DISTANCE EFFECTS IN L2 ARABIC AGREEMENT INFLECTION

A Thesis submitted by

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Master of Arts in Applied Linguistics / EFL

For the award of
Doctor of Philosophy

2024

ABSTRACT

The structural and linear relationship between a controller and a target in an agreement relation is a core aspect of forming a grammatical sentence. This study tested whether or not the linear distance between the controller and the target (or, in one experiment, between the filler and the associated gap) moderates sensitivity to ungrammaticality in second language (L2) processing. Data was collected from 40 intermediate English-speaking learners of Arabic (ELAs), plus four native speakers of Arabic, using a word-by-word self-paced moving-window reading task, plus a comprehension task. The study consisted of three experiments, each concerned with the processing of gender and number agreement in a particular type of construction. Experiment One focused on agreement between a noun and a predicative adjective in a verbless sentence. The remaining two experiments were concerned with agreement between a matrix subject and a matrix verb. In Experiment Two, these two items were adjacent vs. separated. In Experiment Three, the distance between the items was short vs. long, plus they were separated by either a subject-headed or object-headed relative clause (RC). In each experiment, reading times were measured at the target plus three spillover regions. Overall, the results of these three experiments showed that, for gender and/or number agreement, distance (and, in Experiment Three, RC type) moderated learners' sensitivity to agreement anomalies for gender and/or number agreement in at least one of the four critical regions under scrutiny. These results confirm distance as a stumbling block to agreement processing in the L2.

CERTIFICATION OF THESIS

I Ala'a Hatem Khalil declare that the Thesis entitled *Distance effects in L2 Arabic agreement inflection* is not more than 100,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references, and footnotes. The thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

Date: April 30th, 2024

Endorsed by:

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Student and supervisors' signatures of endorsement are held at the University.

ACKNOWLEDGEMENTS

I begin by acknowledging the boundless blessings and guidance upon me by Allah, the Almighty, whose blessings and mercy have been my constant companion throughout this endeavour. It is through His grace that I have been granted this opportunity to pursue and embark on this academic pursuit.

This endeavour would not have been possible without my parents, spouse and children, sisters and brothers. Their boundless love that they have bestowed upon me, their unwavering support, encouragement, and overwhelming prayers, have been a source of strength and motivation throughout my pursuit of a PhD. I would like also to extend my thanks to my friends for their constant encouragement.

I would like to express my utmost gratitude to my supervisor Dr. Gavin Austin for his constant support and invaluable guidance. His expertise and feedback have been instrumental in shaping this thesis. I would like to thank my associate supervisor, Prof. Bernice Mathisen. Many thanks are specially owed to esteemed Prof. Patrick Danaher for his support and help at the beginning of this research journey.

Finally, I would like to thank the Graduate Research School (GRS) at the University of Southern Queensland for the financial support. I also wish to extend my gratitude to the GRS team member Christopher Droney, who graciously provided all the academic and administrative assistance needed to achieve this academic milestone. Thank you.

DEDICATION

To my loving parents (Hatem and Ibtisam), beloved husband (Jamil), beautiful children (Layan, Qusay and Kinda) and caring siblings (Naheel, Mahmoud, Ayat, Hana’a, Saja, Leqa’a and Murad).

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CHAPTER ONE: INTRODUCTION

1.1 Focus of this thesis

Variability in the comprehension of agreement inflection has often been identified as a salient and ingrained feature of L2 processing (e.g., Alamry, 2014; Alhawary, 2003, 2005; Coughlin & Tremblay, 2011, 2013; Jegerski, 2016; Jiang, 2004, 2007; Idrissi et al., 2021; Mansouri, 1995; McCarthy, 2008; Poulos, 2014; Rajab, 2017, Tucker et al., 2015, 2021; White, 2004).

One source of variability in the processing of this type of morphology by second language (L2) learners is the distance between the controller and the target in an agreement relation.[1] Two kinds of distance have figured especially prominently in research on the L2 processing of agreement: linear distance (LD) or structural distance (SD). Evidence for the effects of LD and/or SD is abundant (e.g., Alemán Bañón et al., 2014; Bannai, 2011; Foote, 2011; Keating, 2009, 2010; Mao et al., 2022; Song, 2015b). Moreover, diverse hypotheses related to these two notions have been proposed by researchers (e.g., Clahsen & Felser, 2006; Gibson, 2000; Hawkins, 2004; O'Grady et al., 2003) and subsequently tested in an L2 context. Yet, despite this healthy level of research interest and activity, certain limitations and gaps in previous work on the L2 processing of agreement have left the door open for further investigation.

The main focus of the current study is to explore whether or not the LD between the controller and the target (or, in one experiment, the filler and the associated gap) in an agreement relation moderates learners' sensitivity to ungrammaticality in L2

[1] In this thesis, every abbreviation is redefined anew in each chapter.

processing.[2] For this purpose, I focus on English-speaking learners of Arabic (ELAs). ELAs are an apt choice of learner group for two reasons. First of all, while some attention has been paid to the acquisition of Arabic in research on L2 agreement processing in general (Alamry, 2014; Alhawary, 2009b; Poulos, 2014; Rajab, 2017; Tucker et al., 2021; Tucker et al., 2015), I know of no previous study that has been specifically concerned with the effects of distance within this area.

The other reason for focusing on ELAs is that agreement relations play a central role in the construction of phrases and sentences in Arabic (Ryding, 2005), giving rise to a system of great richness and complexity. In the nominal domain, a noun agrees in number, gender, indefiniteness, and case with one or more modifiers (e.g., an adjective, or another noun); in the verbal domain, a verb agrees in number, gender and person with one or more other constituents (e.g., a subject noun).

Within this space of possibilities, the current study focuses specifically on gender and number agreement in two main types of construction: noun-adjective (N-Adj) agreement (i.e., between a noun and a predicative adjective), and subject-verb (Subj-V) agreement (i.e., between a matrix subject and a matrix verb). By focusing on gender and number agreement in more than one construction, I aim to triangulate my analysis of how these two types of agreement are processed by ELAs, thereby providing a more representative account of this phenomenon than would otherwise have been possible.

Another key characteristic of this study is that I focus on learners at intermediate level. To date, within research on L2 processing in general, advanced learners have

[2] From this point onwards in this study, as a rule, the term ‘distance’ (not preceded by an adjective) will be used to denote *linear* distance in particular. This rule will only be broken when it is necessary to distinguish explicitly between LD and SD, as in the previous paragraph. When distance can be either LD or LD, this will also be made clear.

received more attention than other proficiency groups. By investigating learners at intermediate proficiency, we can then gain further insight into the role of proficiency in difficulties with L2 agreement processing.

1.2 Modern Standard Arabic

Arabic is characterised by diglossia between two varieties: Modern Standard Arabic (MSA) and colloquial Arabic (Aoun et al., 2009; Jelinek, 1981; Mansouri, 1995). In the Arab world, MSA is the prestige language used by the literate in formal writing and speaking; by contrast, colloquial Arabic is the variety used in informal writing and speaking. MSA is also the medium of instruction in schools. This variety of Arabic is the one used in the present study. Henceforth, when I refer to 'Arabic', I am referring specifically to MSA.[3]

1.3 Distance

Establishing an agreement relation between a controller and a target (or a filler and a gap) in a sentence is crucial for language comprehension and production. One variable that plays a key role in the processing of agreement is distance in general (i.e., LD or SD). I distinguish between these two types of distance in Sections 1.3.1 and 1.3.2, respectively. Both types of distance come into play in each of the three experiments in this study: LD is manipulated while SD is controlled. The related concept of the filler-gap domain is explained in Sections 1.3.3: this will be relevant to Experiment Three only.

[3] Relevant theoretical background regarding how N-Adj and Subj-V agreement operate in Arabic will be provided in the appropriate parts of Chapters 2 to 4.

1.3.1 Linear distance

It is important to distinguish between the 'simple' definition of LD and the one in Gibson (2000). In the former case, we count the number of intervening words between a controller (e.g., a noun) and a target (e.g., an adjective or a verb; Hawkins, 1989), regardless of what classes these words belong to. In the Gibsonian definition, we only count the number of discourse referents (i.e., nouns or verbs) that separate these two items. These two ways to calculate LD are compared in the relative-clause (RC) structures in (1a) and (1b), respectively (controller in bold, target in italics).

(1) (a) the **expert** that *advises* the president

LD = 1 word (i.e., *that*)

number of discourse referents = 0

(b) the **expert** that [the president *advises*]

LD = 3 words (i.e., *that the president*)

number of discourse referents = 1 (i.e., *president*)

In the present study, I use the simple definition of LD.

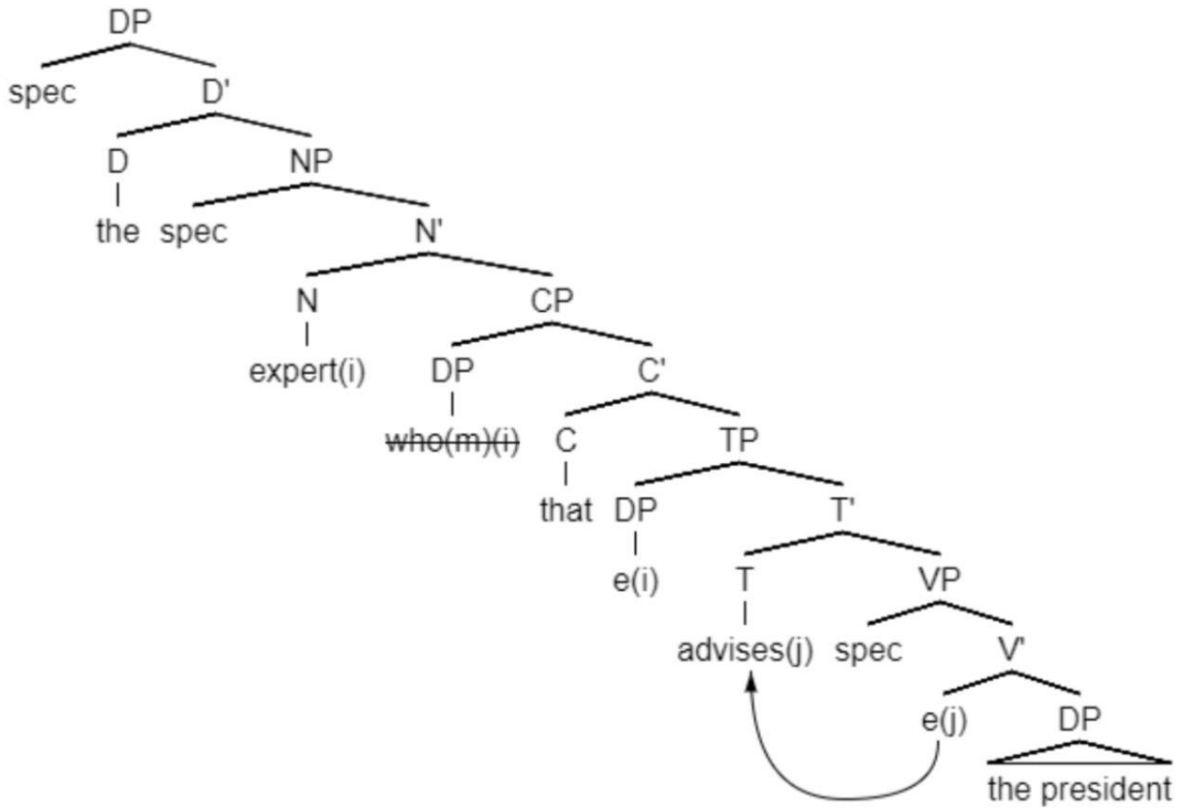
1.3.2 Structural distance

SD is basically concerned with the complexity of the syntactic path between the two agreeing elements. This is measured by counting the number of maximal projections (i.e., XPs) that lie on this path (O'Grady, 1997; O'Grady et al., 2003). The difference in SD between the two structures in (1) above is represented in Figure 1.1

and Figure 1.2 (CP = complementiser phrase, DP = determiner phrase, e = empty category, NP = noun phrase, TP = tense phrase, VP = verb phrase).[4]

Figure 1.1

Syntactic Representation of (1a)

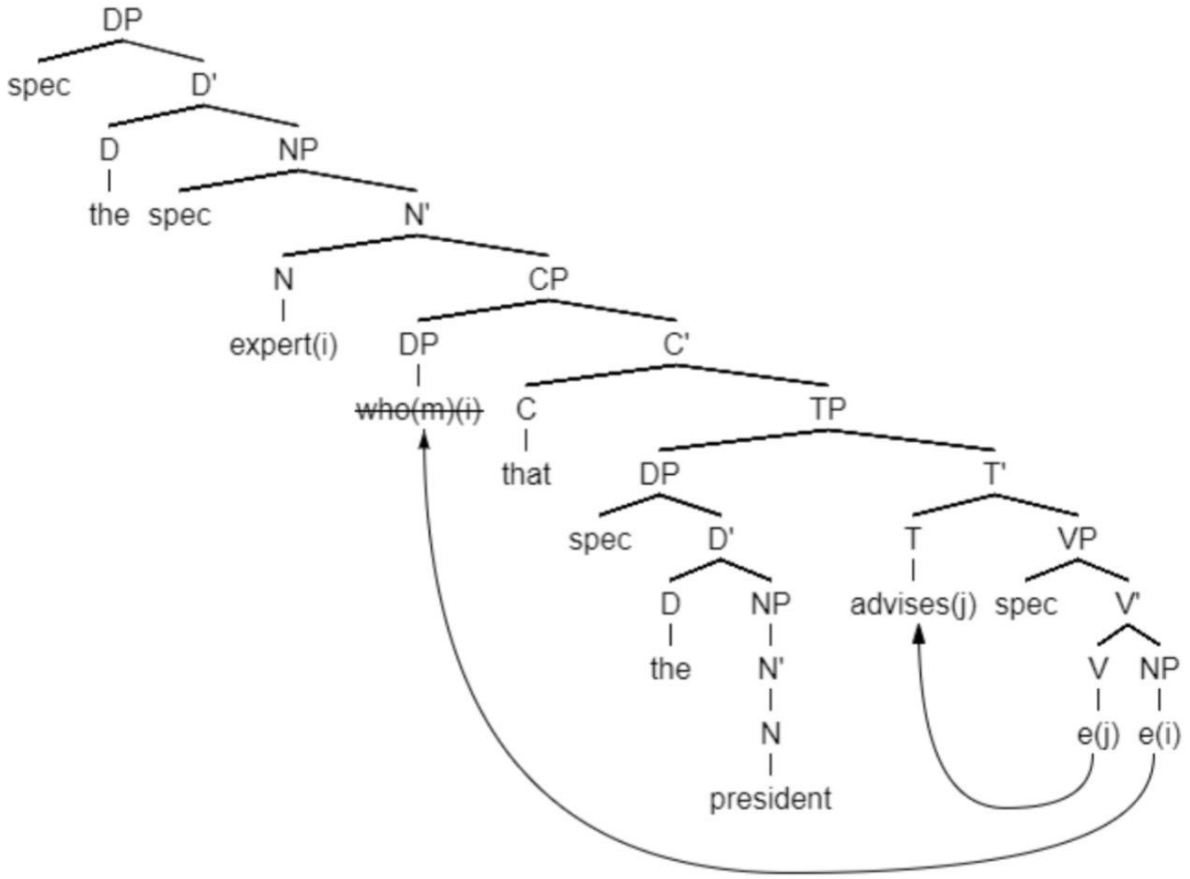


SD = 2 nodes (i.e., CP, TP)

[4] In both of these figures, I follow Radford's (2016) analysis of RC structure in English (pp. 394-442; see especially pp. 402, 403, 437). The relative pronoun 'who(m)' is not spelled out: this is why it is crossed out in the structural representations.

Figure 1.2

Syntactic Representation of (1b)



SD = 3 nodes (i.e., CP, DP, TP)

In Figure 1.1, the matrix subject ‘the expert’ is separated from the matrix verb ‘advises’ by two XPs. In Figure 1.2, these two items are separated by three XPs.

1.3.3 Filler-gap domain

Hawkins (1999) proposed another metric for calculating the distance between two items in an agreement relation. A filler is an item that comes before a gap, and a gap is an empty space that can be filled by the filler. In turn, a filler-gap domain (FGD)

consists of “the smallest set of terminal and non-terminal nodes dominated by the mother of the filler and on a connected path that must be accessed for gap identification and processing” (Hawkins, 2004, p. 248). Hence, one could say that the notion of the FGD conflates those of LD and SD, since terminal and non-terminal nodes must both be included within the FGD. Consider (3) (adapted from Hawkins, 2004, p. 176).

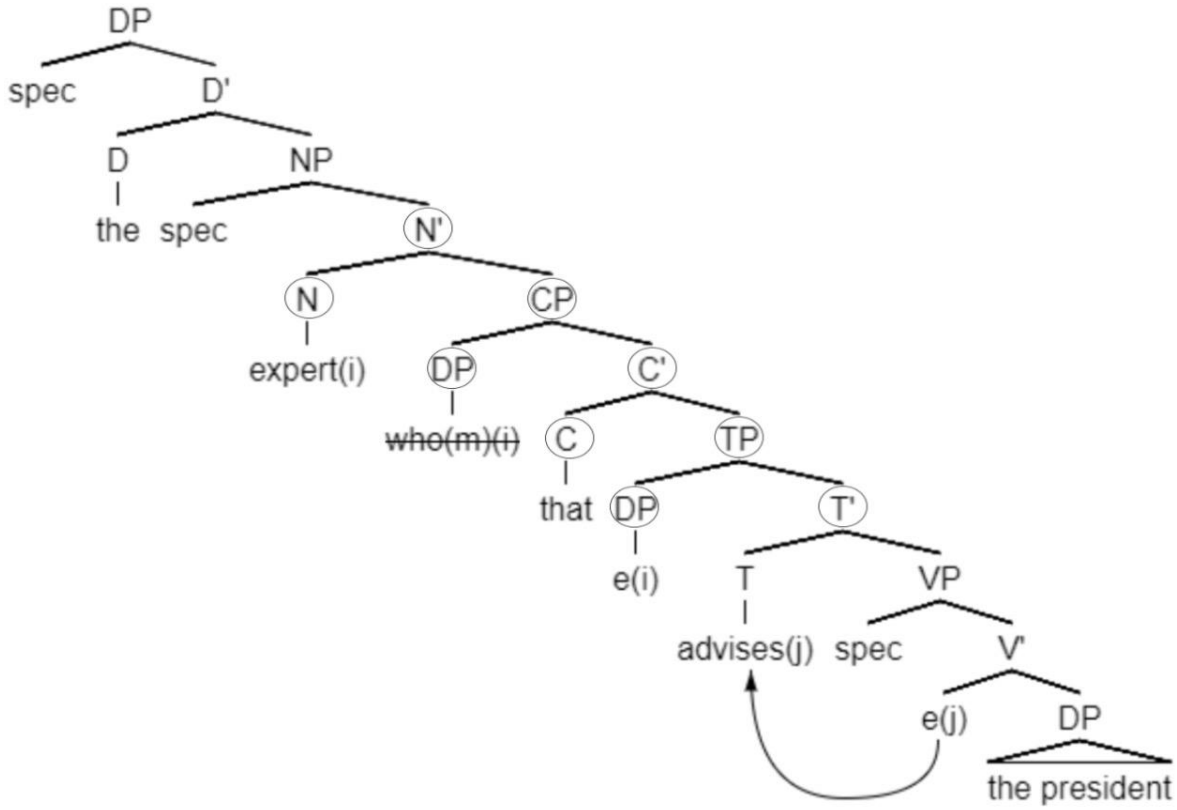
(3) (a) the expert$_i$ [**that advises$_i$** the president]

(b) ‘the expert$_i$ [**that the president advises$_i$**]

Notice that, in (3a), the FGD does not extend to include the RC object ‘the president’; however, in (3b), this domain includes the RC subject ‘the president’. In Figures 1.3 and 1.4, I provide the syntactic representations for (3a) and (3b), respectively. In each figure, the circled nodes are the ones that lie within the FGD.

Figure 1.3

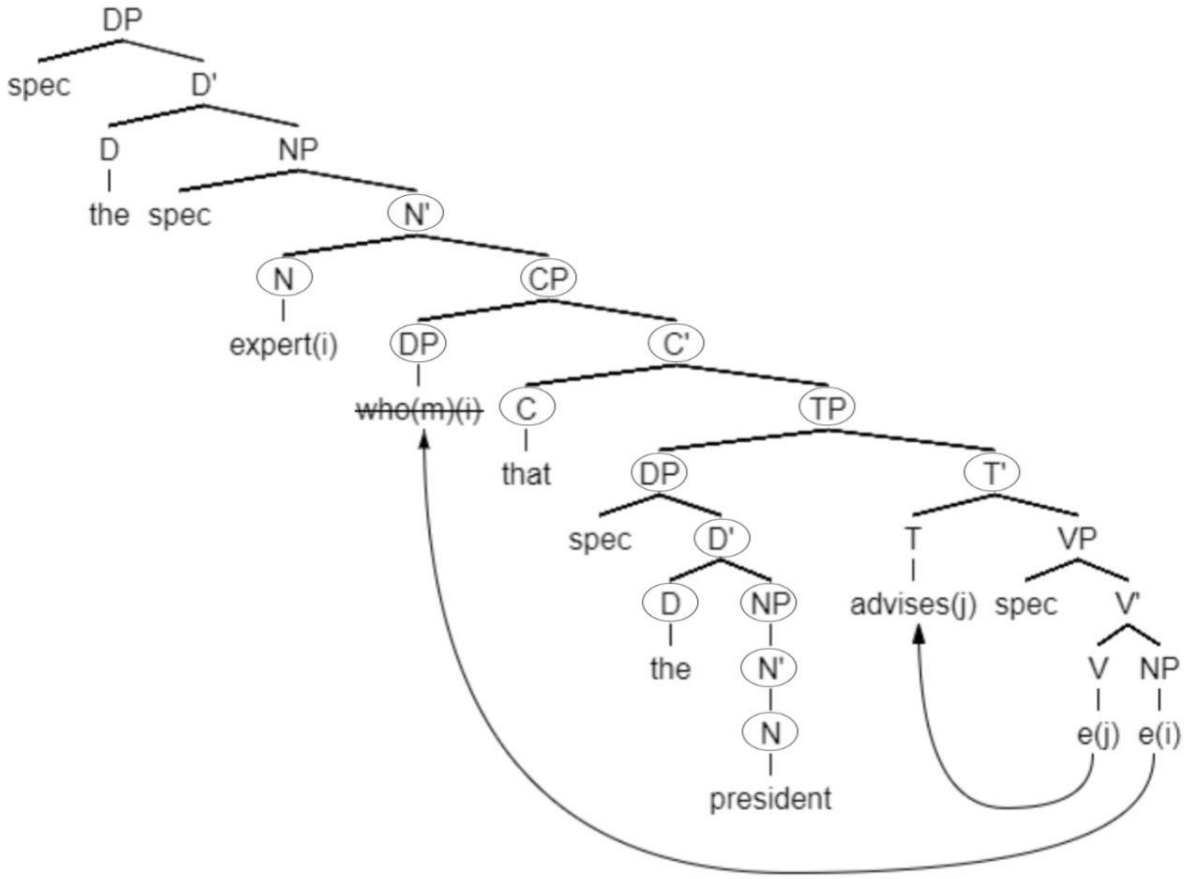
Styntactic Representation of (3a)



FGD = 9 nodes

Figure 1.4

Syntactic Representation of (3b)



FGD = 14 nodes

1.4 Theories of second language acquisition

Inflectional morphology is notoriously difficult for L2 learners in general (Franck et al., 2002; Montrul et al., 2008; White et al., 2004), including L2 learners of Arabic (Alamry, 2014; Alhawary, 2003; Alkohlani, 2016; Mansouri, 1995; Mohammad, 1990). This difficulty manifests itself as the absence of inflectional morphemes during production, or as insensitivity to incorrect inflection during real-time sentence processing in comprehension (Wen, 2010). Research on what underlies these problems is plentiful; however, this issue has not been settled yet.

The present study is concerned with the processing of agreement relations between two sentence elements, where these relations are made overt in the form of inflection. There are two major types of theories intended to explain inaccuracies in this type of processing. One type of theory attributes this problem to a representational issue; specifically, acquisition of the target-language syntactic representation is incomplete in one way or another (Clahsen & Felser, 2006b; Hawkins & Hattori, 2006; Hawkins & Liszka, 2003; Jiang et al., 2010). Song (2015b) refers to this approach as the Representational Deficit Account (RDA).

A notable theory consistent with the RDA is Hawkins and Chan's (1997) Failed Functional Features Hypothesis (FFFH), which holds that adult L2 learners cannot acquire abstract grammatical knowledge. According to the FFFH, functional categories and features that are not instantiated in the L1 cannot be acquired by post-pubertal learners. Thus, a nativelike mental representation will necessarily be unattainable in those cases where the functional features and categories between the L1 and the L2 differ. For example, the FFFH predicts that adult native English speakers cannot acquire syntactic gender-agreement in Spanish despite exposure to input, because gender is not among the functional features that occur in the L1. However, adult native Italian learners are expected to acquire Spanish gender agreement because gender is found in their L1.

Another theory aligned with the RDA was proposed by Clahsen and Felser (2006a, 2006b). The Shallow Structure Hypothesis (SSH) maintains that difficulties with processing the inflectional system of the L2 occurs because L2 learners are only able to build ‘shallow’ syntactic representations (e.g., simple ones based on word order), rather than deep representations (e.g., more elaborate ones which include phrase-level constituents organised in hierarchical relationships), when they process

sentences. Thus, L2 learners are expected to check grammatical features such as Phi features only in local domains, but not in non-local domains. Empirical support for the SSH has come from various experimental paradigms, including self-paced reading, eye-tracking and neuroimaging studies (e.g., Alemán Bañón et al., 2014; Keating, 2009, 2010; Lago & Felser, 2018; Song, 2015a, 2015b).

The other type of theory intended to explain inaccuracies in L2 processing focuses instead on linguistic performance. According to the Performance Deficit Account (PDA; Lardiere, 1998; Wen, 2010; White et al., 2004), difficulties in L2 processing are due to constraints such as working memory (e.g., Coughlin & Tremblay, 2011, 2013; Reichle et al., 2013; Service et al., 2002). Evidence for this position comes from the fact that, for example, L2 learners who display insensitivity to violations in agreement inflection on targets under heavy processing loads may display sensitivity to these violations under moderate processing loads as well (Song, 2015a).

The main theory aligned with the PDA is the Full Transfer Full Access (FTFA) Hypothesis, put forward by Schwartz and Sprouse (1994, 1996). This allows for the possibility that adult L2 learners will be able to acquire functional categories and features that are not instantiated in their L1 even if they begin to acquire the L2 after puberty. Support for this hypothesis comes from White et al. (2004), for example, where native English speakers were able to acquire Spanish gender agreement although it is not present in their L1.

FTFA also makes important predictions regarding the role played by proficiency in L2 acquisition. According to this hypothesis, when their proficiency level is low, learners may lack target-like inflectional knowledge; however, when their proficiency level increases, they may show evidence of having acquired native-like inflectional representations. Support for proficiency effects of this type comes from Coughlin and

Tremblay (2011), where high-level English-speaking learners of French showed sensitivity to ungrammatical clitic number-agreement in a long-distance condition, but low-level learners did not. Likewise, in Sagarra and Herschensohn (2010), intermediate English-speaking learners of Spanish were more sensitive to gender- and number-agreement violations than beginner learners.

1.5 Previous research on the acquisition of Arabic agreement by English-speaking learners

There have been a number of studies conducted on Arabic as an L2, although work in this area is still sparse compared to research on other L2s such as English. This section presents studies that investigated L2 Arabic agreement. Note that none of them have been concerned with distance effects in L2 Arabic agreement processing specifically, as I know of no previous research that has looked at this phenomenon. Two studies examine ELAs' acquisition of Arabic gender agreement (Alamry, 2014; Alhawary, 2009b), two studies focus on the processing of both gender and number agreement (Poulos, 2014; Rajab, 2017), and one study considers the acquisition of gender, number and person agreement (Mansouri, 1995).

Mansouri (1995) investigated the effect of grammatical encoding on the processing of Arabic Subj-V agreement in subject-verb-object and verb-subject-object sentences. Seventeen Australian tertiary students were recruited at three different proficiency levels: five of them were beginners, seven were intermediates and five were advanced-level learners. It was predicted that when the verb (i.e., target) matches the subject (i.e., controller) in gender, number and person, processing is easy; when the verb is missing a feature such as animacy, processing is less easy; and when the verb exhibits features that are not shown on the subject, as in the case

of collectives (e.g., *ʤamaʕah* 'group' [adapted from Mansouri, 1995, p. 32]), processing is difficult.

Two main tasks were employed: a grammar task and a cloze task. In the grammar task, students were asked to fill in the gap with the correct form of the verb in terms of gender, number and person. Three versions of the grammar task were designed, one per proficiency group. The experimental manipulation lay in the structural and lexical difficulty of each set of stimuli. In (1), I show a grammatical error in gender agreement made by an intermediate-level learner (adapted from Mansouri, 1995, p. 60; controller in bold, target in italics; ACC = accusative; F = feminine; H = human; INDF = indefinite M = masculine; PL = plural; NOM = nominative; PERF = perfective; SG = singular).

(1)	***ʔal-wazi:r-u**	*ħadʿar-at*	muʔtamar-a-n
	the-minister-(+H)-M.PL-NOM	attended.PERF-3SG.F	seminar-ACC-INDF
	'The minister (male) attended a seminar.'		

On the verb, the learner selected the correct features for number and person agreement, but not for gender agreement (i.e., masculine). The cloze task was done by the intermediate and advanced groups only; they were given a text, and asked to fill in the gap with the correct form of the verb.

In general, the results from both tasks showed that the advanced learners made fewer overall errors than the intermediates or beginners. Also, when there was concord between the two agreeing elements, the structure was less difficult for learners to process than when the two elements mismatched in terms of one or more features.

