for mismatch and match conditions across five segments.

Table 8.7 Mean RTs for past simple per condition and segment for each participant group (SD in parentheses)

Group	Condition	Segment				
		Verb (V)	V +1	V +2	V +3	V +4
L1 English	Match	-46.85 (49.1)	-22.33 (63.42)	-49.62 (41.85)	-17.75 (78.98)	-28.67 (47.4)
	Mismatch	-59.28 (36.43)	-30.25 (87.35)	-37.08 (56.66)	-40.41 (48.05)	-28.78 (47.54)
Chinese L2 English	Match	-59.55 (49.99)	-38.07 (36.55)	-57.45 (36.31)	-25.9 (53.78)	2.01 (75.59)
	Mismatch	-42.43 (111.55)	-30.88 (54.2)	-30.36 (63.26)	2.89 (98.03)	-2.09 (55.84)
Croatian L2 English	Match	-15.29 (66.25)	-2.14 (88.59)	-21.18 (55.07)	-16.18 (58.36)	-27.18 (35.65)
	Mismatch	-39.03 (44.75)	-11.84 (88.59)	8.13 (120.08)	-40.68 (67.87)	-19.95 (98.05)

The L1 English group showed an unpredictable pattern in that the match sentences

were read slightly faster than mismatch sentences on almost all segments (Figure 8.4). The only exception is the second segment following the verb (V+2) at which the match sentences were read faster than mismatch sentences, as would be expected.

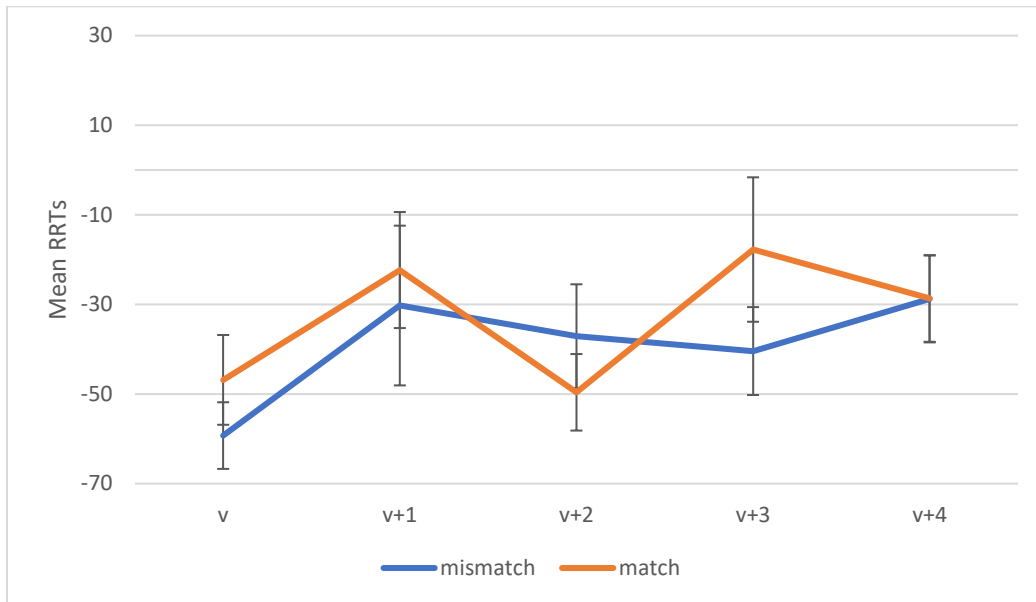


Figure 8.4 L1 English group RTs for past simple (error bars = SE)

Unlike the L1 English group, the L1 Mandarin L2 English group read both types of sentences in a more predictable fashion, as the mismatch sentences produced longer reading times than match sentences (Figure 8.5).

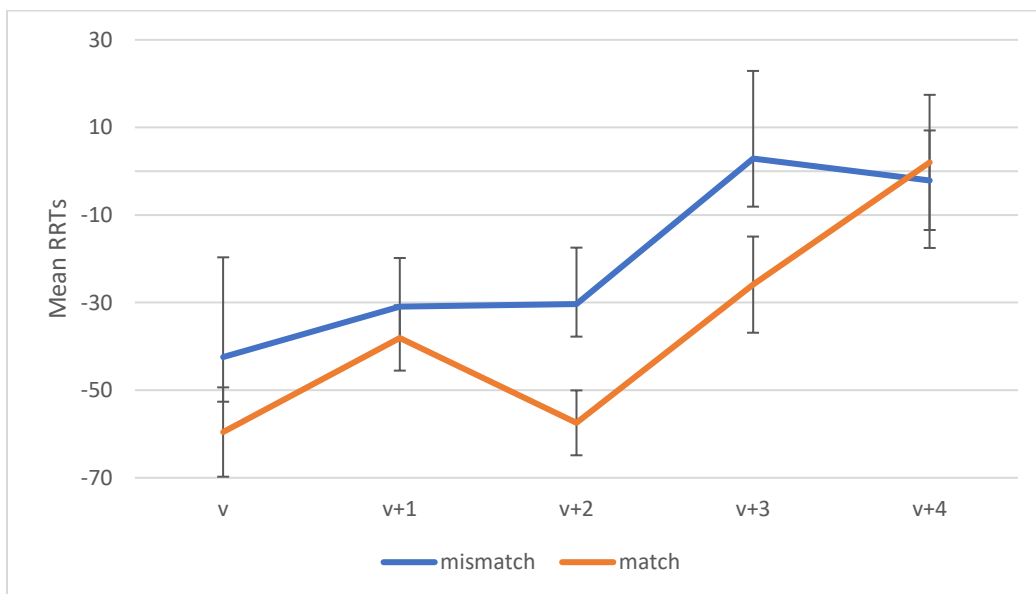


Figure 8.5 L1 Mandarin L2 English group RTs for past simple (error bars = SE)

Finally, the L1 Croatian L2 English group, followed a similar reading pattern as the

L1 English group, as they too read mismatch sentences slightly faster than match sentences except on the second segment following the verb (v+2) where the pattern briefly inverts (Figure 8.6).

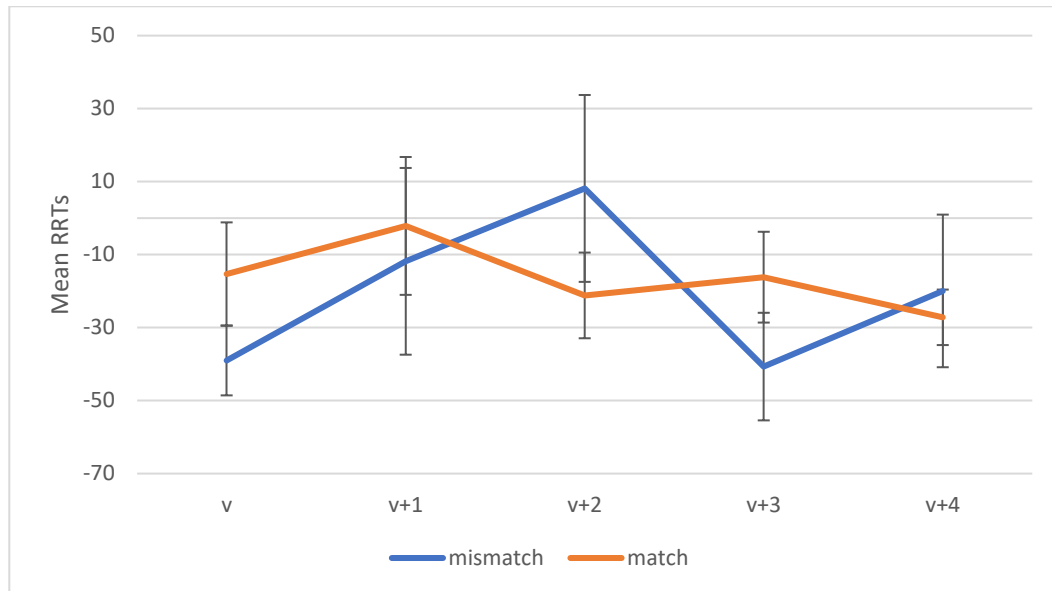


Figure 8.6 L1 Croatian L2 English group RTs for past simple (error bars = SE)

As can be seen from Table 8.8, the linear mixed-effects model analysis did not reveal any statistically significant results on any of the analysed segments for any of the participant groups. This means that there were no significant differences in how the three participant groups read match and mismatch sentences. Furthermore, the two L2 groups did not significantly differ in their reading patterns from the L1 English group.

Table 8.8 Results of linear mixed-effects model analysis for past simple per segment

Segment	Effect		
	Group	Condition	Group:Condition
Verb (V)	$\chi^2(2) = 4.162, p = 0.244$	$\chi^2(1) = 3.811, p = 0.148$	$\chi^2(2) = 6.919, p = 0.140$
V+1	$\chi^2(2) = 2.428, p = 0.488$	$\chi^2(1) = 2.340, p = 0.310$	$\chi^2(2) = 2.811, p = 0.589$
V+2	$\chi^2(2) = 13.184, p = 0.004$	$\chi^2(1) = 9.236, p = 0.009$	$\chi^2(2) = 9.688, p = 0.046$
V+3	$\chi^2(2) = 2.166, p = 0.538$	$\chi^2(1) = 1.941, p = 0.378$	$\chi^2(2) = 6.504, p = 0.164$
V+4	$\chi^2(2) = 4.888, p = 0.180$	$\chi^2(1) = 4.881, p = 0.087$	$\chi^2(2) = 5.113, p = 0.275$

In summary, despite showing explicit knowledge of the past simple tense in English, none of the participants in the present study were statistically sensitive to violations of the past simple tense in online processing.

8.2.2 Present Perfect

Table 8.9 shows the mean reading times of each participant group for mismatch and match conditions across five segments.

Table 8.9 Mean RTs for present perfect per condition and segment for each participant group (SD in parentheses)

Group	Condition	Segment					
		Aux	Verb (V)	V +1	V +2	V +3	V +4
L1 English	Match	-44.74 (28.57)	-35.26 (92.77)	-21.05 (75.12)	-41.45 (46.8)	-14.49 (108.24)	13.52 (164.57)
	Mismatch	-37.24 (41.23)	-37.94 (65.73)	-36.17 (39.74)	-45.5 (45.29)	-27.83 (52.35)	-11.22 (58.1)
Chinese L2 English	Match	-21.67 (78.12)	-70.42 (50.42)	-23.93 (72.43)	-13.97 (81.51)	-12.84 (101.16)	18.53 (72.33)
	Mismatch	-48.62 (74.96)	-30.63 (86.84)	-34.42 (78.71)	-4.04 (120.58)	-17.55 (52.97)	1.81 (67.65)
Croatian L2 English	Match	-35.31 (62.85)	-15.53 (96.31)	-38.14 (56.87)	-49.1 (40.22)	-74.08 (48.9)	-29.04 (89.34)
	Mismatch	-24.35 (35.33)	-30.56 (59.01)	18.93 (138.63)	-24.83 (9.19)	-38.68 (35.29)	-29.96 (47.98)

The L1 English group showed a reverse reading pattern than expected with present perfect as well (Figure 8.7). The mismatch sentences were read slightly faster than match sentences on all segments.

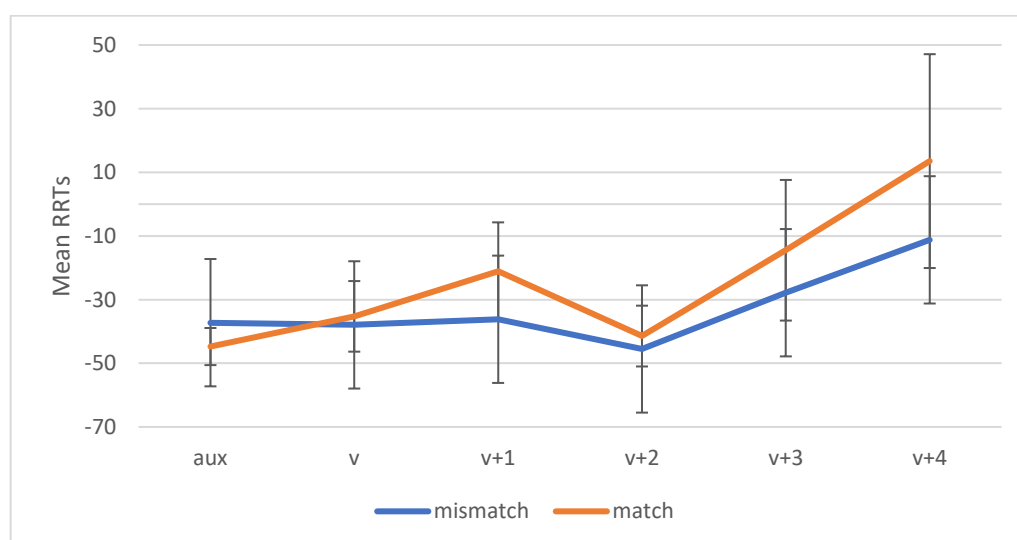


Figure 8.7 L1 English group RTs for present perfect (error bars = SE)

With the past simple tense, the L1 Mandarin L2 English group arguably showed a preference for match sentences after the second segment following the verb as they were read faster than mismatch sentences. However, with the present perfect tense this group showed a more changeable pattern, as on certain segments the match sentences were read faster but then on other segments they were read slower than mismatch sentences (Figure 8.8).

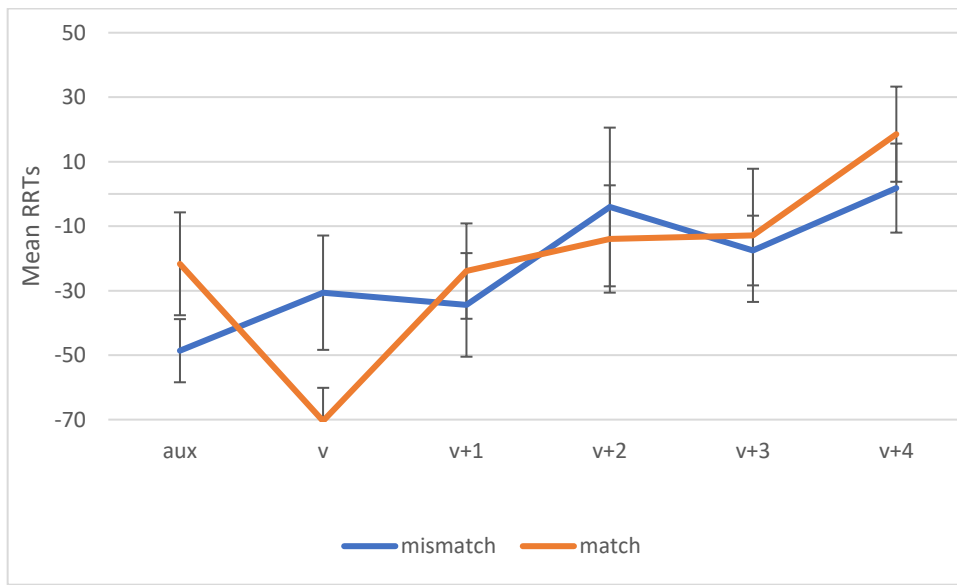


Figure 8.8 L1 Mandarin L2 English group RTs for present perfect (error bars = SE)

The L1 Croatian L2 English group are the only group that show a predictable reading pattern with the present perfect tense, in that the participants read the match sentences faster than mismatch sentences, and an increase in reading times for mismatch sentences is especially noticeable on the second segment following the noun (v+2) (Figure 8.9).

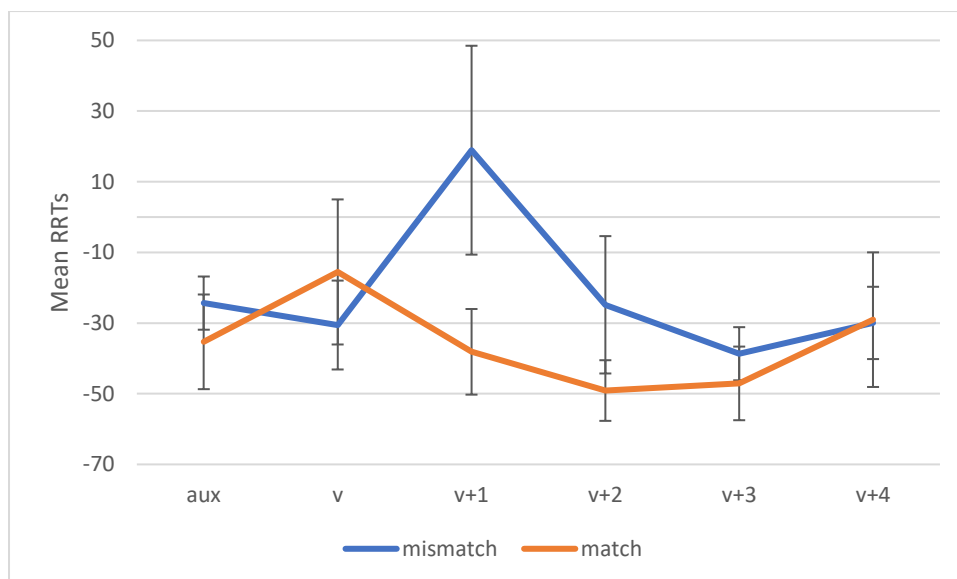


Figure 8.9 L1 Croatian L2 English group RTs for present perfect (error bars = SE)

The results of the linear mixed-effects model analysis did not show any statistically significant differences in how the three groups read sentences in the match and mismatch conditions (Table 8.10). In addition, the reading patterns of the two L2 groups did not significantly differ from the L1 English group.

Table 8.10 Results of linear mixed-effects model analysis for present perfect per segment

Segment	Effect		
	Group	Condition	Group:Condition
Aux	$\chi^2(2) = 4.649, p = 0.199$	$\chi^2(1) = 3.623, p = 0.163$	$\chi^2(2) = 9.590, p = 0.047$
Verb (V)	$\chi^2(2) = 2.813, p = 0.421$	$\chi^2(1) = 2.779, p = 0.249$	$\chi^2(2) = 8.483, p = 0.075$
V+1	$\chi^2(2) = 1.953, p = 0.582$	$\chi^2(1) = 1.436, p = 0.487$	$\chi^2(2) = 8.296, p = 0.081$
V+2	$\chi^2(2) = 5.155, p = 0.161$	$\chi^2(1) = 4.417, p = 0.101$	$\chi^2(2) = 5.475, p = 0.241$
V+3	$\chi^2(2) = 8.159, p = 0.042$	$\chi^2(1) = 7.172, p = 0.027$	$\chi^2(2) = 8.871, p = 0.064$
V+4	$\chi^2(2) = 5.584, p = 0.133$	$\chi^2(1) = 4.716, p = 0.094$	$\chi^2(2) = 5.126, p = 0.274$

8.2.3 Present Simple

Just like with the other two tenses, the L1 English group tended to read the mismatch sentences slightly faster than match sentences (Table 8.11 and Figure 8.10), although on some segments (such as V+1 and V+4) the reading times overlapped.

Table 8.11 Mean RTs for present simple per condition and segment for each participant group (SD in parentheses)

Group	Condition	Segment				
		Verb (V)	V +1	V +2	V +3	V +4
L1 English	Match	-18.7 (120.35)	-32.9 (47.71)	-40.44 (34.52)	-28.58 (40.53)	-36.01 (9.19)
	Mismatch	-43.44 (42.84)	-28.34 (50.92)	-40.05 (30.81)	-44.07 (34.74)	-27.77 (41.29)
Chinese L2 English	Match	-67.1 (43.24)	-24.6 (66.67)	-24.55 (62.74)	-17.95 (64.9)	14.42 (93.73)
	Mismatch	-32.91 (88.03)	-32.51 (67.09)	-19.78 (89.15)	-13.05 (64.9)	27.59 (17.15)
Croatian L2 English	Match	-23.53 (89.95)	-28.27 (57.61)	-32.53 (53.6)	-17.1 (64.9)	-29.67 (51.55)
	Mismatch	-19.74 (56.24)	1.81 (115.75)	4.75 (88.11)	-17.32 (74.86)	-30.08 (66.31)

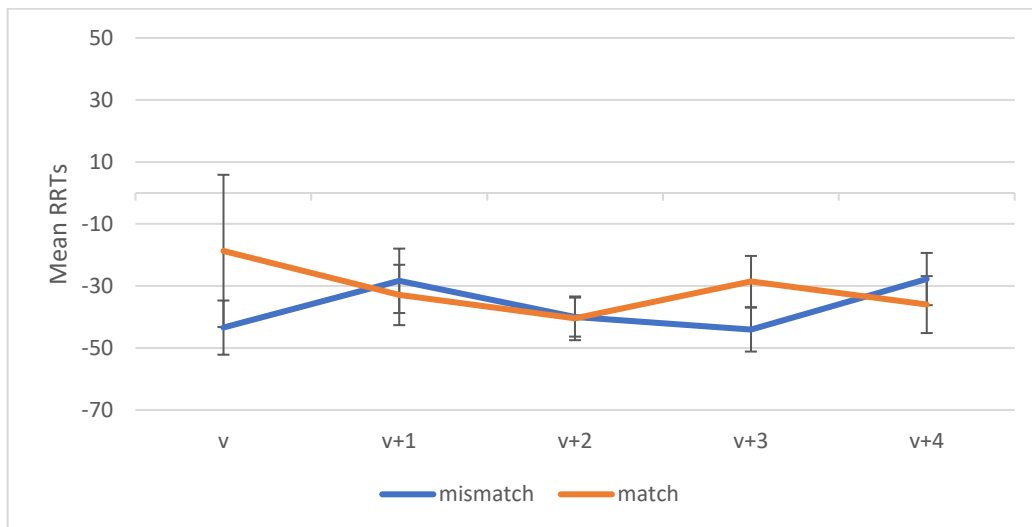


Figure 8.10 L1 English group RTs for present simple (error bars = SE)

Similar to the L1 English group, the L1 Mandarin L2 English group read present simple sentences in both conditions at a similar speed (Figure 8.11). This indicates that the mismatch between the tense and aspect did not create a significant delay in processing of such sentences.