In a longitudinal and cross-sectional study, Alhawary (2009b) investigated the processing of gender agreement in L2 Arabic, including nominal agreement (between a demonstrative pronoun, and a predicate noun or adjective, within a verbless sentence) and verbal agreement. In the longitudinal component of the study, Alhawary investigated whether nominal and verbal gender-agreement are processed by L2 learners of Arabic at the same time (i.e., stage 4), as per Pienemann's Processability Theory (1998); in the cross-sectional component, the issue of interest was whether L2 learners show evidence of L1 transfer in their processing of agreement.[5] Sixty-two L2 learners of Arabic with different L1s (i.e., English and French) were recruited. There were nine participants in the longitudinal component and 53 in the cross-sectional component. Eight of the longitudinal participants were English speakers, and one was a speaker of French and Creole. In the cross-sectional component, there were 27 English-speaking participants and 26 French-speaking participants.

The cross-sectional findings supported those from the longitudinal component of the experiment. The combined findings from both components showed that there was no difference in agreement processing between the ELAs and the French learners of Arabic for the verb-agreement structure; however, there was a difference between the two groups for nominal-gender agreement, as the French learners significantly outperformed the ELAs in this regard. Alhawary took this as evidence for L1 transfer:

[5] Processability Theory (Pienemann, 1998) makes assumptions about how and when L2 grammatical morphemes are acquired. According to this theory, L2 learners at stage 1 (i.e., lemma access) acquire words from the target language. Then they move to stage 2 (i.e., the category procedure), where they acquire the morphological features of lexemes, such as number, gender, or tense. At stage 3, the phrasal procedure allows learners to exchange the features they acquired at the lexical level between a head and its modifier within a phrase. At stage 4, learners are ready to process sentence-interphrasal morphology, which involves accessing grammatical features in a clause. Eventually, learners are able to apply morphological features between clauses at stage 5 (i.e., the subordinate-clause procedure).

unlike English, French has gender agreement between a demonstrative and a predicate.

Poulos (2014) attempted to identify the causes of errors in the acquisition of gender and number agreement between a noun, and an attributive or predicative adjective. Twenty-six English-speaking learners of Spanish and eight ELAs did a total of eight tests per L2 group. The first six tests involved adjective selection in a sentence or a noun phrase in order to indicate the correct agreement; the last two were production-based tests in which the participant had to describe items of clothing in pictures.

The results demonstrated that N-Adj agreement errors in both languages (i.e., Arabic and Spanish) were due to three main factors related to the morphology of the noun itself. The first was that so-called 'broken' plurals in Arabic have no overt number marker, so learners will most likely treat them as singular nouns.[6] The second factor was the presence of other nouns between the noun and adjective. The third was L1 transfer.

In another study, Rajab (2017) investigated the acquisition of agreement morphology by ELAs between noun and adjective in terms of gender as well as number. Participants did three experiments, each consisting of two tasks: an elicited production task followed by a comprehension task. In the first experiment, there were 20 ELAs (at low- and high-proficiency combined) and a control group of 10 Arabic native speakers.[7] The control group spoke Najdi Arabic, a dialect spoken in the mid-

[6] Arabic plurals are of two types: broken (in which the number marking is internal to the word) and sound (in which the number marking is indicated via affixation).

[7] The participants were classified into low- and high-proficiency levels, according to their placement in an Arabic-language program plus their duration of exposure to Arabic. The low-proficiency participants were in their second year of the Arabic program, and had received between 135-180 hours of instruction, while the high-proficiency participants were in their third or fourth year and had received more than 225 hours of instruction.

region of Saudi Arabia. The production task involved naming and describing a picture, while the comprehension task required participants to match sentences with pictures. For each sentence, the participant had to select the appropriate picture from three options: one picture with the correct gender and number features, one with incorrect gender, and one with incorrect number.

In the second and third experiments, there were 40 English-speaking learners (at low- and high-proficiency combined) and a control group of five native Arabic speakers. The control group consisted of teachers of the Arabic language. In the second experiment, the effect of animacy on the acquisition of gender and number agreement was investigated.[8] In the production task, participants were asked to provide a description of a highlighted picture using an N-Adj phrase. In the comprehension task, each sentence consisted of a determiner, a noun, and an adjective, as shown in (2) (adapted from Rajab, 2017, p. 42; controller in bold, target in italics).

(2) **ha:ða:** **rassa:m-u-n** *ma:her*
this.M.SG painter.M.SG-NOM-INDF talented.M.SG
"This is a talented painter."

For each sentence, the participant again had to select the appropriate picture from three options. The findings of the second experiment showed a decrease in accuracy in picture selection for non-human plural nouns.

[8] Animacy refers to the distinction between human and non-human.

The third experiment was intended to investigate number and gender agreement in the production and comprehension of direct-object clitics, as in (3) (from Rajab, 2017, p. 118; areas of interest in bold; CL = clitic).

(3) (a) hiya tu-ħib-u **al-ʔawla:d**.
she F-love.SG-NOM the-boys(+H).PL.M
'She loves the boys.'

(b) hiya tu-ħib-u-**hum**
she F-love.SG-NOM-CL.PL.M
'She loves them.'

Notice that the clitic *hum* 'them', (3b), agrees in number and gender with the noun *al-ʔawla:d* 'boys', (3a). In the production task, participants listened to a recorded sentence and saw a picture. They were asked to produce a clitic that corresponded to the picture. In the comprehension task, participants listened to a sentence containing a direct-object clitic, and were asked to choose which picture corresponded to the sentence they heard.

The results of the three experiments showed that difficulties with the production and comprehension of N-Adj and direct-object clitic agreement by ELAs are pervasive. The difficulties with production observed in these experiments were markedly greater compared to comprehension. The results also showed that animacy affects the acquisition of gender and number agreement; specifically, targets with a (+) human feature are acquired more readily than ones with a (-) human feature. The whole study also revealed that morphological variability in gender-agreement marking is lower than

that found in number, and that Arabic speakers (i.e., the control group) may make errors in the usage of the dual.

In a study of L2 Arabic gender, Alamry (2014) investigated the acquisition of this form of agreement in a Subj-V structure by learners from different L1 backgrounds. Alamry attempted to determine how the native language might positively or negatively impact acquisition. Thus, participants from two groups were recruited: participants whose L1 has gender agreement, and participants whose L1 does not contain gender agreement. A group of 15 native speakers of Arabic was recruited as controls. Forty L2 Arabic learners did a language-proficiency test; based on the results, they were divided up as follows:

Table 1.1

Partticipants in Alamry (2014)

Group	Level of proficiency	*N*
+Gender language	Intermediate	12
	Advanced	14
-Gender language	Intermediate	6
	Advanced	8

The results were as follows: (1) there was no difference between the learners with or without a grammatical gender system in the L1, suggesting no effect of L1 transfer; (2) although the L2 learners were able to acquire Subj-V gender agreement, they did not perform as acurrately as the native group; (3) proficiency level impacted the acquisition of gender agreement, as the advanced-proficiency learners from both L1 groups performed significantly better than the intermediate-proficiency learners. Alamry concluded that these findings were in line with the FTFA hypothesis, which

predicts that L2 learners can acquire the L2 grammatical gender system even if they do not have a similar system in their L1.

1.6 Overview of the remaining chapters

The remaining chapters can be summarised as follows. Chapters 2 to 4 are concerned with Experiments One to Three, respectively. Experiment One is concerned with agreement between a noun and a predicative adjective in two distance conditions: adjacent vs. separated. In the separated case, a possessive noun plus two attributive adjectives intervene between the noun and the predicative adjective. Experiments Two and Three focus on agreement between a matrix subject and a matrix verb. In Experiment Two, I investigate the same two conditions as in Experiment One. The two agreeing items are separated by a subject-headed RC in this experiment. In Experiment Three, the effects of two predictor variables are examined in a cross-cutting design: RC type (i.e., subject- vs. object-headed) and distance (i.e., short vs. long). In the long condition, the matrix subject and the matrix verb are separated by three extra words. Finally, I conclude the study in Chapter Five.

CHAPTER TWO

EXPERIMENT ONE: NOUN-ADJECTIVE AGEEMENT

2.1 Introduction

The Arabic noun-adjective (N-Adj) agreement system is an interesting research subject because of its intricate behaviour. In this experiment, I examine this type of agreement in verbless sentences. In Arabic, a verbless sentence is composed of a noun and a predicative adjective, as exemplified in (1) (INDF = indefinite; m = masculine; NOM = nominative; SG = singular).

(1) ʔal-kita:b-u dʒadi:d-u-n

the-book.M.SG.NOM new.M.SG-NOM-INDF

'The book is new.'

Notice that the noun *kita:bu* 'book' and the adjective *dʒadi:dun* 'new' agree in terms of gender and number.[9] In addition, there is no copula in this sentence.

In Experiment One, I examine the impact of LD on the processing of gender and number agreement between a noun and a predicative adjective in a verbless sentence in two contrasting syntactic contexts: the noun is adjacent to the predicative adjective, and the noun is separated from the predicative adjective. In the first context, the two agreeing elements are linearly juxtaposed (i.e., no words occur between the two elements). This situation is exemplified in (1) above. In the second context, there are three words between the noun and the predicative adjective: a possessive noun,

[9] The transliteration of Arabic words in this thesis follows the International Phonetic Alphabet.

and two attributive adjectives which modify the possessive noun, as shown in (2) (GEN = genitive).

(2) kita:b-u t^{ʕ}-t^{ʕ}a:lib-i l-mudʒtahid-i
book.M.SG-NOM the-student.M.SG-GEN the-diligent.M.SG-GEN

l-muθa:bir-i dʒadi:d-u-n
the-persistent.M.SG-GEN new.M.SG-NOM-INDF
'The persistent (and) diligent student's book is new.'

Several studies have looked at the effect of distance (i.e., linear distance [LD] and/or structural distance [SD]) in second language (L2) gender and number agreement processing in an N-Adj structure with L2 learners of Spanish, mostly with English as the first language (L1). The specific focus of this body of research has been the effect of distance on the learner's sensitivity to agreement violations. However, there are some methodological concerns surrounding certain features of these studies: they tended to focus on advanced learners (Alemán Bañón et al., 2014; Dowens et al., 2010, 2011; Foote, 2011; Keating, 2005, 2009, 2010); relatively low numbers of subjects took part (Keating, 2010; Paquet, 2018); the potential effects of LD and SD were not distinguished from each other (Alemán Bañón et al., 2014, 2018; Dowens et al., 2010, 2011; Foote, 2011; Gabriele et al., 2013; Keating, 2005, 2009; Lichtman, 2009; Paquet, 2018); reading times (RTs) in the adjacent and separated conditions were difficult to compare (Alemán Bañón et al., 2014, 2018; Dowens et al., 2010; 2011, Foote, 2011); or spillover regions were not investigated systematically (Alemán Bañón et al., 2014, 2018; Gabriele et al., 2013; Keating, 2005, 2009;

Lichtman, 2009; Paquet, 2018). In addition, some of these studies exhibit inconsistencies in the results for processing N-Adj gender agreement (Keating, 2005, 2009, 2010; Lichtman, 2009; Paquet, 2018), and gender and number agreement (Alemán Bañón et al., 2014; Dowens et al., 2010, 2011; Gabriele et al., 2013). These inconsistencies may have been due, at least in part, to the small numbers of participants recruited in Keating (2010) and Paquet (2018).

The current experiment addresses the issues listed above; each of these is addressed in Section 2.3.2. The study also extends existing work on distance effects in N-Adj gender- and number-agreement processing by examining L2 Arabic: to my knowledge, no study has investigated this learner group before in a study concerned with these effects.

The present chapter has the following structure. Section 2.2 provides some relevant theoretical background on Arabic morphosyntax. A review of earlier work relevant to L2 N-Adj agreement is presented in Section 2.3. I state the focus of the present experiment in Section 2.4. The methodology that will be used in the current experiment, and also in the two experiments which follow, will be described in Section 2.5. The results of the present study are reported in Section 2.6, and their significance is discussed in Section 2.7.

2.2 Theoretical background

This section provides the theoretical background on Arabic morphosyntax which is relevant to Experiment One. It is structured as follows. Section 2.2.1 contains pertinent information about nouns. Section 2.2.2 is an overview of adjectives. Agreement between nouns and adjectives is discussed in Section 2.2.3. Relevant

noun-phrase (NP) types are presented in Section 2.2.4. Background concerning verbless sentences is provided in Section 2.2.5.

2.2.1 Nouns

Arabic nouns, as in many languages, are words that refer to people, places, things or concepts. They are classified into various types, such as proper nouns, which include names of people or places (e.g., ‘Ali’, ‘Amman’); common nouns, which refer to general objects (e.g., *qahwa* ‘coffee’, *findʒa:n* ‘cup’); or verbal nouns, which indicate the action represented by the associated verb. For instance, the verbal noun *qira:ʔah* ‘reading’ is derived from the verb *qaraʔa* ‘read’.

An Arabic noun can be based on a triliteral root (e.g., *q-r-ʔ* ‘read’) or a quadriliteral root (e.g., *d-h-w-r* ‘decline’; Alzahrani, 2019; Ryding, 2005). Nouns are formed by adding prefixes, infixes, or suffixes to the lexical root. Consider (3) (F = feminine); this example is based on the triliteral root *q-r-ʔ* ‘read’, and illustrates infix and suffix insertion.

(3) qa:riʔ-ah read-F.SG

Arabic nouns can be categorised into two genders: masculine and feminine. Masculine nouns, which are considered the base form of a word, are often indicated by the absence of a morpheme. The feminine form is marked with the suffix *-ah* or *-at*. The masculine and feminine forms for the noun *tˤa:lib* ‘student’ are presented in (4a) and (4b), respectively.

(4) (a) kursi: chair.M.SG

(b) na:fið-ah window-F.SG

The noun *kurski:* ‘chair’ in (4a) is masculine; hence, it is a bare form. By contrast, the feminine noun *na:fiðah* ‘window’ ends with the suffix *-ah*. Other feminine nouns with semantically arbitrary gender are *ħarb* ‘war’ and *nafs* ‘self, spirit’.

By contrast, as far as nouns are concerned, the English gender system is uncomplicated. Sometimes, nouns in English can be changed to feminine by adding the suffix ‘-ess’ (e.g., ‘prince’ → ‘princess’) or by changing the second part of the word from ‘-man’ to ‘-woman’ (e.g., ‘policeman’ → ‘policewoman’). However, modifiers of a noun in English (e.g., adjectives) exhibit no gender agreement at all.

The Arabic number system has three categories: singular, dual and plural. The singular is the basic form of the noun. Yet gender plays a significant role here as well, as the singular feminine is formed by adding the suffix *-ah*, while the singular masculine has no morpheme attached to it; see (4) above.

Nouns can also be inflected for the dual in Arabic. This is used to denote two entities of the same kind as the singular noun. The dual is marked by the suffix *-a:ni* in the nominative case, as in (5), while *-ayni is* suffixed to the noun to mark either the accusative or genitive case, as in (6). The dual can also be either masculine or feminine; this contrast is exemplified in (5a) and (5b), and in (6a) and (6b), respectively (ACC = accusative).

(5) (a) tˤa:lib-a:ni student.M-DUAL.NOM ‘two (male) students’

(b) tˤa:lib-at-a:ni student-F-DUAL.NOM ‘two (female) students’

(6) (a) tˤa:lib-ayni student.M-DUAL.ACC/GEN

(b) tˤa:lib-at-ayni student-F-DUAL.ACC/GEN

The plural is used for a set of three or more entities. For plural nouns, animacy is an essential factor in determining feature compatibility, as plural agreement is sensitive to the distinction between human and non-human elements. Also, nouns in the plural can be either regular or irregular. Regular plural nouns form the 'sound' plural, and irregulars form the 'broken' plural. Sound plurals are nouns which follow a certain pattern based on the singular form of the noun (i.e., by adding a suffix to the singular noun). The sound plural is formed differently depending on the gender of the noun (Ryding, 2005):

i. Masculine sound plural: In the nominative case, the suffix *-u:na* is attached; in the accusative or genitive case, *-i:na* is attached. These two suffixes are exemplified in (7a) and (7b), respectively (PL = plural).

(7) (a) muhandis-u:na engineer.M-PL.NOM

(b) muhandis-i:na engineer.M-PL.ACC/GEN

All masculine sound plural nouns refer to male human beings, or mixed groups of male and female humans.

ii. Feminine sound plural: In the nominative case, the suffix *-a:t-u* is attached; in the accusative or genitive case, *-a:t-i* is attached. These two suffixes are shown in (8a) and (8b), respectively.

(8) (a) tˤa:lib-a:t-u student-F-PL.NOM

(b) tˤa:lib-a:t-i student-F-PL.ACC/GEN

Also, a non-human noun in the feminine singular can have a human sound-plural feminine form. These two forms are illustrated in (9a) and (9b), respectively.

(9) (a) kalim-ah speech-F.SG

(b) kalim-a:t speech-F.PL

By contrast, the broken plural is formed by 'breaking' the noun internally. This can be done by an internal vowel shift only, or by a combination of internal vowel shift and the addition of a suffix. Broken plurals have more than thirty patterns and irregularities (Alrashed, 2021). Examples of broken-plural patterns are given in Table 2.1 (adapted from McCarthy & Prince, 1990, p. 215; C = consonant, V = vowel).

Table 2.1

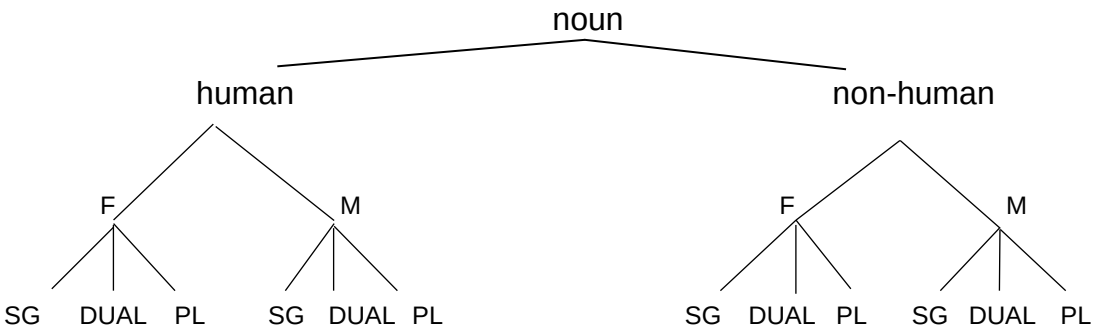
Examples of Broken Plurals

Singular	*Plural*	*Syllable structure*	*Meaning*
tˤa:lib	tˤalabah	CVCVCVC	'student(s)'
kita:b	kutub	CVCVCV	'book(s)'

To summarise, the inflectional possibilities for an Arabic noun in terms of animacy (i.e., human vs. non-human), gender and number are schematised in Figure 2.1.

Figure 2.1

Schema of Inflectional Forms of Arabic Nouns



Arabic nouns are also inflected for case. The case is determined by the grammatical status of the noun in the sentence. For example, nominative case is used for a subject, while the noun will be in the accusative case if it is an object, or if it is preceded by a preposition. In the nominative, a singular masculine or feminine stem takes the short vowel *-u* as its case marker, as in (10a) and (10b), respectively; a dual masculine or feminine stem has the suffix *-a:ni*, as in (11a) and (11b), respectively; a human masculine sound plural has the suffix *-u:na*, as in (12a); and a human feminine sound plural has the suffix *-a:t-u*, as exemplified in (12b) (H = human).

(10) (a) ʔal-kurssiyy-u
the-chair.M.SG-NOM

(b) ʔat-tawsˁiy-at-u
the-recommendation-F.SG-NOM

(11) (a) ʔal-qara:r-a:ni
the-decision.M-DUAL.NOM

(b) ʔaʃ-ʃarik-at-a:ni
the-company-F-DUAL.NOM

(12) (a) ʔal-mudarris-u:na
the-teacher(+H).M-PL.NOM

(b) ʔal-muʃrif-a:t-u
the-supervisor(+H).F-PL-NOM

Nouns are definite if prefixed by the definite article *ʔal* ‘the’, or used as the first noun in a construct-state structure (CS; Ryding, 2005). Further details on the CS will be provided in Section 2.2.4.2.

2.2.2 Adjectives

Like nouns, verbs and prepositions, adjectives are a lexical category which delivers descriptive and semantic content (Alhawary, 2009a). The main use of adjectives is as modifiers. There are two types of adjectives in Arabic: attributive and predicative; these types are exemplified in (13a) and (13b), respectively (adapted from Alhawary, 2009a, p. 7).

(13) (a) ʔar-raʒul-u l-dʒari:ħ-u
the-man.M.SG-NOM the-wounded.M.SG-NOM
‘the wounded man’

(b) ʔatˁ-tˁalib-u dʒadid-u-n
the-student.M.SG-NOM new-M.SG-NOM-INDF
‘The student (is) new.’

Adjectives may also be modified by an adverb, such as one denoting degree (e.g., *dʒiddan* ‘very’).

2.2.3 Noun-adjective agreement in Arabic

Nominal agreement in Arabic can be phrasal or sentential. Both types of agreement include, but are not limited to, matching properties between a head noun and its modifier. Phrasal agreement involves a head noun and an attributive adjective (see Section 2.2.4.1). In this chapter, sentential agreement involves a head noun and a predicative adjective in a so-called 'verbless' sentence (see Section 2.2.5).

In Arabic, an attributive or predicative adjective must be located after the modified noun. These two types of adjectives also have much in common on the level of how N-Adj agreement operates. For instance, as modifiers, they must agree with the head noun in gender (masculine or feminine), number (singular, dual or plural), case (nominative, accusative or genitive) and (for plurals only) animacy. Animacy and gender are inherent features of the noun, while the number and case of the noun can vary. Human plurals trigger agreement on nominal modifiers (e.g., adjectives), as shown for the masculine and feminine nouns in (14a) and (14b), respectively.

(14) (a) ʔal-mudarris-u:na l-mutaħamis-u:na
the-teacher(+H).M-PL.NOM the-keen.M-PL.NOM
'the keen (male) teachers'

(b) ʔal-mudarris-a:t-u l-mutaħamis-a:t-u
the-teacher(+H)-F.PL-NOM the-keen-F.PL-NOM
'the keen (female) teachers'

By contrast, a non-human plural triggers the singular feminine feature on the adjective regardless of the noun's gender, as in (15).

(15) ʔal-maxtu:t-a:t-u l-qadi:m-at-u

the-manuscript(-H)-F.PL-NOM the-old-F.SG-NOM

'the old manuscripts'

To summarise, Rajab (2017, p. 11) presents the adjectival agreement framework shown in Table 2.2.

Table 2.2

Schematic Picture of Adjectival Agreement in Arabic

	Masculine		*Feminine*	
	Human	*Non-human*	*Human*	*Non-human*
Singular	M.SG	M.SG	F.SG	F.SG
Dual	M.DUAL	M.DUAL	F.DUAL	F.DUAL
Plural	M.PL	F.SG	F.PL	F.SG

This table indicates the agreement features that appear on the adjective when modifying a noun, regardless of whether the adjective is attributive or predicative. Notice that, when the noun is plural, the animacy of the noun comes into play; specifically, the non-human morphological reflex for the masculine or feminine plural is the feminine singular.

2.2.4 Noun phrases

The two types of NP that are relevant to Experiment One are the N-Adj phrase (N-AdjP) and the possessive phrase (PossP; formed via the CS). In this section, I will provide a brief overview of the syntactic and morphological properties of the above-

mentioned phrases. Section 2.2.4.1 is concerned with the N-AdjP, and Section 2.2.4.2 presents the CS.

2.2.4.1 Noun-adjective phrases

As mentioned in Section 2.2.2, adjectives in Arabic can be either attributive or predicative. Also, an attributive adjective is usually located in the postnominal position in this language, while in English it occupies the prenominal position.[10] This contrast is illustrated in (16).

(16) ʔal-ʔusta:ð-at-u l-ʤadi:d-at-u
the-professor-F.SG-NOM the-new-F.SG-NOM
'the new (female) professor'

Attributive adjectives show agreement properties with the noun they modify in terms of gender, number, case, and definiteness.[11] To illustrate, the sentence in (16) above shows agreement between a head noun and an attributive adjective in terms of the four morphological features just listed; specifically, the head noun is a feminine singular definite noun in the nominative case.

In an Arabic determiner phrase (DP), it is possible to have more than one adjective describe the noun. However, adjectives in Arabic are not separated by the conjunction 'and', as is possible in English; see (17).

[10] An attributive adjective in Arabic can also occur *before* the noun, acting as a prenominal adjective (Assiri, 2011; Fakih, 2017; Fehri, 1999; Kremers, 2003). Later in this section, an example of an attributive adjective in the prenominal position will be presented. However, the focus of the present work is on postnominal adjectives (i.e., the more frequently occurring pattern); hence, the experimental stimuli only include this type of adjective.

[11] In Arabic, both the noun and the attributive adjective must be marked for definiteness, regardless of whether they are definite or indefinite. In (16), while the definite article *ʔal* 'the' does not inflect for gender or number (Fakih, 2016), it must be copied onto the attributive adjective that modifies it.

(17) ʔal-ʔusta:ð-at-u l-ʤadi:d-at-u ʔað-ðakiyy-at-u
the-professor-F.SG-NOM the-new-F.SG-NOM the-smart-F.SG-NOM
‘the smart (and) new professor’

Also, adjectives in languages generally are either subjective or objective, and this has implications for adjective order in Arabic when a noun is modified by more than one adjective. Kachakeche and Scontras (2020) found that, when a noun is modified by two attributive adjectives in Arabic, native Arabic speakers prefer to have an objective adjective closer to the noun than a subjective adjective, as shown in (18) (adapted from Kachakeche & Scontras, 2020, p. 423).

(18) ʔal-baħr-u l-ʔazraq-u l-wa:seʕ
the-sea.M.SG-NOM the-blue.M.SG-NOM the-wide.M.SG
‘the wide (and) blue sea’

The adjective *wa:seʕ* ‘wide’ is subjective, while the adjective *ʔazraqu* ‘blue’ is objective; therefore, *ʔazraqu* is closer to than noun than *wa:seʕ* is. This is also true of English: in the translation of (18), notice that ‘blue’ is closer to the noun than ‘wide’ is.

2.2.4.2 Construct state

Sometimes a noun can take a syntactic dependent, such as a genitive complement. A noun that takes a genitive complement in Arabic forms a CS. The CS is well-known in Semitic languages, and is called *ʔida:fa* in Arabic (Ryding, 2005).

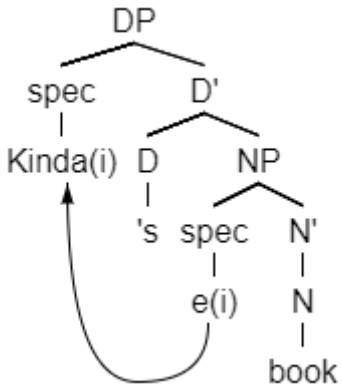
Generally, the CS has the structure ‘noun + noun’; in other words, there is no material between the two nouns. The first noun is the possessum and the second noun (which bears genitive case) is the possessor. This structure differs from the possessive phrase (PossP) in English, where the possessor comes before the possessum and the possessive morpheme ‘-s’ must be attached to the possessor.

In accordance with Abney’s (1987) DP hypothesis, the PossP in English is a DP headed by the possessive morpheme.[12] I present an example in (19); the syntactic representation of this structure is in Figure 2.2.

(19) ‘Kinda’s book’[13]

Figure 2.2

Syntactic Representation of (19)



Note that the possessor ‘Kinda’ moves from Spec NP to Spec DP via head-to-head movement to receive case from the ‘-’s’ morpheme residing in D. By contrast, the possessum 'book’ does not move.

[12] For an alternative analysis of the PossP in English, see Chomsky (1986). In Chomsky’s analysis, the possessor is located in the specifier (Spec) position of a noun phrase (NP) headed by the possessum.
[13] ‘Kinda’ is definite, as it is a proper noun.

Instead of head-to-head movement (Abney, 1987), Shlonsky (2004) analysed CS structure in Arabic (and also Hebrew) in terms of phrasal movement. Shlonsky claims that the head of the CS is merged as the head of the NP; according to this analysis, the genitive noun is a complement, rather than a specifier of the DP. The noun, according to Shlonsky, assigns genitive case to the complement and constrains its movement. Then the whole NP moves to spec DP.[14] This analysis implies that the definiteness of the CS comes from the definiteness of the complement. I exemplify this in (20) and Figure 2.3.

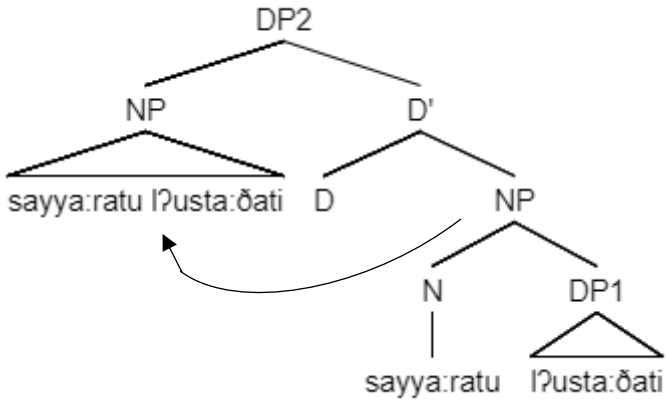
(20) sayya:r-at-u l-ʔusta:ð-at-i

car-F.SG-NOM the-professor-F.SG-GEN

'The professor's car.'

Figure 2.3

Syntactic Representation of (20)



[14] The phrasal movement of the whole NP suggests 'pied piping', according to which the noun and its complement move together.

Notice the difference between the English PossP in (19) and the Arabic CS in (20). In the former structure, the possessor undergoes movement; in the latter, the possessor and possessum move together.

Another thing to note is that the two nouns that form the CS in Arabic do not need to agree in number, gender, case or definiteness, unlike what happens in other types of NPs in this language. The first noun (i.e., the possessum) in the CS is not marked for definiteness, as it receives its definiteness from the second noun (i.e., the possessor; Benmamoun, 2000). Consider (21).

(21) kita:b-a: tˤ-tˤa:lib-i

book.M-DUAL.NOM the-student.M.SG-GEN

'the student's two books'

Also, the possessum (i.e., *kita:ba*: 'two books') is dual in number, and disagrees with the possessor (i.e., *tˤtˤa:libi* 'student') in terms of number.

In a CS, an attributive adjective may follow the second noun. If so, this adjective carries the number, gender, case and definiteness features of this noun, as shown in (22).

(22) sayya:ra-t-u l-ʔusta:ð-at-i l-ʤadi:d-at-i

car-F.SG-NOM the-professor-F.SG-GEN the-new-F.SG-GEN

'the new professor's car' (i.e., 'the car belonging to the new professor')

Here are some further characteristics of the CS that should be noted:

i. Masculine and feminine human dual nouns are marked with the suffix *-a:ni*. If a noun of this type occurs as the first element in a CS, then it is obligatory to delete the suffix *-ni* and keep *-a:,* as shown in (23a) and (23b).

(23) (a) ʔal-waraq-at-a:ni
the-paper-F-DUAL.NOM
'two papers'

(b) waraq-at-a: tˤ-tˤa:lib-i
paper-F-DUAL.NOM the-student.M.SG-GEN
'the student's two papers'

ii. The masculine plural on nouns is marked by the suffix *-u:na.* When the first noun in a CS is masculine plural, the *-na* must be deleted, as demonstrated in (24a) and (24b).[15]

(24) (a) ʔal-mudaris-u:na
the- teacher.M-PL.NOM
'the teachers'

(b) mudaris-u: l-ki:mya:ʔ-i
teacher.M-PL.NOM the-chemistry.M.SG-GEN
'the chemistry teachers'

[15] No change is required in the suffix used on feminine plural nouns when a noun of this type is the first element in a CS structure.

2.2.5 Verbless sentences

A sentence in Arabic can be composed of a subject DP and a non-verbal predicate. This type of sentence is called a 'verbless' (or 'equational') sentence (Benmamoun, 2000, 2008). A verbless sentence is an independent finite sentence, must have a definite subject DP, only occurs in the present tense, and does not contain a copular verb. Al-Balushi (2012), Aoun et al. (2009) and Benmamoun (2008) identify three types of predicates in a verbless sentence: an NP, as in (25a); an adjective phrase (AdjP), as in (25b) (adapted from Aoun et al., 2009, p. 4); or a prepositional phrase (PP), as in (25c) (INDF = indefinite).

(25) (a) Qusay-un[16] tˤa:lib-u-n
Qusay-NOM student.M.SG-NOM-INDF
'Qusay is a student'

(b) ʔal-kita:b-u ʤadi:d-u-n
the-book.M.SG-NOM new.SG.M-NOM-INDF
'The book is new.'

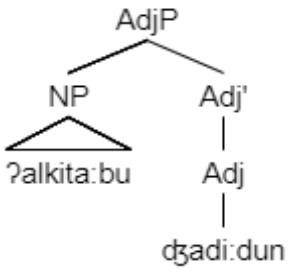
(c) ʔal-kita:b-u ʕala: tˤ-tˤa:wil-at-i
the-book.M.SG-NOM on the-table-F.SG-GEN
'The book is on the table.'

[16] 'Qusay' is a male proper name. This is the reason why gender and indefiniteness are not indicated in the gloss.

Within the generative approach, a verbless sentence is assumed to consist of a lexical layer, and a functional layer that contains a temporal projection called a tense phrase (TP). The debate among researchers revolves around whether or not verbless sentences are clauses with functional projections. If they are not, they only contain projections of lexical elements (i.e., AdjP, PP or NP). Under the latter analysis, the sentence in (25b) would have the structure shown in Figure 2.4 (adapted from Ellafi, 2005, p. 188). This can be called the 'non-clausal' analysis of a verbless sentence.

Figure 2.4

Non-Clausal Analysis of (25b)

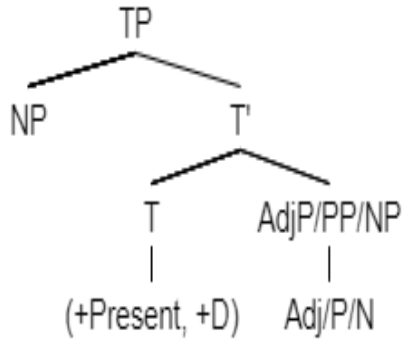


Alternatively, a verbless sentence can be analysed as a sentence in the present tense that has the same set of functional projections as a past- or future-tense sentence containing a copular verb. Along these lines, Shlonsky (1997) and Benmamoun (2000, 2008) rejected the assumption that a verbless sentence in the present tense has a null or omitted copula (Bakir, 1980; Fehri, 1993). Rather, Benmamoun (2008) claimed that verbless sentences are true to their name, proposing that such a sentence contains a functional layer headed by T, but does not contain a copula; thus, there is no verbal projection (i.e., verb phrase [VP]) in this sentence. The T head dominates a lexical layer headed by a non-verbal predicate (i.e., AdjP, PP or

NP). This can be called the ‘clausal’ analysis of this type of sentence. The relevant structure is depicted in Figure 2.5 (adapted from Benmamoun, 2008, p. 115).

Figure 2.5

Clausal Analysis of a Verbless Sentence

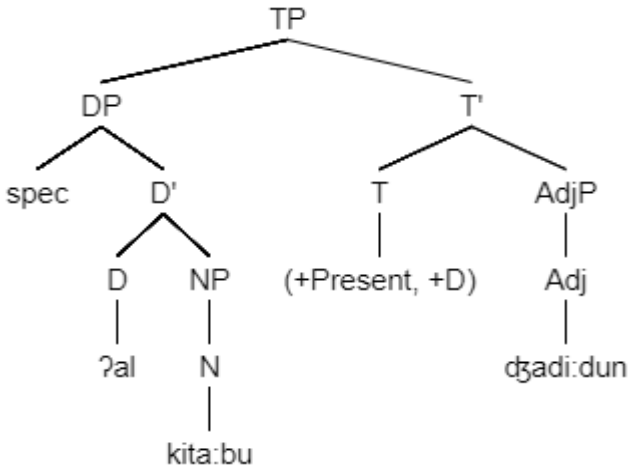


In the above representation, the sentence has no verbal features in the present tense because “deictic present tense is not (+V) and therefore does not require a verbal head to check any of its features” (Benmamoun, 2000, p. 49).[17] Hence, a verbless sentence contains tense features which are not phonetically realised (Benmamoun, 2000, 2008; Jelinek, 1981). Under this analysis, a verbless sentence like the one in (25b) above would have the structure in Figure 2.6 (adapted from Benmamoun, 2000).

[17] Benmamoun refers to the present tense that does not include a copula as ‘deictic’ present tense, and to the present tense that requires a copula as ‘generic’ present tense.

Figure 2.6

Syntactic Representation of (25b)



In the present experiment, I will adopt the 'clausal' analysis of verbless sentences proposed by Benmamoun (2000, 2008).[18] It is necessary to adopt a particular analysis of the syntax of verbless sentences in order to calculate the SD between the controller and the target in this construction.

2.3 Literature review

This section is organised as follows. Section 2.3.1 summarises existing work on the effect of distance on learners' sensitivity to agreement anomalies in N-Adj agreement processing in the L2. Limitations and gaps in these studies are identified in Section 2.3.2.

[18] Other analyses of verbless sentences have also been proposed. Al-Balushi (2012), Bakir (1980) and Soltan (2006) argued that a verbless sentence is composed of a topic, not a subject, followed by a comment. In Al-Balushi (2012), the DP is located in Spec Topic Phrase (TopP); in Soltan (2007), it occurs in Spec TP.

2.3.1 Summaries of previous studies

To the best of my knowledge, there are no studies investigating the effect of distance on learners' sensitivity to ungrammaticality in N-Adj agreement that deal specifically with English-speaking learners of Arabic (ELAs). Hence, I will focus here on studies that examine N-Adj agreement between a noun and an adjective in L2 Spanish: like those in Arabic, Spanish adjectives agree with a modified noun in terms of gender and number. In most of these studies, the L1 was English (i.e., Alemán Bañón et al., 2014, 2018; Dowens et al., 2010; Gabriele et al., 2013; Keating, 2005, 2009, 2010; Lichtman, 2009); however, the L1 in Dowens et al. (2011) was Chinese, while in Paquet (2018) it was French.

Keating (2005) tested the effect of SD using an online eye-tracking task. He recruited 58 participants: 41 English-speaking learners of Spanish (18 beginners, 15 intermediates, and 8 at advanced level) and 17 native speakers of Spanish. Gender was the type of agreement under investigation. Consistent with the Structural Distance Hypothesis (O'Grady, 1997, 2003), Keating proposed a modified version named the Structural Distance Principle (SDP): "The more structural nodes that separate a controller from its target, the more difficult it will be to perform the structural computation" (p. 31). This principle suggests that L2 learners will succeed in processing agreement *within* a phrase, but not between phrases or across clause boundaries.

Keating's study measured the eye movements of learners at the target adjective when processing grammatical and ungrammatical sentences. I exemplify phrasal agreement (i.e., the adjective is located within the same DP as the noun it modifies) in (26a), interphrasal agreement (i.e., the adjective is located within a VP) in (26b), and clausal agreement (i.e., the adjective is located within a complementiser phrase [CP])

in (26c) (examples adapted from Keating, 2005, pp. 134-135; controller in bold, target in italics).

(26) (a) [$_{DP}$ Una [$_{NP}$ **camisa** [$_{AdjP}$ *roja*]]] combina muy bien con pantalones negros.

'A red shirt goes very well with black pants.'

SD = 1 node (i.e., AdjP)

LD = 0 word

(b) [$_{DP}$ Una [$_{NP}$ **pregunta** [$_{TP}$ [$_{VP}$ es bastante [$_{AdjP}$ *buena*]]]]] cuando hace pensar a la gente.

'A question is pretty good when it makes people think.'

SD = 5 nodes (i.e., NP, DP, TP, VP, AdjP)

LD = 2 words (i.e., *es bastante*)

(c) [$_{DP}$ Un [$_{NP}$ **libro** [$_{TP}$ [$_{VP}$ recibe bastante atención [$_{CP}$ quando [$_{TP}$ [$_{VP}$ es [$_{AdjP}$ *nuevo*]]]]]]] y popular.

'A book gets a lot of attention when it is new and popular.'

SD = 8 nodes (i.e., NP, DP, TP, VP, CP, TP, VP, AdjP)

LD = 5 words (i.e., *recibe bastante atención cuando es*)

Note that the SD between the controller and the target increases as we move from (26a) to (26c).[19]

[19] As indicated by the calculations (which are my own), in (26), the LD also increases from (26a) to (26c); however, Keating did not focus on this property. I will return to this point in Section 2.3.2.

Keating found that, for the advanced L2 group only, learners showed sensitivity to agreement violations between a target and its controller in the adjacent condition only, as exemplified in (26a). This was based on the fact that, in this distance condition, the advanced learners recorded longer fixation times for adjectives in ungrammatical sentences compared to grammatical ones. However, the same group of learners did not show sensitivity to gender-agreement anomalies when the controller noun and its target adjective were not in the same phrase, as in (26b) and (26c). The native-speaker group were sensitive to agreement violations regardless of the distance between controller and target, recording longer reading times (RTs) on adjectives when they were ungrammatical than when they were grammatical. Keating concluded that the results for the advanced L2 learners supported the SDP.

Keating argued that the inability of the L2 beginner- and intermediate-proficiency level learners to process agreement in native-like fashion, regardless of how far apart the controller and target were in structural terms, was due to processing deficits (i.e., the effect of SD on agreement processing) rather than competence deficits (i.e., a failure to build a native-like representation of agreement per se). Hence, his results go against the Failed Functional Features Hypothesis (FFFH; Hawkins & Chan, 1997), which claims that L2 learners are unable to acquire a certain feature if it is not found in their native language. Instead, Keating's results are in line with the Full Transfer Full Access Hypothesis (FTFA) put forward by Schwartz and Sprouse (1994, 1996), which proposes that learners *are* able to attain L2 syntactic properties even if these properties are not found in their L1. The learners in Keating's study showed evidence of having syntactic gender agreement in their underlying competence, but still had difficulty computing agreement as the distance between the two elements increased. Specifically, the advanced participants in Keating (2005) showed some

indication of having gender agreement in their underlying competence, as they were able to detect errors when the two agreeing elements were adjacent.

Keating (2009) expanded his earlier work on the effect of SD on L2 gender agreement processing by testing the predictions of the Shallow Structure Hypothesis (SSH; Clahsen & Felser, 2006; Clahsen et al., 2010), which proposes that L2 learners are not able to process agreement dependencies if they are non-local (i.e., the two agreeing elements occur in different phrases). The sentences used were the same as in Keating (2005) (see [26] for examples); however, a slightly larger number of advanced English-speaking learners of Spanish was used than in the new study.

Forty-four English-speaking learners of Spanish (i.e., 18 beginners, 14 intermediates, and 12 at advanced level) and 17 native speakers of Spanish did a self-paced reading-comprehension task which involved eye-tracking. The task included 36 sentences. Each of the three relevant structures was presented in 12 sentences; six of these were grammatical and the rest ungrammatical. Consistent with the SSH, Keating predicted that the L2 learners in the study, regardless of their L2 proficiency, would be sensitive to gender-agreement errors between the two agreeing elements only in the local domain (i.e., within the DP).

The RTs of interest were the ones at the critical region (i.e., the adjective). To factor out any effect of misinterpreting L2 word meanings which might have affected the participants' eye movements, a sample of 103 random native-Spanish-speaking participants did a judgment task in which they were asked to read each Spanish sentence for meaning, and decide whether the English translation conveyed the same meaning by choosing either 'yes' or 'no'. This helped in selecting nouns and adjectives that were suitable for use in the stimulus sentences. Keating used nouns and

adjectives that were known to 90% of the native-Spanish-speaking participants who did the judgment task.

The results showed that the advanced L2 learners in this study were sensitive to gender errors only at the phrasal level; specifically, they had longer fixation times for ungrammatical than grammatical agreement in this distance condition. This result supported the SSH. On the other hand, the beginner and intermediate learners were insensitive to gender-agreement violations in all three distance conditions (i.e., phrasal, interphrasal and clausal).

Keating (2010) investigated the effect of LD on L2 learners' sensitivity to gender-agreement violations in an N-Adj structure. As in Keating (2009), a reading-comprehension task was used; this was done by 13 advanced English-speaking learners of Spanish and 18 native Spanish speakers. However, unlike Keating (2009), Keating (2010) controlled for SD using O'Grady's (1997) metric for measuring this property. To make this possible, Keating focused on predicative adjectives only. This enabled him to investigate the moderating effect of LD on L2 learners' sensitivity to gender violations on a target adjective. The adjectives were one, four and seven words distant from the controller noun, as shown in (27) (adapted from Keating, 2010, p. 119; controller in bold, target in italics).

(27) (a) [$_{TP}$ La **tienda** [$_{VP}$ está *abierta/*abierto*]] los sábados y domingos por la tarde.

'The store is open Saturdays and Sundays in the afternoon.'

LD = 1 word (i.e., *está*)

(b) [$_{TP}$ La **mochila** de la estudiante [$_{VP}$ está *llena/*lleno* de libros de texto.]]

'The backpack of the girl is filled with textbooks.'

LD = 4 words (i.e., *de la estudiante está*)

(c) [$_{TP}$ La **falda** en la tienda de ropa femenina [$_{VP}$ es *roja/*rojo* y viene de Italia.]]

'The skirt in the store of women's clothing is red and comes from Italy.'

LD = 7 words (i.e., *en la tienda de ropa femenina es*)

Notice that the SD is the same in all of these sentences, as the target adjective is separated from the noun by one syntactic node (i.e., VP) in each case.

The RTs showed that the processing of agreement by the L2 learners and the native Spanish speakers was affected by LD. The learners were sensitive to agreement violations in one distance condition only: they had longer RTs for adjectives that were one word away from the noun, but not for adjectives that were distant by four or seven words. By contrast, the native speakers showed sensitivity to agreement violations when the adjective was one word or four words away from the noun, but not when it was seven words away from the noun.

Lichtman (2009) investigated the effects of SD and LD on N-Adj gender agreement acquisition by English-speaking learners of Spanish.[20] In all, 38 L2 learners (14 beginners and 24 intermediates) and 10 native speakers of Spanish took part. The L2 learners were university students in their first, second, third and fourth semester of

[20] As we shall see shortly, Lichtman used offline tasks only. Strictly speaking, this type of task is intended to tap into L2 acquisition (i.e., competence) rather than processing (i.e., performance). Even so, I have included this study in this review on the grounds that the findings have at least some relevance to the issue of processing in the L2. Later in this section, I also summarise a study by Paquet (2018) which used three tiered tasks, one of which was an offline task.

Spanish classes. Lichtman's study aimed to examine the effect of both types of distance by comparing learners' sensitivity to errors in agreement inflection in an N-Adj construction. The intervening structures were an attributive adjective, as shown in (28a); a predicative adjective, as in (28b); a predicative adjective and a PP, as in (28c); and a predicative adjective and a relative clause (RC), as in (28d). In (28b), both the LD and the SD between controller and target were higher than in (28a). To investigate the effect of LD, Lichtman increased this property relative to (28b) by adding a PP as an intervening construction while holding SD constant, as in (28c). According to Lichtman, adding an RC as an intervening construction again increased the SD between the controller and the target, as exemplified in (28d), while keeping the LD between these items the same as in (28c) (adapted from Lichtman, 2009, p. 238; controller in bold, target in italics).[21]

(28) (a) En mi clase, hay [$_{DP}$ un [$_{NP}$ **chico** [$_{AdjP}$ *simpatico*]].

'In my class, there's a nice.M boy.M.'

LD = 0 word

SD = 1 node (i.e., AdjP)

(b) En mi oficina, [$_{DP}$ el [$_{NP}$ **director** [$_{TP}$ [$_{VP}$ es [$_{AdjP}$ *simpatico*]]]]].

'In my office, the director.M is nice.M.'

LD = 1 word (i.e., *es*)

SD = 5 nodes (i.e., NP, DP, TP, VP, AdjP)

[21] Lichtman did not formally calculate the SD between the controller noun and the target adjective in each distance condition. The calculations included in (28) are my own.

(c) [$_{DP}$ El [$_{NP}$ **chico** [$_{PP}$ en mi apartamento]]] [$_{TP}$ [$_{VP}$ es [$_{AdjP}$ *antipático*]].

'The boy.M in my apartment is nice.M.'

LD = 4 words (i.e., *en mi apartamento es*)

SD = 5 nodes (i.e., NP, DP, TP, VP, AdjP)

(d) [$_{DP}$ El [$_{NP}$ **profesor** [$_{RC}$ que trabaja conmigo]]] [$_{TP}$ [$_{VP}$ es [$_{AdjP}$ *simpatico*]].

'The professor.M that works with me is nice.M.'

LD = 4 words (i.e., *que trabaja conmigo es*)

SD = 5 nodes (i.e., NP, DP, TP, VP, AdjP)

Lichtman employed two offline paper-based tasks. The first one was a grammaticality-judgment task (GJT); this had a response scale ranging from '1' (unacceptable) to '4' (acceptable), and also included the option '¿?' in case the participant did not understand the item. To identify any confounding influences other than distance that might have affected participants' judgments, Lichtman asked those who had chosen '1' or '2' on the scale to circle the word(s) that made the sentence unacceptable to them. The second task was a forced-choice task. The participants were asked to choose the correct form of the adjective. This task was intended to examine the participants' knowledge of agreement between a noun, and either an attributive or predicative adjective.

Lichtman predicted that the acquisition of L2 N-Adj gender agreement would be affected by LD or SD only for the beginner group.[22] In the GJT, the native Spanish speakers were able to rate the sentences correctly. Most of the intermediate learners

[22] A cloze test was employed to determine the participant's level of proficiency. Based on the results, participants were categorised into beginners and intermediates.

rated the sentences similarly to the native speakers, though they rated the ungrammatical sentences at around 2 rather 1 on the scale. The beginner learners, on the other hand, were less accurate in recognising ungrammaticality in both distance conditions. For the forced-choice task, the intermediates were able to detect errors on adjectives, but again the beginners showed less accuracy in detecting errors than the intermediates. Hence, the overall results confirmed Lichtman's prediction.

Based on the results from the L2 learners in the study, Lichtman proposed five stages of ability to distinguish between grammatical and ungrammatical agreement. In stage 1, learners are unable to detect agreement violations in any distance condition. In stage 2, they are able to detect violations in the adjacent condition (i.e., LD = 0; attributive adjective as in [28a] above) only. In stage 3, they can do this when the LD is zero or 1 (i.e., a predicative adjective, as in [28b]). In stage 4, learners can detect violations when the LD is zero, 1, or 4, if the intervening construction is a PP, as in (28c), but not if it is an RC, as in (28d). In stage 5, learners can detect errors at all levels of LD or SD (even if the intervening construction is an RC, as in [28d]). Most of the intermediate learners in Lichtman's study (i.e., 12 of them) were at stage 5, while the beginners were at stage 1, with two exceptions that were at stage 5.

In a study using event-related potentials (ERPs), Dowens et al. (2010) recorded the brain activity of a group of 22 high-proficiency English-speaking learners of Spanish. Two types of gender and number agreement were investigated: the first was between a determiner and a following noun; the second was within a predicative-adjective structure. This means that agreement was manipulated at two SD levels: within the DP (i.e., determiner and noun), as in (29a), and across a VP boundary, as in (29b) (adapted from Dowens et al., 2010, p. 1874; controller in bold, target in italics).

(29) (a) [$_{DP}$ El/La/Los [$_{NP}$ *suelo*] está plano y bien acabado.

'The.$_{M\text{-}SG/F\text{-}SG/M\text{-}PL}$ floor.$_{M\text{-}SG}$ is flat and well finished.'

SD = 1 node (i.e., NP)

(b) [$_{DP}$ El [$_{NP}$ **suelo** [$_{TP}$ está [$_{AdjP}$ *plano/plana/planos*]]] y bien acabado.

'The.$_{M\text{-}SG}$ floor.$_{M\text{-}SG}$ is flat.$_{M\text{-}SG/F\text{-}SG\text{-}M\text{-}PL}$ and well finished.'

SD = 4 nodes (i.e., NP, DP, TP, AdjP)

One hundred and twenty stimulus sentences were employed. The results showed that learners were sensitive to agreement violations within a DP, but not across a VP boundary. This indicates that the participants' sensitivity to these anomalies was impacted by SD.

In a follow-up study, Dowens et al. (2011) investigated L2 gender and number agreement processing with a new L1 group (i.e., Chinese). Data was collected from 26 Chinese advanced learners of Spanish. The researchers used the same materials and procedure employed in Dowens et al. (2010); however, the results of the ERP recordings showed that gender- and number-agreement violations were detected in both distance conditions (i.e., within the DP, and across a VP boundary).

Foote (2011) focused on 20 early and 20 advanced bilingual English speakers of Spanish, and 20 native Spanish speakers. The early-group participants were heritage speakers who acquired English in their early years in school; the advanced-group participants learned English as an L2 in a classroom environment. Sensitivity to Spanish Subj-V number-agreement and N-Adj gender-agreement violations was measured using a moving-window word-by-word self-paced reading task; in this summary, for the sake of relevance to the current experiment, I will focus on the data for N-Adj agreement only.

Two experiments were conducted, each with total of 128 sentences. Half of these were utilised to test participants' sensitivity to violations in N-Adj agreement. Thirty-two of these 64 sentences were in the adjacent condition, as in (30a) and (30b); in the remaining 32 sentences, a verb intervened between controller and target, as in (31a) and (31b). In each distance condition, half of the sentences were grammatical, and the other half were ungrammatical. Gender was manipulated while controlling for number. To explore the effect of LD, three words were inserted between the noun and the adjective; however, the SD between these two items was different across the two LD conditions, as we can see from (30) and (31) (adapted from Foote, 2011, p. 202; controller in bold, target in italics).[23]

(30) (a) Dicen que [$_{DP}$ el **libro** [$_{AdjP}$ *blanco*]] esta en esa mesa.

say.3PL that the book-M.SG white-M.SG is on that table

(b) *Dicen que [$_{DP}$ el **libro** [$_{AdjP}$ *blanca*]] esta en esa mesa

say.3PL that the book-M.SG white-F.SG is on that table

'They say that the white book is on that table.'

LD = 0 word

SD = 1 node (e.g., AdjP)

[23] Foote did not formally calculate the SD between controller and target in each distant condition. The calculations included in (30) and (31) are my own.

(31) (a) [$_{DP}$ El **pollo** del taco] [$_{VP}$ esta [$_{AdjP}$ *rico* pero picante.]]

the chicken-M.SG of the taco is tasty-M.SG but spicy

(b) [$_{DP}$ *El [$_{NP}$ **pollo** del taco]] $_{TP}$ [$_{VP}$ esta [$_{AdjP}$ *rica* pero picante]]

the chicken-M.SG of the taco is tasty-F.SG but spicy

'The chicken of-the taco is tasty but spicy.'

LD = 3 words (i.e., *del taco esta*)

SD = 5 nodes (i.e., NP, DP, TP, VP, AdjP)

The RTs for three regions of interest were recorded: the region before the target (position 1, as referred to by Foote), the target (position 2), and the region after the target (position 3). The RTs for these three regions in the ungrammatical sentences were compared to the RTs for the same regions in the corresponding grammatical sentences. The results revealed that the three participant groups were less sensitive to gender-agreement violations in the separated condition than in the adjacent condition.

Gabriele et al. (2013) explored whether or not L2 learners' sensitivity to agreement dependencies is influenced by SD. They investigated the processing of gender and number agreement between a controller noun and a target adjective utilising ERPs. Eleven low, 11 intermediate, and 25 advanced English-speaking learners of Spanish did the task. Twenty-four Spanish native speakers served as a control group. Gabriele et al. studied the processing of agreement at two SD levels: at the first level, the adjective was located within the NP, as in (32a); at the second level,

the adjective was located across a VP boundary, as shown in (32b) (adapted from Gabriele et al., 2013, p. 221; controller in bold, target in italics).[24]

(32) (a) El banco es [DP un [NP **edificio** muy *seguro*] y el juzgado también.
the bank is a building.M-SG very safe.M-SG and the courthouse also
'The bank is a very safe building and so is the courthouse.'

(b) El **cuento** [VP es *anónimo*] y el manuscrito también.
the story.M-SG is anonymous.M-SG and the manuscript also
'The story is anonymous and so is the manuscript.'

Notice that the LD in both SD conditions was controlled, as one word intervened between the noun and the adjective in each sentence (i.e., in [32a], *muy,* and in [32b] the copula *es*).

One hundred and twenty experimental stimuli were used. The grammaticality of the adjectival inflection was manipulated: 40 of the sentences were grammatical in this respect, 40 ungrammatical in terms of gender, and 40 ungrammatical in terms of number. After each sentence, participants were also asked to provide a grammaticality judgment.

For the native speakers, the advanced learners and the intermediate learners, the ERPs indicated less sensitivity to agreement dependencies in the across-phrase condition than the within-phrase condition, pointing to an effect of SD. Moreover, this was true regardless of the grammaticality of the agreement relation. By contrast, there was no effect of SD for the low-proficiency learners. In the GJT, the native speakers

[24] To save space, I have only provided the grammatical version of each example sentence.

and the advanced learners were highly accurate in all conditions; however, the intermediate learners did better on number than gender, regardless of the distance condition, while no difference between gender and number was observed for the low-proficiency learners.

Alemán Bañón et al. (2014) utilised ERPs to investigate the effect of SD on learners' sensitivity to gender- and number-agreement anomalies between a noun, and an attributive or predicative adjective. The question was whether or not sensitivity to gender-agreement violations was limited to elements within the phrase (i.e., phrasal agreement), as predicted by the SSH, or would also occur across phrases (i.e., interphrasal agreement). These two contexts for agreement are exemplified in (33a) and (33b), respectively (adapted from Alemán Bañón et al., 2014, p. 282; controller in bold, target in italics).

(33) (a) El cerebro es un **órgano** muy *complejo* y el cerebelo.
'The brain is [$_{DP}$ an organ-M.SG very complex-M.SG] and the cerebellum.'

(b) El **cuadro** es *auténtico* y el grabado también.
'The painting-M.SG [$_{VP}$ is authentic-M.SG] and the engraving too.'

LD is controlled in (33a) and (33b), as one word intervenes between the agreeing elements in each sentence. In (33a), the target adjective is located within the same phrase as the noun (i.e., the DP). The increased syntactic complexity of (33b) comes from the fact that the adjective is in a different phrase from the noun. Alemán Bañón et al. also tested if the processing of the agreement relation would be impacted by the participants' L1, especially as this language lacks both gender and number agreement

on adjectives. Hence, the study was an attempt to test two competing theories of L2 acquisition: the FFFH and the FTFA.

Twenty-six advanced L2 English-speaking learners of Spanish and 24 native speakers of Spanish performed an ERP task (using an electroencephalogram [EEG]) and a GJT. The participants were seated in front of a computer monitor and instructed to read some Spanish stimulus sentences. They had to judge the grammaticality of each sentence by choosing the word *Bien* 'Good' if they judged it to be grammatical, or *Mal* 'Bad' if they judged it to be ungrammatical. The task was performed in two sessions. In each session, 40 blocks of target sentences were shown to each participant. Each block contained three sentences: a grammatical sentence, one containing a gender-agreement anomaly, and one containing a number-agreement anomaly. Using the Paradigm program, the sentences were presented word by word. Each word was presented for 450 ms, followed by a 300 ms pause before the next word appeared. There was a 1000 ms pause before the grammaticality-judgment prompt appeared. In (34a), I exemplify within-phrase grammatical N-Adj agreement; number-agreement violations and gender-agreement violations are exemplified in (34b) and (34c), respectively (adapted from Alemán Bañón et al., 2014, p. 282; controller in bold, target in italics).

(34) (a) El cerebro es un **órgano** muy *complejo* y el cerebelo.

'The brain is [$_{DP}$ an organ-M.SG very complex-M.SG] and the cerebellum.'

(b) El cerebro es un **órgano** muy **complejos* y el cerebelo.

'The brain is [$_{DP}$ an organ-M.SG very complex-M.PL] and the cerebellum.'

(c) El cerebro es un **órgano** muy **compleja* y el cerebelo

The brain is [DP an organ-M.SG very complex -F.SG] and the cerebellum.'

Adjective gender- and number-marking were manipulated in each structure. In (34a), the inflection on the adjective is grammatical, as this morpheme carries the gender and number features of the controller noun (i.e., masculine singular). In (34b), the inflection on the adjective is ungrammatical, as it disagrees with the noun in number (i.e., the noun is singular while the adjective is plural). In (34c), the adjective disagrees with the noun in gender (i.e., the noun is masculine while the adjective is feminine), which also makes the sentence ungrammatical.