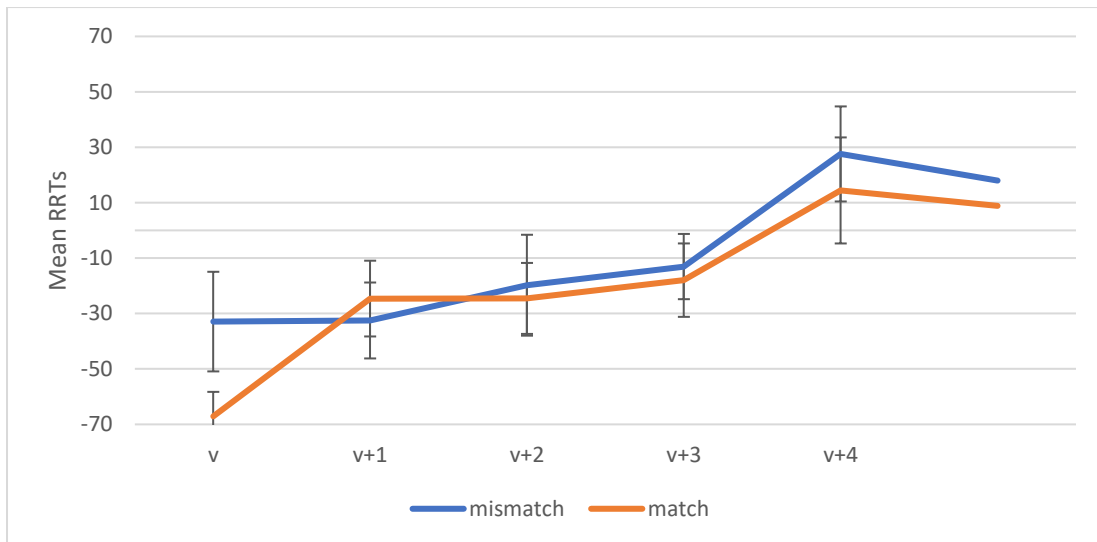


Figure 8.11 L1 Mandarin L2 English group RTs for present simple (error bars = SE)

The L1 Croatian L2 English group read the match and mismatch sentences at a similar speed at first, with mismatch sentences being read slightly faster (Figure 8.12). After the second segment following the verb (V+2) a rather large increase in RTs for the mismatch sentences is noticeable.

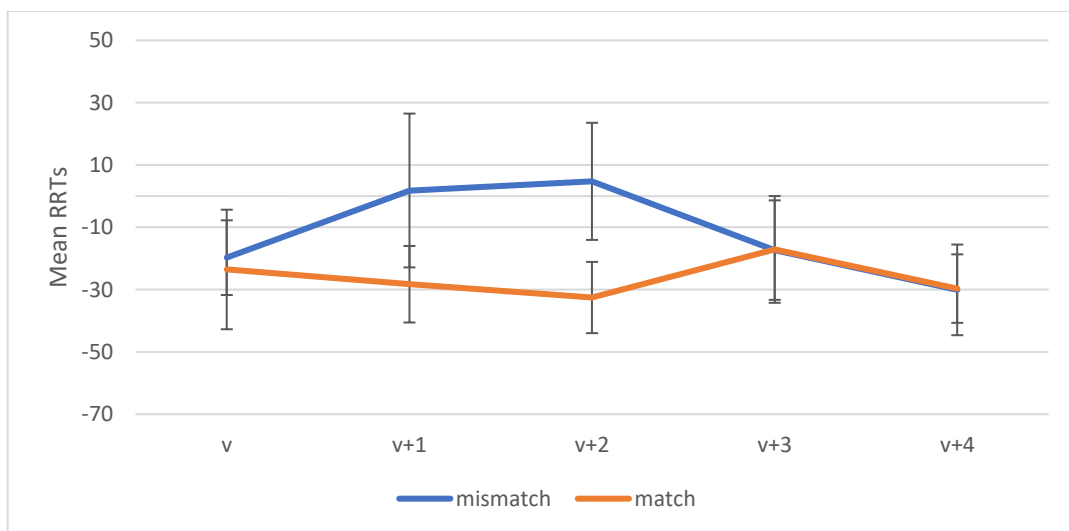


Figure 8.12 L1 Croatian L2 English group RTs for present simple (error bars = SE)

The linear mixed-effects model analysis did not reveal any effects of group, condition or the interaction of the two on the critical segment i.e. the verb or the three segments following the verb (Table 8.12), indicating that there were no statistically significant differences in how the three groups read the two conditions. The two L2 groups also did not significantly differ in their reading patterns when compared to the L1 English group.

The only statistically significance was found on the fourth segment following the verb (v+4) (Table 8.12) which was the result of the L1 Croatian L2 English group showing reading patterns different to the L1 English group ($b = 24.736$, $t(67) = 3.055$, $p = 0.003$, $r = 0.350$).

Table 8.12 Results of linear mixed-effects model analysis for present simple per segment

Segment	Effect		
	Group	Condition	Group:Condition
Verb (V)	$\chi^2(2) = 2.801$, $p = 0.423$	$\chi^2(1) = 2.666$, $p = 0.263$	$\chi^2(2) = 6.909$, $p = 0.141$
V+1	$\chi^2(2) = 2.169$, $p = 0.538$	$\chi^2(1) = 1.677$, $p = 0.432$	$\chi^2(2) = 3.452$, $p = 0.485$
V+2	$\chi^2(2) = 6.028$, $p = 0.111$	$\chi^2(1) = 4.789$, $p = 0.091$	$\chi^2(2) = 7.968$, $p = 0.092$
V+3	$\chi^2(2) = 2.436$, $p = 0.329$	$\chi^2(1) = 3.291$, $p = 0.192$	$\chi^2(2) = 4.110$, $p = 0.391$
V+4	$\chi^2(2) = 14.477$, $p = 0.002$	$\chi^2(1) = 13.876$, $p = 0.001$	$\chi^2(2) = 14.234$, $p = 0.006$

In summary, the results of the SPR task are somewhat surprising. The L1 English group appear to read mismatch sentences slightly faster with all three tenses, indicating that the presence of a tense-aspect mismatch poses no delay in processing of such sentences. On the other hand, the L1 Mandarin L2 English group show a different reading pattern depending on the tense. Whatever the reading pattern differences, they were not statistically significant with any of the three tenses analysed, which indicates that this group too did not experience a processing delay because of tense-aspect mismatches. Finally, the L1 Croatian L2 English group showed the “inverse” reading pattern with the past simple tense, similar to the L1 English group. However, when it comes to the present perfect and present simple tense, the group tended to read match sentences faster than mismatch sentences, but the differences were not statistically significant.

8.3 TA discussion

The result of the GJT task are discussed first, followed by a discussion of the SPR results.

The TA GJT task aimed to answer research question four:

RQ4: Does explicit knowledge of English TA differ between L1 English, L2 English/L1 Mandarin & L2 English/L1 Croatian speakers? Prediction:

- a. Both L2 groups and the L1 English group will demonstrate explicit knowledge of the English TA system.

All three groups, were able to distinguish between correct and incorrect use of English TA with all three tenses which confirms the predictions of the research question above that all participants will have explicit knowledge of the English TA system. This finding

is in line with what Roberts and Liszka (2013) report.

The TA SPR task aimed to answer research question five:

RQ5: Are L1 English, L2 English/L1 Mandarin and L2 English/L1 Croatian speakers sensitive to TA violations on the SPR task?

Predictions:

- a. L1 English speakers will be sensitive to violations of the past simple and present simple tense.
- b. L1 Mandarin L2 English speakers will not be sensitive to violations with any of the tenses.
- c. L1 Croatian L2 English speakers will not be sensitive to violations with any of the tenses.

The SPR results of the L1 English group in the present study are rather unexpected and partly contradict the findings from Roberts and Liszka (2013). The SPR data showed that the L1 English participants were not sensitive to TA violations with any tense, while the L1 English participants in Roberts and Liszka's study were sensitive to present perfect violations but not past simple violations. Therefore, the findings of the present study regarding past simple are in line with Roberts and Liszka's finding. The lack of sensitivity to past simple violations on the SPR are somewhat mirrored by the GJT results in the present study. Although the differences in ratings of match and mismatch past simple sentences on the GJT are significantly different, the L1 English participants rated the past simple mismatch sentences as more acceptable (mean 3.684) than either present perfect (mean 2.432) or present simple (mean 2.419) mismatch sentences. This is additional evidence that TA violations of the past simple tense do not bother L1 English speakers as much as violations of other tenses. The explanation offered by Roberts and Liszka seems adequate and is adopted in this study as well. Namely, the nature of the use of the past simple tense appears to be changing. For example, in American English it is acceptable to use an adverbial which marks perfect aspect with a past tense verb (*I haven't read it yet or I already did that*), and this use is also becoming more present in British English.

In contrast with Roberts and Liszka's findings, the L1 English participants in the present study were not sensitive to present perfect violations, nor were they sensitive to violations of the present simple tense which was a new addition. This is also in contradiction to the GJT results which show that the L1 English speakers do find sentences in which there is a TA mismatch of present perfect and present simple to be grammatically unacceptable.

There are several methodological factors that might have contributed to different results in the present and original study. Firstly, it is possible that the changes made to the stimuli and a different type of statistical analysis have led to different results (for more information see Chapter 6, section 6.6). In addition, Roberts and Liszka did not seem to have performed the Bonferroni adjustment of the alpha value to account for the number of statistical tests carried out on the same data, while the present study used the adjusted p-value (0.007) which was obtained by dividing the alpha value by seven (the number of tests performed). The p-value of 0.007 used in the present study is a lot more conservative than the usual 0.05. Roberts and Liszka do not report exact p-values in their article so it is difficult to tell whether their significance would have been affected by an adjusted and more conservative p-value. Finally, there is evidence that SPR may not be the best methodological tool for detecting sensitivity to violations of tense-aspect agreement, and this is discussed in section Chapter 10, section 10.3.1.2.

Next, we turn to the SPR results of the two L2 groups. Neither group showed statistically significant sensitivity to TA violations of the three tenses tested, but the reading patterns of each group are interesting and point to several implications.

The L1 Mandarin L2 English participants read both conditions with present perfect and present simple at a similar speed. However, with past simple the mismatch sentences (e.g., *Last week, Mary washed the dishes*) were read about 30-40ms slower than match sentences. This reading pattern can partly be explained by the role of the experiential aspect marker *-guo* in Mandarin. Mandarin has a marker of experiential aspect (*-guo*) which, when unspecified signals that an event has occurred at least once before at some indefinite time (Li & Thompson 1981), which is similar to the experiential meaning of present perfect in English. It is possible that the L1 Mandarin learners of L2 English have a strong association of present perfect with what is denoted by experiential *-guo* in their L1. Therefore, violation of past simple (*Last week, Mary washed the dishes*) in which the adverbial used with present perfect denotes a specific time (last week) clashes both in their L1 and L2.

Although the participants in the L1 Croatian group did not show statistically significant sensitivity to TA violations, some of their reading patterns offer potential support for L1 effects. With the past simple tense, the L1 Croatian group did not show any significant sensitivity to violations, and the mismatch sentences were even read slightly faster (about 30-40ms) than match sentences. Similar lack of sensitivity to past simple violations was found with L1 German L2 English learners (Roberts and Liszka, 2013) and L1 Russian L2 English learners (Eriksson, 2016), although both languages (as well as Croatian) mark tense

morphologically. The L1 Croatian group's lack of sensitivity with past simple could be partly explained with L1 transfer. In Croatian the concept of finite present, which expresses meaning similar to that of the English present perfect, is realised through a verb in the past tense. A sentence with the verb in present perfect but containing a past tense adverbial (e.g., *Last week, Mary has washed the dishes*) is a violation in English because the adverbial specifies a time point in the past at which the action occurred which is incompatible with present perfect. By contrast, in Croatian a past adverbial would not exclude a present perfect type reading of a sentence (i.e., some relevance to the present). This acceptance of sentences with a past simple violation is also evident in the Croatian group's GJT results. Although their ratings of match and mismatch sentences were statistically significant, the mean differences in ratings are rather small (match 5.13 and mismatch 4.412). The Croat's rating of mismatch sentences is considerably higher than the ratings of the other two groups, and the size of the statistical effect is smaller in the L1 Croatian group (medium) than with the other two groups (very large).

It was also predicted that the L1 Croatian group would not be sensitive to TA violations of present perfect, and this was supported by the results since no statistically significant sensitivity to violations of this tense was observed. However, when looking at the reading patterns (Figure 7.9) it is clear that the participants had a preference for match sentences which were read faster than mismatch sentences. This is rather unusual since Croatian does not mark the perfect aspect through a designated tense like English does. A possible explanation for such reading patterns is methodological. The majority of sentences in both Roberts and Liszka's and the present study involving a present perfect adverbial start with *since* (18 and 17 out of 24 respectively), and only a small number start with another adverbial *for*. In Croatia, school instruction of English is very grammar based and tenses are often thought in combination with accompanying adverbials. Croatian school children learning English will have been drilled to associate the present perfect tense (i.e., the form *have + past participle*) with adverbials such as *since*, *yet*, and *already*. Similar teaching strategies have been reported in Fuchs et al. (2016) who comment that there is an overemphasis of present perfect in combination with an adverbial in teaching, while such a combination is relatively low in frequency in native varieties in English. Thus, it is entirely possible that the reason why Croats in the present study show an unexpected preference for present perfect with *since* (although not statistically significant), is that they are replicating the pattern they have learned at school: when you see *since*, present perfect has to be used. It would be important to pay attention to the variety of adverbials used in future

studies of L2 TA acquisition, to make sure the participants are transferring (or not) their L1 rather than school instructions.

Finally, the L1 Croatian group also did not show any statistically significant sensitivity to TA violations of the present simple tense. Nevertheless, the reading patterns of the L1 Croatian group (Figure 7.12) show a visual, albeit delayed, preference for the match sentences which were read faster than mismatch sentences. On the one hand, Croats might be expected to be sensitive to such violations since Croatian, like English encodes the concept of the present morphologically on the verb. On the other hand, Croats could also be expected to not be sensitive to violations of the present simple tense because since Croatian allows the use of the present tense in sentences with perfect meaning. The example below shows a sentence from the present simple stimuli from the present study, and its Croatian translation.

74. Since 2005, Mary has lived in London.

75. Mary od 2005 zivi u Londonu.
Mary since 2005 lives in London

The results suggest that rather than incorrectly transferring the L1 afforded option in (75), Croats show a preference for the L2 afforded option, albeit not a statistically significant preference. This is in contrast with the results for past simple, where the participants showed a small preference for mismatch sentences unacceptable in the L2 but plausible in the L1. It is possible, that the form-meaning mappings of present simple are more transparent than that of past simple, making present more straightforward to acquire. There is some support for this interpretation from the GJT results, since out of all the tenses the L1 Croatian group rated present simple mismatch sentences as most ungrammatical compared to mismatches of other tenses, thus demonstrating better explicit command of the present simple tense compared to other tenses. This is, of course, speculation, since the differences between match and mismatch sentences with either tense on the SPR task were not statistically significant.

In summary, neither L2 group showed statistically significant processing costs for mismatch sentences with the three tenses tested (past simple, present perfect, present simple). The lack of sensitivity to TA violations of the L1 Croatian group suggest that having inflectional morphology in both the L1 and L2, and explicit knowledge of the latter, does not necessarily mean that that will be positively transferred into L2 online comprehension. The L1 Croatian L2 English group demonstrated explicit knowledge of English tense-aspect on

the GJT, but according to the present results did not seem to be able to use that knowledge in online processing of the same structures despite their L1 having inflectional morphology. However, as indicated by the graphs for Present Perfect and Present Simple (the gaps in SE bars) with a larger sample size the observed descriptive effects may become statistically significant.

This is in line with previous findings with L1 German L2 English learners in Roberts and Liszka (2013) and L1 Russian L2 English learners in Eriksson (2016). Furthermore, Roberts and Liszka suggest that the reason why their L1 French L2 English learners were sensitive to violations of present perfect is because their L1 has grammatical aspect even though it is realised differently than in English. According to the authors, L2 learners whose L1 grammaticalise aspect should be sensitive to aspect violations (this includes present perfect which is a combination of aspect and tense) in the L2. This premise was not supported by the L1 Russian L2 English learners in Eriksson (2016) who, despite having an L1 that grammaticalises aspect, were not sensitive to TA violations. The premise is also not supported by the present SPR data, since the L1 Croatian group (L1 with grammatical aspect) showed no significant sensitivity to TA violations. In addition, if only having aspect markers was the prerequisite for sensitivity to aspect violations, then we would also expect the L1 Mandarin L2 English learners in the present study to show some sensitivity to present perfect violations considering that Mandarin has the experiential aspect marker *-guo*, which has some overlap with the meaning of present perfect in English.

However, the reading patterns of both L2 groups point to some L1 transfer, since both groups show several reading patterns which are consistent with what is afforded in their respective L1s. It would be interesting for future research to specifically investigate the role of the L1 TA system in the acquisition of the English TA system by these two populations. For example, future research could more specifically investigate the role Mandarin aspect markers *-le* and *-guo* play in the acquisition of L2 English past simple and present perfect.

Chapter 9: Results of oral production tasks (Study 3)

9.1 Introduction

As part of the spontaneous oral production task in the present study, the participants were asked to watch an animated film (Pixar's *Partly Cloudy*) and retell the story as they were watching. The aim of the task was to investigate how accurately L1 English, L1 Mandarin L2 English and L1 Croatian L2 English participants a) produced the indefinite and definite articles in obligatory contexts, and b) inflected verbs for tense.

The results for article production are reported first followed by a discussion of the results. Next, the results for tense production are reported and discussed.

9.2 Articles results

Prior to analysis, all countable singular nouns referring to several chosen characters in the story (cloud, stork and various baby animals) in both the indefinite and definite contexts were identified. Each noun and the preceding article (or the lack of it) were marked as either correct, substituted or omitted (for more information on scoring see Chapter 5, section 5.5.3.1). The data were analysed using a linear mixed-effects model in R, with group entered as random effect into the model, while the type of article (indefinite or definite) was entered as the fixed effect.

The descriptive data for the indefinite and definite article are presented first, followed by the findings of the statistical analysis. The section concludes with a discussion of the findings in light of previous literature.

Although all three participant groups attempted an NP with an indefinite article a similar number of times on average (Table 9.1), the accuracy with which they did so varied between the L1 Croatian L2 English group and the L1 English and L1 Mandarin L2 English groups in several ways.

Firstly, the L1 Croatian L2 English group accurately supplied the indefinite article in obligatory contexts only 55% of the time, while the the L1 English and L1 Mandarin L2 English groups achieved much high accuracy, above 80%. Secondly, although all three groups tended to substitute the indefinite article more than omit it, the L1 Croatian L2 English group also omitted the indefinite article more frequently than the other two groups.

Table 9.1 Average attempts, accuracy and type of determiner supplied for the indefinite article

Group	Attempts			Type of production			Accuracy	
	Min.	Max.	M (SD)	Correct article choice (SD)	Omission	Substitution	% correct	Other determiners
L1 English	5	10	8.08 (1.38)	7.54 (1.53)	0.29 (0.75)	0.54 (0.65)	88%	0.54 (0.83)
L1 Mandarin L2 English	5	11	7.62 (1.66)	6.79 (1.76)	0.25 (0.53)	1.04 (1.04)	85%	0.58 (0.58)
L1 Croatian L2 English	5	14	8.40 (2.44)	5.5 (2.97)	1.72 (1.48)	2.72 (1.98)	55%	0.95 (0.78)

Finally, the L1 English and L1 Mandarin L2 English groups used a different determiner (such as numeral *one*) to introduce an indefinite NP at a similar frequency, while the L1 Croatian L2 English group used a different determiner almost twice as often as the other two groups. Thus, in descriptive terms, the L1 Croatian L2 English group showed a different pattern of indefinite article production to the other two groups.

In comparison to the indefinite article, the overall accuracy of supplying the definite article in obligatory contexts was higher for all groups (Table 9.2). However, just as with the indefinite article, the L1 Croatian L2 English group showed several different patterns compared to the other two groups.

Firstly, the L1 Croatian L2 English group supplied the definite article less accurately (81%) than the L1 English and L1 Mandarin L2 English groups (96% and 94% respectively).

Unlike with the indefinite article, the definite article tended to be more omitted than substituted but only marginally for the L1 English and L1 Mandarin L2 English groups. The Croats, on the other hand, tended to omit the definite article roughly twice as frequently as substitute it. In addition, all groups occasionally supplied a different determiner to introduce a definite NP (such as *this* or *that*), but the L2 groups did so more often than the L1 English group, especially the L1 Croatian L2 English group.

Table 9.2 Average attempts, accuracy and type of determiner supplied for the definite article

Group	Attempts			Type of production			Accuracy	
	Min.	Max.	M (SD)	Correct article choice (SD)	Omission	Substitution	% correct	Other determiners
L1 English	25	62	44.2 (10.38)	43.29 (10.54)	0.62 (1.24)	0.54 (0.77)	96%	0.87 (0.99)
L1 Mandarin L2 English	20	60	37.58 (9.56)	35.95 (9.48)	1.16 (1.63)	1.04 (1.04)	94%	1.16 (1.40)
L1 Croatian L2 English	25	54	32.68 (9.25)	27.36 (9.01)	3.68 (4.53)	2.818 (2.08)	81%	1.63 (1.94)

A linear mixed-effects model analysis revealed that both L2 groups performed significantly differently to the L1 English group, $\chi^2(2) = 78.769$, $p = 0.000$. However, as evidenced by the effect sizes, the magnitude of these differences was smaller between the L1 Mandarin L2 English and L1 English group ($b = 6.030$, $t(67) = 2.992$, $p = 0.003$, $r = 0.343$) than the differences between the L1 Croatian L2 English and L1 English group, $b = -15.082$, $t(67) = -7.320$, $p = 0.000$, $r = 0.667$.

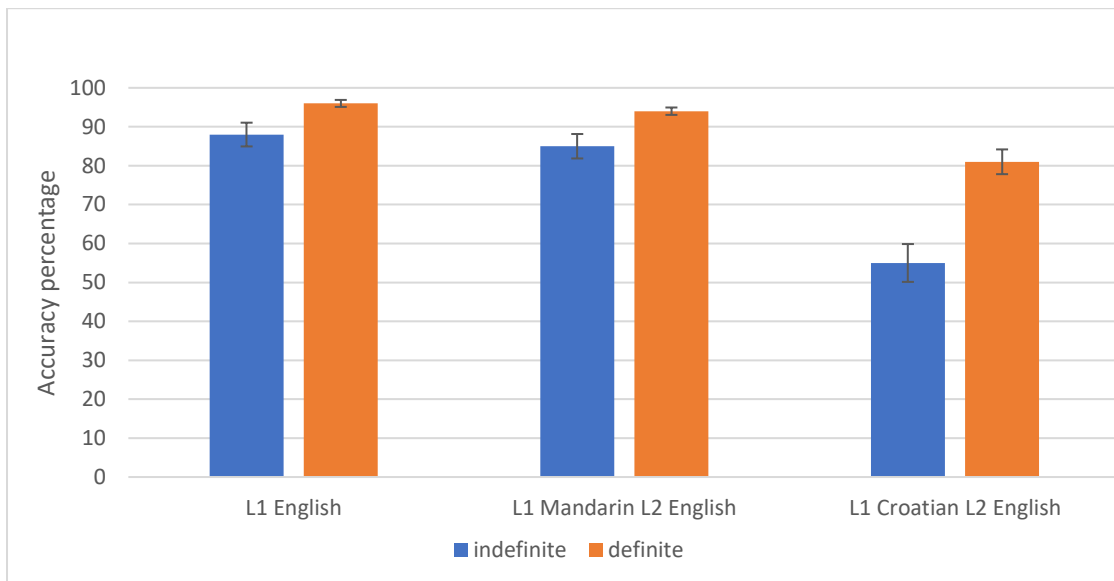


Figure 9.1 Accuracy of article production by article type and group (error bars = SE)

As can be seen from Figure 9.1, all groups produced the indefinite article less accurately in obligatory contexts than the definite article, and these differences were also found to be statistically significant (L1 English group: $b = 3.937$, $t(23) = 2.931$, $p = 0.007$, $r = 0.521$; L1 Mandarin L2 English group: $b = 4.708$, $t(23) = 3.727$, $p = 0.001$, $r = 0.614$; L1 Croatian L2 English group: , $b = 13.022$, $t(21) = 6.475$, $p = 0.000$, $r = 0.816$).

Considering that there was a considerable variation in how many times a participant produced a target NP (Tables 9.1 and 9.2), it was also noteworthy to look at the individual differences in performance on the oral production task between participants in each group. Within the L1 English group, the majority of the participants supplied the indefinite article with 80 - 100% accuracy, while some participants had accuracy as low as 60%. By contrast, when supplying the definite article all L1 English participants were accurate 92 – 100% of the time (only one participant had accuracy of 85%). This shows that even among the L1 English native speakers there was quite a bit of variation in accuracy of article suppliance, and the participants were less homogenous in their suppliance of the indefinite than the

definite article.

The participants in the L1 Croatian L2 English group showed the most individual variation in supplying the indefinite article, with six participants performing at the low end (below 40% accuracy) and six participants at the high end (above 90% accuracy), and the remaining ten with accuracy levels within this range. The L1 Croatian L2 English participants' performance on the definite article was more homogenous, with most performing at 80% or above accuracy.

Unlike the L1 English group and the L1 Croatian L2 English group, the majority of the L1 Chinese L2 English participants supplied both articles accurately more than 79% of the time. There were two participants (out of 24) who fell below 80% accuracy in the indefinite context, and only one participant (again, out of 24) in the definite context.

In summary, the Chinese L2 English group showed fewer between-participant variations than the L1 English and L1 Croatian L2 English group, especially regarding the indefinite article.

9.3 Article discussion

The results of the oral production task into L2 article production aimed to answer RQ6 below.

RQ6: How accurately do L1 Chinese and Croatian L2 learners of English produce the indefinite and definite article in obligatory contexts compared to L1 English speakers in spontaneous oral production?

Predictions:

- a. All three groups will produce the indefinite article less accurately than the definite article.
- b. L1 Chinese/L2 English learners will substitute articles more often than omit them.
- c. L1 Croatian/L2 English learners will frequently omit both articles.

The results for the definite article are presented first, followed by the results for the indefinite article.

9.3.1 Indefinite article

The results of the oral production task for the indefinite article support prediction (a) of RQ6, since the indefinite article on this task was found to be produced less consistently than the definite article in obligatory contexts. This finding has been reported in a number of

previous studies investigating the oral production of L2 speakers of English from various L1 backgrounds (Ekiert & Han, 2016; Kang, 2008; Lee, 2013; Tarone & Parrish, 1988). The asymmetry is also observed in previous studies that have used participants from similar L1 backgrounds as the present study – advanced L1 Mandarin L2 English learners (Snape, 2009) and advanced L1 Serbian L2 English learners (Avery & Radisic, 2007; Trenkic, 2007).

The present study also observed that *the* “floods” the indefinite context; in other words, substitution of the indefinite article is more common than omission of the indefinite article. The same has been found in previous studies on oral production (Trenkic, 2007) but also in studies utilising metalinguistic tasks, such as gap-fill or cloze test (Ionin et al., 2004). However, it is worth noting that the L1 Croatian/L2 English participants in the present study had a higher number of omission errors than the other two groups (Table 9.1).

One possible reason for this, is that the indefinite article is difficult to elicit reliably. This is also evident in the low accuracy, and high substitution rates of the indefinite article among the L1 English group in the present study. The methodological implications of this are discussed in Chapter 10, section 10.3.3.

Finally, in the present study participants in all groups were found to occasionally use the numeral *one* instead of the indefinite article to introduce an indefinite referent, but the L1 Croatian L2 English participants did this almost twice as often as the participants in the other two groups. Previous studies investigating the oral production of L1 Mandarin or L1 Serbian L2 learners of English, observed similar tendencies of their participants (e.g., Avery & Radisic, 2007).

9.3.2 Definite article

The definite article was more consistently supplied in obligatory contexts than the indefinite article by all participant groups in the present study, which mirrors findings from previous research (discussed in previous section). Unlike substitution errors which were more common than omission errors with the indefinite article, the definite article was omitted more than substituted by all three groups. This is in line with previous research which has also demonstrated higher omission of the definite than indefinite article in oral production (Kang, 2008; Sharma, 2005; Snape, 2007). In addition, all participants used *this/that* instead of *the* on occasion, and this tendency was more pronounced with L1 Croatian L2 English participants than with the other two groups.

It is not surprising that the definite article tends to be omitted more frequently than substituted as it has been observed in previous research that articles are frequently omitted

with more salient referents (Trenkic & Pongpaibroj, 2013). A salient referent is one that is activated or given, and the more it is perceived as definite the more salient it is (Trenkic, 2009). With more salient referents, the article becomes more pragmatically redundant as the referent is already well established in both the hearer's and the speaker's minds. Typical examples of more salient definite referents that have been found to be frequently omitted are: a) topic prominent referents (Avery & Radisic, 2007), b) previously established referents (Sharma, 2005) or c) subsequently mentioned referents (Trenkic, 2002a). In the present study all NPs appearing in an obligatorily definite context were subsequent mentions of animals that had been previously introduced, and often more than one subsequent mention to the same referent was necessary to effectively tell the story, making the referent more salient each time it was mentioned.

9.3.3 Articles in Mandarin?

The findings of the oral production task in the present study support the premise that Mandarin is on a path of grammaticalising some of its features into an overt article system. More specifically, it is claimed that the demonstratives *zhei* (this) and *nei* (that) as well as the distal demonstrative *nage* are beginning to take some functions of the definite article in English (Chen, 2004; Huang, 1999; Li & Thompson, 1981). In addition, the numeral *yi* (one) is seen as serving some of the functions of the indefinite article in English (Chen, 2004; Crosthwaite, 2014; Hedberg, 1996).

Research so far has always grouped L1 Mandarin L2 English speakers with other article-lacking L1 backgrounds, but the results of the present oral production task demonstrated that that may not be warranted. The L1 Mandarin participants outperformed the L1 Croatian L2 English group on the production of both the indefinite and definite article, and consistently show production patterns much more similar to that of the L1 English group than the L1 Croatian group. In addition, in support of predictions (b) and (c) of RQ6, the L1 Mandarin/L2 English participants mostly substituted articles, while the L1 Croatian/L2 English group showed a higher tendency to omit articles. Such similarities in article performance between native speakers and an L2 group are usually observed with L2 groups from L1 backgrounds that have an overt article system, while participants from article-lacking L1 backgrounds show persistent differences in article performance in comparison to native speakers. This is not to say that Mandarin has an article system akin to that in English, but it seems that L1 Mandarin speakers encounter nouns preceded by a functional element with higher frequency (e.g., see Crosthwaite, 2014; Hedberg, 1996) than

speakers of other article-lacking languages, and this is possibly helping them with more accurate article use in English.

It is also worth noting from anecdotal evidence from having observed the participants as they retold the animated film story, that the L1 Mandarin L2 English participants seemed to perform more as if though they were tested compared to the L1 Croatian L2 English participants. This was not caused by the research environment as both groups were tested in quiet and designated rooms at the university/foreign languages school. However, the L1 Mandarin (but not L1 Croatian) participants were student at university at the time of testing, and this could have caused them to imitate testing conditions, and as a result lead to somewhat more accurate article production. However, there is no empirical evidence of this, and even if it was the case I do not believe it would have lead to statistically significantly different results between the groups. Therefore, although the perceived research environment might have caused the L1 Mandarin group to perform slightly more accurately than the L1 Croatian group, L1 transfer still seems a more plausible explanation for the group differences.

9.3.4 Prosodic Transfer Hypothesis (PTH)

As discussed in Chapter 2, section 2.8, the PTH predicts that if two languages differ in their prosodification of articles, learners of L2 English will frequently delete articles in obligatory contexts in oral production or will incorrectly transfer structures from their L1. Mandarin and Croatian are both classed as article-lacking languages, but they do allow the free clitic structure for determiners. Thus, according to the PTH, L1 Mandarin and L1 Croatian learners of L2 English are expected to be able to supply articles in obligatory contexts with high accuracy.

Previous research by Goad and White (2008) and Snape (2009) has found L1 Mandarin learners of English to be highly accurate in their supplience of articles in oral production. By contrast, Trenkic (2007) found that the L1 Serbian learners of English in her study struggled to produce articles with high accuracy, especially the indefinite article and articles in general in NPs premodified by an adjective.

The results of the present study support the previous research mentioned above. The L1 Mandarin L2 English speakers were found to supply articles significantly more accurately compared to the L1 Croatian L2 English speakers. In addition, the analysis also revealed that both L2 groups were less accurate at producing the indefinite article compared to the definite article. This asymmetry is not predicted by the PTH since both

articles are prosodified in the same way, but it (the asymmetry) has been observed in a number of previous studies (e.g., Snape, 2007).

Therefore, the PTH cannot fully and adequately explain the patterns of L2 English article production in this study. According to the PTH both L1 Mandarin and L1 Croatian learners of English should have produced articles with similar accuracy. However, this was not the case in the present study since L1 Mandarin learners were found to be more accurate in supplying English articles in obligatory contexts than L1 Croatian learners. Furthermore, both groups displayed an asymmetry in production of the definite and indefinite articles, which is not predicted by the PTH.

Other explanations of the results of the present oral production study are offered in Chapter 10.

9.4 Tense results

The participants watched the same animated film that was used to investigate L2 oral production of English articles, but for this part of the study the type of tense and its correct formation were calculated. The results (Table 9.3) show that the participant groups differed greatly in the choice of tense as well as accuracy.

The L1 English group chose to use present simple about 59% of the time, and occasionally used present perfect (27%) and past simple (15%) in their narrations. By contrast the L1 Croatian and L1 Mandarin groups preferred to tell their stories using past simple (55.91% and 53.09%) and present simple (37.94% and 46.9%) with similar frequency. The L1 Mandarin group did not use the present perfect tense at all, while the Croatian group did so very rarely (4.74%) and by only two participants. When the Croatian participants used the present perfect tense, they did so correctly but the results should be taken with caution since the two participants who used present perfect produced only about two present perfect utterances per story so the correct use could have been deliberate or by chance.

It is also important to note that once a participant chose a particular tense to retell their story, they mainly used that tense throughout with only occasionally switching to a different tense (e.g., mainly retold the story in present simple but sometimes used past simple). The L2 groups switched more frequently between tenses than the L1 English group.

Table 9.3 Average percentage of attempts and accuracy of oral production of tense per group

Group	Past Simple		Present Perfect		Present Simple	
	% <i>Used</i>	% <i>Correct</i>	% <i>Used</i>	% <i>Correct</i>	% <i>Used</i>	% <i>Correct</i>
L1 English	15	100	27	100	59	100
L1 Mandarin	53	88	/	/	47	66
L1 Croatian	56	95	5*	100	38	96

*This was produced by only two participants

In terms of accuracy, the L1 English group were 100% accurate in their production of all three tenses. The L1 Croatian group as a whole barely produced any present perfect, but they inflected verbs for past simple and third person present simple with high accuracy (over 90%) (Figure 9.2). The L1 Croatian group's accuracy with past simple did not statistically differ from the L1 English group, $b = 0.666$, $t(63) = 0.640$, $p = 0.525$, $r = 0.084$. Furthermore, although they supplied the present simple tense with similar accuracy as the past simple tense, their performance on the present simple tense was found to be significantly different to the L1 English group, $b = 8.901$, $t(67) = 3.462$, $p = 0.000$, with a medium effect size $r = 0.390$. This is probably due to greater individual variation in performance on the present simple.

The L1 Mandarin group, on the other hand, produced both tenses less accurately than the L1 Croatian and L1 English group. The past simple tense was produced correctly about 88% of the time, while the present simple tense was produced even less accurately at about 66%. The L1 Mandarin group's accuracy on the past simple was significantly lower than the accuracy of the L1 English group, $b = -6.378$, $t(63) = -6.122$, $p = 0.000$, $r = 0.611$. The difference in performance on the present simple between the L1 Mandarin and L1 English group was also significantly different, $b = -21.464$, $t(67) = -8.533$, $p = 0.000$, $r = 0.722$.

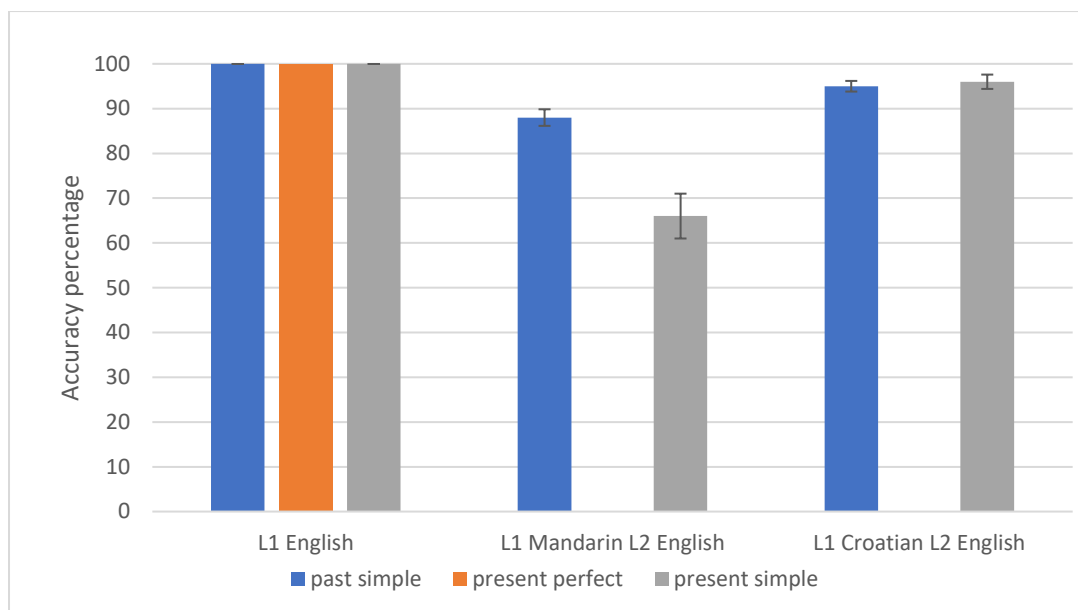


Figure 9.2 Accuracy of oral production of tense by participant group (error bars = SE)

9.5 Tense-aspect discussion

The aim of the oral production task investigating the type of tense used in narratives as well as accuracy was to answer RQ7 below.

RQ7: How accurately do the L1 Chinese and Croatian L2 English learners mark verbs for past tense compared to the L1 English group?

Predictions:

- a. L1 English speakers will consistently mark verbs for past tense.
- b. The L1 Mandarin group will produce uninflected verbs more frequently than the L1 Croatian group.

The results of the task support the predictions above and show strong L1 influence in both tense choice and accuracy. Firstly, the L1 English group showed different preference in their choice of tenses for their oral narrative to the L2 groups. While all three groups showed a high preference for present simple, the L2 groups also used past simple with similar frequency while the L1 English group did not. In addition, the L1 English group used present perfect about one third of the time in their stories, while the L1 Mandarin group did not use present perfect at all, and only two of the L1 Croatian participants used it two times on average in their stories, which could have been by chance (i.e., there is no evidence of systematic use of present perfect). Thus, it appears that both L2 groups avoided using present perfect. Considering that present perfect as a morphosyntactic feature is not

present in either language, the lack of use of this tense suggests that this is in line with their L1 preferences.

Present perfect has been shown to appear relatively late in learner language and is typically used effectively only by advanced learners but mostly on tasks which allow for control of the language, such as metalinguistic tasks or written narratives (Fuchs et al., 2016). Since the oral production task in the present study required the participants to tell the story of the animated film they were watching in real time, it probably burdened their cognitive resources more because they simultaneously had to attend to fluency, complexity and the accuracy of the language. Under such constraints, the participants might have avoided the use of a complex form such as present perfect and opted for forms such as the past or present simple tense, which they arguably had more control over.

Secondly, L1 effects were also observed in relation to the accuracy with which the L2 participants produced present and past simple. Although the L2 participants in the present study have explicit knowledge of present perfect since they were able to tell mismatch from match sentences on the GJT (Chapter 8, section 8.1), it seems that this knowledge did not fully translate into accurate oral production for the L1 Mandarin group. L1 Mandarin participants performed significantly less accurately than the L1 English group with both the present and past simple tense. Mandarin, unlike English, has no grammatical markers of tense and it seems that the L1 Mandarin L2 English participants are transferring uninflected verb forms afforded in their L1 into their L2 some of the time.

By contrast, the L1 Croatian learners of English produced the past simple and present simple tense more accurately than the L1 Mandarin group. Their suppliance of correctly inflected verbs with both tenses was around 95% compared to the 100% performance of the L1 English group (but only present simple was found to be supplied significantly less accurately compared to the L1 English group). Croatian is a language that, like English, morphologically marks verbs for tense. Thus, it seems that correctly inflecting verbs for tense in English is somewhat easier for the L1 Croatian learners as they are presumably able to correctly transfer similar features from their L1.

The findings of the present study are in line with previous research which has also found that the L1 of the participants has an effect on how accurately they produced tense inflection in English. For example, similar L1 effect have been observed in several studies that utilised story telling tasks with participants whose L1 does not morphologically mark tense compared to participants whose L1 does (Chen, 2016; Hawkins & Liszka, 2003).

Finally, it is interesting to comment on the type of errors that both L2 groups had a

tendency to make with past simple. With the L1 Mandarin group, verbs uninflected for past simple were most often irregular verbs. This is somewhat unusual, since previous research has found that irregular verbs are easier to process than regular verbs since irregular verbs are said to be retrieved from memory while regular verbs are computed online (Pliatsikas & Marinis, 2013). However, Pliatsikas and Marinis, for example, investigated L2 acquisition of English regular/irregular verbs with L1 Greek learners whose L1 grammaticalises tense. The L1 Mandarin participants in the present study might have trouble correctly recalling irregular verbs from memory, especially if it is a verb that is less salient in their memory. By contrast, the L1 Croatian participants made few errors with past simple, but when they did it was mainly by using the past participle form (e.g., given) instead of the past simple form (e.g., gave). This occurred with both irregular and regular verbs (no particular pattern was observed). In Croatian the past tense is formed with the verb *to be* and the past participle of the main verb. Thus, it is possible that the L1 Croatian participants were occasionally transferring a part of their L1 construction into English. It is also possible that this is a malformed present perfect with the verb *have* missing, however, this seems less likely since these lone past participles occur even in a succession of past tense forms, such as *...the cloud took...wrapped...and given*.

9.6 Chapter summary

The results of the oral production task into L2 production of English articles largely mirror findings from previous research. Both L2 groups produced the indefinite article less accurately than the definite article in obligatory contexts. In addition, the indefinite article tended to be substitute while the definite article tended to be omitted more. A novel finding of the present oral production study is the difference in the production of English articles between the L1 Mandarin and L1 Croatian learners of English. The L1 Mandarin group produced both articles more accurately than the L1 English and the L1 Croatian L2 English group, which gives support to the claim that Mandarin is on a path of grammaticalising some of its markers of definiteness.

The results of the oral production task into L2 tense marking show that the L1 Mandarin group (whose L1 does not grammaticalise tenses) inflected verbs for tense significantly less accurately than the L1 English group or the L1 Croatian L2 English group (whose L1 has tense inflection). Furthermore, neither Mandarin nor Croatian have a construction similar to the English present perfect, and this was reflected in the choice of tense since both groups avoided using present perfect in their narratives.

Overall, the results of the oral production task indicate strong L1 influence for both L2 groups.

Chapter 10: General discussion

10.1 Introduction

Chapter 10 presents the overall discussion of the results and is divided into three main sections. The chapter starts with a discussion of the methodological implication and limitations of the self-paced reading method, grammaticality judgement tests and the oral production task utilised in the present thesis. The chapter then moves on to the discussion of the results in light of theory and previous research. Based on previous research and the results from the present thesis, a position is taken as to whether Mandarin can be considered a truly article-lacking language. Next, the results are discussed in relation to RQ1 which asked whether late L2 learners can fully acquire morphosyntactic structures in the L2 that are unique to it (i.e., do not exist in the L1). L1 effects as well as the relationship between explicit and implicit knowledge are discussed. The chapter concludes by addressing the potential effects of immersion on the present results and reports a subset of data from L1 Croatian L2 English participants in immersion. The data collection for that group was not finished but the preliminary results arguably indicate potential for further research.

10.2 Discussion of RQ1

10.2.1 Introduction

The results of three individual studies have already been discussed separately in Chapters 7, 8 and 9, but this section of Chapter considers the implications of the results from the present thesis as a whole on the main research question (RQ1) below.