The results of the study showed that the L2 learners were sensitive to gender- and number-agreement violations across both SD conditions. This was clear from the fact that their ERPs were similar to those of the native speakers in the experiment (i.e., P600).[25] These results go against the predictions of the SSH. The ERPs also showed that the L2 learners in this study were able to establish native-like agreement relations even if the L2 syntactic feature of interest was not instantiated in their L1. Thus, the results of the study supported the FTFA but discredited the FFFH. Note also that the P600 values for the N-Adj anomalies were found to be similar for gender and number.

In a more recent ERP study, Alemán Bañón et al. (2018) attempted to address the question of whether or not SD impacts the processing of gender- and number-inflectional morphology in an N-Adj structure. SD was manipulated while LD was controlled, as there was one word between the two elements of interest. Two distance conditions were used: within the phrase (i.e., an DP), as in (35a), and across a phrasal

[25] Yano et al. (2019) define P600 as "a positive component with a peak latency of 600 ms or later post-stimulus onset, which has been observed for (morpho)syntactic violations such as subject-verb disagreement" (p. 34).

boundary (i.e., a VP), as shown in (35b) (adapted from Alemán Bañón et al., 2018, p. 10; controller in bold, target in italics).

(35) (a) La manzana es [$_{DP}$ una [$_{NP}$ **fruta** [$_{AdjP}$ muy *jugosa*]] y la papaya también.
the apple is a fruit-F.SG very juicy-F.SG and the papaya too
LD = 1 word (i.e., *muy*)

(b) [$_{DP}$ La [$_{NP}$ **fresa**]] [$_{TP}$ [$_{VP}$ es [$_{AdjP}$ á*cida*]]] y la piña también.
the strawberry-F.SG is tart-F.SG and the pineapple too.
LD = 1 word (i.e., *es*)

Each distance condition was associated with 120 sentences. Forty of these were grammatical, 40 contained gender-agreement violations, and another 40 contained number-agreement violations.

In Alemán Bañón et al. (2014), data were collected from learners at advanced level only; in the 2018 study under consideration here, 78 English-speaking learners of Spanish did a proficiency test (following the procedure in Pakulak & Neville, 2010). On this basis, learners were divided into a high-proficiency group (*n* = 18) and a low-proficiency group (*n* = 18). The data from the control group of 24 native speakers of Spanish in Alemán Bañón et al. (2012) was also utilised.

The first task was a GJT. Participants were prompted to read Spanish sentences which appeared word by word utilising a rapid-serial visual-presentation paradigm. Each of the 40 experimental sentences was followed by a comprehension statement. Participants had to decide whether each sentence was grammatically correct or not by choosing *Mal* 'Bad' for ungrammatical or *Bien* 'Good' for grammatical.

While the participant was reading the sentences, the brain activity associated with reading each word was recorded.

The results from the GJT showed that the low-proficiency group were less accurate in their judgments than the high-proficiency group. The results from the ERPs showed that both groups were sensitive to number-agreement violations (based on P600 values) at both SD levels; however, only the high-proficiency group showed sensitivity to gender-agreement violations in both SD conditions. Thus, the high-proficiency behaved similarly to the native speakers in Alemán Bañón et al. (2012) in this regard.

Paquet (2018) investigated LD as a potential source of gender-agreement violations between a controller noun and a target adjective. Twenty-three English-speaking learners of Spanish (11 intermediate and 12 advanced) and 20 French-speaking learners of Spanish (10 intermediate and 10 advanced) did three tasks: an untimed GJT, an elicited oral-imitation (EOI) task and an eye-tracking task. In the GJT, if the learner judged the sentence to be ungrammatical, they had to identify the error in the sentence. Then the learner did the EOI task: this involved listening to a sentence and then reconstructing it in Spanish. The final task involved recording the eye movements associated with reading each word.

Twenty-four experimental sentences were constructed. In half of these, the modifying adjective agreed with the controller noun; in the other half, the adjective disagreed with this noun. LD was manipulated at three levels to investigate the effect of this property on the acquisition of gender agreement: adjacent (in which the noun agreed or disagreed with an attributive adjective), as in (36a) and (36b), respectively; linearly distant by one word (i.e., in which the noun agreed or disagreed with a predicative adjective), as shown in (37a) and (37b), respectively; and linearly distant

by four words (i.e., in which the noun again agreed or disagreed with a predicative adjective), as exemplified in (38a) and (38b), respectively (adapted from Paquet, 2018, p. 6; controller in bold, target in italics).[26]

(36) (a) La **fruta** *preferida* de mi tía Gabriela es la naranja.

'My aunt Gabriela´s favorite fruit is the orange.'

LD = 0 word

(b) El Quijote es un **libro** **famosa* de la literatura española.

'Don Quixote is a famous novel of Spanish literature.'

LD = 0 word

(37) (a) El **verano** es *hermoso* con flores, montañas y sol

'The summer is wonderful with its flowers, mountains and sun.'

LD = 1 word (i.e., *es*)

(b) En los aeropuertos, un **refresco** es **cara* para los viajeros.

'At the airport, a soft-drink is expensive for travellers.'

LD = 1 word (i.e., *es*)

[26] The adjectives were inflected with the suffix *-a* (if the noun was feminine) or *-o* (if it was masculine) only.

(38) (a) La **comida** de la cocinera está *preparada* con poca sal.

'The cook's food is prepared with little salt'

LD = 4 words (i.e., *de la cocinera está*)

(b) El **empleo** de mi padre es **aburrida* y muy díficil.

'My father´s job is boring and very difficult.'

LD = 4 words (i.e., *de mi padre es*)

The results of the GJT showed no effect of LD, as participants at both levels of proficiency (with L1s collapsed together at each level) were not sensitive to gender-agreement violations. However, the English-speaking learners of Spanish (with proficiency levels collapsed together) were less accurate in judging ungrammatical than grammatical items, and the same was true of the intermediate learners (again with L1s collapsed together).

The results of the EOI also showed that, overall, the participants in this experiment were able to reconstruct Spanish sentences accurately in the adjacent condition, as in (36a) and (36b), and also in the four-word LD condition, as in (37a) and (37b); however, they were unable to do this in the one-word condition, as in (38a) and (38b). Paquet tentatively attributes this unexpected result to the confounding effect of SD.

The eye-tracking results showed that, among all six combinations of L1 and proficiency, only the advanced French learners were able to detect gender-agreement violations, but only in the adjacent context. In other words, the intermediate participants in the English and French groups, and also the ones in the advanced English group, did not show significant effects of LD on sensitivity to anomalies in

gender-agreement processing. This indicates that the advanced French learners in this study possessed implicit knowledge of gender agreement, which also speaks to a combined effect of L1 properties plus L2 proficiency. All things considered, Paquet's findings militate against the possibility that LD is a source of insensitivity to gender-agreement violations.

To sum up, the effects of SD and LD have been investigated in previous research. Several studies have examined the effects of SD on insensitivity to agreement violations in an N-Adj structure, with a particular focus on L2 proficiency level (Alemán Bañón et al., 2014, 2018; Dowens et al., 2010, 2011; Foote, 2011; Keating, 2005, 2009). In Lichtman (2009), an SD effect was evident at intermediate level but not beginner level. In Gabriele et al.'s (2013) study, the intermediate and advanced learners showed less sensitivity to agreement violations when the controller and target were structurally distant from each other than when it was adjacent. LD was investigated in two studies (Keating, 2010; Paquet, 2018). The results obtained by Keating (2010) showed that the high-proficiency L2 learners were sensitive to agreement violations in the shortest of the three distance conditions in his experiment (i.e., one intervening word), indicating an LD effect. In contrast, Paquet's (2018) results did not speak to this type of effect.

2.3.2 Limitations and research gaps

In the previous section, I summarised studies on distance effects in gender- and number-agreement processing (and, in one experiment, acquisition) that focused on English-speaking learners of Spanish. The specific focus of these studies was the moderating effect of distance on learners' sensitivity to ungrammaticality. There are several methodological limitations in this body of literature.

The first problem is related to the participants. Two such issues are noteworthy. To begin with, the literature in this area as a whole is, on balance, biased towards research on advanced L2 learners, compared to intermediates and beginners. Admittedly, Gabriele et al. (2013) and Keating (2005, 2009) investigated participants at all three levels of proficiency, Lichtman (2009) studied beginner and intermediate learners, Paquet (2018) examined intermediate and advanced learners, and Alemán Bañón et al. (2018) recruited high- and low-proficiency learners. However, in each of Alemán Bañón et al. (2014), Dowens et al. (2010, 2011), Foote (2011) and Keating (2010), only advanced-level learners took part. In total, advanced learners feature in nine studies, while intermediates and beginners feature in only four studies each.

The second issue related to the participants in previous studies are the relatively small sizes of some of the L2 learner groups. Keating (2010) tested 13 learners, and Paquet (2018) used 10 to 12 learners, depending on their proficiency level. In Gabriele et al. (2013), two of the three proficiency groups had 11 learners each.

In addition, spillover effects were not investigated systematically in the studies under scrutiny. Dowens et al. (2010, 2011), Foote (2011) and Keating (2010) noted this type of effect, but did not consider the findings in detail. The studies by Alemán Bañón et al. (2014, 2018), Gabriele et al. (2013), Keating (2005, 2009), Lichtman (2009) and Paquet (2018) did not record RTs at any spillover regions.

Spillover effects are worthy of attention in processing research concerned with noun-adjective agreement, as difficulties with processing agreement in general might not be detectable at the target itself (Jiang, 2012). In line with this, effects of this type have been reported in previous studies in the area under scrutiny in the current experiment. For example, the English-speaking learners of Spanish in Dowens et al.

(2010, 2011) and Foote (2011) showed sensitivity to ungrammaticality at the target and one spillover region. In an eye-tracking experiment focusing on gender agreement in Spanish, Keating (2010) found that advanced English-speaking learners did not exhibit sensitivity to gender-agreement violations until second-pass reading.[27] In an ERP study of gender agreement in Dutch by German learners, sensitivity to agreement violations peaked at the spillover region (Sabourin & Stowe, 2008).

Two other methodological limitations are related to the design of the stimulus sentences. First, the potential effects of SD and LD were not distinguished from each other in Alemán Bañón et al. (2014, 2018), Dowens et al. (2010, 2011), Foote (2011), Gabriele et al. (2013), Keating (2005, 2009), Lichtman (2009) or Paquet (2018). The goal of each of these studies was to scrutinize the effect of distance on sensitivity to Spanish gender-agreement violations; however, the question remains whether the participants' hesitation at the target region (i.e., the adjective) was due to SD or to LD, as both distance conditions were confounded in the stimulus sentences. For example, Keating (2005, 2009) acknowledged that, in increasing SD, he was also increasing LD.

The second design limitation is related to the words used in the stimulus sentences as the controller (i.e., the noun) or the target (i.e., the adjective). Specifically, the words that were compared across distance conditions differ in every condition in Alemán Bañón et al. (2014, 2018), Dowens et al. (2010, 2011), Keating (2009, 2010), Lichtman (2019) and Paquet (2018). Granted, given the types of contrasting structures that were used in Alemán Bañón et al.'s study, for instance, it would have been difficult – perhaps impossible – to match words between the phrasal-

[27] According to Keating (2010, p. 121), "First-pass time is generally assumed to index initial processing whereas second-pass time captures later effects". In other words, L2 learners are able to detect ungrammaticality, but not as early in the sentence as native speakers.

level agreement condition and the across-phrase agreement condition; even so, this feature of Alemán Bañón et al.'s experiment must be noted as a concern. In (39a), I exemplify phrasal-level agreement in that study, while (39b) exemplifies across-phrase agreement (adapted from Alemán Bañón et al., 2014, p. 279; controller in bold, target in italics).

(39)	(a)	**órgano**	muy	*complejo*
		organ.M-SG	very	complex.M-SG
	(b)	**cuadro**	es	*auténtico*
		painting.M-SG	is	authentic.M-SG

As illustrated in (39b), across-phrase agreement requires a verb to be located between the controller and the target; however, a verb cannot be used in the corresponding location in phrasal-level agreement, as we can see from (39a). This contrast is noteworthy because the use of different words between the two compared sentences may have impacted the participants' RTs at the target regions, thereby confounding any comparison based on these RTs.

A similar problem arose in Dowens et al. (2010, 2011). Here, although the same words were utilised in creating the experimental sentences in both distance conditions, the actual structures (i.e., DP vs NP) used to gauge the effect of distance were not the same. This means that the target item in every distance condition was not only different, but belonged to a different word class (i.e., noun vs. adjective) as well. The target in the within-phrase condition was a noun, as in (40a), while the one in the

across-phrase condition was a predicative adjective, as in (40b) (adapted from Dowens et al., 2010, p. 1874; controller in bold, target in italics).

(40) (a) **El** *suelo* está plano y bien acabado.

'The-M.SG floor-M.SG is flat and well finished.'

(b) El **suelo** está *plano* y bien acabado.

'The floor-M.SG is flat-M.SG and well finished.

A target noun, as in (40a), might be processed differently from a target adjective, as in (40b), as the efficiency of the recognition process is influenced by word properties (e.g., semantics), plus the contexts that the words are used in (Khurana et al., 2018). In turn, the RTs could also be affected.

Another area of concern are the results. The findings in Keating (2005, 2009) show that advanced learners were only able to process agreement inflection in native-like fashion when both agreeing elements were adjacent (i.e., in the phrasal-agreement condition). However, the advanced learners in Alemán Bañón et al. (2014) showed sensitivity to agreement violations both within and across phrases. For the intermediate participants in Lichtman (2009), sensitivity to gender-agreement violations depended on the LD or SD between controller and target; by contrast, the intermediate participants in Keating (2005, 2009) were not sensitive to gender-agreement violations in any distance condition (i.e., phrasal, interphrasal or clausal). In Keating (2005, 2009, 2010), learners demonstrated non-native-like gender-agreement processing, while Alemán Bañón et al. (2014) and Lichtman (2009)

reported an ability on the part of learners to process gender agreement in native-like fashion at the phrasal as well as the interphrasal levels.

Regarding the reasons for these inconsistencies, sample size may have played a role. This is a concern in research dealing with L2 learners at intermediate level (e.g., Gabriele et al., 2013 [*N*=11]; Paquet, 2018 [*N*=11]) and advanced level (e.g., Keating, 2005 [*N*=8], 2009 [*N*=12], 2010 [*N*=13]; Paquet, 2018 [*N*=12]). In a simulation using within-group contrasts, Brysbaert (2021) found that samples of fewer than 30 participants were not large enough to yield the desired effect size. Such concerns indicate a need for further research on L2 N-Adj gender- and number-agreement processing using larger samples.

In addition to the limitations of previous research that I demonstrated earlier in this section, there is a notable gap in existing research on N-Adj gender- and number-agreement processing: no study has investigated this phenomenon using ELAs.

2.4 The present experiment

This study addresses the limitations of previous research that were identified in Section 2.3.2:

(1) I focus on intermediate learners, plus the sample is larger than in previous studies in this area (*N* = 40). Brysbaert and Stevens (2018) propose that a sample of 40 participants is sufficiently large for psycholinguistic research.

(2) RTs are measured at *three* spillover regions in the current study, following Jiang's (2012) recommendation that at least two such regions be investigated.

(3) The stimulus sentences associated with the adjacent vs. separated distance conditions are composed of the same controller noun and predicative adjective,

followed by the same three words in the spillover regions. Consider (41) (controllers in bold, targets in italics, spillover regions underlined).[28]

(41) (a) **ʔal-kita:b-u** *mumtiʕ-u-n* fiʕlan wifqa

the-book.M.SG-NOM interesting.M.SG-NOM-INDF really in

raʔy-i: ʃ-ʃaxsˤiyy-i wa l-mutawadˤiʕ-i

opinion.M.SG-my the-personal.M.SG-GEN and the-humble.M.SG-GEN

'The book is really interesting, in my personal and humble opinion.'

(b) **kita:b-u** l-xiri:ʤ-i:na mutafawiq-i:na

book.M.SG-NOM the-graduate.M-PL.GEN the-excellent.M-PL.GEN

l-mutamayiz-i:na *mumtiʕ-u-n* fiʕlan wifqa

the-distinguished.M-PL.GEN interesting.M.SG-NOM-INDF really in

raʔy-i: ʃ-ʃaxsˤiyy-i wa l-mutawadˤiʕ-i

opinion.M.SG-my the-personal.M.SG-GEN and the-humble.M.SG-GEN

'The distinguished (and) excellent graduates' book is really interesting, in my personal and humble opinion.'

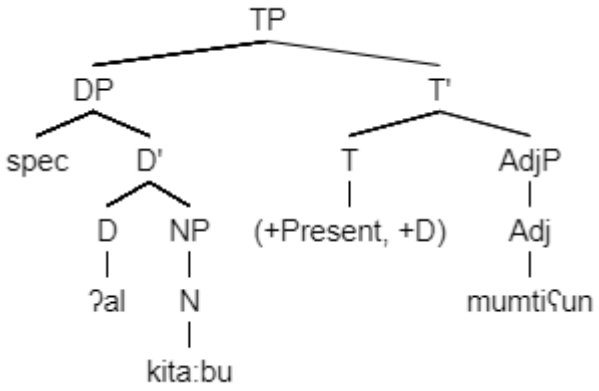
Notice that, in each case, the adjective *mumtiʕun* 'interesting' is followed by *fiʕlan wifqa raʔyi:* 'really … in my opinion'.

[28] (41a) is part of a stimulus sentence from the current experiment, while (41b) is a full stimulus sentence. Further information regarding the design of the stimulus sentences will be provided in Section 2.5.2.

(4) The potential effects of SD and LD are distinguished from each other. This is achieved by controlling for SD while manipulating LD. In Figure 2.7, I show the syntactic representation for the subject DP (containing the controller noun) and the target predicative adjective in (41a), while Figure 2.8 does the same for these items in (41b).[29] In each figure, the XP nodes between the noun and the adjective are indicated.

Figure 2.7

Syntactic Representation of (41a)



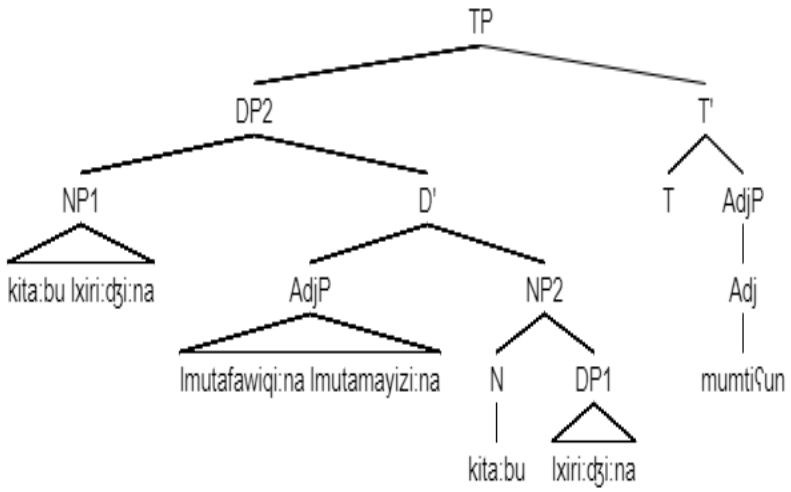
SD = 4 nodes (i.e., NP, DP, TP and AdjP)

LD = 0 words

[29] In Figure 2.8, I show the surface structure after head-to-head movement has taken place in the CS. See Figure 2.3 earlier.

Figure 2.8

Syntactic Representation of (41b)



SD = 4 nodes (i.e., NP1, DP2, TP, AdjP)

LD = 3 words (i.e., *lxiri:ʤi:na mutafawiqi:na lmutamayizi:na*)

From each of these syntactic representations, it is possible to calculate the SD and LD between the controller and target in each case. Notice that the SD between the controller and the target is four nodes in Figure 2.7 and Figure 2.8, while the LD increases from zero to three.

In addressing the limitations in (1) to (4) above, I also aim to gain an insight into the inconsistencies observed in previous work in this area.

The predictions (Ps) for this experiment are listed below:

P1. ELAs will be less sensitive to ungrammaticality in gender agreement when the noun and adjective are separated than when they are adjacent.

P2. ELAs will be less sensitive to ungrammaticality in number agreement when the noun and adjective are separated than when they are adjacent.

Moreover, these predictions will be tested using data from ELAs. Hence, the present experiment extends the coverage of research in this area by focusing on this learner group.

2.5 Methods

In Section 2.5.1, I provide details regarding the participants who were recruited for the purpose of this study as a whole. Information about the stimulus sentences can be found in Section 2.5.2. Section 2.5.3 explains the task design and procedure. The same methods will be used in Experiments Two and Three (see Chapters 3 and 4, respectively), except that the stimulus sentences are different in each of the three experiments.

2.5.1 Participants

There were three groups of participants in Experiment One. The first two groups consisted of native speakers of Arabic. These two groups could be regarded as providing baselines for understanding L2 learners' performance (Foster, 2001; Tavakoli & Foster, 2011). Both groups were made up of Jordanian Arabic speakers (age range: 18-35). They were all university graduates in various disciplines.

The first native-speaker group were 10 speakers recruited to norm the stimulus sentences (Sunderman, 2014) for all three experiments. For this purpose, 72 sentences were chosen from the full set of stimulus sentences; see Section 2.5.2 below for details of the materials used for the norming. Nine of these 72 sentences were chosen for each of the following structures: (1) N-Adj agreement in the adjacent condition; (2) N-Adj agreement in the separated condition; (3) Subj-V agreement in the adjacent condition; (4) subject-verb (Subj-V) agreement with a short subject-headed

RC intervening between controller and target; (5) Subj-V agreement with a long subject-headed RC intervening between controller and target; (6) Subj-V agreement with a short object-headed RC intervening between controller and target; (7) Subj-V agreement with a long object-headed RC intervening between controller and target; and (8) Subj-V agreement with PP intervening between controller and target. Half of the controllers in these sentences had masculine controllers, and the other half feminine. Within the sentences based on masculine controllers, one third had singular controllers, one third had dual controllers, and one third had plural controllers. Thus, gender and number were counterbalanced.

I created the norming task using Google docs, and shared the invitation link with the participants. Participants were asked to make a judgment about each sentence using one of the following options: 'Correct', 'Incorrect', 'Can't decide'. This was intended to help identify any vocabulary that may cause delays in the RTs at the regions of interest, and to verify that the sentences were deemed to be grammatically correct by native speakers of Arabic.

The second group of native speakers were four controls. They were recruited in order to verify that the RTs for the ELAs reflected L2 processing rather than task effects; in other words, it was intended that the control data would serve to validate the task only (cf. Austin et al., 2022). These four participants confirmed that they had spoken Arabic at home and at school since they were born.

The third group of participants in this study consisted of 40 ELAs. The ages of these participants ranged from 18-35 (M = 25.7; SD = 5.07). All participants (14 female learners and 26 male learners) were right-handed, with normal or corrected-to-normal vision. They also reported familiarity with basic skills in using computers. They gave informed consent in accordance with the ethics requirements of the University of

Southern Queensland. The participants in this group received monetary compensation after completing the third and final experiment.

All the ELAs were classified as non-heritage learners, in that they grew up in homes where Arabic was not spoken. They were from the United States of America, the United Kingdom and South Africa. They were students at two Arabic language institutes in Jordan. The participants confirmed that they were exposed to this language for the first time in a classroom context only. None of the participants had had any immersion experience in an Arabic-speaking environment before the age of 18.

All members of this group were intermediate English-speaking learners of Arabic. Their L2 proficiency was measured using a test administered by Al-Arabiyya Institute (Al-Arabiyya Institute, 2011). Tests at three different levels are available for free download; these levels were determined in accordance with the global scale of the Common European Framework Reference (CEFR; CoE, 1946). These are shown in Table 2.3.[30]

Table 2.3

CEFR Global Scale

Proficiency	*Level*
Basic user (beginner)	A1-A2
Independent user (intermediate)	B1-B2
Proficient user (advanced)	C1-C2

[30] A1-A2 level includes learners who are familiar with the language. B1-B2 level includes learners who can understand the main ideas in a complex text. C1-C2 is the highest level of proficiency: these learners have very high comprehension skills, including an ability to understand implicit meanings.

To recruit intermediate participants, I chose the B1-B2 level test. At this level, test takers needed to score 60% or above to be recruited for the current study. In the test, participants responded to 45 questions, each worth one point; the items assessed their reading comprehension plus their knowledge of grammar. The items were cloze or multiple choice. The test was delivered in paper form, took 30-40 minutes, was done individually, and was conducted in a quiet room. A total of 45 people did the proficiency test; of these, 40 were recruited.

2.5.2 Materials

A self-paced moving-window reading-comprehension task was used to collect the data for all three experiments in this study. In order to record the RT for each word in each stimulus sentence, word-by-word segmentation was used. The rationale behind using this type of task is that, according to Jegerski (2014, p. 4), “eyes can be a window to cognition.” This is consistent with the eye-mind premise of Just and Carpenter (1980), which states that the amount of time a person takes to read a word is the same amount of time required to process that same word. As this paradigm decreases the possibility of any intervention from the participant’s metalinguistic knowledge (Jiang, 2004; Song, 2015b), it is suitable for assessing learners' integrated knowledge of inflectional systems in the target language. In particular, when the learner hesitates at a word containing an inflectional anomaly, this hesitation is assumed to reflect their sensitivity to this anomaly. On account of such advantages, self-paced reading tasks have been widely used in inflectional-processing research with L2 learners (e.g., Foote, 2011; Hopp, 2010; Jiang, 2012; Lago & Felser, 2018; Sánchez-Walker & Montrul, 2016; Song, 2015a, 2015b).

Eight sets of stimulus sentences (36 each) were used in the experimental task for this study; hence, there were 288 sentences in all. Due to limitations of space, the data collected using one of these sets was excluded, so that the total number of sentences actually used in the three experiments in the present study was 252.[31] In each set, 12 sentences were grammatical, 12 ungrammatical in that the *gender* of the target did not match that of the controller (henceforth, the 'ungrammatical gender' condition), and 12 ungrammatical in that the *number* of the target did not match that of the controller (henceforth, the 'ungrammatical number' condition).[32] In each of these sets of 12 sentences, the controller noun was masculine in six sentences, and in the other six the controller noun was feminine. In each of these sets of six sentences, two sentences had singular subjects, two had dual subjects, and two had plural subjects. Hence, within each set of 36 sentences, gender, number and (un)grammaticality were all counterbalanced. The controller noun was in the nominative case in every stimulus sentence.

For the sake of consistency, each stimulus sentence consisted of 11 words. So that all of these sentences would contain this number of words, two phrases were inserted after the target as a filler in the adjacent condition, and one phrase was inserted after the target in the separated condition. In order to facilitate comparison of the RTs between the regions of interest (i.e., the controller, the target, and the three words following the target) in both distance conditions, the words used in these regions were the same in both conditions.

In 48 of the initial pool of 288 stimulus sentences (i.e., six sentences per set of 36), a comprehension statement immediately followed the sentence. Twelve of these

[31] The focus of the excluded set was Subj-V agreement with a prepositional phrase (PP) intervening between controller and target.
[32] In the ungrammatical-gender condition, number was grammatical, and vice versa.

48 sentences were grammatical, 12 had ungrammatical gender, and 12 had ungrammatical number. The comprehension statement either did, or did not, match the stimulus sentence in terms of truth value. The answer to half of these statements was ‘True’, and the answer to the other half was ‘False’. The comprehension statements were used to check the participants’ understanding of the stimulus sentences. In addition, they served as distractors (Jegerski, 2014, p. 14).

In order to collect all of the data initially intended for inclusion in this study, four sessions were created, each containing 72 sentences. In each session, one quarter of the sentences (i.e., nine) from each of the eight sets was used. The 72 sentences in the session were pooled together, and divided into four batches of 18 sentences each. Sentence types were counterbalanced across the batches. I used sentences from all eight sets within each session as a distraction strategy: this reduced the possibility that the participants might understand what each of the three experiments in this thesis was concerned with, which in turn might have affected their performance in the task. Also, I divided the whole task into separate sessions, and also batches within sessions, in order to reduce any effects of fatigue on their performance.

I will focus now on the current experiment. The stimulus sentences used in the adjacent and separated conditions can be found in Appendices B and C, respectively. In the separated condition, the subject of the sentence was a CS. The second noun in the CS was followed by two attributive adjectives. The controller was separated from the target by the NP formed from the second noun in the CS plus the two attributive adjectives. In (42), I exemplify the two distance conditions using one of the (grammatical) sentence pairs from this experiment. In (42a), the two agreement elements are adjacent, and in (42b) they are separated (controller in bold, target in italics).

(42) (a) **ʔaʃ-ʃarħ-u** *wa:dˁiħ-u-n* ʤiddan wifqa

the-explanation.M.SG-NOM clear.M.SG-NOM-INDF very in

raʔy-i: ʔaʃ-ʃaxsˁiyy-i wa l-mutawadˁiʕ-i

opinion.M.SG-MY the-personal.M.SG-GEN and the-humble.M.SG-GEN

li-l-ħa:dˁir-i wa l-ɣa:ʔib

for-the-present.M.SG-GEN and the-absent.M.SG

'The explanation is very clear, in my personal and humble opinion, for those (who are) present and absent.'

(b) **ʃarħ-u** l-ʔusta:ð-ayni

explanation.M.SG-NOM the-professor.M-DUAL.GEN

l-qadi:r-ayni l-marmu:q-ayni

the-respected.M-DUAL.GEN the-eminent.M-DUAL.GEN

wa:dˁiħ-u-n ʤiddan wifqa raʔy-i:

clear.M.SG-NOM-INDF very in opinion.M.SG-MY

ʔaʃ-ʃaxsˁiyy-I wa l-mutawadˁiʕ-i

the-personal.M.SG-GEN and the-humble.M.SG-GEN

'The two eminent (and) respected professors' explanation is very clear, in my personal and humble opinion.'

Notice that, in each of (42a) and (42b), the controller noun is *ʔaʃʃarħu/ʃarħu* ‘the explanation’ while the target adjective is *wa:dˤiħun* ‘clear’. In both sentences, the three regions which follow the target contain the same three words (i.e., *ʤiddan wifqa raʔyi:* ‘really … in my opinion’).

The ungrammatical gender or number version of the sentence pair in (43) was identical to the grammatical pair, except that the gender or number of the target adjective was altered so that it did not match the gender or number of the controller. Since Arabic has two values for gender (i.e., masculine and feminine) and three for number (i.e., singular, dual and plural), there were six different possibilities for ungrammatical number agreement between controller and target. I followed a certain pattern: when the noun was singular, the adjective was plural; when the noun was dual, the adjective was singular; and when the noun was plural, the adjective was dual. Consider (43).

(43) (a) **ʔaʃ-ʃarħ-u** *wa:dˤiħ-u-n*
the-explanation.M.SG-NOM clear.M.SG-NOM-INDF

(b) * **ʔaʃ-ʃarħ-u** *wadiħ-at-u-n*
the-explanation.M.SG-NOM clear-F.SG-NOM-INDF

(c) * **ʔaʃ-ʃarħ-u** *wadiħ-u:na*
the-explanation.M.SG-NOM clear.M-PL.NOM

(43a) illustrates grammatical agreement for gender and number. In (43b), the ungrammaticality of the sentence is due to the agreement anomaly in terms of gender

on the adjective (i.e., *wadiħatun* ‘clear’), while the adjective in (43c) (i.e., *wadiħu:na*) shows disagreement with the controller in terms of number. Table 2.4 summarises all of the possibilities for agreement used in Experiment One.

Table 2.4

Target Stimuli Schema Used in Experiment One

Grammatical		*Ungrammatical gender*		*Ungrammatical number*	
Noun	*Adjective*	*Noun*	*Adjective*	*Noun*	*Adjective*
M	M	M	F	SG	PL
F	F	F	M	DUAL	SG
				PL	DUAL

In (42b), we saw that, in the separated condition, the subject NP contained a noun other than the controller (i.e., the possessor in the CS). As this other noun was the possessor, it was in the genitive case; however, its gender and number were free to vary. For consistency, all of the possessor nouns in the stimulus sentences in the present experiment were masculine. I also followed a consistent pattern of number marking for the possessor noun in order to factor out any confounding effect of this property on agreement processing. When the controller was singular, the possessor noun was dual in one sentence and plural in the other. When the controller was dual, the possessor noun was singular in one sentence and plural in the other. When the controller was plural, the possessor noun was singular in one sentence and dual in the other. In (44), I exemplify two sentences in which the controller is dual; the possessor is singular in (44a), and plural in (44b).

(44) (a) **qara:r-a:** ʔar-raʔi:s-i l-ħa:liyy-i

decision.M-DUAL.NOM the-president.M.SG-GEN the-current-GEN

l-maħbu:b-i *muʔaθir-a:ni*

the-loved.M.SG-GEN influential.M-DUAL.NOM

‘The loved (and) current president’s two decisions are influential.’

(b) **tˁalab-a:** l-mutaqadim-i:na ʔatˁ-tˁamu:ħ-i:na

request.M-DUAL.NOM the-applicant.M-PL.GEN the-ambitious.M-PL.GEN

l-mutafa:ʔil-i:na *ka:mil-a:ni*

the-optimistic.M-PL.GEN complete.M-DUAL.NOM

‘The optimistic (and) ambitious applicants’ two requests are complete.’

The pattern of grammatical gender- and number-marking used in the current experiment is schematised in Table 2.5.

Table 2.5

Schematic Picture of Controller, Possessor and Target Gender and Number Marking in Experiment One

Controller		*Possessor*		*Target*	
Gender	*Number*	*Gender*	*Number*	*Gender*	*Number*
M	SG	M	DUAL, PL	M	SG
	DUAL		SG, PL		DUAL
	PL		SG, DUAL		PL
F	SG	F	DUAL, PL	F	SG
	DUAL		SG, PL		DUAL
	PL		SG, DUAL		PL

As mentioned earlier, comprehension statements were included in the experimental task for this thesis to check the participant's understanding of the stimulus sentences. Focusing again on Experiment One, consider the sentence in (45).

(45) ʔal-qara:r-a:ni muʔaθir-a:ni ʤiddan wifqa
the-decision.M-DUAL.NOM influential.M-DUAL.NOM very in

raʔy-i: ʔa-ʃʃaxsˁiyy-i wa sˁsˁari:ħ-i
opinion.M.SG-my the-personal.M.SG-GEN and the.honest.M.SG-GEN

maħaliyy-a-n wa dawliyy-a-n
domestically.M.SG-ACC-INDF and internationally.M.SG-ACC-INDF
'The two decisions are very influential, in my personal and honest opinion, domestically and internationally.'

The comprehension statement corresponding to (45) is shown in (46).

(46) taʔθi:r-u l-qara:r-a:ni maħaliyy-u-n
effect-NOM the-decision.M-DUAL.NOM domestically.M.SG-NOM-INDF

wa dawliyy-u-n
and internationally.M.SG-NOM-INDF
'The effect of the two decisions is domestic and international.'

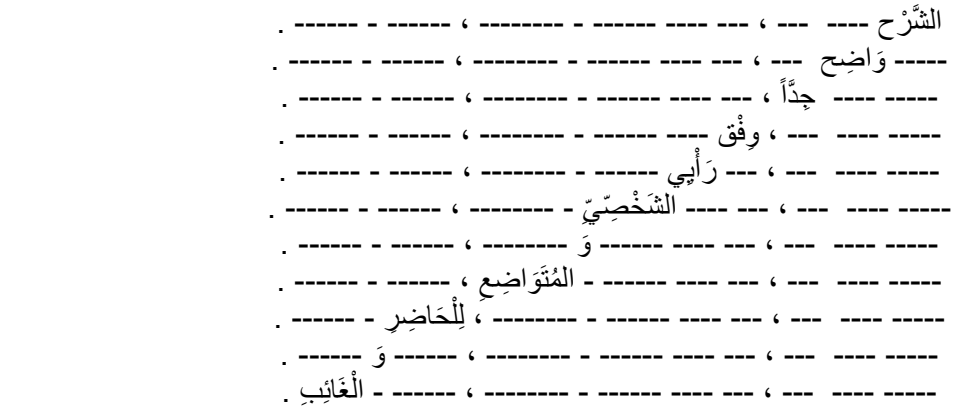
In (46), the statement matches the stimulus sentence in terms of truth value, so the correct answer is 'True'.

2.5.3 Procedure

The experimental task was set up within PsychoPy3 (Peirce et al., 2019). The task was done individually on a laptop. The participant was only able to move forward, not backward; the instructions were in English. The sentences in the task were presented in the centre of the screen as dashes: these indicated the number of characters in each word. Participants had to press the space bar to display the first word. When they pressed it again, the first word disappeared, and the following word appeared. In keeping with word order in written Arabic, each sentence was presented from right to left, and ended with a period. For sentences which were followed by a comprehension statement, this was displayed on the screen after the last word of the stimulus sentence had been read. The display for one sample sentence is shown in Figure 2.9.

Figure 2.9

Display for One Experimental Sentence



The participant was asked to read each sentence quickly, but carefully enough to be able to decide if the comprehension statement was true or false. The RT for each word was recorded within PsychoPy3.

Before starting the main part of the task, a set of four sentences (one of which was followed by a comprehension statement) served as a training run; the results were discarded. In the main part of the task, the order of batches within each session, plus the order of the sentences within each batch, were both randomised anew for every participant by PsychoPy3 to reduce any priming effects. A one-minute break was offered to the participant between batches, and a longer one of 15 minutes was offered between sessions. For most of the ELAs, each session lasted between 25-35 minutes; for most of the native speakers, each session lasted between 20-25 minutes. Each participant did the task over two days: two sessions were done per day. After finishing the task on the second day, the participant was monetarily compensated for participating.

2.5.4 Data analysis

All participants' accuracy on the comprehension statements for all three experiments combined was 80% or above; accordingly, no individuals were excluded from any of the three experiments.

The RTs from all three experiments were screened for outliers. All values that were shorter than 150 milliseconds (ms) or longer than 5,000 ms were excluded, following Coughlin and Tremblay (2011).[33] This resulted in the exclusion of 3% of the L2 learners' data and 4% of the native speakers' data. After that, in order to reduce skewing in the distribution of the response variable, the RTs for all critical regions (see below) in each experiment were log-transformed (Nicenboim et al. 2024).

In the current experiment, I used regression modelling to test P1 and P2 (see Section 2.4 above). Separate analyses were conducted for four critical regions: the target (t+0) and the three spillover regions (t+1, t+2, t+3). For t+0, the model incorporated fixed and random effects (Bates et al., 2015; Linck & Cunnings, 2015). Distance (adjacent vs. separated; reference level underlined) and ungrammaticality (grammatical vs. ungrammatical) were the fixed effects, and RT (as a measure of L2 processing) was the response variable. Both predictor variables were sum-to-zero coded: in addition to an estimate for the interaction term (see the regression model in [50] below), sum-to-zero coding enabled me to obtain an estimate of the main effects of distance and ungrammaticality.[34] Separate regression models were run for gender and number. Random intercepts and slopes for distance and ungrammaticality were included for participant and item. Random slopes for distance and ungrammaticality

[33] Keating and Jegerski (2015) recommend a lower bound of between 100-200 ms and an upper bound of between 2,000-6,000 ms. Thus, the lower and upper bounds used in the current experiment were in keeping with Keating and Jegerski's recommendation.

[34] By contrast, when a regression model contains an interaction term, treatment (or dummy) coding, for example, only allows us to estimate a simple (or marginal) effect for each of the predictor variables involved in the interaction. Further details can be found in Nicenboim et al. (2024; see Section 9).

were included for participant, because each participant responded to pairs of stimulus sentences in both distance conditions and both ungrammaticality conditions. Random slopes for distance and ungrammaticality were also included for item, because each item was presented to the participant in both distance conditions and both ungrammaticality conditions. I provide the specification in R syntax for the model employed for t+0 in (47) (ID = participant).

(47) RT ~ Distance * Ungrammaticality + (1 + Distance * Ungrammaticality | ID) + (1 + Distance * Ungrammaticality | Item)

For each of t+1, t+2 and t+3, the same model was used, except that the random effects for item were removed. This was because there were only three different items at t+1 in the set of stimulus sentences in this experiment (i.e., not enough items to allow me to treat item as a random effect and run a stable model), while, for each of t+2 and t+3, the same item was used in every stimulus sentence at each of these two regions. The model used for t+1, t+2 and t+3 is shown in (48).

(48) RT ~ Distance * Ungrammaticality + (1 + Distance * Ungrammaticality | ID)

Both models were run within R (R Core Team, 2020) in Stan (Carpenter et al., 2017) via the brms package (Bürkner, 2018).

To run the regression models, I used a Bayesian approach. A key advantage of this approach over the more familiar frequentist one is that it enables researchers to generate a distribution of probable values for the parameter estimate, rather than arrive at a single value of this estimate and surround it with uncertainty. Further

information on Bayesian methods can be found in Kruschke (2015) and Vasishth et al. (2018). R tutorials in which linguistic data is analysed from a Bayesian perspective can be found in Nalborczyk et al. (2019) and Winter and Bürkner (2021). Recent studies in L2 acquisition that have employed this framework are Austin et al. (2022, 2023) and Garcia (2020).

Before seeing the data, we may have certain expectations about the value (or range of values) that might plausibly be taken by a given parameter. Another advantage of the Bayesian paradigm is that it allows us to incorporate these expectations into the statistical model in the form of a prior probability distribution (Vasishth et al., 2018, p. 147). In the current experiment, I used adjusted values of the priors adopted by Nicenboim et al. (2024) on the basis of the authors' meta-analysis of research comparable to the present one. The priors are stated in Table 2.6 (Cor = correlation between random slopes and intercepts).

Table 2.6

Priors for the Regression Models Used in Experiment One

Parameter	*Prior*
Intercept	$\beta \sim \mathcal{N}(6, 0.6)$
Distance	$\beta \sim \mathcal{N}(0, 0.05)$
Ungrammaticality	$\beta \sim \mathcal{N}(0, 0.05)$
SD	$\beta \sim \mathcal{N}(0, 0.1)$
Sigma	$\beta \sim \mathcal{N}(0, 0.5)$
Cor	$\beta \sim$ lkj(2)

The results of prior-predictive checks (Gabry et al., 2019) confirmed that these priors were appropriate.

2.6 Results

In Section 2.6.1, I present the results for the norming group and the native-speaker controls. In Section 2.6.2, the results for the ELAs are presented.

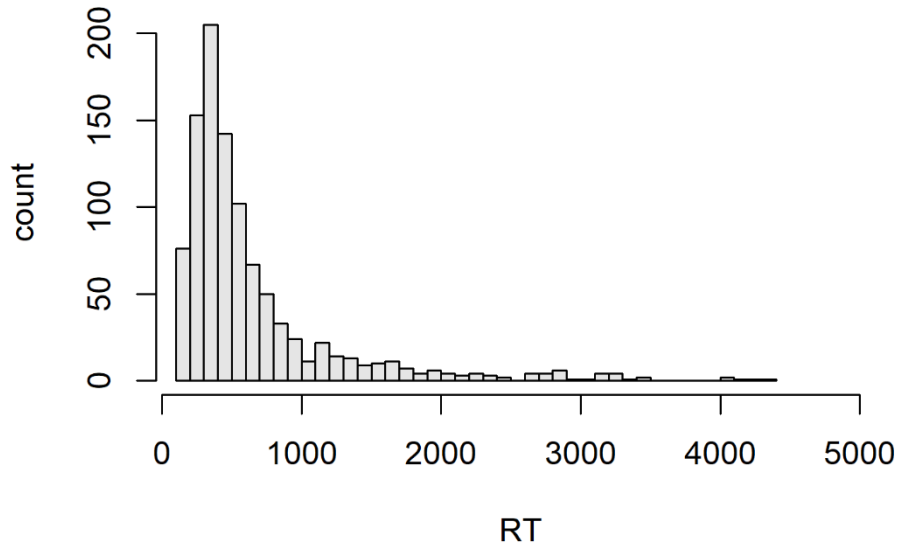
2.6.1 Native Arabic Speakers

The results for the norming group confirmed that the stimulus sentences were not semantically or pragmatically deviant. The results of the norming process for all of the stimulus sentences used in this thesis are available in Appendix A.[35]

In Figure 2.10, I provide a histogram showing the RT data from the control group for the grammatical stimulus sentences only.

Figure 2.10

Histogram Summarising the Control Group Data for Experiment One



We can see that most of the RTs are lower than 1000 ms, and that hardly any of these values are over 2000 ms. This pattern suggests that, on the whole, the control-group

[35] The results for the nine sentences that contained PPs were excluded, as this structure was not investigated in this study.

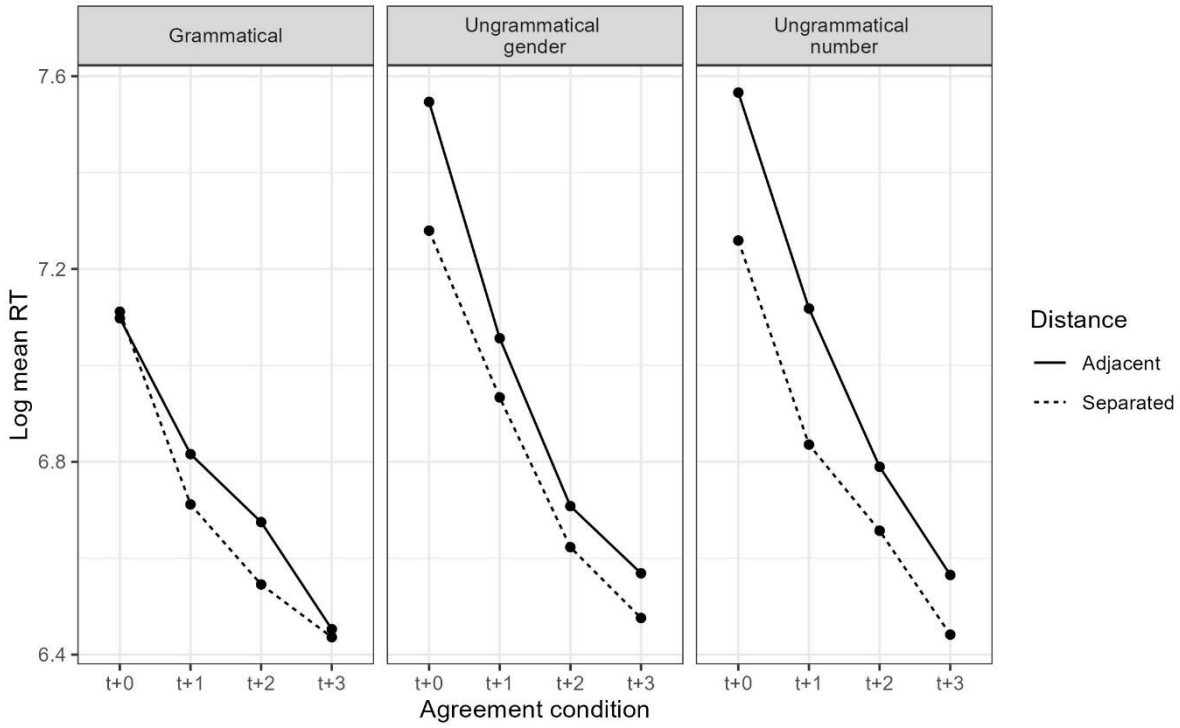
participants did not encounter any particular grammatical, semantic or pragmatic characteristics of the stimulus sentences that caused them to hesitate significantly when reading the sentences. From this, I conclude that the data collected from the ELAs reflected L2 processing rather than task effects.

2.6.2 ELAs

In Figure 2.11, I show the log-transformed values of the mean RTs for the ELA group at each critical region. These values are also categorised by distance and agreement condition.

Figure 2.11

Log Mean RTs for the Four Critical Regions by Distance and Agreement Condition in Experiment One



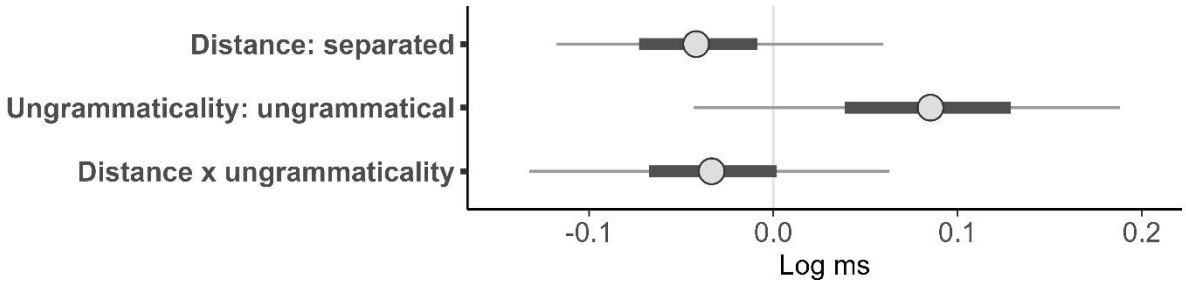
At each region, RTs were longer in both of the ungrammatical conditions than in the grammatical condition. Likewise, with the exception of t+0 in the grammatical condition, RTs were shorter in the separated condition than in the adjacent condition.

All models were run with Markov-Chain Monte Carlo (MCMC) sampling using four chains. Each chain had 4000 iterations (including a warm-up of 1000). The trace plots of each model, the $\hat{R}$ values and the effective sample sizes demonstrated that the model had successfully converged. A posterior predictive check (Gelman et al., 2014) confirmed that the data predicted by the fitted model was consistent with the observed data for each of the models that were run.

I will deal with the results for gender agreement first. Each critical region will be considered in turn. Figure 2.12 shows the posterior distributions for the effects of distance and ungrammaticality at t+0.

Figure 2.12

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+0: Gender Agreement: Experiment One



Note. 'Adjacent' was the reference level for distance, and 'grammatical' was the reference level for ungrammaticality. The thick line denotes the 89% highest density interval (HDI): this encompasses the range of the 89% most credible values for the parameter The mean of these values is used as the parameter estimate ($\hat{\beta}$); this is indicated with a hollow circle in the plot. The thin line extends over the full range of values in the posterior distribution. RT was measured in milliseconds (log-transformed).

For distance, the HDI lies entirely to the left of zero: this provides credible evidence that the main effect of distance was negative. Given that 'adjacent' was the reference level for distance, we can conclude that RTs were shorter in the separated condition than in the adjacent condition.

For ungrammaticality, the HDI lies entirely to the right of zero: this provides credible evidence that the main effect of ungrammaticality was positive. Given that 'grammatical' was the reference level for ungrammaticality, we can conclude that RTs were longer in the ungrammatical condition than in the grammatical condition.

There was credible evidence for a negative interaction between distance and ungrammaticality, indicated by the fact that most of the probable values of this parameter were negative, though the evidence in this case is weak (*pd* = 0.940; see Table 2.7).[36] Specifically, when agreement was ungrammatical, the RTs increased to a lesser extent in the separated condition than in the adjacent condition. Thus, learners were less sensitive to ungrammaticality in the former condition than the latter.[37]

Table 2.7 presents the findings in detail.

[36] As a rule, if the credible interval does not cross zero, this is usually taken as evidence that an effect is present. In cases where the credible interval crosses zero but *most* of this interval is either positive or negative, it is possible to claim an effect (although we should qualify this by adding that the evidence is weak, as I have done). There is no universally accepted cutoff for deciding, in a situation where the credible interval crosses zero, how much of this interval is 'allowed' to cross zero. In this thesis, I have used a cutoff which I believe is reasonable for the minimum amount of probability mass that needs to lie on one side of zero (i.e., $pd \geq 0.90$).

[37] From this point onwards, in order to minimise repetition, I will present the results of the regression analyses in this thesis more succinctly.

Table 2.7

Effects of Distance and Ungrammaticality on RTs at Region t+0: Gender Agreement: Experiment One

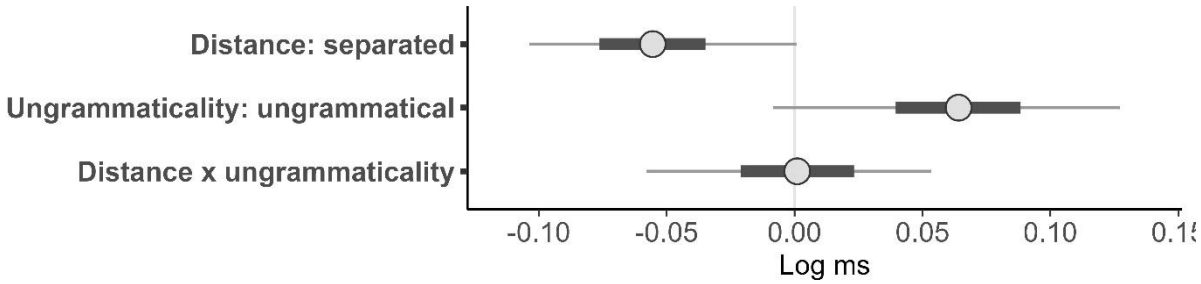
Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.995	0.062	6.897	7.093	1.000	1.004	2209
Distance: separated	-0.042	0.020	-0.073	-0.009	0.976	1.000	8009
Ungramm.: ungramm.	0.085	0.029	0.038	0.130	0.997	1.001	5375
Distance x ungramm.	-0.034	0.021	-0.067	0.001	0.940	1.001	8887

Note. SD = standard deviation of the distribution. 89% HDI: *L* = lower bound; *U* = upper bound; *pd* = probability of direction. n_{eff} = effective sample size. The *pd* is the portion of the probability density in the entire range that sits to the left or right of zero, contingent upon whether the sign of $\hat{\beta}$ is negative or positive, respectively. This indicates the probability that the effect exists in the direction implied by this sign.

We now turn our attention to the results for region t+1. Figure 2.13 shows the posterior distributions.

Figure 2.13

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+1: Gender Agreement: Experiment One



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was no interaction between distance and ungrammaticality, as the HDI for this parameter straddles zero. Thus, learners were not more or less sensitive to ungrammaticality in the separated condition than in the adjacent condition.

Table 2.8 presents the findings in detail.

Table 2.8

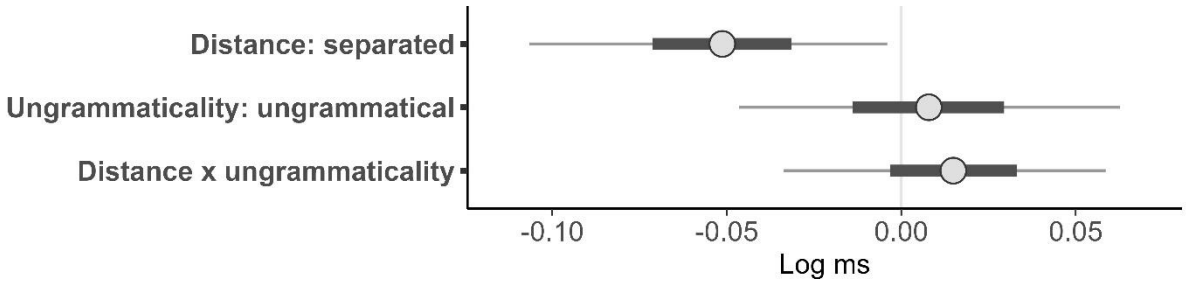
Effects of Distance and Ungrammaticality on RTs at Region t+1: Gender Agreement: Experiment One

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.638	0.058	6.545	6.730	1.000	1.005	1063
Distance: separated	-0.055	0.013	-0.076	-0.035	1.000	1.000	14219
Ungramm.: ungramm.	0.064	0.015	0.040	0.088	1.000	1.001	3148
Distance x ungramm.	0.001	0.014	-0.021	0.023	0.524	1.000	7599

I will now present the results for the effects of distance and ungrammaticality at t+2. Consider Figure 2.14.

Figure 2.14

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+2: Gender Agreement: Experiment One



The main effect of distance was negative. There was no main effect of ungrammaticality. There was a positive interaction between distance and ungrammaticality, indicated by the fact that most of the probable values of this parameter were positive (*pd* = 0.905; see Table 2.9). Specifically, when agreement was ungrammatical, the RTs increased to a greater extent in the separated condition

than in the adjacent condition. Thus, learners were more sensitive to ungrammaticality in the former condition than the latter.

Table 2.9 presents the findings in detail.

Table 2.9

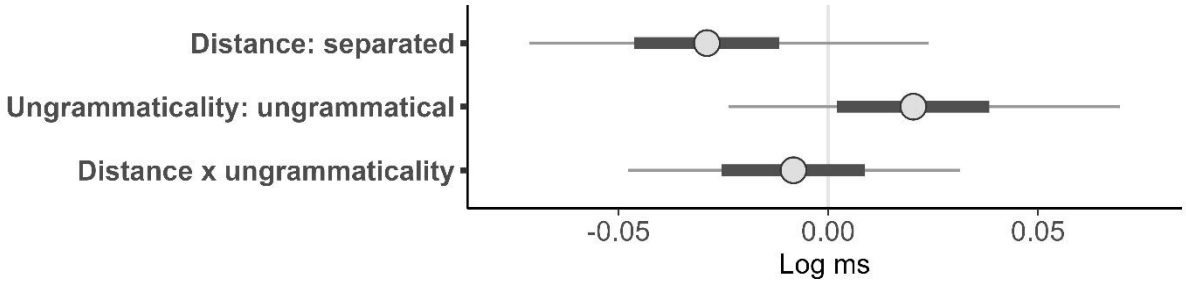
Effects of Distance and Ungrammaticality on RTs at Region t+2: Gender Agreement: Experiment One

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.451	0.052	6.368	6.536	1.000	1.003	1062
Distance: separated	-0.051	0.012	-0.071	-0.031	1.000	1.000	8953
Ungramm.: ungramm.	0.008	0.014	-0.014	0.029	0.721	1.000	5834
Distance x ungramm.	0.015	0.011	-0.003	0.033	0.905	1.000	14039

Figure 2.15 shows the posterior distributions for the effects of distance and ungrammaticality at t+3.

Figure 2.15

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+3: Gender Agreement: Experiment One



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was no interaction between distance and ungrammaticality.

Table 2.10 presents the findings in detail.

Table 2.10

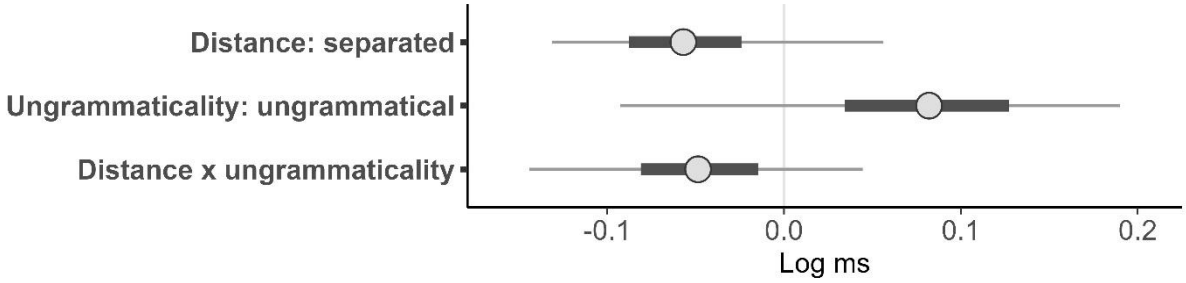
Effects of Distance and Ungrammaticality on RTs at Region t+3: Gender Agreement: Experiment One

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.269	0.061	6.174	6.366	1.000	1.003	1091
Distance: separated	-0.029	0.011	-0.046	-0.012	0.995	1.000	22932
Ungramm.: ungramm.	0.020	0.011	0.002	0.038	0.962	1.000	12246
Distance x ungramm.	-0.008	0.011	-0.025	0.009	0.777	1.000	22270

The results for number agreement will be considered next. Figure 2.16 shows the posterior distributions for the effects of distance and ungrammaticality at t+0.

Figure 2.16

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+0: Number Agreement: Experiment One



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was a negative interaction between distance and ungrammaticality.

Table 2.11 presents the findings in detail.