RQ1: Can late L2 English learners effectively produce and process L2 morphosyntactic structures that are realised differently in the learners' L1?

The results of all three individual studies in the present thesis indicate that L2 learners have problems in both production and processing of unique-to-L2 morphosyntactic structures. The causes of such problems in the present thesis can be arguably ascribed to a strong L1 influence, and the relationship between explicit and implicit knowledge. Previous research (e.g., Hopp, 2006) and preliminary findings from a subset of L1 Croatian immersion participants reported in section 10.2.3 suggest that difficulties in production and processing of unique-to-L2 structures could potentially be overcome by enough immersion exposure and the “near-native” proficiency that may result from such exposure.

10.2.2 L1 influence

So far it has been assumed in the literature that both Mandarin and Croatian are article-lacking languages. However, several researchers claim that Mandarin is on a path of grammaticalising some of its markers of definiteness and that Mandarin speakers encounter NPs premodified by a functional element more frequently than speakers of other article-lacking languages. Therefore, before a discussion into the L1 effects on the present results, it is important to take a position as to whether Mandarin is truly article-lacking as this will inform how L1 transfer in both L1 Mandarin and L1 Croatian participants is interpreted.

10.2.2.1 Articles in Mandarin

While Croatian is considered to be an article-lacking language and there is very little debate about that, some researchers claim that Mandarin is on a path of grammaticalising some of its markers of definiteness (Chen, 2004; Huang, 1999; Li & Thompson, 1987). So far in L2 article research, Mandarin has always been grouped with other article-lacking languages although there is ample evidence that L1 Mandarin L2 English learners behave differently on tests to participants from article-lacking L1s (see Chapter 2, section 2.7). The results of both the oral production and online comprehension tasks in the present study point to the conclusion that Mandarin is not article-lacking in the same way Croatian is. The results of the oral production task show a stark contrast between the L2 groups. The L1 Croatian group in the present study produced articles in a similar pattern to what has been previously observed in studies with L2 learners from Slavic (article-lacking) L1 backgrounds. These participants supply articles less accurately and omit them with higher frequency than native speakers or L2 learners from L1s that have an article system. In fact, article omission is a common characteristic of this population even at advanced proficiency (Ekiert, 2004; Schönenberger, 2014; Świątek, 2013; Trenkic, 2007). On the other hand, the L1 Mandarin L2 English speakers in the present study supplied articles with a similar accuracy as the L1 English group, and with the definite article achieved accuracy as high 94% which is similar to the accuracy of 96% by the L1 English group. In addition, they showed an error pattern similar to the L1 English group in that the indefinite article was most commonly substituted while the definite article was substituted and omitted at a similar frequency (omission being only marginally higher in both groups).

On the SPR task in the present study neither L2 group showed statistically significant

sensitivity to omission¹⁸ violations while the L1 English group was sensitive to omission violations. However, if we look at the descriptive reading patterns of each L2 group we find that the reading patterns of the L1 Mandarin group resemble that of the L1 English group, while the reading patterns of the L1 Croatian group do not resemble either group. With the indefinite article the L1 English group show a marked increase in RTs for omission sentences on the first segment following the noun, while the L1 Mandarin group show a similar increase in RTs (although not statistically significant) but delayed by two segments. By contrast, the L1 Croatian group initially read all sentences at a similar speed only to eventually show a slight preference for substitution sentences which were read at a faster speed. With the definite article, the L1 English group show an increase in RTs for omission sentences on the same segment as with the indefinite article. Although the increase in RTs is not statistically significant, the L1 Mandarin group show a visually similar increase in RTs on the same segment as the L1 English group. The L1 Croatian group read all sentences in the definite context at a similar speed. The results of the SPR for both the indefinite and definite article are in line with the GJT results which show that the L1 Mandarin group rated sentences containing an omission error as less grammatical than the L1 Croatian group.

In conclusion, the position adopted in the present thesis is in support of the claim that Mandarin has begun to grammaticalise some its markers of definiteness. This is not to say that the process of grammaticalisation has been completed or that Mandarin has an article system akin to that in English. However, it is possible that with increased use of certain markers of definiteness in discourse, L1 Mandarin speakers have become more accustomed to seeing an NP preceded by a functional element and are able to transfer this pattern into their L2 English, albeit not with full precision since their L1 still allows bare NPs (although a preference for premodified NP is developing). This could potentially explain a reading pattern of the L1 Mandarin L2 English group which arguably shows a dislike of article omission but not a statistically significant one, as well as the groups more accurate suppliance of articles in oral production. Therefore, for the purposes of the discussion of RQ1 and all other discussions in this work, it is assumed that Mandarin is not an article-lacking language in the same way as Croatian is. This means that some positive transfer can be expected which help L1 Mandarin L2 English speakers to produce articles more

¹⁸ Sensitivity to article substitution is not discussed at this point since there is potential evidence that the lack of sensitivity to such violations even by L1 English speakers is down to the methodological incompatibility of the SPR method in testing such violations. Therefore, the lack of sensitivity to substitution violations is only discussed as a methodological consideration and it is not discussed as evidence in answering RQ1.

accurately than L1 Croatian L2 English speakers whose L1 does not have articles at all.

10.2.2.2 L1 effects

The results of three experiments in the present thesis suggest late L2 learners are not able to produce and process L2 morpho-syntactic structures that do not exist in the L1 in the same way as native speakers but are able to do so for structures that are similarly instantiated in their L1 and L2. The results of all three individual studies point to the conclusion that the L1 plays a detrimental role in L2 grammar production and processing. In other words, both L2 participant groups in the present study were producing and processing English articles and TA in accordance with what is afforded in their respective L1s. This is in line with previous research that L2 learners from incongruent languages (to use Jiang et al.'s terminology) do not perform the same as L2 learners from congruent languages or even native speakers. This is evident in metalinguistic studies, production studies, and online processing studies (for review see Jiang et al., 2011). More specific to the morphosyntactic structures investigated in the present study, previous research has demonstrated that language congruency seems to matter in the acquisition of English articles (Crosthwaite, 2014), as well as the acquisition of English TA system (Hawkins & Liszka, 2003; Roberts & Liszka, 2013).

The present results of the online comprehension task (SPR) into L2 processing of English articles show that L1 Croatian L2 English learners are not sensitive article omission and appear to read all sentences in both contexts at a similar speed. Considering that Croatian does not have a grammaticalised article system like English, this suggests that bare NPs in English do not have a processing cost for L1 Croatian L2 English learners. Similarly, the L1 Mandarin L2 English group was not significantly slowed down by either omission, but when looking at the reading patterns of this group we find a resemblance to the reading patterns of the L1 English group. Like the L1 English group, L1 Mandarin learners were slowed down by omission violations on the same segment as L1 English speakers with the definite article but somewhat delayed with the indefinite article. If L1 Mandarin speakers are seeing nouns preceded by another grammatical element with higher frequency in their L1 as claimed by numerous researchers, then this could be causing them to more quickly acquire the rule that countable singular nouns in English also need to be preceded by a grammatical element, most commonly an article.

The results of the oral production task for both articles and TA also show a strong L1 influence. The articles results show that the L1 Mandarin group outperformed the L1 Croatian group with both articles, presumably due to L1 transfer. By contrast, the TA results

present the opposite picture. The L1 Croatian group, whose L1 morphologically marks tense, were highly accurate ($\geq 95\%$) in correctly inflecting verbs for both the past and present simple tense. The L1 Mandarin group, whose L1 has no morphological markers of tense, struggled with tense inflection and produced the past simple tense correctly about 88% of the time, and the present simple tense only 66% of the time. In addition, neither Croatian nor Mandarin have a dedicated grammatical construction that is equivalent to the English present perfect, and as a result both groups seemed to avoid using present perfect in their narratives.

Thus, the findings of the present study (as a whole) provide support for the morphological congruency hypothesis developed by Jiang and collaborators (2011). The morphological congruency hypothesis posits that L2 learners are able to fully acquire L2 grammatical features that are congruent with their L1, while features that are incongruent will always be subject to variability and non-native like production and processing. Results of the oral production tasks in the present study suggest that the L2 participants performed similarly to the L1 English group on congruent features. For example, the L1 Mandarin group produced articles with high accuracy, and (although not statistically significant) show reading patterns in online comprehension (SPR) similar to the L1 English group. In addition, the L1 Croatian group marked verbs for tense with high accuracy. The L2 participants in the present study also showed marked variability and lower accuracy on L2 features that were incongruent with their L1. The L1 Croatian group produced articles with low accuracy while the L1 Mandarin group had trouble consistently marking verbs for tense.

It is also possible to explain the results of the present thesis with the structural competition model. The structural competition model proposes that both languages are simultaneously activated in a bilingual's mind, and when using the L2 the speaker needs to suppress the L1 licensed structure in order to correctly use the L2 licensed structure. The L2 speakers are not always expected to be able to suppress the L1 licensed structure which leads to variable production. More specifically, in terms of L2 article use, the structural competition model predicts that learners from article-lacking L1s will tend to omit articles frequently as they will not always be able to successfully suppress the L1 licensed bare NP form. The results of the two L2 groups in the present thesis on both the oral production and online comprehension tasks support the predications of the structural competition model. The L1 Croatian group frequently produced bare NPs in their narratives on the oral production task and were not sensitive to article omission in online comprehension. By contrast, the L1 Mandarin group (whose L1 is in the process of grammaticalising some of its

markers of definiteness) produced bare NPs significantly less frequently and supplied the correct article with high accuracy. The L1 Mandarin group also had a tendency to read sentences in which the article was omitted somewhat slower than match sentences in online comprehension, although this difference was not found to be statistically significant.

The structural competition model also predicts that the frequency of article omission will increase in more cognitively demanding situations (e.g., online tasks). The results of the articles GJT in the present study indicate that on a cognitively less demanding tasks, such as an untimed GJT in which the participants have enough time to access their explicit knowledge, the L2 speakers are able to recognise that sentences in which the NP is bare are erroneous and less preferable to sentences in which the NP is preceded by an article regardless of their L1. However, on online tasks in the present thesis the L1 Croatian L2 English participants do not seem to have equally good command of the English article system since they were neither able to produce nor process English articles in a native-like manner.

So far the SCM has only made predictions for the use articles and plural -s, but based on the present results the model could be potentially extended to the production of English tense. Similarly to the GJT results for articles, all L2 participants were able to distinguish between grammatical and ungrammatical use of three English tense – past simple, present perfect and present simple. However, on the oral production task suppliance of inflectional morphology to mark tense was variable. The L1 Mandarin group, whose L1 does not morphologically mark tense, had difficulty with consistently marking verbs for both past simple and present simple tense. On the other hand, the L1 Croatian group (a language with inflectional morphology) marked verbs for past and present tense correctly above 95% of the time in their narratives. This asymmetry could be explained by the L1 Mandarin participants' inability to consistently suppress the L1 licensed bare verb form, especially on cognitively more demanding tasks such as the SPR or oral production in the present thesis. By contrast, for the L1 Croatian L2 English participants both the L1 and L2 forms that are activated would be inflected thus resulting in inflected verbs in English more consistently.

10.2.3 Effects of immersion

It is also important to address any potential effects of immersion on the data, considering that the L1 Mandarin group in the present study had had about three months of immersion experience in the UK at the time of testing, while the L1 Croatian group had had none. Previous research suggests that immersion, even of several years, rarely has considerable

benefits in the acquisition of unique-to-L2 morphosyntactic structures such as the English articles (Avery & Radisic, 2007; Chrabaszcz & Jiang, 2014). The present data do not show any significant immersion effects for the L1 Mandarin group, since both L2 groups seem to perform according to what is afforded in their L1s. If there were significant immersion effects for the L1 Mandarin group, we would expect the participants to outperform the L1 Croatian group on all tasks regardless of L1 influence, but this is not the case. The L1 Mandarin group outperformed the L1 Croatian group on tasks involving English articles. On the SPR task the L1 Mandarin group showed reading patterns more similar to the L1 English group, and somewhat different from the L1 Croatian group. Additionally, the L1 Mandarin participants produced English articles significantly more accurately than the L1 Croatian group. These results are in line with what is acceptable in the participants' L1s. While Croatian has no obligatory grammatical marker of definiteness and bare NPs are very frequent, Mandarin is on a path of grammaticalising some of its markers of definiteness with a high number of NPs appearing preceded by a functional element (such as demonstratives) in discourse. By contrast, the results of the oral production task investigating English tense marking paint the opposite picture. The L1 Croatian participants, whose L1 marks tense morphologically, performed with high accuracy comparable to the L1 English group. The L1 Mandarin participants, whose L1 has no overt tense marking, marked verbs for tense with significantly lower accuracy than either the L1 Croatian or the L1 English groups.

In conclusion, there is no convincing evidence from the data that the performance of the L1 Mandarin group on the tasks involving English articles could be largely explained by immersion effects. Instead, the data point to strong L1 effects regardless of immersion.

However, there is potentially some support for the findings in Hopp (2006, 2010) which suggest that immersion and near-native proficiency (as a result of immersion?) could facilitate the acquisition of unique-to-L2 structures and lead to ultimate attainment. Originally, the present thesis was supposed to also test L1 Croatian participants who had been living in the UK for a number of years and had achieved near-native or high C2 level proficiency. Data from eight such participants were collected; however, the data collection was not finished and a full sample was not obtained. It is, nevertheless, interesting to consider the data from those eight participants to potentially inform directions in further research.

The data were not presented along with the other two L2 groups due to the small number of participants, and the data were not statistically analysed for the same reason.

Descriptive data for this group are only presented here to inform the discussion and future research. Only the articles data are presented, due to unreliable results of the L1 English group and the potential methodical issues with the TA data (Chapter 10, section 10.3).

All of the L1 Croatian participants in the immersion group had learned English only in school in Croatia until the age of 18, just as the non-immersion Croatian group. The eight participants moved to the UK at some point after the age of 18 and had been living there for several years at the time of testing (Table 10.1). They were of highest proficiency (C2) according to the Oxford Placement Test, and also considered themselves to be very proficient in the four language skills according to the self-reports.

Table 10.1 L1 Croatian L2 English immersion participants' background information

	Croatian immersion participants
	<i>M (SD)</i>
Age	31 (5.01)
Age of onset of English lessons	9 (0.46)
Years of learning English in formal education	9 (1.59)
Residency in the UK (months)	8 (7.23)
Daily use of English in	
<i>Speaking (%)</i>	76 (16.91)
<i>Writing (%)</i>	82 (17.7)
Self-rating in	
<i>Speaking English (1-10, 1=poor)</i>	9 (1.19)
<i>Writing English (1-10, 1=poor)</i>	10 (0.46)
<i>Listening English (1-10, 1=poor)</i>	10 (0.75)
<i>Reading English (1-10, 1=poor)</i>	10 (0.75)
OPT score (advanced range 48-54)	C2

The participants also reported that they used English frequently in speaking and writing (75% and 82% respectively), which was more frequent than the L1 Mandarin group who were immersed for three months (speaking 56%, writing 53%) or the non-immersion L1 Croatian group (speaking 31%, writing 28%).

The articles SPR data for the non-immersion L1 Croatian group show RTs for the match sentences and both violations. However, the data of the immersion L1 Croatian group suggest possible processing costs for omission violations. In the indefinite context, the non-immersion L1 Croatian group read all sentences at a similar speed, and after the second segment following the noun appear to read substitution sentences faster (Figure 10.1).

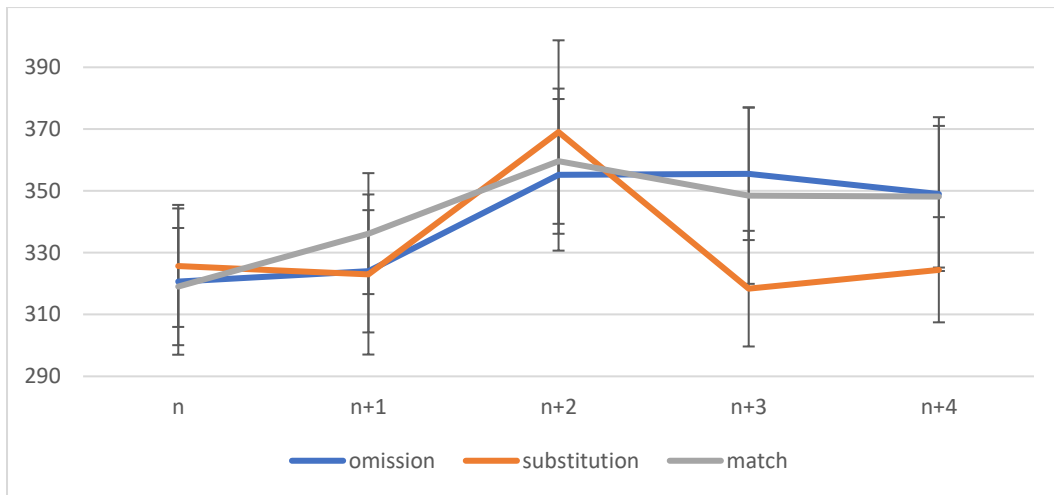


Figure 10.1 Indefinite article RTs for non-immersion L1 Croatian group (error bars = SE)

By contrast, the immersion L1 Croatian group show a slow-down for omission sentences at the onset of the stimulus, as well as later on the fourth segment following the noun, suggesting a processing cost for omission violations (Figure 10.2). Similar reading patterns are found with the L1 English group who were significantly slowed down by omission violations on the first segment following the noun.

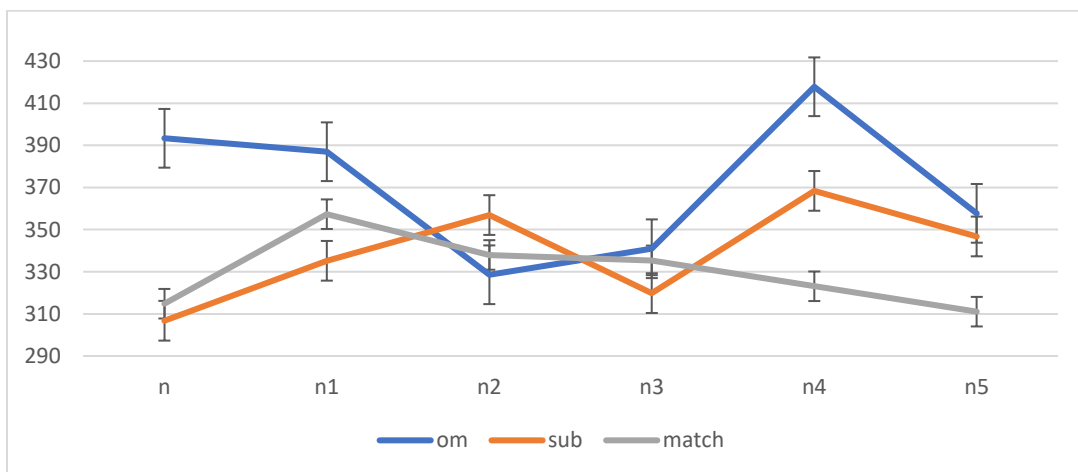


Figure 10.2 Indefinite article RTs for immersion L1 Croatian group (error bars = SE)

In the definite context, the non-immersion L1 Croatian group did not show any processing cost for violations either, and all sentences were read at a similar speed (Figure 10.3).

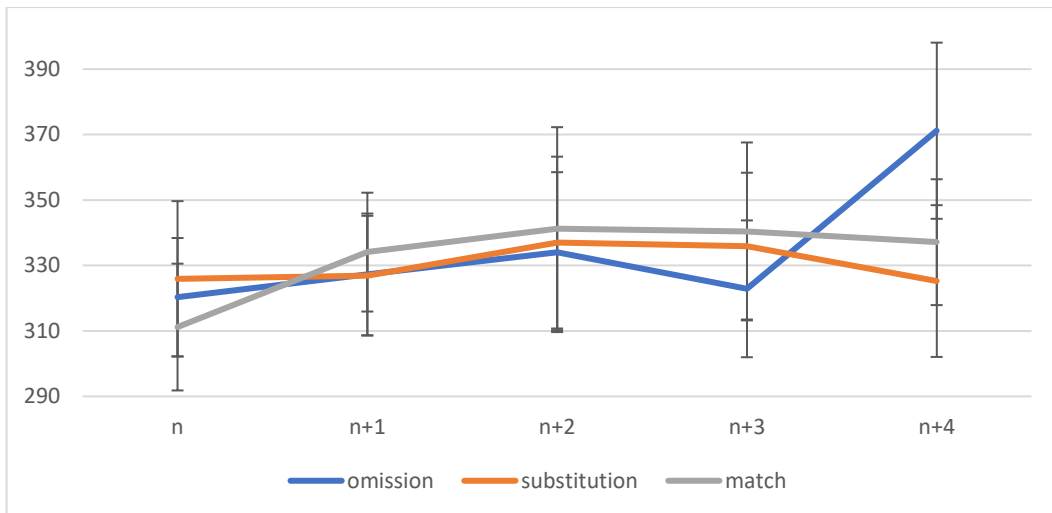


Figure 10.3 Definite article RTs for non-immersion L1 Croatian group (error bars = SE)

The immersion L1 Croatian group, on the other hand, were slowed down by omission violations compared to accurately formed sentences on the first segment following the noun, which is the same segment on which the processing cost for omission is found in the L1 English group.

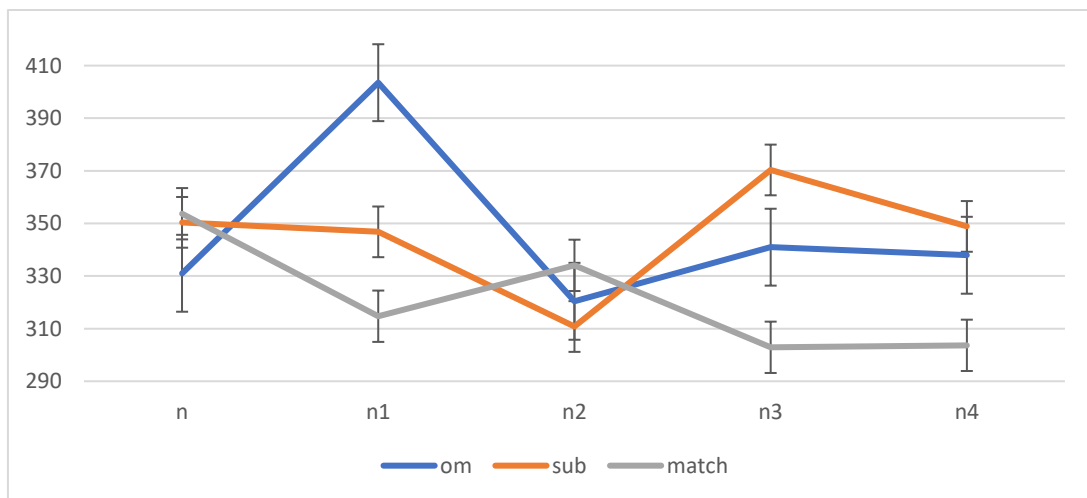


Figure 10.4 Definite article RTs for immersion L1 Croatian group (error bars = SE)

The preliminary results of the oral production task also indicate an improvement in article suppliance for the immersion L1 Croatian group compared to the non-immersion group (Table 10.2). The accuracy with the definite article improved by almost 10% for the immersed L1 Croatian group, while the improvement in accurate suppliance of the indefinite article is even greater, rising from 55% for the non-immersed L1 Croatian group to 84% for the immersed L1 Croatian group.

Table 10.2 Accuracy on the oral production task by group

Group	Indefinite accuracy %	Definite accuracy %
Non-immersed L1 Croatian	55	81
Immersion L1 Croatian	84	90

In conclusion, the preliminary descriptive analysis of the eight immersed L1 Croatian participants show differences to the data from the non-immersed L1 Croatian group on both the SPR and oral production tasks for English articles. A larger sample of the immersed participants would allow for statistical analysis to determine whether a) the processing cost for omission violations evident from the RTs is statistically significant, b) the improvement in the accuracy of article suppliance on the oral production task is statistically significant, and c) these differences on both the SPR and oral production tasks are significantly different to the performance of the non-immersed L1 Croatian group and the L1 English controls on the same tasks.

The preliminary results of both tasks in the present study are in line with findings from Hopp (2006, 2010) who found that his immersed and highly proficiency (C2) learners of L2 German were able to acquire a unique-to-L2 morphosyntactic structure to a native-like level. Therefore, there are indications that full acquisition of unique-to-L2 morphosyntactic structures is possible, but the effects are only observable with L2 learners of highest proficiency. What is not clear either from the present study or Hopp's studies (who had immersed participants of different proficiencies), is whether immersion is a key factor in this acquisition, or is it an effect of proficiency only. It is also not clear whether such high proficiency can be achieved through classroom exposure only, or whether it necessarily required immersion exposure. Future research would benefit from comparing two groups of learners at (equal) highest proficiency levels, with one group having had classroom exposure only while the other group is immersed. Only then it would be possible to completely tease apart immersion effects from proficiency.

10.3 Methodological implications and limitations

10.3.1 Limitations of self-paced reading

10.3.1.1 SPR limitations in the present thesis

The present SPR task produced somewhat unexpected results which are in contradiction

with previous research. In the present study, the L1 English speakers¹⁹ were not sensitive to either article substitution or TA violations. They were, however, sensitive to article omission. This is in contrast with the predictions of the present and previous studies, as L1 English speakers were expected to also be sensitive to substitution violations of articles, as well as TA violations of present simple and present perfect. In an eye-tracking study by Trenkic et al. (2014), both L1 English and L1 Mandarin L2 English participants were able to use English articles to resolve referents sooner in online comprehension, indicating that they were sensitive to article substitution. Based on the findings, the L1 English speakers were predicted to show sensitivity to both substitution and omission violations in future studies. However, the results of the SPR task in the present study suggest that L1 English speakers are sensitive to omission but not substitution violations.

Furthermore, the part of the present study on L2 online processing of TA is a replication of Roberts and Liszka (2013), who found that their L1 English control group was sensitive to TA violations of present perfect, but not past simple. Thus, the prediction of the present study was that the same effects (or lack of thereof) would be observed. However, the evidence from the present study suggests that L1 English speakers are not sensitive to TA violations of past simple, present perfect or present simple. Once again, unusual and contradicting results.

There are numerous methodological reasons that could have led to different results than expected, including the lack of replication of the TA results.

Firstly, one of the major limitations of the present SPR study is the smaller sample size. The same number of participants per group (24) were tested as in Roberts and Liszka (2013), however, in the present study the participants saw one more condition than in the original study. The sample size should have, therefore, been increased to reflect the increase in number of conditions. As a result, it is possible that with a larger sample size the findings of the present SPR study would be different. For example, some differences in reading times observed in the descriptive data that were not found to be statistically significant (e.g., results of the L1 Mandarin L2 English group) might become an effect with a larger sample size.

Additionally, it was not possible to obtain equal sample sizes across all groups in the present SPR study since two groups have 24 participants each while the third group has 22 participants. Such a small departure in sample size is not likely to have caused major

¹⁹ At this point, the L2 groups are not included in the discussion since it is the L1 English group that served as a control and a benchmark against which the L2 groups' performance was assessed.

differences in the results but is nevertheless not “ideal”.

Secondly, specific to the study testing participants’ sensitivity to violations of English articles, testing syntactic (omission) and semantic (substitution) processing in the same experiment might be problematic. Having two types of violations could pose more of a processing burden on the L2 participants, and as such makes the task more difficult than having only one violation. It is for future research to determine the effect testing multiple violations has on the outcome of the study.

the stimuli from Roberts and Liszka (2013) use the adverbial *since* with present perfect sentences most of the time. This is potentially problematic since L2 learners are often taught in ESL classrooms to associate present perfect with adverbials such as *since*, *yet* and *already*. Having stimuli that strongly favour such links could make any sensitivity to present perfect difficult to interpret, since the sensitivity could be a result of the participants having been primed to associate present perfect with *since*, rather than a real ability to use present perfect in real time. This potential methodological issue was not rectified in the present stimuli, but it is worth considering in future research.

Finally, the present study introduced a number of other changes to the Roberts and Liszka’s (2013) design, such as including a scenario in all the stimuli, and changing the number of words after the critical segment. Additionally, the alpha values in the present study were adjusted according to the Bonferroni procedure for multiple testing, which inevitably results in a more conservative p-value than in Roberts and Liszka who did not use this procedure.

Another potential methodological limitation of the SPR method is arguably its unsuitability to detected sensitivity to all types of violations.

10.3.1.2 Limitations of types of violations tested

Although the lack of sensitivity to TA violations in the present study is highly unusual on the surface, such lack of sensitivity to TA violations has been reported in previous studies that used the event-related brain potentials paradigm (ERP). In an ERP study the participants read very similar stimuli as they would in an SPR study, but it is not the speed at which they press a key to switch from one word to another that is measured but rather their brain potentials. The brain potentials (EEG signals) are recorded through a series of electrodes strategically positioned on a participant’s scalp. Numerous studies so far have observed a negativity at about 400ms after the stimulus onset (N400) in relation to lexical (semantic) processing. When morphosyntactic processing is involved (e.g., grammatical agreement of gender, number or person) the electrophysiological pattern obtained is usually a Later

Anterior Negativity (LAN) followed by a positivity at around 600ms post stimulus onset (P600). Thus, it can be said that semantic and morphosyntactic features seem to implicate different processes in the brain.

Flecken et al. (2015) utilised the ERP method to investigate L2 processing of the English TA system by L1 English speakers. In addition to testing the participants' processing of TA violations (76), they also included semantic (77) and number agreement violations (78).

76. Right now, Sophie is swimming /*swims in the pool.

77. Right now, Sophie is swimming/*is cooking in the pool.

78. Right now, Sophie is swimming/*are swimming in the pool.

(adapted from Flecken et al., 2015, p. 3)

The sentence in example (77) is considered a semantic violation because the word *cooking* is semantically incompatible with being done in the pool, while the sentence in example (78) is considered a purely syntactic violation occurring on the verb, since the auxiliary verb *are* (plural) does not match the subject *Sophie* (singular) in number. By contrast, sentence in example (76) includes components of both a semantic and morphosyntactic mismatch. The violation does not occur on the verb itself as both *is swimming* and *swims* are correctly constructed verb forms and agree with the subject *Sophie* in number, but rather the violation is a result of the mismatch between the aspectual adverbial *right now* and the incompatible tense form *swims*.

As expected, the semantic violation as in example (76) elicited a clear N400 effect, while the number violation as in example (77) elicited a clear P600 effect. Somewhat surprisingly, the TA violation as in example (75) elicited a short-lived LAN but was followed by neither the N400 nor the P600, although it was expected to elicit the P600 commonly associated with morphosyntactic processing. Considering that the P600 is commonly interpreted "as an attempt at reintegrating the unexpected word form with the preceding context" (Flecken, Walbert, & Dijkstra, 2015, p. 12), the authors suggest that the lack of P600 indicates that a) the reanalysis happened very quickly before the effect could be observed, or b) no such reanalysis occurred. The results of the ERP were also corroborated by the offline GJT task on the same stimuli used in the ERP part of the study. Although they judged the other two types of violations as ungrammatical, the L1 English participants did not judge TA violations as overtly ungrammatical. Thus, the authors conclude that the TA violations do not seem to pose a particular problem for L1 English speakers either online or

offline.

The findings from Flecken et al. (2015) suggest that violations that combine semantic and syntactic components (such as TA violations) do not pose the same processing cost as purely semantic or syntactic violations. A similar pattern can also be observed in the present SPR data – TA violations do not appear to bear a processing cost for L1 English speakers, while purely syntactic violations, such as article omission do. However, according to the findings in Flecken et al. (2015) and Trenkic et al. (2014) we would have expected the L1 English group in the present study to be sensitive to substitution violations on the SPR task since substitution is a purely semantic violation. It is probable that the reasons as to why no such sensitivity was found are also methodological (discussed in the next section).

10.3.1.3 Location of violation tested

Firstly, the task in Trenkic et al. (2014) had a communicative purpose (i.e., the participants were trying to resolve referent ambiguity), and the results showed that both the L1 and L2 group made use of articles. In contrast, the SPR task has no communicative purpose, since the participants are asked to read sentences (comprehension) and occasionally answer questions about a sentence they have read. It would appear that in such a task as long as the article is there, the entire scenario can be understood without a processing delay. This also echoes the findings of Tarone and Parrish (1988) who found that their L2 English participants performed more accurately on the oral production task than on the grammaticality judgment test. The authors argue that a possible explanation for the results is that effective use of articles is more important in story-telling than in a GJT task because story-telling requires both the hearer and speaker to keep track of new and already introduced referents in order to successfully follow the story. Thus, it is likely that the uncommunicative nature of the SPR task does not render itself to testing sensitivity to article substitution.

Secondly, the use of a short story before the critical item sentence is somewhat unusual in SPR. The majority of studies using SPR to investigate L2 morphosyntax use one or two sentences which the participants see one word at a time, and the violation appears directly within the critical item sentences as in the example (79) below in which the verb *have been* does not match the temporal adverbial *last year*.

79. Last year, I **have been* on a nice holiday.

The same design is possible with articles only with omission violations, while this is

not possible with substitution violations. A substitution violation is established in relation to a referent that has either been previously mentioned (definite article) or is being mentioned for the first time (indefinite article). To achieve this, in addition to the critical item sentences that the participants read one word at a time, a scenario was created providing context that remained on the screen for the duration of the whole stimulus as in the example (80) below.

80. Frank's been saving money to buy a ring for his girlfriend. He finally bought it yesterday at a fancy jewellery shop. (scenario)

*d. He'll give her **the** ring as a surprise at dinner tonight. She'll surely like it.
(match)*

*e. He'll give her **a** ring as a surprise at dinner tonight. She'll surely like it.
(substitution)*

*f. He'll give her **x** ring as a surprise at dinner tonight. She'll surely like it.
(omission)*

The scenario is not necessary for the omission of the article in (80f) to be a violation since it is a syntactic violation which is established by its mere absence or presence in front of a countable singular noun (*ring* in the example above). However, the correctness of the article in sentences *d* or *e* depends on the context scenario. Since *a ring* is mentioned in the scenario, sentence *d* is correct, while sentence *e* contains a substitution violation – the article is there (no syntactic violation) but it does not match the definite context. This design has meant that the violation was no longer localised to the critical item sentence, as has been previously seen in SPR design. Thus, it is possible that in combination with the uncommunicative nature of the task, it was not time effective for the participants to remember the status of a referent (indefinite or definite) or look back at the scenario to verify its status in order to determine the appropriateness of the article. It seems that as long as the article is there, the reading of the sentence can proceed without a delay.

There are two ways to potentially verify these claims. Firstly, the same stimuli could be used in an eye-tracking study to see whether once a participant arrives at the critical noun they look back at the scenario to verify the article choice or whether they just move one to reading the next word in the sentence. Secondly, there may be implications for the working memory capacity, since usually more than one referents from the scenario need to be held in working memory in order to cross-check them against the article in the critical item sentence. It might be useful in future research to incorporate tests of working memory

into SPR studies.

10.3.2 Limitations of grammaticality judgement tests

10.3.2.1 GJT limitations in the present thesis

The GJT used in the present SPR study suffers from some of the methodological limitations discussed above. Firstly, it is not fully certain that the participants in the present study rated the target structures only. Although the critical item sentences that the participants were asked to judge were visually made distinct from the rest of the stimuli (by bolding the sentence), the specific target structure was not underlined nor were the participants asked to correct the errors in the ungrammatical sentences. The decision to only bold the sentences that the participants were asked to judge was partly made due to time considerations.

Secondly, in order to make a judgement whether a substituted article was grammatically acceptable or not, the participants in the present study had to carefully read the scenario (i.e., short context story) provided above. Although instructed to read the whole scenario before making a judgement, it is entirely possible that due to fatigue and/or boredom the participants did not always read the scenario and made their judgement based on other criteria. The results of the present study show that the participants rated substitution errors as more acceptable than omission errors, and the effect could have potentially been increased by task design.

There is no evidence that either of the above mentioned methodological concerns had detrimental effect on the present data (i.e., changed the results) as the participants performed as expected on the GJT, and the results are also supported by the participants behaviour on the SPR task. However, it would be beneficial in future research to administer GJT tasks that require the participants to make judgements about the target structure(s) only by, for example, underlining the target structure that needs to be judged or asking the participants to correct a mistake they observe (Gass & Mackey, 2011). This would help ensure that the participants do as instructed and would potentially decrease the amount of individual variation in the data.

10.3.3 Limitations of oral production tasks

The oral production task into L2 article production showed that all participants, including the L1 English group produced the indefinite article less accurately. This is less surprising with the L2 participants as this has been observed in previous research. However, the

accuracy of the L1 English group for the indefinite article (88%) is rather low and in contrast with the the same participants' 100% accuracy in inflecting verbs for tense on the same task. There are some potential methodological reasons as to why the definite article was supplied more consistently in obligatory contexts than the indefinite article, and why articles were supplied less consistently than tense inflection, especially by L1 English speakers.

Firstly, the indefinite article is particularly difficult to elicit in spontaneous oral production even when the researcher does everything possible to make the context unambiguous because the status of a referent also depends on the speaker's perception. A referent that appears for the first time in a picture or a film is usually thought of as being indefinite but can also be perceived as definite if the viewer/speaker perceives it as the (only, unique) referent on the screen. The intended indefinite status of a referent can be made more ambiguous depending on who is with a participant in the room at the time of testing and who is the participant telling the story to. In other words, if the researcher is in the room with the participant and is also looking at the screen on which the film is played (or is also looking at pictures) this can affect whether the narrator perceives the referent as (in)definite. A referent that is seen by both the narrator and listener can be perceived as more definite. Even in situations when the referent appears for the first time, and as such should be marked as indefinite, a narrator may choose a definite article because both he/she and the listener can see the referent.

This has been observed in the pilot phase of the picture story task (pilot task 1 in Chapter 6, section 6.5.1) originally meant to supplement the animated film task in the present study. The picture story task was eventually dropped because it was nearly impossible to elicit an indefinite referent from L1 English speakers when the same referent appeared in a subsequent picture that they could see. Unfortunately, the researcher did not take this into account when conducting the animated film task and was sitting next to the participant as they were retelling the story, and both the participant and the researcher were watching the animated film on the screen. The participants were instructed to tell the story as if they were telling it to someone who cannot see what is happening, but in hindsight this might have worked better if the researcher had been sitting opposite the participant, thus not being able to see the screen.

In the present task even the L1 English group had relatively low accuracy with the indefinite article (88%), which has not be typically observed in previous research where native speakers perform at either 100% accuracy or above 90% (Snape, 2009). The reason

for such unusually low accuracy with the indefinite article is the fact that L1 English speakers often used the definite article to introduce a new referent, which is consistent with the previous observation that in situations in which both parties can see the film, even new referents tend to be interpreted as more definite.

Therefore, it is possible that the environment in which the oral production task was conducted has influenced the accuracy with which the indefinite article was supplied in the oral production task in the present study.

10.4 Chapter summary

Chapter 10 presented several methodological implications and limitations of the methods used in the present thesis, as well as theoretical discussion of the results. The main points of the chapter are summarised below.

First, methodological limitations of the SPR method and their potential impact on the present results were discussed. Overall, there seems to be some evidence that violations that combine semantic and syntactic violations are not processed in the same way and/or do not require the same reanalysis that has been evidenced with purely semantic and morphosyntactic violations in previous SPR and ERP studies. The SPR results from the present study (TA data) support this, as surprisingly, the L1 English controls were not sensitive to TA violations, which is in line with what was observed by Flecken et al. (2015) with the ERP method. This of course, begs the empirical question as to why these hybrid violations are processed and reanalysed differently which is beyond the scope of the present work.

Furthermore, SPR is potentially not suitable for detecting sensitivity to article substitution violations, possibly due to the lack of a communicative purpose of the task and the external localisation of the referent used to establish the appropriateness of the article in the critical item sentence. However, this needs to be further empirically tested, especially since a different experiment and stimuli design might be more suitable to testing substitution violations with SPR.

Second, the methodological limitations of the GJT task in the present thesis were discussed. In summary, it is clear that GJTs are widely used as tests of explicit knowledge and SPRs as tests of implicit knowledge regardless of the ongoing debate as to whether we can be sure that the former measures explicit knowledge only and the latter implicit knowledge without any access to awareness/attention. With regards to SPR, more empirical evidence is necessary to validate to what extent it can be considered a measure of

online/implicit knowledge/processing. In addition, SPR study design and analysis would benefit from standardisation to ensure consistency and better comparability across studies. The GJT method has already gone through some empirical validation, but the particularities of task design, especially when used in combination with SPRs, needs clearer guidelines.

Third the methodological limitations of the oral production task used in the present thesis were discussed, particularly with respect to the lower accuracy of the L1 English group with the indefinite article. The indefinite article appears to be more difficult to elicit consistently than the definite article, but the indefinite status of a referent can be made more unambiguous depending on testing conditions. Indefinite referents might be elicited more reliably in testing conditions where the researcher is sitting across from the participant and not next to them looking at the same screen, as the latter might unintentionally prompt the participant to perceive referents intended as indefinite as more definite.

Finally, the chapter presented a discussion of RQ1 which asked whether late L2 learners of English can acquire two unique-to-L2 morphosyntactic structures, namely English articles and TA. The results of the present thesis point to strong L1 effects which does not make full acquisition of unique-to-L2 structures possible at advanced proficiency. The L2 participants' performance in the present thesis in both online comprehension and oral production was influenced by what is afforded in their L1. However, the results of a small subset of data with immersed L1 Croatian learners of English suggest that at near-native like proficiency, and with immersion, processing and production patterns more similar to that of L1 English speakers are possible.

Chapter 11: Conclusion

11.1 Summary of the study

The present thesis has presented the findings of three studies into the L2 acquisition of morphosyntactic structures that are unique to the L2. More specifically, the thesis explored the L2 processing and production of English articles and tense-aspect by L1 Mandarin L2 English and L1 Croatian L2 English learners. Mandarin and Croatian differ from English in how they express definiteness, and do not have a dedicated article system for it like English. Additionally, Croatian is similar to English in that both tense and aspect are marked morphologically while Mandarin lacks tense morphology but does mark aspect. But neither Mandarin nor Croatian have a dedicated structure which expresses a past event connected to the present as is the case with English present perfect. Therefore, it can be said that both Mandarin and Croatian instantiate articles and (some aspects) of the tense-aspect system differently to English. The participants were 24 L1 Mandarin/L2 English and 22 L1 Croatian/L2 English learners, and 24 L1 English controls. All L2 participants were of advanced proficiency as evidenced by their Oxford Quick Placement Test (QPT) scores, and were late learners (started learning English in school at about nine years of age).

The L2 acquisition of English articles and TA were investigated in three studies. The first two were online processing studies using the self-paced reading paradigm. Study 1 investigated L2 online processing of English articles, while Study 2 investigated L2 online processing of the English TA system. While Study 1 was novel in design, Study 2 aimed to replicate the study by Roberts and Liszka (2013) but expanded upon the original design by including stimuli testing sensitivity to present simple violations along with past simple and present perfect. In addition to the self-paced reading task, the participants were also asked to complete a GJT to ascertain that they had explicit knowledge of English articles and TA.

Studies 3 investigated the oral production of English articles and tense. The participants were asked to watch a short animated film and describe the plot as they were watching. Their narrations were transcribed and analysed for how accurately the participants produced articles and tenses, as well as which tense(s) they preferred to use in their narrations.

11.2 Summary of the findings

The results of Study 1 into L2 online processing of English articles showed that the L1 English group were significantly sensitive to omission violations of articles in both contexts

(indefinite/definite) but were not significantly sensitive to substitution violations in either context. This suggests that syntactic violations (omission) pose a greater processing cost in sentence comprehension than semantic violations (substitution) of articles. The results of the SPR task are in line with the GJT results, since the L1 English group only rated sentences containing omission violations as significantly less accurate than match sentences. The participants also found sentences with substitution violations less accurate than sentences in which the article was used appropriately but this difference was not statistically significant. The L2 groups did not show significant sensitivity to either violation, but the L1 Mandarin group read sentences in a more similar pattern to the L1 English group while the L1 Croatian group did not. Although there was no statistical significance, it seems that the two L2 groups from article-lacking L1s do not read sentences in real time in quite the same way. The GJT results of both L2 groups mirror the L1 English group, since only omission sentences were rated significantly less acceptable than match sentences. Despite having the explicit knowledge that singular concrete nouns not preceded by an article are not acceptable in English, the L2 participants were not able to fully apply this knowledge in online sentence processing.