Table 2.11

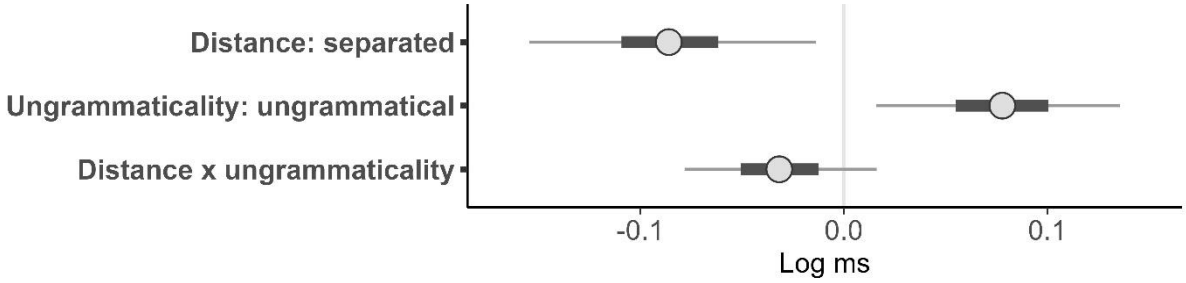
Effects of Distance and Ungrammaticality on RTs at Region t+0: Number Agreement: Experiment One

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.997	0.061	6.899	7.093	1.000	1.002	1344
Distance: separated	-0.057	0.020	-0.088	-0.024	0.995	1.000	7297
Ungramm.: ungramm.	0.082	0.029	0.034	0.127	0.994	1.000	4294
Distance x ungramm.	-0.049	0.021	-0.081	-0.014	0.987	1.000	6972

Figure 2.17 shows the posterior distributions for the effects of distance and ungrammaticality at t+1.

Figure 2.17

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+1: Number Agreement: Experiment One



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was a negative interaction between distance and ungrammaticality.

Table 2.12 presents the findings in detail.

Table 2.12

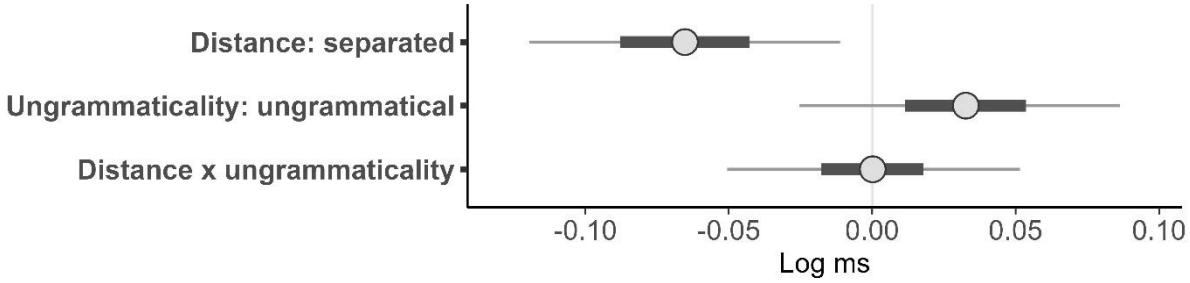
Effects of Distance and Ungrammaticality on RTs at Region t+1: Number Agreement: Experiment One

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.655	0.056	6.564	6.742	1.000	1.001	1232
Distance: separated	-0.086	0.015	-0.109	-0.062	1.000	1.000	8821
Ungramm.: ungramm.	0.078	0.014	0.055	0.101	1.000	1.000	6288
Distance x ungramm.	-0.032	0.012	-0.051	-0.012	0.994	1.000	13744

Figure 2.18 shows the posterior distributions for the effects of distance and ungrammaticality at t+2.

Figure 2.18

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+2: Number Agreement: Experiment One



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was no interaction between distance and ungrammaticality.

Table 2.13 presents the findings in detail.

Table 2.13

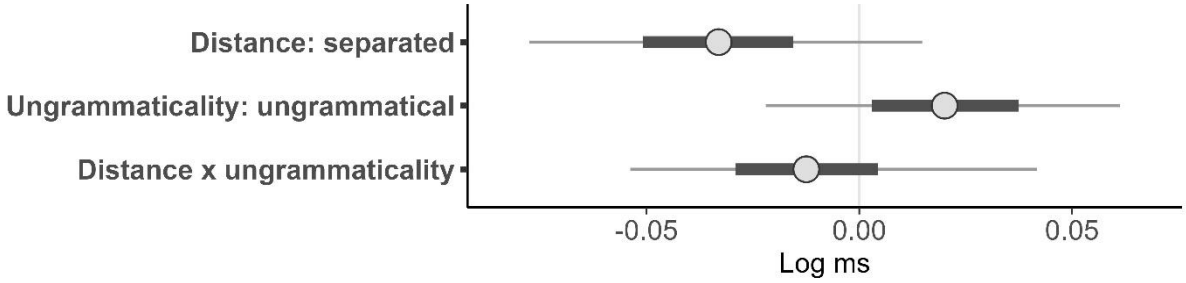
Effects of Distance and Ungrammaticality on RTs at Region t+2: Number Agreement: *Experiment One*

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.474	0.053	6.389	6.558	1.000	1.002	1171
Distance: separated	-0.065	0.014	-0.088	-0.043	1.000	1.000	8477
Ungramm.: ungramm.	0.033	0.013	0.011	0.054	0.993	1.000	7898
Distance x ungramm.	0.000	0.011	-0.018	0.018	0.506	1.000	18849

Figure 2.19 shows the posterior distributions for the effects of distance and ungrammaticality at t+3.

Figure 2.19

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+3: Number Agreement: Experiment One



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was a negative interaction between distance and ungrammaticality; however, it must be conceded that the evidence was somewhat weak (*pd* = 0.884; see Table 2.14).

Table 2.14 presents the findings in detail.

Table 2.14

Effects of Distance and Ungrammaticality on RTs at Region t+3: Number Agreement: Experiment One

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.271	0.060	6.174	6.368	1.000	1.023	600
Distance: separated	-0.033	0.011	-0.051	-0.015	0.998	1.000	10080
Ungramm.: ungramm.	0.020	0.011	0.003	0.037	0.969	1.000	11238
Distance x ungramm.	-0.012	0.010	-0.029	0.004	0.884	1.000	12350

2.7 Discussion and conclusion

The present study set out to examine how sensitivity to agreement anomalies is affected by distance. To this end, I investigated the processing of gender and number agreement between a noun and a predicative adjective in a verbless sentence in two different LD conditions (i.e., adjacent and separated), while holding SD constant. There were two predictions:

P1. ELAs will be less sensitive to ungrammaticality in gender agreement when the noun and adjective are separated than when they are adjacent.

P2. ELAs will be less sensitive to ungrammaticality in number agreement when the noun and adjective are separated than when they are adjacent.

These predictions were tested at four critical regions each. The first region (i.e., t+0) was the location of the target adjective, and the remaining regions (i.e., t+1, t+2 and t+3) were spillover regions. In Table 2.15, for each agreement type and also each

region of interest, I indicate whether the ELAs in this study were less sensitive to ungrammaticality in the separated condition than the adjacent condition.

Table 2.15

Were Learners Less Sensitive to Ungrammaticality in the Separated Condition than the Adjacent Condition?: Noun-Adjective Agreement: Experiment One

Region	*Gender*	*Number*
t+0	Yes	Yes
t+1	No	Yes
t+2	No*	No
t+3	No	Yes**

Note. * Learners were *more* sensitive to ungrammaticality in the separated condition. ** The evidence for an effect was weak.

Based on these results, P1 was confirmed for t+0, while P2 was confirmed for t+0, t+1 and (with the caveat that the evidence for an effect in this case was weak) t+3.

The findings of Experiment One have implications for various theories of L2 acquisition and/or processing. First of all, they support the Linear Distance Principle (LDP; Keating, 2005) and the Linear Distance Hypothesis (LDH; O'Grady et al., 2003), both of which hold that sensitivity to inflectional violations declines under a higher load of intervening words. For gender agreement, the results of this experiment offer support for both of these theories of L2 processing. At the same time, distance only moderated learners' sensitivity to ungrammaticality at the target itself: no such effect was detected downstream from the target. For number agreement, distance moderated learners' sensitivity to ungrammaticality at t+0, t+1 and t+3, but not at t+2. Overall, the findings of this experiment uphold the LDP and the LDH for both types of agreement, particularly at t+0. In addition, given that the ELAs were able to acquire

gender and number agreement at t+0 at the very least, the findings of this experiment support FTFA (although is a theory of acquisition rather than processing).

At the same time, as Table 2.15 makes clear, the results for the four critical regions are different for the two types of agreement. For gender agreement, the ELAs were less sensitive to ungrammaticality in the separated condition than the adjacent condition only at t+0; however, for number agreement, this decrease in sensitivity was evident not only at t+0 but also at two of the three spillover regions. Thus, all things considered, the moderating effect of distance on sensitivity to ungrammaticality was slightly stronger for number than gender. Note, however, that gender agreement does not occur in the L1, whereas number agreement is present in the L1 (in the form of plural marking or subject-verb agreement). In this light, it is possible that the ELAs' acquisition of number agreement was facilitated by positive transfer of this type of agreement from the L1. Before this conclusion can be accepted, though, an in-depth study of this putative facilitative effect is called for. In particular, one could compare L2 learners from L1 backgrounds that contrast in terms of whether or not these L1s have agreement systems elsewhere in the language.

The results of this experiment can also be compared to those of one previous study which also focused on LD effects in L2 N-Adj agreement processing. Recall from Section 2.3.1 that, in Keating (2010), English-speaking learners of Spanish showed sensitivity to gender-agreement anomalies when the target adjective was one word away from the controller noun (i.e., close to the controller, though admittedly not adjacent to it), but not when the target adjective was four or seven words away.[38] Thus, in broad terms, the results of the present study are in line with those of Keating (2010), since, in each study, L2 learners are shown to be sensitive to grammaticality when the

[38] Keating (2010) focused on gender agreement only.

controller is adjacent (or close) to the noun, but not when controller and target are separated. Note also that Keating's findings were similar to my own even though the learners in his study were at advanced level while those in the current study were intermediates. Further investigation is required to elucidate the role played by L2 proficiency in an experiment concerned specifically with LD effects in L2 N-Adj agreement processing. For instance, it would be worth investigating if intermediate L2 learners with L1s other than Arabic behave like the ELAs in the present experiment in terms of their processing of N-Adj agreement.

Finally, the results for all four regions of interest (see Table 2.15) merit some detailed discussion. To begin with, there is the general question of where exactly in a series of critical regions distance starts to moderate learners' sensitivity to agreement violations. In the present study, this occurred at t+0 (i.e., the target itself) for both types of agreement. By contrast, in a study by Song (2015a) concerned with the processing of simple DPs and partitive structures by advanced Korean L2 learners of English, the learners did not show sensitivity to missing plural inflection until the second spillover region. One possible reason for the divergence between Song's results and my own is that Song manipulated SD rather than LD. Further research on divergences such as this one is needed.

Second, when we take a synoptic perspective on the results for all four critical regions, the learners in the present experiment did not exhibit a consistent pattern in their response to the moderating effect of distance on sensitivity to ungrammaticality for either type of agreement. Consider gender agreement first of all. If these participants had shown no effect of distance at t+2, we might have reasonably concluded that the effect of the agreement violation at the target adjective simply 'faded away' as the learner moved downstream. However, the ELAs were *more*

sensitive to ungrammaticality in the separated condition than the adjacent condition at t+2. I have no explanation for this anomaly.

For number agreement, the ELAs show a pattern of responses that more plausibly suggests an attenuation in the effect of the agreement violation at the target region as one moves downstream. Once again, though, we encounter an anomaly, as, at t+3, the learners were less sensitive to ungrammaticality in the separated condition than the adjacent condition. Given that the evidence for this effect was not compelling, one could take the position that the effect of the agreement violation at the target region did indeed fade away after t+1. Even so, the result for t+3 suggests that the effect of an agreement violation that has apparently faded away can 'reassert itself' in delayed fashion. Further investigation into this aspect of L2 processing is clearly warranted, as it has not been reported in previous experiments that used self-paced reading, to the best of my knowledge. In Jegerski (2016), for example, a spillover effect effect is observed at two regions downstream from the target: the effect does not fade away and then reassert itself.

CHAPTER THREE

EXPERIMENT TWO: SUBJECT-VERB AGREEMENT: SUBJECT-HEADED RELATIVE CLAUSES

3.1 Introduction

Arabic subject-verb (Subj-V) agreement is a complex system that involves matching the φ (phi) features (i.e., gender, number, and person) of the subject with those of the verb, while also taking into account other properties of the verb (i.e., tense, mood and aspect). In Experiment Two, I compare Subj-V gender- and number-agreement processing in two contrasting syntactic constructions.[39] In the first context, the two agreeing elements are adjacent, as shown in (1) (3 = third person; M = masculine; NOM = nominative; PERF = perfective; SG = singular; controller in bold, target in italics).[40]

(1) **ʔatˤ-tˤa:lib-u** *daras-a*
the-student.M.SG-NOM study.PERF-3SG.M
'The student studied.'

In the second context, the two elements are separated by a three-word subject relative clause (RC), as exemplified in (2) (2 = second person; ASRT = assertive particle;[41] ASP = aspect).

[39] Person agreement is controlled in this experiment: all subjects are third person.
[40] Note that, in (1), the sentence has subject-verb (SV) word order. When this order is used in Arabic, we have full agreement between controller and target (i.e., in terms of gender, number, and person). However, Arabic also allows VS word order. In this situation, the verb typically shows agreement in gender and person only. In the present experiment, all stimulus sentences follow SV word order; therefore, in each of these sentences, the subject agrees fully with the verb.
[41] In general, the assertive particle *qad* indicates that the action associated with the verb is completed (Ryding, 2005). In order to reflect this, in (2), the RC verb *sa:ʕada* is translated into English as past perfect. I will say more about the assertive particle *qad* in Section 3.2.3.

(2) **ʔatˤ-tˤa:lib-u** ʔallaði: qad sa:ʕad-a-k-a

the-student.M.SG-NOM that.M.SG ASRT help.PERF-3SG.M-2SG-M

daras-a

study.PERF-3SG.M

‘The student that had helped you studied’

Several studies have investigated the effects of linear distance (LD) and structural distance (SD) on second language (L2) Subj-V gender- and number-agreement processing. The specific focus of these studies has been the effect of distance on the learner’s sensitivity to agreement anomalies. However, there are some methodological concerns regarding certain aspects of these studies: they tended to focus on L2 learners at advanced level (Foote, 2011; Mao et al., 2022; Ocampo, 2013; Romanova, 2013); relatively low numbers of subjects took part (Foote, 2011; Romanova, 2013); apart from Foote (2011) and Romanova (2013), who investigated both gender and number agreement, studies in this area were concerned only with number agreement (Bannai, 2011; Ocampo, 2013), or number and person (Mao et al., 2022); among the four studies in this area which have looked at spillover effects (Bannai, 2011; Foote, 2011, Mao et al., 2022, Ocampo, 2013), two studies examined only one of these regions (Bannai, 2011; Foote, 2011), while another study examined only two (Ocampo, 2013); reading times (RTs) in the adjacent and separated conditions have been difficult to compare (Bannai, 2011; Foote, 2011; Romanova, 2013); and the SD between controller and target appears to have been calculated incorrectly in Ocampo (2013). Among the studies just mentioned, only Ocampo (2013) employed subject-headed relative clauses (SRCs) in order to create a long-distance

dependency between the matrix subject and the matrix verb. Finally, there are some inconsistencies in the results of the five studies in question (Bannai, 2011; Foote, 2011; Mao et al., 2022; Ocampo, 2013; Romanova, 2013). These inconsistencies may have been due, at least in part, to the small numbers of participants recruited in Foote (2011) and Romanova (2013).

The present experiment addresses the issues identified above. It also extends current work on distance effects in Subj-V gender- and number-agreement processing by focusing on L2 Arabic: as far as I am aware, no previous work has investigated this learner group before in a study focusing on these particular effects.

The chapter is organised as follows. In Section 3.2, I analyse the morphological and syntactic characteristics of Arabic Subj-V agreement and RC structure which pertain to the current experiment. In Section 3.3, I review a collection of relevant existing studies. Section 3.4 states the focus of the experiment. Recall from Section 2.5 that the same methodology is used for each experiment reported in this thesis; in Section 3.5, those aspects of the methodology which are specific to Experiment Two are described. The results follow in Section 3.6. Section 3.7 discusses these findings in light of the predictions formulated earlier.

3.2 Theoretical background

In this section, I present the theoretical background on Arabic morphosyntax which is pertinent to Experiment Two. It is organised as follows. Section 3.2.1 contains information about Arabic verbs. Section 3.2.2 is concerned with the syntactic structure of sentences containing Subj-V agreement in this language. Arabic RCs are covered in Section 3.2.3.

3.2.1 Verbs

Verbs in Arabic are inflected for tense as either past tense (or perfective) or present tense (or imperfective).[42] In each case, the verb agrees with the subject in gender, number and person; further details will be provided in Section 3.2.2. The current section focuses on the perfective form of the verb, since all the verbs used in the stimulus sentences (including the verb inside the RC) are in this tense.

The Arabic verb is based on a root consisting of two to four consonants (Alhawary, 2009a; Tucker, 2010). In the case of a verb based on a three-consonant root, for example, the perfective form follows a $C_{v1}C_{v2}C_{v3}$ pattern (e.g., $f_{v1}ʕ_{v2}l_{v3}$; C = consonant; v = vowel; Bahloul, 2008).[43] Also, whereas the root indicates the lexical meaning of the verb, each inserted vowel acts as an independent morpheme with its own semantic characteristics (Bahloul, 2008). Er-rayyan (1986) and Bahloul (2008) argue that the first vowel expresses tense-aspect traits, the second vowel indicates valence (i.e., transitive vs. intransitive), and the third vowel carries the φ features involved in the agreement relation between the subject and the verb. Note, however, that the third vowel does not bear any morphological realisation of the tense: the tense is an abstract morpheme with no phonological content (Al-Balushi, 2011; Bahloul, 2008; Benmamoun, 1992, 2000; Fehri, 1993; Soltan, 2007, 2011). Table 3.1 shows the morphophonemic shape of the Subj-V agreement suffix in the perfective form for

[42] In Benmamoun (2003), the term 'perfective' refers to the past tense, whereas 'imperfective' is employed for non-past tenses, including modal particles and negative particles. In this chapter, I will be using the term 'perfective' for the past tense, consistent with Benmamoun's position. However, scholars do not always agree regarding the properties of tense and aspect in this language; in particular, Gadalla (2006, citing Raḍwaan, 1975, p. 30) suggests that aspect and tense are two independent categories. For comprehensive overviews of Arabic tense and aspect, see Alasmary (2020), Al-Dobaian (2018), Bahloul (1994) and Fehri (1993).

[43] There are 15 perfective verbal forms for the trilateral roots, among which 10 commonly occur. For the quadriliteral roots, there are four common patterns. For more information on derivational Arabic verb forms, see Alasmari (2020), Alshdaifat (2014), Tucker (2010), Martínez (2012) and Ryding (2005).

SV word order by person, gender and number (adapted from Bahloul, 2008, p. 34; Ø = *suku:n*; F = feminine).[44]

Table 3.1

Morphophonemic Shape of the Agreement Morpheme in the Perfective Form

Person	*Gender*	*Number*		
		Singular	*Dual*	*Plural*
First	-	-tu	-[45]	-na:
Second	M/F	-ta/-ti	-tuma:/-tuma:	-tum/tunna
Third	M/F	-a/-atØ	-a:/-ata:	-u:/-na

In (3a) and (3b), I show the conjugation of the perfective form with a masculine subject and with a feminine subject, respectively ([3a] adapted from Bahloul, 2008, p. 34; [3b] adapted from Benmamoun, 2003, p. 757).

(3)	(a)	katab-a	(b)	ʔakal-atØ
		write.PERF-3SG.M		eat.PERF-3SG.F
		‘He wrote.’		‘She ate.’

In Experiment Two, I follow the analysis of the Arabic perfective form in Bahloul (2008) and Benmamoun (2000, 2003); specifically, my position is that the third vowel in the perfective form reflects agreement between the subject and the verb in terms of all φ features.

[44] According to Jarrar et al. (2019, p. 10:2), “A *sukoon* [sic] … denotes a silent diacritic sound on the letter.”

[45] For the first-person dual, the first-person plural morpheme *-na:* is used to refer to two people, as in (i) (1 = first person).

(i)	ana	wa	Kinda	qaraʔ-na:	kitab-an
	I	and	Kinda	read.PERF-1SG.M	book
	‘Kinda and I read a book.’				

3.2.2 Subject-verb agreement

Aoun et al. (2009), Fehri (1993) and Mohamad (1999, 2000) argue that, in an Arabic SV sentence, the subject determiner phrase (DP) moves from a position inside the verb phrase (VP; i.e., Spec VP; Spec = specifier) to the Spec position in the tense phrase (TP), forming a Spec-head relation with the functional head T. Also, the verb moves to T to join its inflectional features (Benmamoun, 2000). In (4), I exemplify a sentence in the perfective tense; the syntactic structure for this sentence is depicted in Figure 3.1 (e = empty category; NP = noun phrase).

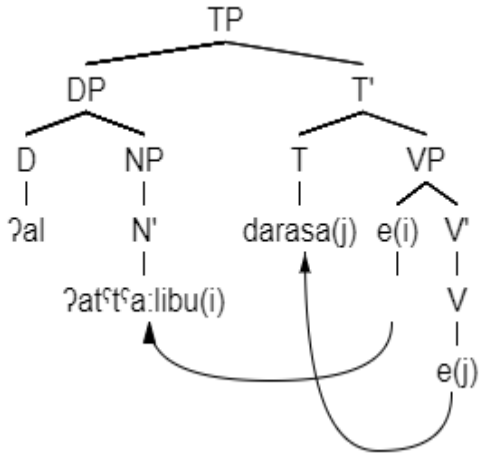
(4) ʔatˤ-tˤa:lib-u daras-a

the-student.M.SG-NOM study.PERF-3SG.M

'The student studied'

Figure 3.1

Syntactic Representation of (4)



For the purpose of calculating the SD between the controller and the target in the present experiment, I will assume that, in a sentence containing Subj-V agreement, the syntactic structure of this agreement relation is as exemplified in Figure 3.1.

3.2.3 Relative clauses

Experiment Two is concerned with Subj-V agreement in sentences containing definite subject DPs. In (5), I exemplify a subject DP with an RC attached to it.

(5)	ʔatˤ-tˤa:lib-u	ʔallaði:	qad	sa:ʕad-a-k-a
	the-student.M.SG-NOM	that.M.SG	ASRT	help.PERF-3SG.M-2SG-M
	‘the student that had helped you’			

Notice that the subject DP *ʔatˤtˤa:libu* ‘the student’ is definite; also, the relative pronoun (RP) *ʔallaði:* ‘that’ matches the subject noun *tˤtˤa:libu* ‘student’ in gender and number, and matches the RC verb *sa:ʕad* ‘help’ in gender, number and person. Also, the object is suffixed to the verb *sa:ʕad* as *-k*, which corresponds to the independent pronoun ‘you’ in English.

Different analyses of RCs have been proposed to account for the structural relationship between the RP, and the head of the RC, in Arabic (for more on RC structure in this language, see Galal, 2004, and Mohammad Ali, 2004). In the present experiment, I will adopt the matching analysis proposed by Chomsky (1977) for RC structure crosslinguistically: the RC attaches to the NP as a complementiser phrase (CP), and the RP moves from the position of RC object to Spec CP, where it can be checked for agreement features.[46] The matching analysis has been applied to Arabic

[46] This syntactic structure is shown for the Arabic case in Figure 3.2 below.

RCs in previous work (Algady, 2013; Alsayed, 1998; Galal, 2004; Mohammad, 1989). However, where a gap (i.e., trace) is involved (e.g., in a subject-headed RC), I will adopt the proposal of Algadi (2013) and Galal (2004), which involves movement to Spec CP of an operator (i.e., OP) coreferential with the relativised noun. Thus, the matching analysis of Arabic RCs assumes that the CP is right-adjoined to the head noun, and that the OP moves from the position of the matrix-object head noun to Spec CP.

Some remarks on the meaning of the assertive particle *qad* are also required, as the RCs in the stimulus sentences in this experiment all contain this particle. When *qad* precedes a perfective verb, it signals the completion of the action (Ryding, 2005). Therefore, in a sentence containing an RC, *qad* can be used to clearly indicate that the action associated with a perfective RC verb happens before the one associated with the matrix verb.

In addition, an analysis of the *syntax* of *qad* is required, as this particle needs to be taken into account when the SD between controller and target in the stimulus sentences is calculated in the current experiment. Al-Mansouri (2002), Bahloul (2008, 2016) and Fessi Fehri (2012) adopt a temporal and aspectual analysis of *qad*; more particularly, Bahloul (2008) proposes that this particle is the head of an assertive phrase (AsrtP).[47] Thus, a relativised subject DP like the one mentioned in (5), which I repeat in (6) for convenience, would have the structure shown in Figure 3.2 (pro = pronoun).

[47] As we shall see in Figure 3.2 shortly, Bahloul's proposal also requires that a Taxis and Aspect Phrase (Tax-AspP) be assumed as part of the structure of a sentence containing an RC in this language, where Taxis "characterizes the narrated event in relation to another narrated event and without reference to the speech event" (Jakobson, 1957, p. 4). For further details of Bahloul's (2008) proposal, see that source.

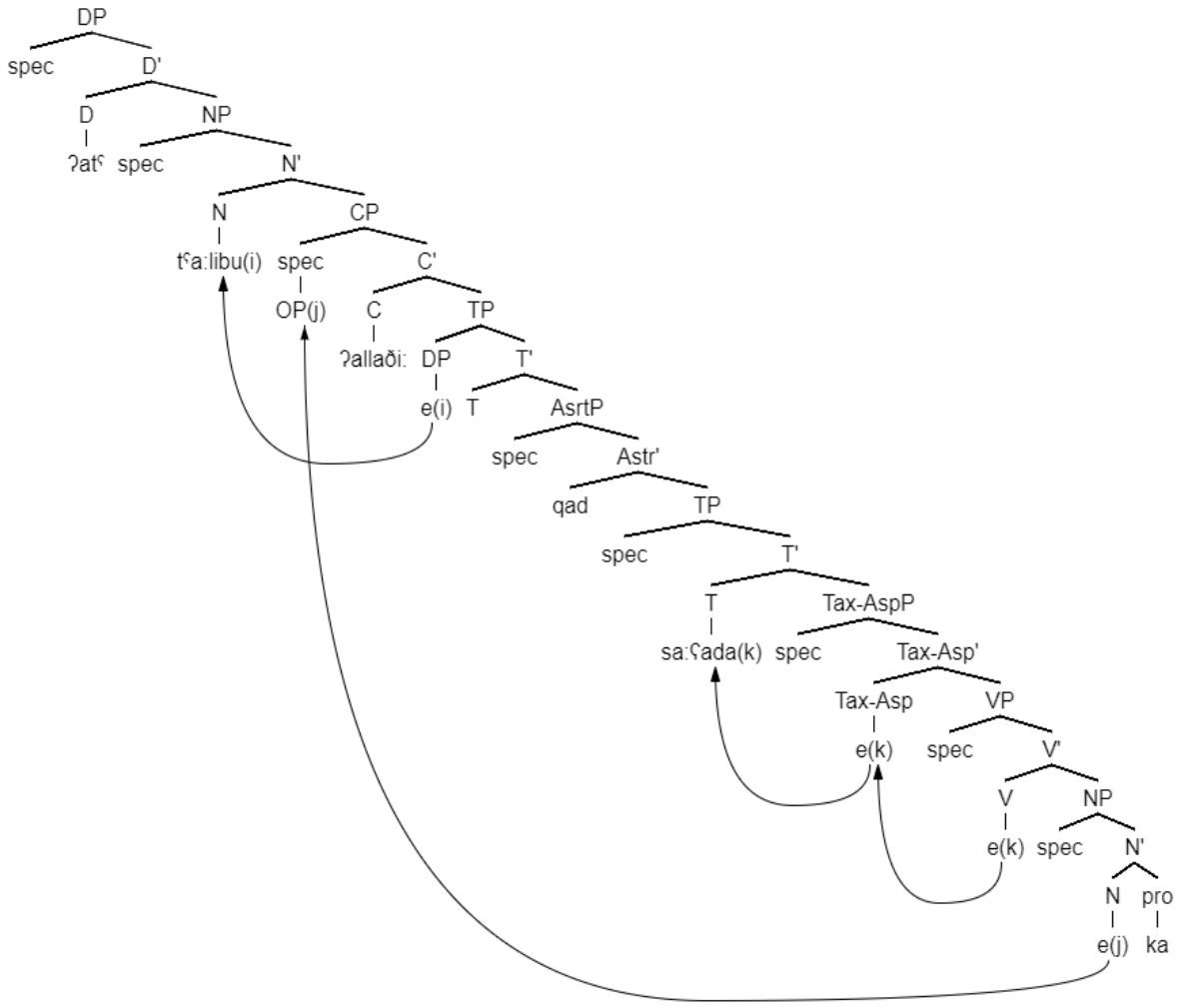
(6) ʔatˤ-tˤa:lib-u ʔallaði: qad sa:ʕad-a-k-a

the-student.M.SG-NOM that.3SG.M ASRT help.PERF-3SG.M-2SG-M

‘the student that had helped you’

Figure 3.2

Syntactic Representation of (6)



3.3 Literature review

This section consists of two subsections. Section 3.3.1 summarises previous research on the effect of distance on Subj-V agreement processing in the L2. Limitations and gaps in these studies are brought to light in Section 3.3.2.

3.3.1 Summaries of previous research

Several studies have yielded evidence for an effect of distance on sensitivity to anomalies in the L2 processing of Subj-V gender and/or number agreement. These studies have featured a variety of L1-L2 combinations: English-speaking learners of Spanish (Foote, 2011) and Russian (Romanova, 2013), Japanese learners of English (Bannai, 2011), Spanish learners of English (Ocampo, 2013), and Chinese learners of Spanish (Mao et al., 2022).

In the first study considered here, Bannai (2011) looked at one group of 23 lower- to upper-intermediate Japanese learners of English, and a control group of 13 native speakers of English. There were two critical regions: the verb (which Bannai refers to as 'T1') and the spillover region ('T2'). A word-by-word non-cumulative self-paced reading task was used, followed by a grammaticality-judgment task (GJT).