The results of Study 2 into L2 online processing of TA agreement produced somewhat confounding results. The results of the L1 English group did not replicate the results reported in Roberts and Liszka's (2013) study. Roberts and Liszka found that their L1 English participants were sensitive to TA agreement violations of present perfect but not of past simple. The authors explain the lack of sensitivity to TA with past simple due to a change in how past simple is used. It is possible to use past simple with a present perfect adverbial such as *I didn't finish reading the book yet* in which the verb in past simple denotes a completed action in the past but the adverbial *yet* implies some connection to the present. This construction is especially common in American English and is becoming more popular in British English as well. However, the L1 English participants in the present study did not show significant sensitivity to any of the three tenses tested. This is somewhat surprising because the GJT results indicate that L1 English speakers find sentences with TA violations of all three tenses significantly less acceptable than sentences in which the tense and aspect match. It is possible that the results were influenced by methodological constraints discussed in Chapter 6, section 6.3.1.1, and summarised in the section below of this chapter. The L2 groups also did not show significant sensitivity to TA violations with the three tenses tested. However, the reading patterns of each group arguably show some L1 influence.

The results of Study 3 into L2 oral production of English articles suggest that the L1 Mandarin L2 English speakers have fewer problems with accurate production of English articles than the L1 Croatian L2 English speakers. The L1 Mandarin group produced articles with high accuracy similar to L1 English speakers, especially with the definite article. The L1 Croatian group, on the other hand, produced articles significantly less accurately than the L1 English group. Such asymmetry in the performance of L1 Mandarin and L1 Croatian learners of L2 English can be explained by the emergence of functional elements in Mandarin which take on some of the functions of English articles. Thus, L1 Mandarin speakers are used to encountering NPs preceded by a function element more frequently than L1 Croatian speakers who mainly encounter bare NPs in their L1.

There was also a general tendency of all three groups to produce the definite article more accurately than the indefinite article, which has been observed in previous research (Ekiert, 2004; Lee, 2013; Pylypenko & Alexopoulou, 2018; Świątek, 2013). Furthermore, all three groups tended to substitute the indefinite article more than omit it, a phenomenon usually referred to as “*the flooding*”. For L2 speakers this might be a strategy to increase accuracy since the definite article is more likely to be correct in a wider variety of contexts than the indefinite article (Leroux & Kendall, 2018). By contrast, the definite article tended to be omitted more than substituted. This has also been observed in previous research and is ascribed to the tendency to omit articles with more salient referents, such as those that have been previously mentioned.

The results of Study 3 into oral production of tense, paint a reversed picture. On this task the L1 Croatian group supplied all three tenses (past simple, present perfect and present simple) with high accuracy ($\geq 95\%$) similar to the L1 English group who performed at 100% with all three tenses. The L1 Mandarin group, however, used the three tenses significantly less accurately than the L1 English group. It was also observed that the L1 English group preferred to retell their story using present simple, occasionally switching to present perfect, and very rarely using past simple. By contrast, both L2 groups retold their story using past simple and present simple at a similar frequency but tended to avoid present perfect altogether. The results of this task suggest strong L1 influence. Croatian grammaticalised both tense and aspect similarly to English, and this is reflected in their good command of English tense morphology in spontaneous oral production. Mandarin lacks tense morphology and, as a result, it seems that L1 Mandarin speakers of L2 English struggle with morphologically marking verbs for tense in English a lot more than the L1 Croatian group. Furthermore, neither Mandarin nor Croatian have a construction similar

to that of present perfect in English, and this construction was also avoided by both groups in oral production, while many of the L1 English participants used present perfect in their narratives.

11.3 Limitations and future research

One of the main limitations of the present study is the number of participants per group recruited for the SPR study of the thesis. A similar number of participants was tested as in Roberts and Liszka (2013) of which the present study is a semi-replication, however, the sample size should have been increased because the present study tested one condition more than the original study. Therefore, it is possible that the results of the SPR task would be different with a larger sample size.

Another potential limitation of the present study is the difference between the participants in each L2 group. The L1 Mandarin L2 English learners had had about three months immersion experience studying at a UK university at the time of testing, while the L1 Croatian L2 English group had had no immersion experience. The present study did not find strong evidence of immersion effects in the present data (see Chapter 9, section 9.3.3). However, preliminary results of eight L1 Croatian L2 English participants who have been immersed for a longer time (one year or more) and were of near-native proficiency level indicate immersion and/or proficiency effects. The data of this group were not statistically analysed due to the small participant number, but their reading pattern on the articles SPR task do not resemble the reading pattern of the advanced non-immersion L1 Croatian group, but rather look more similar to the reading pattern of the L1 English group. Furthermore, the immersed L1 Croatian participants showed improved article use on the oral production task compared to the non-immersed L1 Croatian group. It is difficult to say whether the differences between the immersed and non-immersed L1 Croatian participants are down to immersion, higher proficiency level or a combination of the two. Similar positive effects of immersion and proficiency have been observed in studies by Hopp (2006, 2010) but on different morphosyntactic structures. Considering that articles have been found to be a particularly difficult structure to acquire for L2 learners, it would be important for future research to investigate the effects of proficiency and immersion on the acquisition of English articles (i.e., whether there are conditions which facilitate native-like acquisition of articles).

A further limitation of the present thesis has been the suitability of the SPR method to detect sensitivity of violations of English articles. The L1 English group in the present

study were significantly sensitive to omission violations but not substitution violations. This suggests that either SPR is not able to detect sensitivity to substitution violations or such violations do not pose a significant processing cost for native speakers. This finding presents several options for future research.

Firstly, one of the reasons for the lack of sensitivity with substitution is that substitution errors need to be established externally, that is, the violation does not occur within the critical item sentence (as it is the case with omission violations) but is rather established by keeping the previously encountered referent in mind until the same referent is encountered again or not, and it can be established whether it is definite or indefinite (see Chapter 9, section 9.2). Establishing such external referents might either be a strain on the working memory and in case one did not keep the referent in memory it may not be economical to check the status of the referent in the external context. Future research could incorporate measures of working memory with SPR tasks. In addition, an eye-tracking study could help determine whether the participants, once they encounter the referent in the critical item sentence, gaze back to check whether the referent had been mentioned before in the scenario. If they do gaze back, that could indicate, not only potential effects of working memory capacity, but also that establishing the status of the referent is important for comprehension. If they do not gaze back, this could indicate that as long as the article is there, the status of the referent is not crucial for comprehension to proceed. Finally, if there are differences in how substitution and omission violations are processed, they would be better detected with the ERP method. If substitutions are processed as semantic units we would expect an N400 component, while with omission we would expect the P600 component associate with syntactic processing.

11.4 Contributions of the study

The present thesis has made several contributions to our understanding of the L2 acquisition of unique-to-L2 morphosyntactic structures, more specifically how English articles and TA are processed and produced by L2 English learners from L1 Mandarin and L1 Croatian backgrounds. In addition, the thesis contributes to our understanding of which methods are more (un)suitable for investigating these phenomena.

11.4.1 ...to our understanding of L2 acquisition of English articles

Firstly, the present Study 1 is one of the first systematic attempts at using the SPR paradigm to investigate online processing of English articles. The present study attempted to adhere

to the majority of guidelines put forward by Keating and Jegerski (2015) in its design, and to analyse the data using linear models which have been advocated as a better alternative to ANOVA when dealing with data with multiple groups and levels (Plonsky & Oswald, 2017). The results of Study 1 suggest that syntactic violations (omission) pose a greater processing cost for L1 English speakers than semantic violations (substitution), while L2 English speakers from article-lacking L1s do not seem to be able to fully integrate their explicit knowledge of the English article system into online processing of articles. Finally, it seems that SPR in the present design cannot be used to detect sensitivity to semantic violations of articles, but more research is necessary to determine whether sensitivity would be detectable with a different stimuli design. However, there are methodological issues that make the contributions of the present study limited (see Chapter 10).

Secondly, researchers have generally avoided investigating spontaneous oral production of articles due to the messy nature of such designs, and studies that have used oral production tasks lack standardisation, sometimes leading to confounding results. However, the results of the oral production task in Study 3 show us that when oral production tasks are designed and analysed systematically, they still have a great deal to tell us about L2 article acquisition. While the results of the SPR task potentially point to a different reading pattern of articles by the L1 Mandarin group compared to the L1 Croatian group (due to a lack of statistical significance), the oral production confirm this asymmetry. The L1 Mandarin group supplied English articles in oral production with similar accuracy as the L1 English group while the L1 Croatian group was significantly less accurate. Thus, the results of the SPR and oral production tasks point to a conclusion that Mandarin is on a path of grammaticalising some of its markers of definiteness.

So far it has been assumed that learners from article-lacking backgrounds will acquire articles similarly even if they have very different languages as their L1. However, this has not been extensively tested since most studies compare a) learners from a language with and without articles or b) learners from an article-lacking L1 but on different proficiency levels. Very few studies into article acquisition have directly compared learners from an Asian and a Slavic L1, and the ones that have investigated the predictions of the fluctuation hypothesis (Ionin et al., 2004). The results of the present study indicate that such comparisons would be very important in future research since two L2 groups from article-lacking L1s did not show the same results. In fact, the results of the L1 Mandarin and L1 Croatian groups differ somewhat on both the SPR and oral production tasks.

11.4.2 ...to our understanding of L2 acquisition of English TA

The results of Study 2 into online processing of English TA did not further our understanding of TA acquisition as such but point to several methodological implications. The present study was (semi)replication of Roberts and Liszka's (2013) study but also, in addition to testing sensitivity to violations of TA with past simple and present perfect, it extended their scope to the present simple tense. The results of Roberts and Liszka were not replicated, and the reasons are likely to be methodological. Firstly, the stimuli from Roberts and Liszka were adapted to fit with the articles stimuli, which means that a scenario was added to each critical item sentence which remained at the top of the screen for the duration of the whole stimulus. Secondly, the critical item sentences in Roberts and Liszka have a variable number of words after the main verb, and this was changed in the present stimuli so that each main verb was followed by exactly six words. Although these changes seem minor "cosmetic" changes, it cannot be excluded that this might have had an effect on how the sentences were read and processed. In addition, it is important to note that neither Roberts and Liszka's study (nor Eriksson's replication study) seem to have used the Bonferroni adjustment for multiple tests nor did they report effect sizes, so it is not certain how well these effects would hold under stricter cut-offs and what their magnitude is. Finally, in an ERP study Flecken et al. (2015) did not find the expected components implicated in morphosyntactic processing with TA violations but did find them with processing of purely semantic or syntactic violations. In sum, there are several methodological implications of the present study:

- a) We do not know whether, and if yes to what extent, changes in study design and methodology have an impact on detecting sensitivity to certain violation.
- b) There is a lack of consensus in the field as to whether to use the Bonferroni adjustment for multiple tests as some claim that it is overly conservative and inflates the Type 2 error, while others claim that it inflates the Type 1 error. Reporting effect sizes would certainly be a way forward to help us gauge the size of the effect if we cannot be certain of its statistical significance.
- c) The lack of sensitivity in the present study and results from the the ERP study by Flecken et al. (2015) point to a possibility that TA violations are resolved and processed differently to purely semantic or syntactic violations, and sensitivity to such violations may not always be detectable using the SPR method.
- d) There is a greater need for standardisation of the SPR method so as to enable a more

consistent interpretation of the results and future replication.

11.4.3 ...to our understanding of L2 acquisition of unique-to-L2 structures

The findings of oral production tasks investigating English articles and tense suggest that the learners L1 highly influences the extent to which they will be able to produce morphosyntactic structures that only exist in their L2. It seems that structures that are instantiated in a similar way in the L1 and L2 can be produced with high accuracy often similar to that of native speakers. It in the present study this evidenced in the ability of the L1 Mandarin group to produce articles with high accuracy, while the L1 Croatian group frequently omitted articles which is in line with the bare NPs they frequently encounter in their L1. By contrast, the L1 Croatian group, whose L1 marks tense morphologically, inflected verbs for tense with very high accuracy, while the L1 Mandarin group (L1 with no tense morphology) struggled with inflecting verbs. Finally, both groups tended to avoid using present perfect in oral production (while the native speakers used it relatively frequently), and this is a structure that is absent in both Mandarin and Croatian.

The results of the SPR tasks are more difficult to interpret due to a lack of statistical significance (articles) or potential methodological implications (TA). However, the articles SPR reading patterns can be tentatively interpreted despite the lack of statistical significance. The results of the SPR task suggest that L1 Mandarin learners of English process articles more similarly to L1 English speakers than L1 Croatian learners of English. The L1 Mandarin group showed a descriptive processing cost for sentences containing omission violations but the difference in reading times compared to the match sentences was not statistically significant. This processing cost for omission was very similar to what the L1 English group showed, but with the L1 English the processing cost was large enough to be statistically significant. By contrast, the L1 Croatian group did not seem to be particularly affected by article violations of either type.

The findings reported in the present thesis are in line with the predictions of the morphological congruency hypothesis (Jiang et al., 2011) which posits that morphosyntactic structures which are congruent (similarly instantiated) in the L1 and L2 will be easier to acquire than structures that are incongruent (different or absent in the L1). The morphological congruency effects are claimed to be a result of L2 activation of incongruent features which are not automatized enough.

The results also offer some support for the L1-L2 structural competition model (Austin et al., 2015; Trenkic et al., 2014), which predicts variable processing and production

of L2 morphosyntax to be a result of parallel activation of L1-licensed and L2-licensed forms. However, it is the task of future research to determine whether the present results are best explained in terms of a lack of automatised activation or suppression of parallel activation.

11.4.4 ...to the wider field of SLA

The findings of the present thesis contribute the wider field of SLA in several ways. Firstly, one of the main reasons why online processing methods have become more popular for investigating L2 acquisition in the last decade is because they can help us answer theoretical questions regarding how learners process the L2 in real-time compared to native speakers (Roberts, 2012). Considering that the present study used the SPR paradigm (a method of measuring online processing), it can contribute to this debate. The present results, although limited, suggest that L2 processing is heavily influenced by the L1, and it can resemble that of native speakers but only under certain conditions (such as L1 similarity, proficiency and potentially immersion).

Secondly, by investigating both similar and unique morphosyntactic structures within the same study, the present thesis can contribute to our understanding of how L1 influences the online processing, production and ultimately acquisition of the L2 by late learners.

Finally, the methodological disadvantages but also advantages of the experiments (SPR and oral production) in the present thesis have potential implications for future research. There is still a great deal of variation in methodologies and design of both SPR and production experiments, and the findings from the present thesis can contribute to our understanding but also further testing and standardisation of these methods.

Appendix A

THE UNIVERSITY *of York*

PARTICIPANT CONSENT FORM

Research Project: **Acquiring English as a second language**

Researcher: Jelena Horvatic

Research Institutions: University of York

Please circle the appropriate option:

I have read and understood the information sheet and have had the opportunity to ask questions about the study. YES/NO

I agree to take part in this research project and agree for my data to be used for the purposes outlined in the information provided. YES/NO

The first language I learned and spoke at home before the age of 5 was only Croatian/Serbian/Bosnian. YES/NO

I have not lived in an English speaking country before the age of 18. YES/NO

I understand that my data will be kept confidential. YES/NO

I understand that I may withdraw at any time. YES/NO

Have you ever been diagnosed with dyslexia? YES/NO

Name of participant (print name).....

Signature of participant.....

Date.....

INFORMATION

Acquiring English as a second language

The aim of this study is to investigate comprehension and production in English as a second language.

You will be asked to undertake an English language proficiency test and also a language background questionnaire. Next, you will be asked to perform four tasks. In the first task you will be asked to watch a short animated film and retell the story. Then, you will be presented with several short stories in pictures and you will be asked to describe them. After these two tasks there will be a short break. For the third task, you will be asked to read a series of short texts on a laptop and answer some comprehension questions. Half way through the third task, you will be offered a short break. For the final task you will be asked to judge the grammatical acceptability of a series of sentences. In total, the placement test and these four tasks should take around 1 hour and 30 minutes to complete.

You will be offered a £10 Amazon voucher for your participation.

All the information about participants in this study will be kept confidential and data will be anonymised and stored securely. To ensure confidentiality each participant will be randomly assigned an ID number; this will be the only form of identification that will be included on any database and paper based tasks used in this study. The code linking your name and your data will be kept in a password protected encrypted file for up to 2 years after the data is collected, and only the researchers will have access to this code. The anonymised data may be kept indefinitely and used in other research projects. You will not be identifiable in any use of your data (in presentations or written reports).

Your involvement in the study is voluntary. You can withdraw during the study and you can also contact the researcher to withdraw your data up to one month after you have taken part. After that time it will not be possible to remove your data as it will be fully anonymised.

If you have any questions, feel free to contact the researcher, Jelena Horvatic, at jh1633@york.ac.uk.

You can also contact the Education Ethics Committee at the University of York, at education-research-administrator@york.ac.uk.

Appendix B

Participant ID: _____

Language background questionnaire

- 1) Age: _____
- 2) You are : Male Female
- 3) Your native language is: _____
- 4) How old were you when you started learning English? _____
- 5) How long have you learned English in a formal setting?
In primary and/or secondary school _____
In a foreign language school/additional classes _____
- 6) Have you ever attended primary and/or secondary school in an English-speaking country?
YES / NO
- 7) After you finished secondary school, have you ever lived/studied in an English-speaking country?
YES / NO
- 8) If you answered “yes” to question number 7, how long did you live there?
number of years _____
number of months _____
- 9) Where do you currently live? _____
- 10) On a scale from 1-10, how would you rate your English proficiency in (please circle)

Speaking	1	2	3	4	5	6	7	8	9	10
Reading	1	2	3	4	5	6	7	8	9	10
Listening	1	2	3	4	5	6	7	8	9	10
Writing	1	2	3	4	5	6	7	8	9	10

- 11) What was your IELTS result?

(if you haven't taken IELTS, but have taken a different language test, please tell us which test, and what result you achieved).

- 12) What percentage (0%-100%) of the time do you use **spoken English**? For example, if you use English at home about half the time, and other languages the other half you would put 50% for *at home* (circle *not working* if appropriate).

At work ___ *not working*

At home ___

At university ___ *not studying at university*

In other social situations ____

14) What percentage (0%-100%) of the time do you use **written English** for the following (for example, if half of your emails are written in English, and the other half in other languages, you would put 50% for *Email*):

Email ____

Business communication ____

University work ____

Social communication ____

15) Overall, what percentage (0%-100%) of the time would you say you use **English** in your daily life (written and/or spoken)? ____

16) How often do you (1=not at all, 4=sometimes, 7=very often)

Watch movies in English 1 2 3 4 5 6 7

Listen to the radio in English 1 2 3 4 5 6 7

Read books/newspapers in English 1 2 3 4 5 6 7

Have conversations with native English speakers 1 2 3 4 5 6 7

Have conversations with non-native English speakers (in English) 1 2 3 4 5 6 7

Appendix C

Articles SPR stimuli

1. Frank's been saving money to buy a ring for his girlfriend. He finally bought it yesterday at a fancy jewellery shop.

- a. He'll give her **the** ring as a surprise at dinner tonight. She'll surely like it.
- b. He'll give her **a** ring as a surprise at dinner tonight. She'll surely like it.
- c. He'll give her **x** ring as a surprise at dinner tonight. She'll surely like it.

Frank's been saving money to buy a necklace for his girlfriend's birthday. When he finally went to buy it, the shop assistant told him that the necklace had been sold.

- d. Instead, he bought **a** ring to surprise her at dinner tonight. She'll surely like it.
- e. Instead, he bought **the** ring to surprise her at dinner tonight. She'll surely like it.
- f. Instead, he bought **x** ring to surprise her at dinner tonight. She'll surely like it.

2. Jenny went to a pet shop to buy a present for her son. She saw a puppy; it looked so lonely because it was the only one in the shop.

- a. So she decided to buy **the** puppy because her son really likes dogs. He'd always wanted one.
- b. So she decided to buy **a** puppy because her son really likes dogs. He'd always wanted one.
- c. So she decided to buy **x** puppy because her son really likes dogs. He'd always wanted one.

Jenny went to a pet shop to buy a present for her son. She was looking for a cat or a hamster because they require less care.

- d. In the end, she decided to buy **a** puppy because her son really likes dogs. He'd always wanted one.
- e. In the end, she decided to buy **the** puppy because her son really likes dogs. He'd always wanted one.
- f. In the end, she decided to buy **x** puppy because her son really likes dogs. He'd always wanted one.

3. Jack lives by himself and only has a dog to keep him company. He lets it sleep on his bed and gives it only the best food.

- a. He often takes **the** dog for long walks in the park. Jack is often lonely.
- b. He often takes **a** dog for long walks in the park. Jack is often lonely.
- c. He often takes **x** dog for long walks in the park. Jack is often lonely.

Jack lives by himself and only has a cat to keep him company. He lets it sleep on his bed and gives it only the best food.

- d. He also wishes he had **a** dog to take out to the park. Jack is often lonely.
- e. He also wishes he had **the** dog to take out to the park. Jack is often lonely.
- f. He also wishes he had **x** dog to take out to the park. Jack is often lonely.

4. On her trip to Mexico Sally bought a hat from a market. It's very colorful and interesting.
- She hasn't worn **the** hat since her return three weeks ago. She hasn't had the chance.
 - She hasn't worn **a** hat since her return three weeks ago. She hasn't had the chance.
 - She hasn't worn **x** hat since her return three weeks ago. She hasn't had the chance.

On her trip to Mexico Sally bought a scarf from a market. It's very colorful and interesting.

- She wishes she'd bought **a** hat that perfectly matched the new scarf. Sadly, she didn't find one.
 - She wishes she'd bought **the** hat that perfectly matched the new scarf. Sadly, she didn't find one.
 - She wishes she'd bought **x** hat that perfectly matched the new scarf. Sadly, she didn't find one.
5. Tommy did the washing up after lunch. As he was washing a plate, his mum told him that she got it as a wedding gift.
- So Tommy washed **the** plate with care and put it away. He didn't want to break it.
 - So Tommy washed **a** plate with care and put it away. He didn't want to break it.
 - So Tommy washed **x** plate with care and put it away. He didn't want to break it.

Tommy did the washing up after lunch. As he was washing a wine glass, his mum told him that she got it as a wedding gift, so he washed it with great care.