The structures employed in the study were as follows: the subject DP and the verb were adjacent, as in (7a) and (7b); the adverb 'often' intervened between the subject DP and the verb, as in (7c) and (7d); and the subject DP contained a prepositional phrase (PP) complement, as in (7e) to (7h). Hence, the controller and target were adjacent in (a) and (b), one word distant in (c) and (d), and four words distant in (e) to (h). Within each of these structures, there was also some variation in terms of the number marking on the subject nouns and PP-object nouns, and in terms of the syntactic complexity of the subject DP (adapted from Bannai, 2011, p. 123).

(7) (a) the doctor drinks/*drink a lot of coffee

(b) those two sisters make/*makes a lot of money

(c) the mother often cooks/*cook a lot of rice

(d) those two sisters often spend/*spends a lot of money

(e) the student with a large bag carries/*carry a lot of books

(f) the teacher with the cute earrings drinks/*drink a lot of tea

(g) those two workers in the ticket office listen/*listens to music all the time

(h) those two workers with the white bags go/*goes to Seven-Eleven

In his study, Bannai attempted to answer three questions. The first question did not focus on distance; rather, it asked whether or not L2 learners were sensitive to the overuse of the third-person singular Subj-V agreement morpheme '-s' on the verb in (7b), (7d), (7g) and (7h), and whether or not they were sensitive to the omission of this morpheme on the verb in (7a), (7c), (7e) and (7f). In other words, this research question was concerned primarily with the distinction between overuse and omission of Subj-V agreement inflection in L2 English. The RT results confirmed that the learners in this study were sensitive to '-s' overuse in (7b), (7g) and (7h),[48] but insensitive to '-s' omission in (7a), (7c), (7e) and (7f).

The second and third research questions were more relevant to the current experiment, as they both directly addressed the effect of distance. The second question compared (7b) and (7d), and asked whether or not the learners' sensitivity to the overuse of '-s' was impacted by the insertion of the adverb between the subject DP and the verb in (7d). As mentioned in fn. 41, the learners were not sensitive to '-s'

[48] Even though (7d) is similar to (7b), (7g) and (7h) insofar as the subject is plural in (7d), the learners were not sensitive to the overuse of '-s' on the verb in this structure. I will return to this issue shortly.

overuse in this structure. According to Bannai, this insensitivity was due to the intervening verb.[49] The third question was concerned with whether or not the learners' sensitivity to the overuse of '-s' was affected by the intervening PP in (7g) and (7h). As stated above, the learners were sensitive to this agreement anomaly in both of these structures. To recap, for the L2 learners in Bannai's study, distance did not moderate learners' sensitivity to ungrammaticality on L2 processing when, in the separated condition, the controller and target were separated by a PP; however, distance *did* moderate this effect when, in the separated condition, the controller and target were separated by an adverb.

As for the native speakers, in at least one of the two critical regions under scrutiny, these participants were sensitive to agreement violations in all of the eight structures of interest, except (7f) and (7g).[50]

The results for T1 and T2 are summarised in Tables 3.2 and 3.3 for the Japanese learners of English and the native speakers, respectively.

Table 3.2

Sensitivity to Subject-Verb Agreement Anomalies in Bannai (2011): Japanese Learners of English

	7a	7b	7c	7d	7e	7f	7g	7h
T1	No	Yes	No	No	No	No	Yes	Yes*
T2	No	Yes	No	No	No	No	Yes	Yes

Note. * This effect was marginal.

[49] Specifically, this item disrupted the "adjacency of strings of terminal nodes specified in the entry of a Vocabulary entry" and led to "failure to retrieve the entry" (Hawkins & Casillas, 2008, p. 609, as cited in Bannai, 2011, p. 132).

[50] Bannai suggested that this was due to the number disagreement between the subject noun, and the noun inside the PP, in each of (7f) and (7g) (e.g., 'teacher' cf. 'earrings' in [7f]).

Table 3.3

Sensitivity to Subject-Verb Agreement Anomalies in Bannai (2011): Native Speakers

	7a	7b	7c	7d	7e	7f	7g	7h
T1	No	No	No	Yes	No	No	No	Yes
T2	Yes*	Yes	Yes	Yes	Yes	No	No	No

Finally, the results of the GJT showed that the L2 learners and the native speakers were accurate in judging grammaticality for all of the relevant sentence types, indicating that the participants in both groups had explicit knowledge of Subj-V agreement.

Foote (2011) investigated 20 early and 20 advanced bilingual English speakers of Spanish, and 20 native Spanish speakers.[51] Sensitivity to violations in Spanish Subj-V number agreement and noun-adjective (N-Adj) gender agreement was measured using a moving-window word-by-word self-paced reading task; in keeping with the focus of the current experiment, I will focus here on Foote's investigation of Subj-V agreement. Two experiments were conducted, each with total of 128 sentences; half of these were utilised to test participants' sensitivity to Subj-V agreement violations. In each distance condition, half of these 64 sentences were grammatical, and the other half were ungrammatical. Cross-cutting this distinction between grammatical and ungrammatical conditions, 32 of the 64 sentences were in the adjacent condition; in the remaining 32 sentences, a two-word PP intervened between controller and target.

[51] The early-group participants were heritage speakers who had acquired English in their early years in school. The advanced participants had learned English as an L2 in a classroom environment.

I exemplify the adjacent condition in (8a) and (8b), and the separated condition in (9a) and (9b) (adapted from Foote, 2011, pp. 201-202; controller in bold, target in italics).[52]

(8) (a) Veo que [DP tu [NP**padre**] TP [VP *es* de Texas]]].
see.1SG that your father.3SG is.3SG from Texas

(b) *Veo que [DP tu [NP **padre**] TP [VP *son* de Texas]]].
see.1SG that your father.3SG are.3PL from Texas
'I see that your father is from Texas.'
LD = 0 word
SD = 4 nodes (i.e., NP, DP, TP, VP)

(9) (a) [DP El [NP **reloj** del hombre] TP [VP *es* de Suiza]]].
The watch.3SG of the man is.3SG from Switzerland

(b) [DP *El [NP **reloj** del hombre] TP [VP *son* de Suiza]]].
the watch.3SG of the man is.3PL from Switzerland
'The watch of-the man is from Switzerland.'
LD = 2 words (i.e., *del hombre*)
SD = 4 nodes (i.e., NP, DP, TP, VP)

[52] Foote did not formally calculate the SD between controller and target in each distant condition: the calculations included in (8) and (9) are my own. As far as these calculations are concerned, all that really matters for our purposes is that the SD between controller and target was the same in both distance conditions.

Note that, as mentioned in fn. 45, SD was kept constant in (8) and (9), while the LD between controller and target increased.

The RTs for the three regions of interest were recorded: the region before the target (position 1), the target (position 2), and the region after the target (position 3). All three groups of participants showed greater sensitivity to Subj-V agreement violations in the adjacent condition than the distant condition at position 3 (i.e., the spillover region); however, there was no moderating effect of distance on sensitivity to ungrammaticality at position 1 or position 2. A main effect of ungrammaticality was detected at position 3, but not at position 1 or position 2.[53] There was no three-way interaction among ungrammaticality, distance, and group, indicating that all three groups exhibited similar patterns in terms of the effect of distance on their sensitivity to ungrammaticality.

Ocampo (2013) explored the effect of SD on Subj-V agreement processing using an online non-cumulative moving-window self-paced reading paradigm. The learner group consisted of 20 advanced Spanish learners of English; in addition, 28 native speakers of English were recruited as a control group. The specific goal of Ocampo's experiment was to investigate whether increasing the structural complexity of the material between the matrix subject and the matrix verb (i.e., the number of syntactic nodes between these two items) reduces sensitivity to number-agreement violations in L2 learners. For this purpose, the controller and the target were structurally distant from each other; also, in order to manipulate the structural complexity of the intervening material, two different constructions were used. Each

[53] Foote did not report the main effect of distance.

was inserted between the matrix subject and the matrix verb: a PP, as in (10a), and an RC, as in (10b) (adapted from Ocampo, 2013, p. 56).[54]

(10) (a) The politician $_{PP}$[from $_{NP}$[$_{AdjP}$ [dry] $_{NP}$[$_{AdjP}$ [western] $_{NP}$[Libya]]]] often works in the evening.

LD = 5 words (i.e., *from dry western Libya often*)

SD = 2 nodes (i.e., PP, NP)

(b) The politician $_{CP}$[who$_{(i)}$ $_{TP}$[(*ed*) $_{VP}$[$_{CP}$[(*who*)$_{(ti)}$ feared] $_{PP}$[for $_{NP}$[Libya]]]]] often works in the evening.

LD = 5 words (i.e., *who feared for Libya often*)

SD = 5 nodes (i.e., CP, TP, VP, PP, NP)

In (10a), the PP 'from dry western Libya' separates the target verb 'works' from the controller noun 'the politician'. Therefore, participants had to establish agreement across two syntactic nodes (i.e., the PP 'from dry western Libya' and the embedded NP 'dry western Libya'). On the other hand, in the RC 'who feared for Libya', the parser had to move across five syntactic nodes: the CP 'who feared for Libya', the TP (headed by the past-tense morpheme '-ed'), the VP 'fear for Libya', the PP 'for Libya' and the NP 'Libya'. Hence, according to Ocampo, the SD between the controller and the target was higher in the RC-based construction in (10b) than the PP-based construction in (10a), which in turn also meant that the intervening material was more structurally complex in the former case than the latter. At the same time, as we can see in (10),

[54] The SD calculations presented in (10) are the ones reported in Ocampo (2013), as is the explanation under (10). I will present a different analysis of these sentences in Section 3.3.2.

the LD was controlled such that the number of words between the matrix subject and the matrix verb in both SD conditions was the same (i.e., four).

Ocampo investigated four constructions: singular subject plus PP, as in (11a); plural subject plus PP, as in (11b); singular subject plus RC, as in (11c); and plural subject plus RC, as in (11d). There were ten regions (Rs) in each sentence; R8 (i.e., the matrix verb) was the critical region (copied from Ocampo, 2013, p. 35; spillover regions underlined).

(11) (a) The tourist in warm southern Mexico often fishes/*fish in the ocean.

(b) The tourists in warm southern Mexico often fish/*fishes in the ocean.

(c) The tourist who hunted in Mexico often fishes/*fish in the ocean.

(d) The tourists who hunted in Mexico often fish/*fishes in the ocean.

R1 /R2 / R3 / R4 / R5 / R6 / R7 / R8 / R9 / R10

The variables of interest were construction (i.e., PP vs. RC), subject number (i.e., singular vs. plural), and ungrammaticality (i.e., grammatical vs. ungrammatical).

The results for the matrix verb revealed that the L2 learners were sensitive to agreement anomalies when a PP was the intervening construction, but not when an RC was the intervening construction. The Shallow Structure Hypothesis (SSH; Clahsen & Felser, 2006, 2010) predicts that L2 learners will not be able to establish agreement across phrases in general, as they lack sensitivity to hierarchical structures; hence, the SSH was challenged by the results for the PP intervener. The results for the Spanish native speakers showed that they were sensitive to agreement violations regardless of which type of material intervened between controller and target.

In addition to the critical region, Ocampo examined the effects of spillover at two regions downstream from the matrix verb: R9 and R10. The results for the L2 learners showed that they were sensitive to agreement violations at R9 in the PP condition, as in (11a) and (11b), but not in the RC condition, as in (11c) and (11d). There was no spillover effect at R10 in either distance condition. At R9, the native speakers showed sensitivity to number violations in both the PP and the RC conditions, regardless of whether the subject was singular or plural; however, at R10, sensitivity to number violations was detected only when the subject was plural in the RC condition.

Romanova (2013) investigated whether 11 low- and 11 high-proficiency L2 English-speaking learners of Russian were sensitive to gender and number agreement anomalies in two SD conditions which differed in terms of the type of agreement involved. In the first of these, Romanova focused on within-phrase agreement in an N-Adj structure, while the second condition involved across-phrase agreement in a Subj-V structure.[55] The participants did a combined reading task and GJT based on 108 sentences. If they judged a particular stimulus sentence to be ungrammatical, they highlighted the grammatical error.

The sentences involving N-Adj agreement included grammatical and ungrammatical conditions for each of gender and number. In Russian, a noun and adjective agree in gender, as in (12a), where both of these items are feminine. A noun and adjective also agree in number, as in (12b), where both items are singular. In (12c), I exemplify disagreement in gender (i.e., the noun is feminine while the adjective

[55] Recall that the L2 processing of N-Adj agreement was the focus of Experiment One. However, in Romanova (2013), SD was not manipulated *within* each of the two types of agreement under scrutiny; rather, the effect of SD was investigated by comparing these two agreement types. Therefore, it was not possible for me to consider Romanova's findings for both distance conditions separately: N-Adj agreement in Experiment One, and Subj-V agreement in Experiment Two (cf. Foote, 2011). Accordingly, I opted to deal with Romanova's results for both types of agreement in the present section.

is masculine), and disagreement in number (i.e., the noun is plural while the adjective is singular. These examples are adapted from Romanova (2013, p. 48; controller in bold, target in italics).

(12) (a) У твоей подруги очень **добрая** *улыбка*
'Your friend has a very **kind** *smile*.'

(b) По-моему, это довольно **сложный** *текст*.
'This seems to me a rather **complex** *text*.'

(c) * Я знаю, что у тебя **красивый** *жена*.
'I know you have a **beautiful** *wife*.'

(d) * У этого режиссера всегда **интересный** *фильмы*.
This film director always makes **interesting** *films*.'

The same agreement and disagreement conditions were used for Subj-V agreement, as shown in (13) (adapted from Romanova, 2013, p. 49; controller in bold, target in italics).

(13) (a) **Бабушка** *устала* и хочет хорошо отдохнуть.
'**Grandmother** *is* tired and wants to rest well.'

(b) **Анжелика** очень хорошо *фотографирует*.
'**Angelica** *takes* very good pictures.'

(c) **Максим Горький** *жила* в *И*талии долгое время.

‘**Maxim Gorky** *lived* in Italy for a long time.’

(d) * В выходные ребята **любит** *ходить* в зоопарк.

‘On weekends **the kids** *loves* going to the zoo.’

Both groups of L2 learners indicated greater sensitivity to gender and number agreement anomalies within the phrase (i.e., in N-Adj agreement) than across phrase boundaries (i.e., in Subj-V agreement). Also, the high-proficiency participants were more sensitive to these anomalies than the low-proficiency participants in each SD context.

Mao et al. (2022) investigated the effect of LD on Subj-V agreement for number and person.[56] Forty-seven advanced Chinese learners of Spanish and 21 native speakers of Spanish did a combined self-paced reading task and GJT. Participants were instructed to read 100 sentences which had been previously utilised in L1 studies with native Spanish speakers (Biondo, 2017; Biondo et al., 2018). Each sentence contained an NP in subject position, an adverb of time (i.e., *mañana* ‘tomorrow’), and a lexical verb. The LD between the subject and the verb was manipulated at two levels: adjacent, as in (14); and three-words linearly distant (i.e., *mañana al mediodía* ‘tomorrow at noon’), as in (15). Each of the grammatical sentences (14a) and (15a) had two ungrammatical counterparts: one involved ungrammatical number agreement, as in (14b) and (15b), and the other involved ungrammatical person

[56] These researchers did not provide any SD calculations that might have indicated whether or not this property was controlled.

agreement, as in (14c) and (15c) (adapted from Mao et al., 2022, p. 7; controller in bold, target in italics).

(14) (a) Mañana al mediodía **el viajero cansado**$_{3SG}$ *regresará*$_{3SG}$ a casa con mucho equipaje.

(b) * Mañana al mediodía **el viajero cansado**$_{3SG}$ *regresarán*$_{3PL}$ a casa con mucho equipaje.

(c) * Mañana al mediodía **el viajero cansado**$_{3SG}$ *regresarás*$_{2SG}$ a casa con mucho equipaje.

‘Tomorrow at noon the tired traveler$_{3SG}$ will go$_{3SG}$ back home with a lot of bags.’

(15) (a) **El viajero cansado**$_{3SG}$ mañana al mediodía *regresará*$_{3SG}$ a casa con mucho equipaje.

(b) ***El viajero cansado**$_{3SG}$ mañana al mediodía *regresarán*$_{3PL}$ a casa con mucho equipaje.

(c) ***El viajero cansado**$_{3SG}$ mañana al mediodía *regresarás*$_{2SG}$ a casa con mucho equipaje.

‘The tired traveler$_{3SG}$ tomorrow at noon will go$_{3SG}$ back home with a lot of bags.’

Stimulus sentences were presented in a word-by-word moving-window paradigm, and RTs were recorded for each word. At the end of each sentence, the participant had to judge whether the sentence was grammatically *Bien* 'Good' or *Mal* 'Bad'. The regions of interest were the verb, and three spillover regions downstream from the verb (i.e., verb+1, verb+2, verb+3).[57]

No main effect of distance was evident at any of the four critical regions, and the same was true of the interaction between distance and ungrammaticality, and also of the three-way interaction among distance, ungrammaticality and group. There was a main effect of ungrammaticality at verb+1, verb+2 and verb+3, but not at the verb itself.

The results of the GJT showed that the L2 learners performed less accurately than the native speakers in the adjacent condition and the distant condition. These results also indicated that the native speakers judged the ungrammatical sentences to be ungrammatical more accurately than they judged the grammatical sentences to be grammatical; however, the L2 learners did not exhibit this discrepancy in their judgments.

To sum up, the effects of SD and LD have been investigated in previous research. Several studies have examined the effect of SD on sensitivity to agreement violations between the matrix subject and the matrix verb. Foote (2011) and Ocampo (2013) found that highly proficient speakers of L2 Spanish had nativelike online sensitivity to both local and nonlocal errors in verbal number agreement. Romanova's (2013) high-proficiency speakers of L2 Russian showed sensitivity to agreement violations in both SD conditions. On the other hand, Japanese learners of English

[57] Participants with a GJT error-rate of more than 30% were excluded from the RT analysis. On this basis, two Chinese learners of Spanish were removed.

(Bannai, 2011), and Chinese learners of Spanish (Mao et al., 2022) did not show sensitivity to verbal agreement violations when LD was present. However, Japanese learners' sensitivity to agreement violations was clearly observed to be affected by the disruption of a string of terminal nodes (i.e., LD).

3.3.2 Limitations and research gaps

In the previous section, I summarised studies concerned with distance effects in Subj-V gender- and/or number-agreement processing involving L2 learners from a variety of L1 backgrounds. The specific focus of these studies was the moderating effect of distance on learners' sensitivity to ungrammaticality. Although this is a relatively small corpus of work consisting of only five studies, it would be fair to say that there are several methodological concerns therein.

The first is that these studies focused more on advanced L2 learners than intermediates or beginners. Foote (2011), Mao et al. (2022) and Ocampo (2013) investigated participants at advanced level, plus Romanova (2013) examined high- as well as low-level learners. Only Bannai (2011) did not look at advanced or high-level learners: this study was concerned with beginners and upper intermediates.

Another methodological issue is that, while all of the five studies of interest investigated number agreement, only two examined gender as well (Foote, 2011; Romanova, 2013).

Moreover, spillover effects were not studied systematically in the experiments under scrutiny. Admittedly, Mao et al. (2022) examined three spillover regions and Ocampo (2013) two. Apart from these two experiments, though, Bannai (2011) and Foote (2011) provided the RTs for only one region after the target adjective, while Romanova (2013) did not report RTs at any spillover regions.

Spillover effects are worthy of attention in processing research concerned with subject-verb agreement involving RCs, as difficulties with processing agreement in general might not be detectable at the target itself (Jiang, 2012). In line with this, effects of this type have been reported in previous studies in the area under scrutiny in the current experiment. For example, in each of Foote (2011) and Bannai et al. (2011), spillover occurred at the target plus one spillover region. In Ocampo (2013), learners were sensitive to agreement violations at one spillover region. In Mao et al. (2022), learners were sensitive to violations at the target plus the three following regions.

A further area of concern is the potential involvement of confounding variables. In Foote (2011), the stimulus sentences did not contain the same words for the controller (i.e., the subject) and the target (i.e., the verb) in both distance conditions. As a result, we cannot rule out the possibility that comparisons across these conditions were confounded by the effects of extraneous variables, particularly the frequencies of the words used as controller and target. Likewise, in Romanova (2013), two different syntactic structures were utilised (i.e., N-Adj agreement and Subj-V agreement), one per distance condition. In this situation, differences in RTs might be reasonably attributed, at least in part, to the difference between the syntactic structures themselves rather than to the difference in distance condition per se.

Let us also consider how SD was calculated in Ocampo (2013). Recall that two different constructions were used in this study: in one of these, the subject NP was separated from the verb by a PP, and, in the other, this NP was separated from the verb by an RC. In (10) earlier, using bracket notation, Ocampo took the position that the SD between the subject NP and the verb was higher in the RC-based construction than the PP-based construction. I repeat (10) as (16) below for convenience.

(16) (a) [$_{DP}$ The [$_{NP}$ politician from dry western Libya] [$_{TP}$ often works]]] in the evening.

LD = 5 words (i.e., *from dry western Libya often*)

SD = 3 nodes (NP, DP, TP)

(b) [$_{DP}$ The [$_{NP}$ politician who feared for Libya [$_{TP}$ often works]]] in the evening.

LD = 5 words (i.e., *who feared for Libya often*)

SD = 3 nodes (NP, DP, TP)

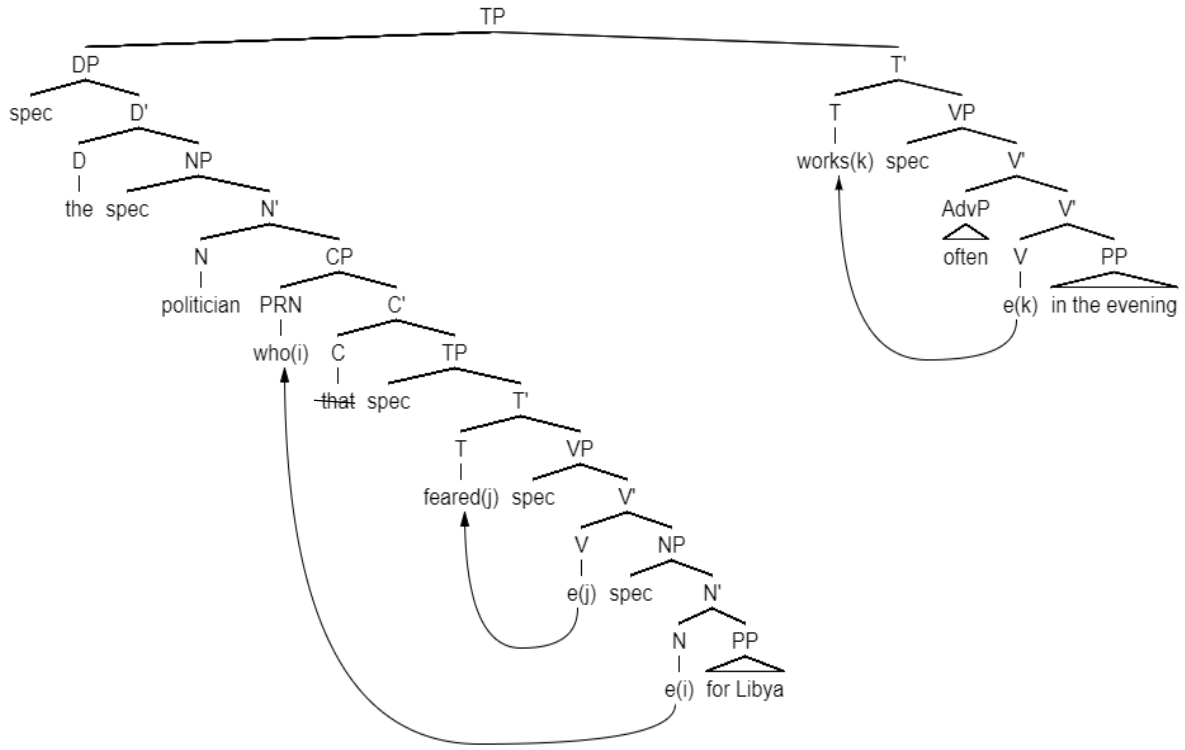
Contra Ocampo, I will now show that the number of nodes between the head of the subject NP and the verb in these two distance conditions is the same. In Figure 3.3, I present the structural representation for the sentence in (16b), repeated as (17) without bracket notation for the sake of clarity (AdvP = adverb phrase).[58]

(17) The politician who feared for Libya often works in the evening.

[58] For the sake of consistency with the approach to syntactic analysis adopted elsewhere in this study, the matrix verb 'works' raises from V to T. However, as a result, it ends up being located *before* the adverb 'often' rather than after it (cf. adverbs of manner). Further movement of constituents in this tree structure seems to be needed. In this respect, the structure in Figure 3.3 is somewhat simplified. An analysis of the syntax of frequency adverbs in English is beyond the scope of this thesis.

Figure 3.3

Syntactic Representation of (17)



Notice that the SD between the controller noun ‘politician’ and the target verb ‘works’ is five (i.e., NP, DP, TP, and VP). Crucially, the SD would be the same for the PP-based construction, as the PP would occupy the same syntactic position in the tree as the RC (i.e., the CP) does in Figure 3.3. For this reason, I have opted not to provide the tree for the PP-based construction here.[59]

[59] Additionally, as mentioned in Section 3.3.1, Ocampo found that RTs were longer in the RC condition than the PP condition. As we have just seen, this discrepancy is difficult to explain in terms of SD, since the SD between controller and target is the same in both conditions. One possibility is that the RC condition is more taxing computationally because, following Gibson (2000), there are more referents (i.e., nouns or verbs) between the controller and the target in the RC condition than the PP condition. Further investigation is needed to determine what might be giving rise to the discrepancy in question.

Lastly, there are inconsistencies in the results of these studies. Some of the findings from the lower- to upper-intermediate learners in Bannai (2011), plus the results for the advanced learners in Mao et al. (2022), indicate that L2 learners are sensitive to agreement violations regardless of distance. On the other hand, the low- and high-proficiency level learners in Romanova (2013) showed more sensitivity to gender and number agreement violations within the phrase than across phrasal boundaries. Similarly, the advanced L2 learners in Foote (2011) and in Ocampo (2013) showed less sensitivity to agreement violations when the controller and target were linearly distant, and when the intervening material was syntactically complex. These inconsistencies suggest that additional research on the L2 processing of Subj-V gender and number agreement is warranted. Regarding the reasons for these inconsistencies, sample size may have played a role in Foote (2011) and Romanova (2013).

In addition to the limitations noted above, there is a notable gap in existing research on Subj-V gender- and number-agreement processing: no study has examined this phenomenon using ELAs.

3.4 The present experiment

The present study addresses the limitations of previous research identified in Section 3.3.2:

(1) I focus on intermediate learners, plus the sample is larger than in previous research in this area (N = 40).

(2) In addition to number agreement, I consider the processing of gender agreement.

(3) Besides the target region, I examine spillover effects in depth by measuring RTs at the three regions that follow the target.

(4) The stimulus sentences associated with the adjacent vs. separated conditions have the same controller noun and target verb followed by the same three words in the spillover regions. Consider (18) (GEN = genitive; INDF = indefinite; controllers in bold, targets in italics, spillover regions underlined).[60]

(18) (a) **ʔal-mutardʒim-u** *taħaddaθ-a*
the-interpreter.M.SG-NOM speak.PERF-3SG.M

<u>bi-fasˁa:ħ-at-i-n</u> <u>wa</u> <u>tˁala:q-at-i-n</u>
with-eloquence-F-GEN-INDF and fluency-F-GEN-INDF
'The interpreter spoke eloquently and fluently.'

(b) **ʔal-mutardʒim-u** ʔallaði: qad wazˁzˁaff-a-k-a
the-interpreter.M.SG-NOM that.M.SG ASRT hire.PERF-3SG.M-2SG-M

taħaddaθ-a <u>bi-fasˁa:ħ-at-i-n</u> <u>wa</u>
speak.PERF-3SG.M with-eloquence-F-GEN-INDF and

<u>tˁala:q-at-i-n</u>
fluency-F-GEN-INDF
'The interpreter that had hired you spoke eloquently and fluently.'

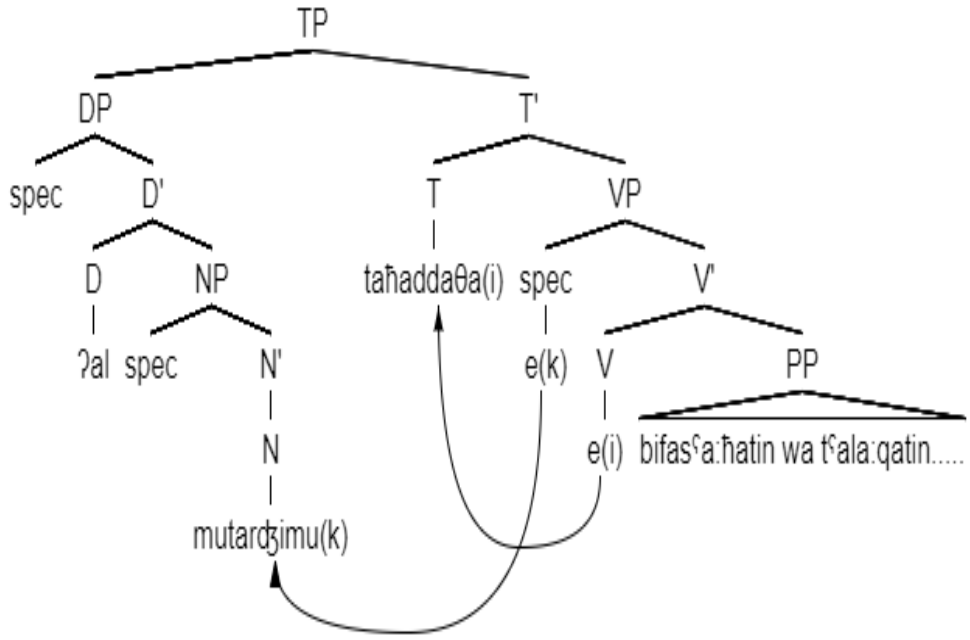
[60] Each sentence in (18) is part of a stimulus sentence from the present experiment. Further information regarding the design of the stimulus sentences will be provided in Section 3.5.