- Shortly after, he dropped **a** plate on the floor of the kitchen. His mum got angry.
 - Shortly after, he dropped **the** plate on the floor of the kitchen. His mum got angry.
 - Shortly after, he dropped **x** plate on the floor of the kitchen. His mum got angry.
6. Olivia went to a bookstore to buy a book. The shop assistant told her that the book she was looking for was on the shelf in the corner.
- But she couldn't find **the** book on the shelf or anywhere else. Maybe they didn't have it in stock.
 - But she couldn't find **a** book on the shelf or anywhere else. Maybe they didn't have it in stock.
 - But she couldn't find **x** book on the shelf or anywhere else. Maybe they didn't have it in stock.

Olivia went to the newsagents to buy a magazine. The newsagent told her that she could find the magazines in the corner, but she had already spotted a shelf with books that looked interesting.

- She decided to buy **a** book for learning German in four weeks. It looked useful.
- She decided to buy **the** book for learning German in four weeks. It looked useful.
- She decided to buy **x** book for learning German in four weeks. It looked useful.

7. Tim forgot to bring his pencil case to school yesterday, so he had to borrow a pen from his teacher. He used it for the rest of the lesson.
- When the bell rang, he put **the** pen in a box on the teacher's desk. She thanked him.
 - When the bell rang, he put **a** pen in a box on the teacher's desk. She thanked him.
 - When the bell rang, he put **x** pen in a box on the teacher's desk. She thanked him.

Tim forgot to bring his pencil case to school yesterday. No one was able to lend him a pen.

- Since he didn't have **a** pen he had to use a pencil. This was against school rules.
 - Since he didn't have **the** pen he had to use a pencil. This was against school rules.
 - Since he didn't have **x** pen he had to use a pencil. This was against school rules.
8. A teacher told her class that they were going to watch a movie. She said it would be related to their History lesson on slavery.
- The students were excited about watching **the** movie she promised to bring in tomorrow. Slavery was an interesting topic.
 - The students were excited about watching **a** movie she promised to bring in tomorrow. Slavery was an interesting topic.
 - The students were excited about watching **x** movie she promised to bring in tomorrow. Slavery was an interesting topic.

The History teacher told her class that they were going to watch a movie next lesson. The students liked watching movies in school.

- They'd never been allowed to watch **a** movie before because their teacher was strict. They were excited.
 - They'd never been allowed to watch **the** movie before because their teacher was strict. They were excited.
 - They'd never been allowed to watch **x** movie before because their teacher was strict. They were excited.
9. Jane bought her husband a suit to wear at his friend's wedding. It was on special offer and seemed like the perfect outfit.
- But he couldn't wear **the** suit because it was the wrong size. It was too small.
 - But he couldn't wear **a** suit because it was the wrong size. It was too small.
 - But he couldn't wear **x** suit because it was the wrong size. It was too small.

Jane bought her husband a tuxedo for his friend's wedding. She thought it would be stylish, but he wasn't sure about it.

- He decided to wear **a** suit because it was more comfortable. His wife was a little upset.
- He decided to wear **the** suit because it was more comfortable. His wife was a little upset.
- He decided to wear **x** suit because it was more comfortable. His wife was a little upset.

10. Anna was hoping to get a bracelet she saw last week at the mall for Christmas. When she opened her presents, she was slightly disappointed.

- a. She didn't get **the** bracelet she wanted but a silver ring. She doesn't like silver jewellery.
- b. She didn't get **a** bracelet she wanted but a silver ring. She doesn't like silver jewellery.
- c. She didn't get **x** bracelet she wanted but a silver ring. She doesn't like silver jewellery.

Anna was hoping to get a necklace for Christmas. When she opened her presents she realized that her wish hadn't come true.

- d. She found **a** bracelet with her name engraved on it. She was even happier.
- e. She found **the** bracelet with her name engraved on it. She was even happier.
- f. She found **x** bracelet with her name engraved on it. She was even happier.

11. Miss Brown gave all her students a notebook to bring to German class. They were told to use it to write down important vocabulary learned in class.

- a. Yesterday, Kim accidentally left **the** notebook in her locker after the break. Miss Brown gave her some lined paper.
- b. Yesterday, Kim accidentally left **a** notebook in her locker after the break. Miss Brown gave her some lined paper.
- c. Yesterday, Kim accidentally left **x** notebook in her locker after the break. Miss Brown gave her some lined paper.

Miss Brown's students always write down vocabulary in German class. Yesterday, a new student joined the class.

- d. He didn't have **a** notebook to write down the new words. He used a piece of paper instead.
- e. He didn't have **the** notebook to write down the new words. He used a piece of paper instead.
- f. He didn't have **x** notebook to write down the new words. He used a piece of paper instead.

12. Jim arrived in Madrid and left the train station to find his hotel. According to the map, he had to cross a bridge after 500 meters.

- a. When he got there, he saw that **the** bridge was sadly closed until further notice. He was confused.
- b. When he got there, he saw that **a** bridge was sadly closed until further notice. He was confused.
- c. When he got there, he saw that **x** bridge was sadly closed until further notice. He was confused.

Jim arrived in Madrid and left the train station to find his hotel. According to the map, after 500 meters he would reach some steps.

- d. When he got there, he saw **a** bridge but he couldn't see any steps. He was confused.
- e. When he got there, he saw **the** bridge but he couldn't see any steps. He was confused.
- f. When he got there, he saw **x** bridge but he couldn't see any steps. He was confused.

13. Last week Emma bought a car because she needs it to get to work. She got it for a very reasonable price.

- a. She liked **the** car because of its bright red color. She was excited.
- b. She liked **a** car because of its bright red color. She was excited.
- c. She liked **x** car because of its bright red color. She was excited.

Emma's been saving for a scooter because she needs a vehicle to get to work. She's looked at all the ads but hasn't found anything.

- d. Instead, she found **a** car that was affordable and more practical. She was excited.
- e. Instead, she found **the** car that was affordable and more practical. She was excited.
- f. Instead, she found **x** car that was affordable and more practical. She was excited.

14. Ben and Mary went to Ikea to buy some furniture for their new house. Mary chose a red sofa and a gray armchair.

- a. Ben didn't like **the** armchair because he doesn't like grey furniture. But it's being delivered tomorrow.
- b. Ben didn't like **an** armchair because he doesn't like grey furniture. But it's being delivered tomorrow.
- c. Ben didn't like **x** armchair because he doesn't like grey furniture. But it's being delivered tomorrow.

Ben and Mary went to Ikea to buy some furniture for their new house. They both liked a blue sofa but it was very expensive.

- d. Instead, they had to get **an** armchair but they weren't happy about it. They couldn't afford the sofa.
- e. Instead, they had to get **the** armchair but they weren't happy about it. They couldn't afford the sofa.
- f. Instead, they had to get **x** armchair but they weren't happy about it. They couldn't afford the sofa.

15. When Harry comes to work in the morning, he has to put on a cap. It's red and has his name on it.

- a. He always removes **the** cap at the end of the day. He leaves it on his desk.
- b. He always removes **a** cap at the end of the day. He leaves it on his desk.
- c. He always removes **x** cap at the end of the day. He leaves it on his desk.

When he comes to work in the morning, Harry has to put on a company T-shirt. All employees have to do the same.

- d. Only the boss wears **a** cap with a logo in the front. Customers can easily see he's in charge.
- e. Only the boss wears **the** cap with a logo in the front. Customers can easily see he's in charge.
- f. Only the boss wears **x** cap with a logo in the front. Customers can easily see he's in charge.

16. Lauren baked a cake for her niece's birthday party. It was chocolate and covered with sprinkles.

- a. Her niece wanted to eat **the** cake right away because it looked delicious. But she had to wait.
- b. Her niece wanted to eat **a** cake right away because it looked delicious. But she had to wait.
- c. Her niece wanted to eat **x** cake right away because it looked delicious. But she had to wait.

Lauren baked a cake for her niece's birthday party. It was chocolate and covered with sprinkles.

- d. She had never baked **a** cake before so she was quite nervous. It turned out well.
- e. She had never baked **the** cake before so she was quite nervous. It turned out well.
- f. She had never baked **x** cake before so she was quite nervous. It turned out well.

17. Matt was eating an ice-cream. He bought it to refresh himself on a hot summer's day.

- a. But it was so hot that **the** ice-cream melted before he could finish it. It was such a hot day.
- b. But it was so hot that **an** ice-cream melted before he could finish it. It was such a hot day.
- c. But it was so hot that **x** ice-cream melted before he could finish it. It was such a hot day.

Matt was drinking a juice. He bought it to refresh himself on a hot summer's day but it wasn't enough.

- d. He then bought an ice-cream but it melted in the sun. It was such a hot day.
- e. He then bought the ice-cream but it melted in the sun. It was such a hot day.
- f. He then bought x ice-cream but it melted in the sun. It was such a hot day.

18. Jill went grocery shopping because she wanted to make a pie for lunch. She was going to surprise her husband with it when he came home from work.

- a. She was still preparing **the** pie when he knocked on the door. He arrived early.
- b. She was still preparing **a** pie when he knocked on the door. He arrived early.
- c. She was still preparing **x** pie when he knocked on the door. He arrived early.

Jill went grocery shopping because she wanted to make a pie for dinner. She was going to surprise her husband with it when he came home from work.

- d. She had never made **a** pie before because she doesn't cook well. But it was tasty.
- e. She had never made **the** pie before because she doesn't cook well. But it was tasty.
- f. She had never made **x** pie before because she doesn't cook well. But it was tasty.

19. In the pub last night, Sarah met an artist and a banker. They both liked her and asked for her number.

- a. She wanted **the** artist to call her the following day. She really liked him.
- b. She wanted **an** artist to call her the following day. She really liked him.
- c. She wanted **x** artist to call her the following day. She really liked him.

In the pub last night, Sarah met an artist. He was a nice guy and asked for her number.

- d. She'd never met an artist before that she wanted to date. But she really liked this guy.
- e. She'd never met the artist before that she wanted to date. But she really liked this guy.
- f. She'd never met **x** artist before that she wanted to date. But she really liked this guy.

20. The first toy Rose ever got was a teddy and she always slept with it.

One day, her mum washed it and ruined it.

- a. Rose missed **the** teddy next to her and got upset. She cried all night.
- b. Rose missed **a** teddy next to her and got upset. She cried all night.
- c. Rose missed **x** teddy next to her and got upset. She cried all night.

Rose always slept with a doll in her bed. Last month they moved house and the doll got lost.

- d. Her mum got her **a** teddy at the department store in town. But she missed her doll.
- e. Her mum got her **the** teddy at the department store in town. But she missed her doll.
- f. Her mum got her **x** teddy at the department store in town. But she missed her doll.

21. It was pouring with rain, so Jim offered to lend Will an umbrella but Will refused. By the time he got home he was soaking wet.

- a. Will wished he had taken **the** umbrella Jim so kindly had offered him. He wouldn't have caught a cold.
- b. Will wished he had taken **an** umbrella Jim so kindly had offered him. He wouldn't have caught a cold.
- c. Will wished he had taken **x** umbrella Jim so kindly had offered him. He wouldn't have caught a cold.

Will and Jim were about to go home when it started pouring with rain. Jim offered to give Will a ride home but he refused.

- d. Will said that he had **an** umbrella in his bag all the time. He liked to walk in the rain.
- e. Will said that he had **the** umbrella in his bag all the time. He liked to walk in the rain.
- f. Will said that he had **x** umbrella in his bag all the time. He liked to walk in the rain.

22. Tim wanted to sell a painting he'd painted after his return from Brazil. It was very large so he was afraid no one would want to buy it.
- a. He managed to sell **the** painting but at a much lower price. It wasn't easy to sell.
 - b. He managed to sell **a** painting but at a much lower price. It wasn't easy to sell.
 - c. He managed to sell **x** painting but at a much lower price. It wasn't easy to sell.

Tim wanted to sell a painting he'd painted after his return from Brazil. It was very large so he was afraid no one would want to buy it, and he was right.

- d. No one wanted to buy **a** painting that was so big and pricy. He wasn't able to sell it.
 - e. No one wanted to buy **the** painting that was so big and pricy. He wasn't able to sell it.
 - f. No one wanted to buy **x** painting that was so big and pricy. He wasn't able to sell it.
23. We heard the cat bring in a mouse last night. It was making a lot of noise in the kitchen.
- a. We eventually found **the** mouse hidden under the big fridge. We caught it.
 - b. We eventually found **a** mouse hidden under the big fridge. We caught it.
 - c. We eventually found **x** mouse hidden under the big fridge. We caught it.

The cat brought a dead animal into the house. We thought it might be a bird so we searched the house.

- d. In the end, we found a mouse hidden under the big fridge. We caught it.
 - e. In the end, we found the mouse hidden under the big fridge. We caught it.
 - f. In the end, we found **x** mouse hidden under the big fridge. We caught it.
24. Tom bought a coat but soon realized that it was too warm for it. He should have bought a jacket instead.
- a. So, Tom returned **the** coat to the shop the next day. Luckily, he had kept the receipt.
 - b. So, Tom returned **a** coat to the shop the next day. Luckily, he had kept the receipt.
 - c. So, Tom returned **x** coat to the shop the next day. Luckily, he had kept the receipt.

Tom bought a jacket but soon realized that it was still too cold outside. He needed something warmer, so he went back to the shop.

- d. He bought **a** coat with the money from the refund. Luckily, he had kept the receipt.
- e. He bought **the** coat with the money from the refund. Luckily, he had kept the receipt.
- f. He bought **x** coat with the money from the refund. Luckily, he had kept the receipt.

Appendix D

Tense-aspect SPR stimuli

1. Mary has lived in many different cities. She is very adventurous.
 - a. Since 2005, Mary **has lived** in London in a nice neighbourhood. She likes London a lot.
 - b. In 2005, Mary **has lived** in London in a nice neighbourhood. She likes London a lot.
 - c. In 2005, Mary **lived** in London in a nice neighbourhood. She liked London a lot.
 - d. Since 2005, Mary lived in London in a nice neighbourhood. She liked London a lot.
 - e. At the moment, Mary **lives** in London in a nice neighbourhood. She likes London a lot.
 - f. Since 2005, Mary **lives** in London in a nice neighbourhood. She likes London a lot.

2. Dominic loves to play football and is on his school's team. His parents are proud of him.
 - a. Since last season, Dominic has scored many goals for his football team. He is very talented.
 - b. Last Saturday, Dominic **has scored** many goals for his football team. He is very talented.
 - c. Last Saturday, Dominic **scored** many goals for his football team. He is very talented.
 - d. Since last season, Dominic **scored** many goals for his football team. He is very talented.
 - e. Every game, Dominic **scores** many goals for his football team. He is very talented.
 - f. Since last season, Dominic **scores** many goals for his football team. He is very talented.

3. Jim studied Finance at university. He was an excellent student.
 - a. Since he finished university, Jim **has thought** about starting his own small business. He wants to be a millionaire.
 - b. When he finished university, Jim **has thought** about starting his own small business. He wants to be a millionaire.
 - c. When he finished university, Jim **thought** about starting his own small business. He wanted to be a millionaire.
 - d. Since he finished university, Jim **thought** about starting his own small business. He wanted to be a millionaire.
 - e. Every day, Jim thinks about starting his own company. He wants to be a millionaire.
 - f. Since he finished university, Jim **thinks** about starting his own small business. He wants to be a millionaire.

4. A friend persuaded Laura to participate at the local raffle. At first she was hesitant.
 - a. But for months now, Laura has won great prizes at the local raffle. She is very excited.
 - b. Last year, Laura has won great prizes at the local raffle. She is very excited.
 - c. Last year, Laura won great prizes at the local raffle. She was very excited.

- d. But for months now, Laura won great prizes at the local raffle. She was very excited.
 - e. Every year, Laura wins great prizes at the local raffle. She is very excited.
 - f. But for months now, Laura wins great prizes at the local raffle. She is very excited.
5. Sam and Jenny met at work and he liked her a lot.
- a. Since he first saw her, Sam **has thought** Jenny was beautiful and very intelligent. However, he's too nervous to speak to her.
 - b. When he first saw her, Sam **has thought** Jenny was beautiful and very intelligent. However, he's too nervous to speak to her.
 - c. When he first saw her, Sam **thought** Jenny was beautiful and very intelligent. However, he's too nervous to speak to her.
 - d. Since he first saw her, Sam **thought** Jenny was beautiful and very intelligent. However, he's too nervous to speak to her.
 - e. Every time he sees her, Sam **thinks** Jenny is beautiful and very intelligent. However, he's too nervous to speak to her.
 - f. Since he first saw her, Sam **thinks** Jenny is beautiful and very intelligent. However, he's too nervous to speak to her.
6. Ben loves quizzes of all sorts. He especially likes the more challenging ones.
- a. Since Sunday, Ben has completed the crossword puzzles in the Guardian. He is very smart.
 - b. Last Monday, Ben has completed the crossword puzzles in the Guardian. He is very smart.
 - c. Last Monday, Ben completed the crossword puzzles in the Guardian. He is very smart.
 - d. Since Sunday, Ben completed the crossword puzzles in the Guardian. He is very smart.
 - e. Every Monday, Ben completes the crossword puzzles in the Guardian. He is very smart.
 - f. Since Sunday, Ben completes the crossword puzzles in the Guardian. He is very smart.
7. Helen smokes and drinks coffee a lot. It's not good for her health.
- a. Since New Years Eve, Helen has promised to stop smoking cigarettes for good. But she never keeps her promises.
 - b. On New Years Eve, Helen has promised to stop smoking cigarettes for good. But she never keeps her promises.
 - c. On New Years Eve, Helen promised to stop smoking cigarettes for good. But she never keeps her promises.
 - d. Since New Years Eve, Helen promised to stop smoking cigarettes for good. But she never kept her promises.
 - e. Every New Years Eve, Helen promises to stop smoking cigarettes for good. But she never keeps her promises.
 - f. Since New Years Eve, Helen promises to stop smoking cigarettes for good. But she never keeps her promises.
8. Julie felt bored with her current life and was looking for a change.
- a. Since March, Julie **has considered** living in a houseboat in Amsterdam. She thinks it might be fun.

- b. Last March, Julie **has considered** living in a houseboat in Amsterdam. She thinks it might be fun.
 - c. Last March, Julie **considered** living on a houseboat in Amsterdam. She thought it might be fun.
 - d. Since March, Julie **considered** living in a houseboat in Amsterdam. She thought it might be fun.
 - e. From time to time, Julie considers living in a houseboat in Amsterdam. She thinks it might be fun.
 - f. Since March, Julie **considers** living in a houseboat in Amsterdam. She thinks it might be fun.
9. Steven needed extra money but couldn't find any additional work. He decided to try his luck.
- a. Since January, Steven **has won** five thousand Euros on the lottery. He is very lucky.
 - b. Last January, Steven **has won** five thousand Euros on the lottery. He is very lucky.
 - c. Last January, Steven **won** five thousand Euros on the lottery. He is very lucky.
 - d. Since January, Steven **won** five thousand Euros on the lottery. He is very lucky.
 - e. Every January, Steven **wins** five thousand Euros on the lottery. He is very lucky.
 - f. Since January, Steven **wins** five thousand Euros on the lottery. He is very lucky.
10. Alex has some problems at home. His wife was unhappy and their son is failing Maths.
- a. For hours, Alex has found it hard to concentrate on work. He has a lot on his mind.
 - b. Yesterday morning, Alex has found it hard to concentrate on work. He has a lot on his mind.
 - c. Yesterday, Alex found it hard to concentrate on work. He has a lot on his mind.
 - d. For hours, Alex found it hard to concentrate on work. He has a lot on his mind.
 - e. Occasionally, Alex finds it hard to concentrate on work. He has a lot on his mind.
 - f. For hours, Alex finds it hard to concentrate on work. He has a lot on his mind.
11. Jane works as a manager and is often stressed. Sometimes she just wants to quit.
- a. For several months now, Jane has wanted to escape from busy city life. She wants some peace and quiet.
 - b. Last year, Jane **has wanted** to escape from busy city life. She wants some peace and quiet.
 - c. Last year, Jane **wanted** to escape from busy city life. She wanted some peace and quiet.
 - d. For several months now, Jane **wanted** to escape from busy city life. She wanted some peace and quiet.
 - e. Sometimes, Jane **wants** to escape from busy city life. She wants some peace and quiet.
 - f. For several months now, Jane **wants** to escape from busy city life. She wants some peace and quiet.

12. Tom grew up on a farm and has been riding horses all his life.
- For some time now, Tom **has wanted** to go horseback riding through Iceland. But he doesn't have time.
 - Last summer, Tom **has wanted** to go horseback riding through Iceland. But he doesn't have time.
 - Last summer, Tom **wanted** to go horseback riding through Iceland. But he didn't have time.
 - For some time now, Tom **wanted** to go horseback riding through Iceland. But he didn't have time.
 - This summer, Tom **wants** to go horseback riding through Iceland. But he doesn't have time.
 - For some time now, Tom **wants** to go horseback riding through Iceland. But he doesn't have time.
13. This was a difficult period for John. He had to make hard decisions.
- For eleven years now, John has owned a beautiful house in west London. But he has to sell it.
 - Many years ago, John **has owned** a beautiful house in west London. But he has to sell it.
 - Many years ago, John **owned** a beautiful house in west London. But he had to sell it.
 - For eleven years now, John **owned** a beautiful house in west London. But he had to sell it.
 - Nowadays, John **owns** a beautiful house in west London. But he has to sell it.
 - For eleven years now, John **owns** a beautiful house in west London. But he has to sell it.
14. Mandy's husband doesn't want to pay a plumber. He is very stingy.
- For hours now, Mandy **has tried** to fix the old bathroom sink. She can't do it.
 - Yesterday morning, Mandy **has tried** to fix the old bathroom sink. She can't do it.
 - Yesterday morning, Mandy **tried** to fix the old bathroom sink. She couldn't do it.
 - For hours now, Mandy **tried** to fix the old bathroom sink. She couldn't do it.
 - Occasionally, Mandy **tries** to fix the old bathroom sink. She can't do it.
 - For hours, Mandy **tries** to fix the old bathroom sink. She can't do it.
15. Before the wedding Dani was sceptical about marriage but she changed her mind.
- Since the wedding, Dani has accepted her new role as a wife. She quite likes it.
 - Last year after the wedding, Dani has accepted her new role as a wife. She quite likes it.
 - Last year after the wedding, Dani **accepted** her new role as a wife. She quite likes it.
 - Since the wedding, Dani **accepted** her new role as a wife. She quite likes it.
 - Nowadays, Dani **accepts** her new role as a wife. She quite likes it.
 - Since the wedding, Dani **accepts** her new role as a wife. She quite likes it.

16. Kate had always wanted to go to university to study languages. She is good at languages.
- Since last winter, Kate has studied Dutch and German at Oxford University. She loves it.
 - Last winter, Kate **has studied** Dutch and German at Oxford University. She loves it.
 - Last winter, Kate **studied** Dutch and German at Oxford University. She loves it.
 - Since last winter, Kate **studied** Dutch and German at Oxford University. She loves it.
 - Nowadays, Kate **studies** Dutch and German at Oxford University. She loves it.
 - Since last winter, Kate **studies** Dutch and German at Oxford University. She loves it.
17. Jordan has visited many countries. He likes to buy things that remind him of his trips.
- Since the summer, Jordan has purchased many souvenirs for his big collection. He loves to travel.
 - On his last trip, Jordan has purchased many souvenirs for his big collection. He loves to travel.
 - On his last trip, Jordan purchased many souvenirs for his big collection. He loves to travel.
 - Since the summer, Jordan purchased many souvenirs for his big collection. He loves to travel.
 - Every time he travels, Jordan purchases many souvenirs for his big collection. He loves to travel.
 - Since the summer, Jordan purchases many souvenirs for his big collection. He loves to travel.
18. When Albert moved into the house, the garden looked terrible. He wanted to change that.
- Since spring, Albert **has planted** roses and potatoes in the garden. It looks lovely.
 - Last spring, Albert **has planted** roses and potatoes in the garden. It looks lovely.
 - Last spring, Albert **planted** roses and potatoes in the garden. It looked lovely.
 - Since spring, Albert planted roses and potatoes in the garden. It looked lovely.
 - Every spring, Albert **plants** roses and potatoes in the garden. It looks lovely.
 - Since spring, Albert **plants** roses and potatoes in the garden. It looks lovely.
19. Carol studied very hard for her final exams. She used many books to study from.
- Since the end of term, Carol has returned all her books to the library. She is very responsible.
 - After the exam yesterday, Carol has returned all her books to the library. She is very responsible.
 - After the exam yesterday, Carol returned all her books to the library. She is very responsible.
 - Since the end of term, Carol returned all her books to the library. She is very responsible.

- e. After every exam, Carol returns all her books to the library. She is very responsible.
 - f. Since the end of term, Carol returns all her books to the library. She is very responsible.
20. For centuries the Ancient Egypt has been a site of many excavations. It has a very rich history.
- a. Since 1990, archaeologists have discovered many important ancient stones in Egypt. They're now in museums.
 - b. Last century, archaeologists have discovered many important ancient stones in Egypt. They're now in museums.
 - c. Last century, archaeologists discovered many important ancient stones in Egypt. They're now in museums.
 - d. Since 1990, archaeologists discovered many important ancient stones in Egypt. They're now in museums.
 - e. Every ten years, archaeologists discover many important ancient stones in Egypt. They're now in museums.
 - f. Since 1990, archaeologists discover many important ancient stones in Egypt. They're now in museums.
21. Recently, Linda and her family moved into a new house. But it needs some work done.
- a. Since yesterday, Linda **has smelled** a bad odour in the kitchen. She doesn't know what it is.
 - b. Yesterday evening, Linda **has smelled** a bad odour in the kitchen. She doesn't know what it is.
 - c. Yesterday evening, Linda **smelled** a bad odour in the kitchen. She doesn't know what it is.
 - d. Since yesterday, Linda smelled a bad odour in her kitchen. She doesn't know what it is.
 - e. Sometimes, Linda **smells** a bad odour in the kitchen. She doesn't know what it is.
 - f. Since yesterday, Linda **smells** a bad odour in the kitchen. She doesn't know what it is.
22. Rebecca likes making crafts. She especially loves making them for holidays.
- a. For the last few weekends, Rebecca **has sold** her candles at the Christmas Market. She makes the candles herself.
 - b. In December last year, Rebecca **has sold** her candles at the Christmas Market. She makes the candles herself.
 - c. In December last year, Rebecca **sold** her candles at the Christmas Market. She made the candles herself.
 - d. For the last two weekends, Rebecca sold her candles at the Christmas Market. She made the candles herself.
 - e. Every December, Rebecca **sells** her candles at the Christmas Market. She makes the candles herself.

- f. For the last few weekends, Rebecca **sells** her candles at the Christmas Market. She makes the candles herself.
23. Paul is a nice guy but he is very clumsy. He usually breaks things.
- a. Since his birthday, Paul has broken two of the expensive wine glasses. He is now very upset.
 - b. At the party yesterday, Paul has broken two of the expensive wine glasses. He is now very upset.
 - c. At the party yesterday, Paul broke two of the expensive wine glasses. He is now very upset.
 - d. Since his birthday, Paul broke two of the expensive wine glasses. He is now very upset.
 - e. Often at parties, Paul breaks some of the expensive wine glasses. He is now very upset.
 - f. Since his birthday, Paul breaks some of the expensive wine glasses. He is now very upset.
24. Susan loves holidays. She always buys many gifts.
- a. Since Christmas, she has spent £1000 on gifts for her family. She is very generous.
 - b. Last Christmas, she has spent £1000 on gifts for her family. She is very generous.
 - c. Last Christmas, she spent £1000 on gifts for her family. She is very generous.
 - d. Since Christmas, she spent £1000 on gifts for her family. She is very generous.
 - e. Every Christmas, she spends £1000 on gifts for her family. She is very generous.
 - f. Since Christmas, she spends £1000 on gifts for her family. She is very generous.

Appendix E

SPR filler stimuli

1. James is very sporty. He prefers comfortable clothes.
He does not like wear suits, although he has to for his work.
2. Many times the family heard strange noises in the house. The kids were terrified.
In the end, they decided selling the house. They discovered it was haunted. (new)
3. Noam speaks Spanish and French. He is now learning Chinese.
He has likes learning new languages since he was little. He is good at it.
4. The nature of shopping has changed. Small shops have a hard time making profit.
With the growing popularity of big shopping malls, nobody ever bothers go to the city centre anymore.
5. Mike had an important exam in the morning. He set his alarm clock very early.
When he woke down, he realised he had overslept. He was furious.
6. The Royal family attended a concert. The cellist was brilliant.
The young musician were praised by the Queen. He was thrilled and proud.
7. Jack went for a beer. Soon he realized that his key was missing.
The loss of his house keys was cost Jack a fortune. He was very angry.
8. Neil is a good father. He is involved in his kids' lives.
He always pick them up from school in the afternoon. The kids are always excited to see him.
9. Jill and her friends suddenly fell ill. And many more children from the school were infected as well.
The spreading of the virus couldn't being stopped until Tim discovered a cure. Luckily, he was successful.
10. The mugger bought a monkey. He trained it to steal for him.
The little monkey has taken the purse out of the old women's handbag. She didn't notice anything.
11. When David went to India, he had trouble finding food that suited him.
Indian food are too spicy for many Europeans. He ate crisps all the time.
12. North America has a good reputation. The living standards are thought to be high.
Many people would like immigrate to Canada nowadays. They want a better life.
13. Ella couldn't fall asleep. She wasn't happy with the story her dad was telling her.
Telling a good story is a very difficult task. He will need to practice.
14. Adam has had many health problems lately. He was in hospital a lot.
Adam has been unable to talk properly because he had a stroke. But he is recovering.
15. Rita was very unhappy with the decorations in their house. She especially disliked the curtains.
The new curtains are a lot better than the old ones. They are more colourful.(old)
She felt better after she bought new curtains. The new ones were more colourful.
16. Steve entered a photography competition. He was chosen as the winner.
Without a doubt, he was a brilliant photographer. It was a great honour.
17. Anna and Will had an argument. He had forgotten to buy milk.
But Will refused to apologize for his mistake. He is very stubborn.
18. The company had been trying very hard to get a celebrity to come to their annual fundraiser. They were successful in the end.
The host proudly announced the arrival of the special guest. It was Brad Pitt.
19. Cinderella needed to quickly get to the ball. It was almost midnight.
While the princess was entering the coach, the coachman looked at her suspiciously. She looked so different.

20. Tom and his wife opened a bakery. They sold delicious bread.
It was very popular among the inhabitants of the little town. It was everyone's favourite bakery.
21. Rachel was driving back home from work. She was 9 months pregnant.
She was stuck in traffic when she felt that she was going to have her baby. She called an ambulance. (old)
She was stuck in traffic when she started going into labour. She called an ambulance.
22. The young couple were working very hard. So they booked a holiday together.
They enjoyed their trip to Rome very much. It was very romantic.
23. Last month, Kevin was under a lot of stress at work. He was working 10 hours a day.
The article had to be done by the end of the month. Kevin did his best.
24. Johanna likes to look nice. It's important for her job.
She always puts on make up before she goes to work. It makes her look less tired.

Appendix F

SPR comprehension questions

- 1) Has Helen continued smoking cigarettes? YES
- 2) Was David able to eat a lot of Indian food on his trip to India? NO
- 3) Did the monkey steal the woman's purse? YES
- 4) Does James like wearing suits? NO
- 5) Is Jane tired of the busy city life? YES
- 6) Did Tim use a pencil? YES/NO
- 7) Living standards are thought to be higher in Canada? YES
- 8) Did the cat bring a bird into the house? NO
- 9) Is it true that Jack was not upset about the loss of his house key? NO
- 10) Did the article have to be finished by the end of the week? NO
- 11) Does Harry have to wear a red cap at work? YES/NO
- 12) Were only Jill and her friends ill? NO
- 13) Did Olivia go grocery shopping? NO
- 14) Did Brad Pitt come to the fundraiser? YES
- 15) Did Tom keep the receipt? YES
- 16) Did Steve win second place in the competition? NO
- 17) Does Tom like riding horses? YES
- 18) Did Tom buy a gift for his girlfriend's birthday? YES
- 19) Is the furniture being delivered next week? NO/Was the sofa too expensive? YES
- 20) Is Jane's husband going to attend a wedding? YES
- 21) Did Albert grow cabbage in his garden? NO
- 22) Is Mandy's husband very generous? NO
- 23) Has Kate always wanted to study history? NO
- 24) Did both men like Sarah? YES

Appendix G

Example (List 6) of the GJT stimuli

1. EXAMPLE: Marta has recently taken up horseback riding. She is very excited about it. **Sadly, she fell off her horse yesterday because it got scared.** But she wasn't badly injured.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Jim arrived in Madrid and left the train station to find his hotel. According to the map, he had to cross a bridge after 500 meters. **When he got there, he saw that the bridge was sadly closed until further notice.** He was confused.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Cinderella needed to quickly get to the ball. It was almost midnight. **While the princess was entering the coach, the coachman looked at her suspiciously.** She looked so different.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. On her trip to Mexico Sally bought a hat from a market. It's very colourful and interesting. **She hasn't worn hat since her return three weeks ago.** She hasn't had the chance.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Helen smokes and drinks coffee a lot. It's not good for her health. **Since New Years Eve, Helen promises to stop smoking cigarettes for good.** But she never keeps her promises.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Jill went grocery shopping because she wanted to make a pie for lunch. She was going to surprise her husband with it when he came home from work. **She was still preparing the pie when he knocked on the door.** He arrived early.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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7. When David went to India, he had trouble finding food that suited him.
Indian food are too spicy for many Europeans. He ate crisps all the time.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. The mugger bought a monkey. He trained it to steal for him.
The little monkey has taken the purse out of the old women's handbag. She didn't notice anything.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Rose always slept with a doll in her bed. Last month they moved house and the doll got lost.
Her mum got her the teddy at the department store in town. But she missed her doll.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. The young couple were working very hard. So they booked a holiday together.
They enjoyed their trip to Rome very much. It was very romantic.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Many times the family heard strange noises in the house. The kids were terrified.
In the end, they decided selling the house. They discovered it was haunted.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Noam speaks Spanish and French. He is now learning Chinese.
He has liked learning a new languages since he was little. He is good at it.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. The nature of shopping has changed. Small shops have a hard time making profit. **With the growing popularity of big shopping malls, nobody ever bothers go to the city centre anymore.**

1	2	3	4	5	6
---	---	---	---	---	---

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

14. Mike had an important exam the following morning. He set his alarm clock very early.
When he woke up, he looks at his clock and realised he had overslept. He was furious.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Rita was very unhappy with the decorations in their house. She especially disliked the curtains.
She felt better after she bought new curtains. The new ones are more colourful.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Steven needed extra money but couldn't find any additional work. He decided to try his luck.
Since January, Steven won five thousand Euros on the lottery. He is very lucky.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. James is very sporty. He prefers comfortable clothes.
He does not like wear suits, although he has to for his work.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Jane works as a manager and is often stressed. Sometimes she just wants to quit.
Last year, Jane has wanted to escape from busy city life. She wants some peace and quiet.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. The History teacher told her class that they were going to watch a movie next lesson. The students liked watching movies in school.
They'd never been allowed to watch the movie before because their teacher was strict. They were excited.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. Tim forgot to bring his pencil case to school yesterday. No one was able to lend him a pen.
Since he didn't have pen he had to use a pencil. This was against school rules.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. Rachel was driving back home from work. She was 9 months pregnant.
She was stuck in traffic when she started going into labour. She called an ambulance.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. North America has a good reputation. The living standards are thought to be high. **Many people would like immigrate to Canada nowadays.** They want a better life.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

23. Lauren baked a cake for her niece's birthday party. It was chocolate and covered with sprinkles.
Her niece wanted to eat cake right away because it looked delicious. But she had to wait.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

24. Susan loves holidays. She always buys many gifts.
Since Christmas, she has spent £1000 on gifts for her family. She is very generous.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

25. Johanna likes to look nice. It's important for her job.
She always puts on make up before she goes to work. It makes her look less tired.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. Anna and Will had an argument. He had forgotten to buy milk.
Till now, Will has refused to apologize for his mistake. He is very stubborn.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

27. We heard the cat bring in a mouse last night. It was making a lot of noise in the kitchen.
We eventually found a mouse hidden under the big fridge. We caught it.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

28. Miss Brown gave all her students a notebook to bring to German class. They were told to use it to write down important vocabulary learned in class.

Yesterday, Kim accidentally left a notebook in her locker after the break. Miss Brown gave her some lined paper.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

29. Tim wanted to sell a painting he'd painted after his return from Brazil. It was very large so he was afraid no one would want to buy it.

He managed to sell painting but at a much lower price. It wasn't easy to sell.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

30. Jack went for a beer. Soon he realized that his key was missing.

The loss of his house keys was cost Jack a fortune. He was very angry.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

31. Ella couldn't fall asleep. She wasn't happy with the story her dad was telling her. **Telling a good story is a very difficult task.** He will need to practice.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

32. Last month, Kevin was under a lot of stress at work. He was working 10 hours a day. **The article had to be done by the end of the month.** Kevin did his best.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

33. When he comes to work in the morning, Harry has to put on a company T-shirt. All employees have to do the same.

Only the boss wears a cap with a logo in the front. Customers can easily see he's in charge.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

34. Julie felt bored with her current life and was looking for a change.
From time to time, Julie considers living in a houseboat in Amsterdam. She thinks it might be fun.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

35. Neil is a good father. He is involved in his kids' lives.
He always pick them up from school in the afternoon. The kids are always excited to see him.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

36. Ben loves quizzes of all sorts. He especially likes the more challenging ones.
Since Sunday, Ben has completed the crossword puzzles in the Guardian. He is very smart.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

37. Jill and her friends suddenly fell ill. And many more children from the school were infected as well.
The spreading of the virus couldn't being stopped until Tim discovered a cure. Luckily, he was successful.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

38. Sam and Jenny met at work and he liked her a lot.
When he first saw her, Sam has thought Jenny was beautiful and very intelligent. However, he's too nervous to speak to her.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

39. A friend persuaded Laura to participate at the local raffle. At first she was hesitant. **Last year, Laura won great prizes at the local raffle.** She was very excited.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

40. Jim studied Finance at university. He was an excellent student.
Since he finished university, Jim thought about starting his own small business. He wanted

to be a millionaire.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

41. Dominic loves to play football and is on his school's team. His parents are proud of him. **Every game, Dominic scores many goals for his football team.** He is very talented.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

42. Tom and his wife opened a bakery. They sold delicious bread. **It was very popular among the inhabitants of the little town.** It was everyone's favourite bakery.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

43. Carol studied very hard for her final exams. She used many books to study from. **Since the end of term, Carol returns all her books to the library.** She is very responsible.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

44. Anna was hoping to get a bracelet she saw last week at the mall for Christmas. When she opened her presents, she was slightly disappointed. **She didn't get bracelet she wanted but a silver ring.** She doesn't like silver jewellery.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

45. Olivia went to a bookstore to buy a book. The shop assistant told her that the book she was looking for was on the shelf in the corner. **But she couldn't find the book on the shelf or anywhere else.** Maybe they didn't have it in stock.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

46. Adam has had many health problems lately. He was in hospital a lot. **Since his stroke last year, Adam has been unable to talk properly.** But he is recovering.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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47. Tommy did the washing up after lunch. As he was washing a plate, his mum told him that she got it as a wedding gift.

So Tommy washed a plate with care and put it away. He didn't want to break it.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

48. Emma's been saving for a scooter because she needs a vehicle to get to work. She's looked at all the ads but hasn't found anything.

Instead, she found car that was affordable and more practical. She was excited.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

49. The company had been trying very hard to get a celebrity to come to their annual fundraiser. They were successful in the end.

The host proudly announced the arrival of the special guest. It was Brad Pitt.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

50. The Royal family attended a concert. The cellist was brilliant.

The young musician were praised by the Queen. He was thrilled and proud.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

51. Mary has lived in many different cities. She is very adventurous.

Since 2005, Mary lives in London in a nice neighbourhood. She likes London a lot.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

52. Tom bought a coat but soon realized that it was too warm for it. He should have bought a jacket instead.

So, Tom returned the coat to the shop the next day. Luckily, he had kept the receipt.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

53. Matt was eating an ice-cream. He bought it to refresh himself on a hot summer's day. **But it was so hot that an ice-cream melted before he could finish it.** It was such a hot day.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

54. Rebecca likes making crafts. She especially loves making them for holidays. **In December last year, Rebecca sold her candles at the Christmas Market.** She made the candles herself.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

55. Steve entered a photography competition. He was chosen as the winner. **Without a doubt, he was a brilliant photographer.** It was a great honour.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

56. Recently, Linda and her family moved into a new house. But it needs some work done. **Since yesterday, Linda smelled a bad odour in her kitchen.** She doesn't know what it is.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

57. Tom grew up on a farm and has been riding horses all his life. **For some time now, Tom has wanted to go horseback riding through Iceland.** But he doesn't have time.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

58. Alex has some problems at home. His wife was unhappy and their son is failing Maths. **Yesterday, Alex found it hard to concentrate on work.** He has a lot on his mind.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

59. Frank's been saving money to buy a necklace for his girlfriend's birthday. When he finally went to buy it, the shop assistant told him that the necklace had been sold. **Instead, he bought ring to surprise her at dinner tonight.** She'll surely like it.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

60. Ben and Mary went to Ikea to buy some furniture for their new house. They both liked a blue sofa but it was very expensive.
Instead, they had to get the armchair but they weren't happy about it. They couldn't afford the sofa.

1	2	3	4	5	6
---	---	---	---	---	---

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

61. Jenny went to a pet shop to buy a present for her son. She was looking for a cat or a hamster because they require less care.
In the end, she decided to buy the puppy because her son really likes dogs. He'd always wanted one.

1	2	3	4	5	6
---	---	---	---	---	---

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

62. For centuries the Ancient Egypt has been a site of many excavations. It has a very rich history.
Every ten years, archaeologists discover many important ancient stones in Egypt. They're now in museums.

1	2	3	4	5	6
---	---	---	---	---	---

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

63. Will and Jim were about to go home when it started pouring with rain. Jim offered to give Will a ride home but he refused.
Will said that he had an umbrella in his bag all the time. He liked to walk in the rain.

1	2	3	4	5	6
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<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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64. Jane bought her husband a tuxedo for his friend's wedding. She thought it would be stylish, but he wasn't sure about it.
He decided to wear a suit because it was more comfortable. His wife was a little upset.

1	2	3	4	5	6
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<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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65. When Albert moved into the house, the garden looked terrible. He wanted to change that.
Since spring, Albert has planted roses and potatoes in the garden. It looks lovely.

1	2	3	4	5	6
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<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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66. Jack lives by himself and only has a cat to keep him company. He lets it sleep on his bed and gives it only the best food.
He also wishes he had a dog to take out to the park. Jack is often lonely.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

67. This was a difficult period for John. He had to make hard decisions.
For eleven years now, John owns a beautiful house in west London. But he has to sell it.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

68. Before the wedding Dani was sceptical about marriage but she changed her mind. **Since the wedding, Dani accepted her new role as a wife.** She quite likes it.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

69. Mandy's husband doesn't want to pay a plumber. He is very stingy.
Occasionally, Mandy tries to fix the old bathroom sink. She can't do it.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

70. Jordan has visited many countries. He likes to buy things that remind him of his trips. **On his last trip, Jordan has purchased many souvenirs for his big collection.** He loves to travel.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

71. Paul is a nice guy but he is very clumsy. He usually breaks things.
At the party yesterday, Paul has broken two of the expensive wine glasses. He is now very upset.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

72. Kate had always wanted to go to university to study languages. She is good at languages.
Last winter, Kate studied Dutch and German at Oxford University. She loves it.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

73. In the pub last night, Sarah met an artist. He was a nice guy and asked for her number. **She'd never met artist before that she wanted to date.** But she really liked this guy.

1	2	3	4	5	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Definitions

+Art	A language with articles
-Art	A language without articles
ERPs	Event-related brain potentials
GJT	Grammaticality judgement test
GLM	Generalised linear model
L1	First language
L2	Second language
M	Mean
NA	Not available
NP	Noun phrase
<i>r</i>	Pearson's <i>r</i>
RQ	Research question
RT	Reaction time, reading time
SD	Standard deviation
SE	Standard error
SOC	Supplied in obligatory contexts
SPR	Self-paced reading
TA	Tense-aspect
TLU	Target-like use
T-SIT	Time of situation
TU	Time of utterance

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