Notice that, in each of (18a) and (18b), the verb *taħaddaθa* ‘speak’ is followed by *bifasˁa:ħatin wa tˁala:qatin* ‘eloquently and fluently’.

(5) I distinguish between LD and SD. This is achieved by controlling for SD while manipulating LD. In Figure 3.4, I give the syntactic representation for the matrix subject DP (containing the controller noun) and the matrix verb in (18a), while Figure 3.5 does the same for (18b).[61] In each figure, the XP nodes between the noun and the verb are indicated.

Figure 3.4

Syntactic Representation of (18a)



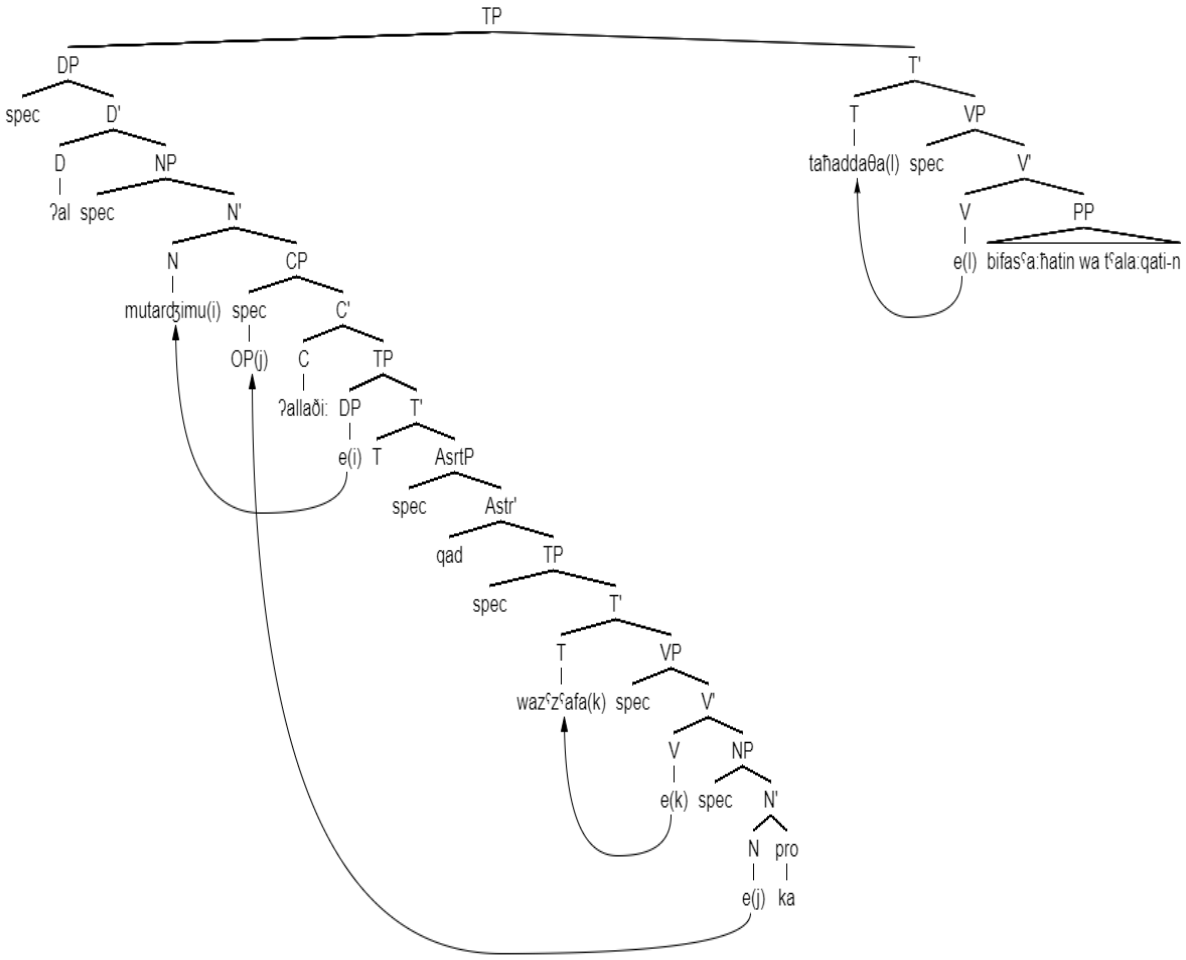
LD: 0 words

SD: 3 nodes (i.e., NP, DP and TP)

[61] For the sake of simplicity, I have omitted two details from Figure 3.5, as neither of these has any bearing on the calculation of the LD or SD between controller and target in this structure: the movement of the RP from the RC object position, and the Tax-AspP projection (cf. Figure 3.2).

Figure 3.5

Syntactic Representation of (18b)



LD: 3 words (i.e., *ʔallaði: qad wazˁzˁaffaka*)

SD: 3 nodes (i.e., NP, DP and TP)

From each of these syntactic representations, it is possible to calculate the SD and LD between the controller and target in each case. Notice that the SD between the controller and the target is three nodes in Figure 3.4 and Figure 3.5, while the LD increases from zero to three.

In addressing the limitations in (1) to (5) above, I also aim to gain an insight into the inconsistencies that are evident in previous research in this area.

The predictions (Ps) for this experiment are stated below:

P1. ELAs will be less sensitive to ungrammaticality in gender agreement when the matrix subject noun and matrix verb are separated than when they are adjacent.

P2. ELAs will be less sensitive to ungrammaticality in number agreement when the matrix subject noun and matrix verb are separated than when they are adjacent.

Moreover, these predictions will be tested using data from ELAs. Thus, the current experiment broadens the coverage of research in this area by investigating this learner group.

3.5 Methods

The participants and procedure were the same as those in Experiment One; therefore, this section is concerned only with the materials for Experiment Two. To save space, I will mention only those attributes of the materials that differed from the ones in Experiment One. In (19), I exemplify the two distance conditions in Experiment Two using one of the (grammatical) sentence pairs from this experiment. In (19a), the two agreeing elements are adjacent, and in (19b) they are separated (controller in bold, target in italics).

(19) (a) **ʔal-mutardʒim-u** *taħaddaθ-a* bi-fasˁa:ħ-at-i-n

the-interpreter.M.SG-NOM speak.PERF-3SG.M with-eloquence-F-GEN-INDF

wa tˁala:q-at-i-n wifqa raʔy-i: ʃ-ʃaxsˁsˁiy

and fluency-F-GEN-INDF in opinion.M.SG-my the-personal.M.SG

wa taqdi:r-i: ʔa-ðða:tiy

and estimation.M.SG-my the-self

'The interpreter spoke eloquently and fluently, in my personal opinion and my own estimation.'

(b) **ʔal-mutardʒim-u** ʔallaði: qad wazˁzˁaff-a-k-a

the-interpreter.M.SG-NOM that.M.SG ASRT hire.PERF-3SG.M-2SG-M

taħaddaθ-a bi-fasˁa:ħ-at-i-n wa

speak.PERF-3SG.M with-eloquence-F-GEN-INDF and

tˁala:q-at-i-n wifqa raʔy-i: ʃ-ʃaxsˁsˁiy

fluency-F-GEN-INDF in opinion.M.SG-my the-personal.M.SG

'The interpreter that had hired you spoke eloquently and fluently, in my personal opinion.'

As in Experiment One, the ungrammatical gender or number version of the sentence pair in (19) was identical to the grammatical pair, except that the gender or number of

the target verbs was altered so that it did not match the gender or number of the controller. Consider (20).

(20) (a) **ʔal-mutardʒim-u** *taħaddaθ-a*

the-interpreter.M.SG-NOM speak.PERF-3SG.M

(b) * **ʔal-mutardʒim-u** *taħaddaθ-atØ*

the-interpreter.M.SG-NOM speak.PERF-3SG.F

(c) * **ʔal-mutardʒim-u** *taħaddaθØ-u:*

the-interpreter.M.SG-NOM speak.PERF-3PL.M

(20a) illustrates grammatical agreement for gender and number. In (20b), the ungrammaticality of the sentence is due to the agreement anomaly in terms of gender on the verb (i.e., *taħaddaθatØ* 'speak'), while the verb in (20c) (i.e., *taħaddaθØu:)* shows disagreement with the controller in terms of number.

In order to facilitate comparison of the RTs between the regions of interest in both distance conditions (i.e., the controller, the target, and the three words following the target), the words used in these regions were the same in both conditions. This is exemplified in (19) above. Notice that, in each of (19a) and (19b), the controller noun is *ʔalmutardʒimu* 'the interpreter' while the target verb is *taħaddaθa* 'speak'*.* In both sentences, the three regions which follow the target contain the same three words (i.e., *bifasˁa:ħatin wa tˁala:qatin* 'eloquently and fluently').

The regression models in Experiment One were utilised to analyse the data for the current experiment; however, the random-effects structures were different. At t+0,

t+1 and t+3, random intercepts and slopes for distance and ungrammaticality were included for participant and item; at t+2, random intercepts and slopes for distance and ungrammaticality were included for participant only.

3.6 Results

In Section 3.7.1, I present the results for the norming group and the native-speaker controls. In Section 3.7.2, the results for the ELAs are given.

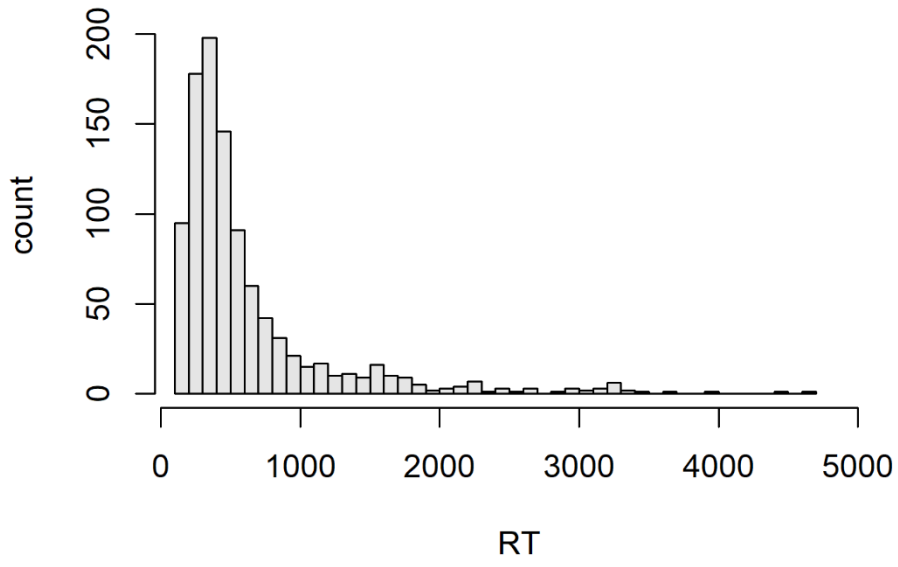
3.6.1 Native speakers of Arabic

The norming group confirmed that the stimulus sentences were grammatically acceptable, and that they were not semantically or pragmatically deviant.

In Figure 3.6, I provide a histogram showing the RT data from the control group for the grammatical stimulus sentences only.

Figure 3.6

Histogram Summarising the Control Group Data for Experiment Two



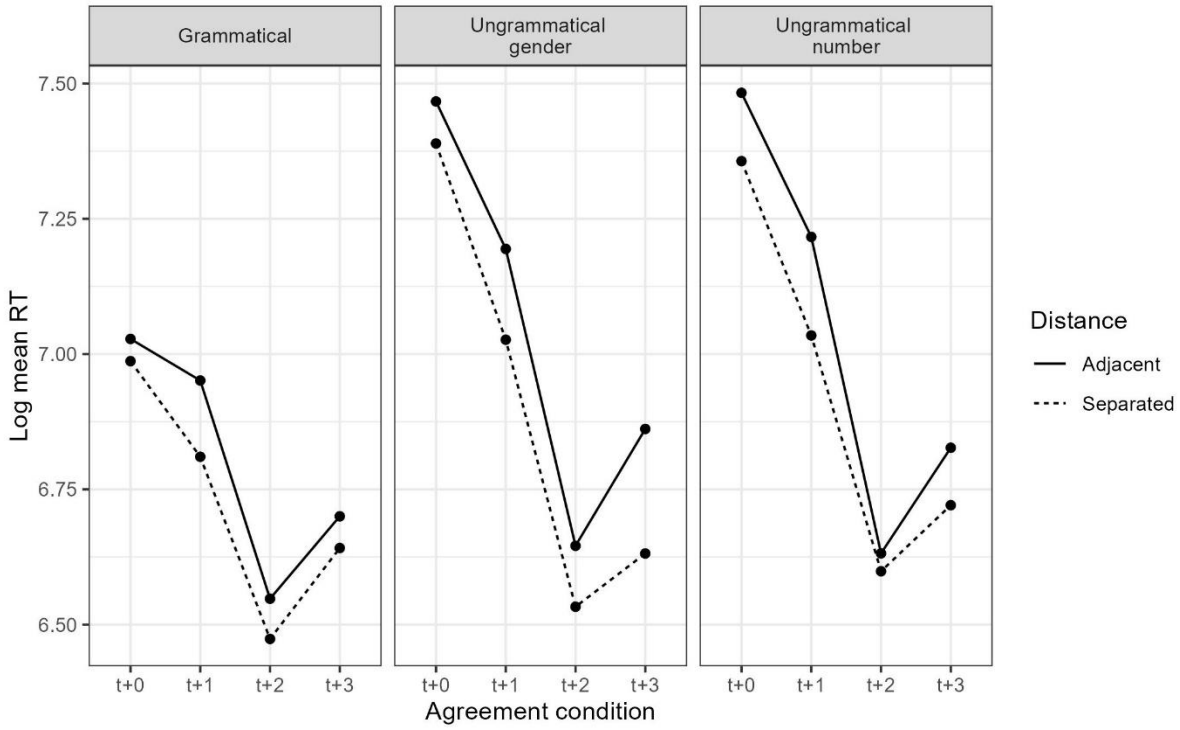
As in Experiment One, most of the RTs are lower than 1000 ms, plus hardly any of these values are over 2000 ms. This pattern suggests that, on the whole, the control-group participants did not encounter any particular grammatical, semantic or pragmatic characteristics of the stimulus sentences that caused them to hesitate significantly when reading the sentences. From this, I conclude that the data collected from the ELAs reflected L2 processing rather than task effects.

3.6.2 ELAs

In Figure 3.7, I show the log-transformed values of the mean RTs for the ELA group at each critical region. These values are also categorised by distance and agreement condition.

Figure 3.7

Log Mean RTs for the Four Critical Regions by Distance and Agreement Condition in Experiment Two

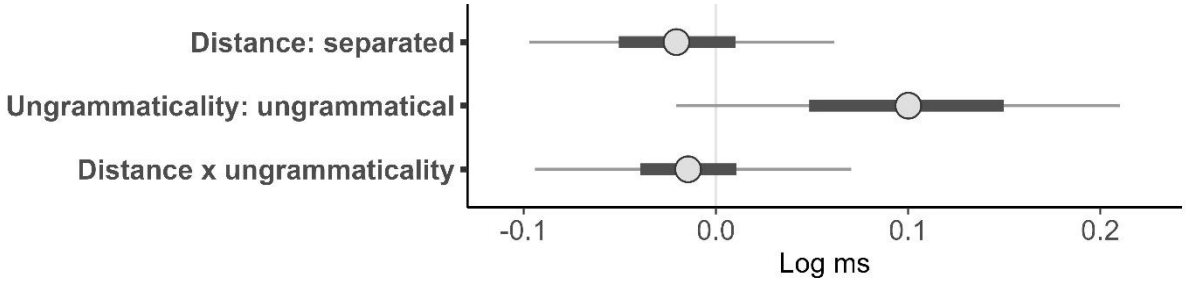


At each critical region, RTs were longer in both of the ungrammatical conditions than in the grammatical condition. Likewise, RTs were shorter in the separated condition than in the adjacent condition.

I will present the results for gender agreement first. Each critical region will be considered in turn. Figure 3.8 shows the posterior distributions for the effects of distance and ungrammaticality at t+0.

Figure 3.8

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+0: Gender Agreement: Experiment Two



There was no main effect of distance. The main effect of ungrammaticality was positive. There was no interaction between distance and ungrammaticality.

Table 3.4 presents the findings in detail (L = lower bound, n_{eff} = effective sample size, pd = probability of direction, SD = standard deviation of the distribution, U = upper bound).

Table 3.4

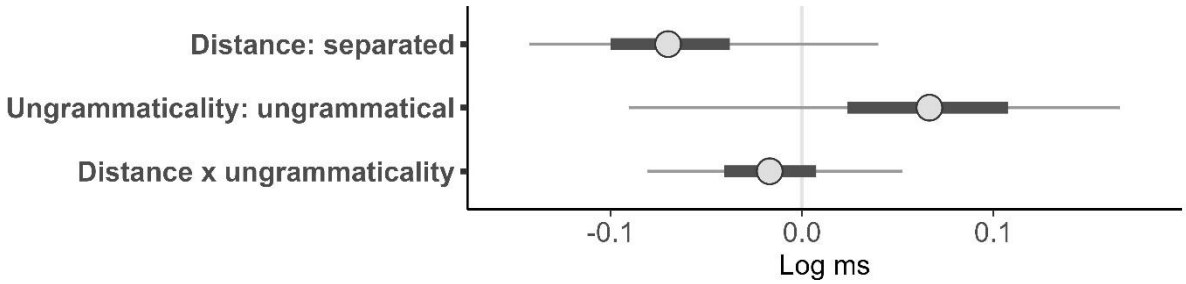
Effects of Distance and Ungrammaticality on RTs at Region t+0: Gender Agreement: Experiment Two

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.904	0.065	6.801	7.007	1.000	1.002	954
Distance: separated	-0.021	0.019	-0.050	0.010	0.865	1.000	7229
Ungramm.: ungramm.	0.100	0.032	0.049	0.150	0.998	1.001	2862
Distance x ungramm.	-0.014	0.016	-0.039	0.011	0.823	1.000	10922

We now turn our attention to the results for region t+1. Figure 3.9 shows the posterior distributions.

Figure 3.9

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+1: Gender Agreement: Experiment Two



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was no interaction between distance and ungrammaticality.

Table 3.5 presents the findings in detail.

Table 3.5

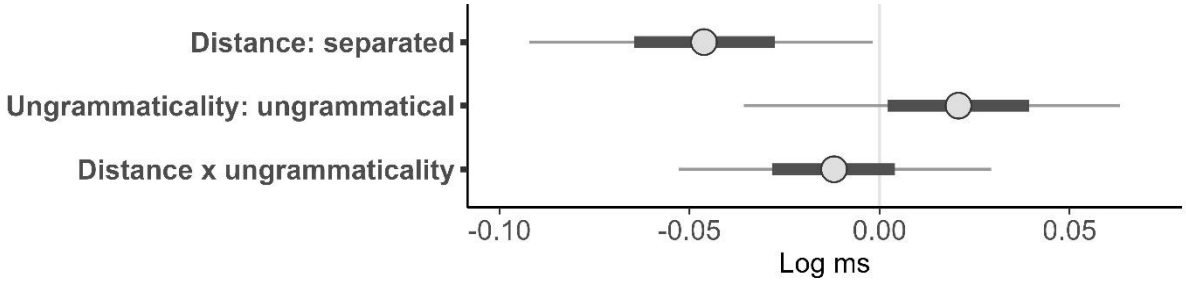
Effects of Distance and Ungrammaticality on RTs at Region t+1: Gender Agreement: Experiment Two

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.763	0.056	6.672	6.851	1.000	1.007	1033
Distance: separated	-0.070	0.020	-0.100	-0.038	0.999	1.000	5953
Ungramm.: ungramm.	0.067	0.027	0.024	0.108	0.990	1.001	5004
Distance x ungramm.	-0.017	0.015	-0.041	0.007	0.873	1.000	11395

I will now present the results for the effect of distance and ungrammaticality at t+2. Consider Figure 3.10.

Figure 3.10

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+2: Gender Agreement: Experiment Two



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was a negative interaction between distance and ungrammaticality; however, it must be conceded that the evidence was somewhat weak (*pd* = 0.885; see Table 3.6).

Table 3.6 presents the findings in detail.

Table 3.6

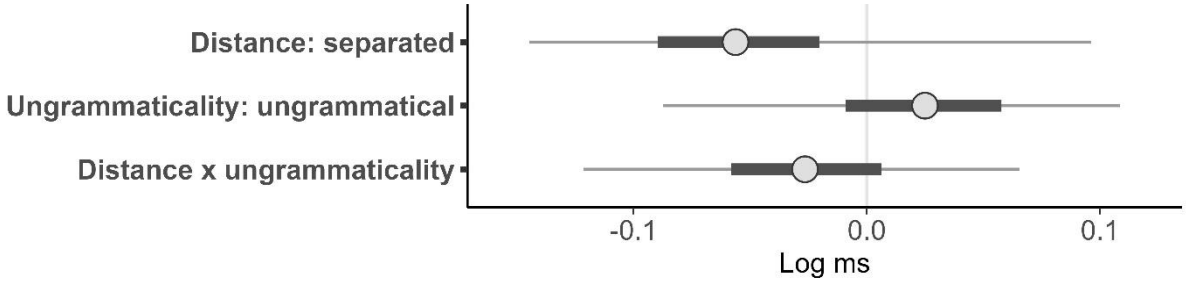
Effects of Distance and Ungrammaticality on RTs at Region t+2: Gender Agreement: Experiment Two

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.340	0.061	6.243	6.438	1.000	1.003	758
Distance: separated	-0.046	0.012	-0.065	-0.027	1.000	1.000	10536
Ungramm.: ungramm.	0.021	0.012	0.002	0.039	0.962	1.000	6789
Distance x ungramm.	-0.012	0.010	-0.028	0.004	0.885	1.000	18749

Figure 3.11 shows the posterior distributions for the effects of distance and ungrammaticality at t+3.

Figure 3.11

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+3: Gender Agreement: Experiment Two



The main effect of distance was negative. The main effect of ungrammaticality was positive; however, it must be conceded that the evidence was somewhat weak (*pd* = 0.886; see Table 3.7). There was a negative interaction between distance and ungrammaticality, indicated by the fact that most of the probable values of this parameter were negative (*pd* = 0.905; see Table 3.7).

Table 3.7 presents the findings in detail.

Table 3.7

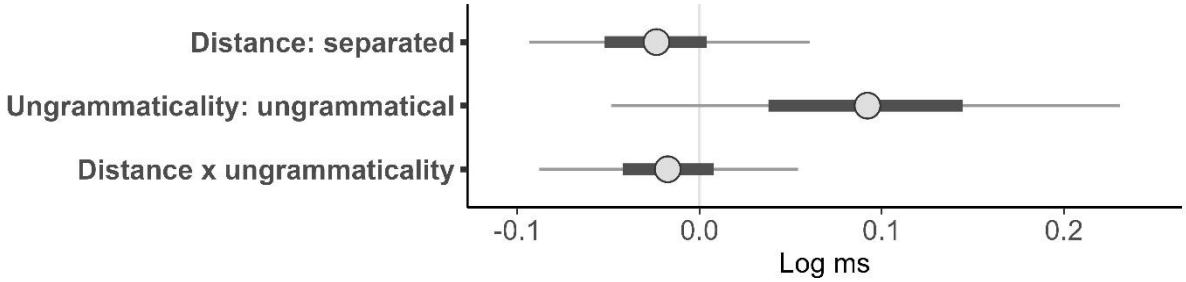
Effects of Distance and Ungrammaticality on RTs at Region t+3: Gender Agreement: Experiment Two

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.467	0.060	6.370	6.563	1.000	1.003	1184
Distance: separated	-0.056	0.022	-0.090	-0.020	0.990	1.000	5644
Ungramm.: ungramm.	0.025	0.021	-0.009	0.058	0.886	1.000	6487
Distance x ungramm.	-0.026	0.020	-0.058	0.006	0.905	1.000	7471

The results for number agreement will be considered next. Figure 3.12 shows the posterior distributions for the effects of distance and ungrammaticality at t+0.

Figure 3.12

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+0: Number Agreement: Experiment Two



The main effect of distance was negative, indicated by the fact that most of the probable values of this parameter were negative (*pd* = 0.915; see Table 3.8). The main effect of ungrammaticality was positive. There was no interaction between distance and ungrammaticality.

Table 3.8 presents the findings in detail.

Table 3.8

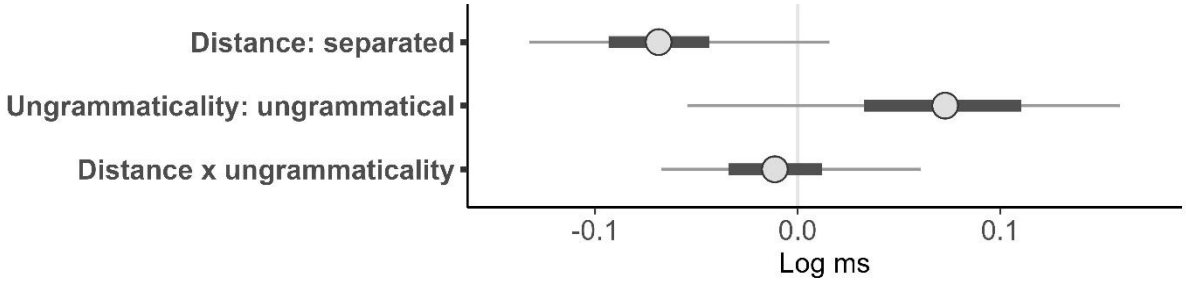
Effects of Distance and Ungrammaticality on RTs at Region t+0: Number Agreement: Experiment Two

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.898	0.064	6.794	7.001	1.000	1.001	1482
Distance: separated	-0.024	0.017	-0.052	0.004	0.915	1.000	7391
Ungramm.: ungramm.	0.092	0.034	0.038	0.144	0.994	1.000	4293
Distance x ungramm.	-0.017	0.016	-0.042	0.008	0.872	1.000	11908

Figure 3.13 shows the posterior distributions for the effects of distance and ungrammaticality at t+1.

Figure 3.13

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+1: Number Agreement: Experiment Two



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was no interaction between distance and ungrammaticality.

Table 3.9 presents the findings in detail.

Table 3.9

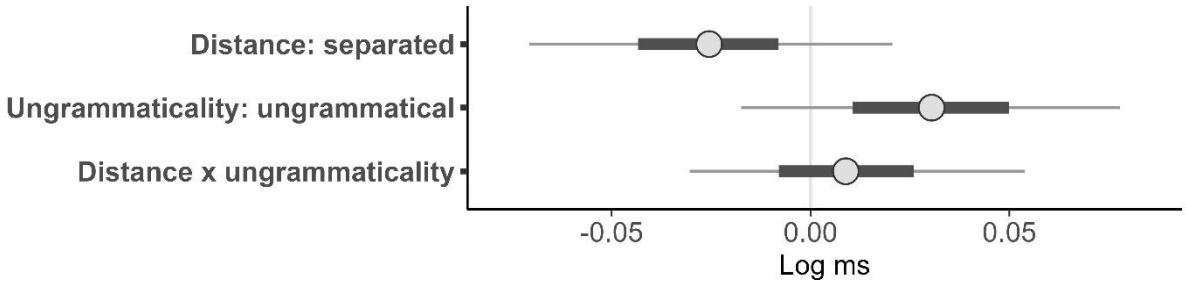
Effects of Distance and Ungrammaticality on RTs at Region t+1: Number Agreement: Experiment Two

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.749	0.064	6.647	6.851	1.000	1.008	1315
Distance: separated	-0.069	0.016	-0.093	-0.044	1.000	1.000	11539
Ungramm.: ungramm.	0.073	0.025	0.033	0.110	0.996	1.001	4745
Distance x ungramm.	-0.011	0.014	-0.034	0.012	0.789	1.000	12618

Figure 3.14 shows the posterior distributions for the effects of distance and ungrammaticality at t+2.

Figure 3.14

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+2: Number Agreement: Experiment Two



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was no interaction between distance and ungrammaticality.

Table 3.10 presents the findings in detail.

Table 3.10

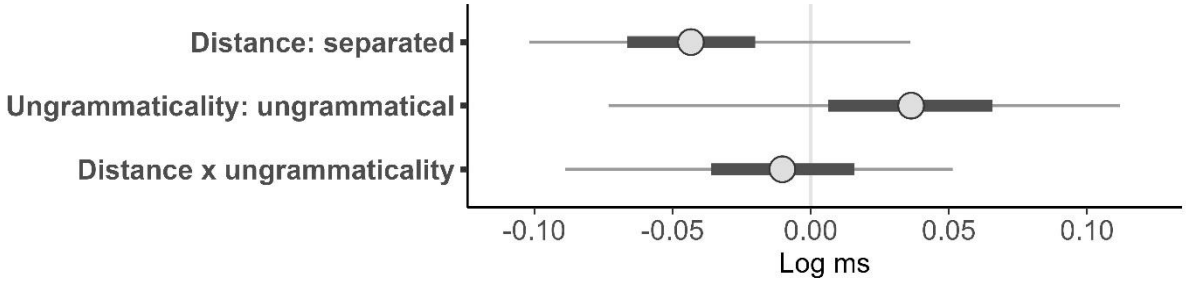
Effects of Distance and Ungrammaticality on RTs at Region t+2: Number Agreement: *Experiment Two*

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.354	0.059	6.260	6.448	1.000	1.005	8912
Distance: separated	-0.025	0.011	-0.043	-0.008	0.986	1.000	13453
Ungramm.: ungramm.	0.030	0.012	0.011	0.050	0.993	1.000	7564
Distance x ungramm.	0.009	0.011	-0.008	0.026	0.797	1.000	17532

Figure 3.15 shows the posterior distributions for the effects of distance and ungrammaticality at t+3.

Figure 3.15

Posterior Distributions for the Effects of Distance and Ungrammaticality on RTs at Region t+3: Number Agreement: Experiment Two



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was no interaction between distance and ungrammaticality.

Table 3.11 presents the findings in detail.

Table 3.11

Effects of Distance and Ungrammaticality on RTs at Region t+3: Number Agreement: *Experiment Two*

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.482	0.059	6.388	6.577	1.000	1.001	1156
Distance: separated	-0.043	0.015	-0.066	-0.020	0.996	1.000	12307
Ungramm.: ungramm.	0.036	0.019	0.006	0.066	0.970	1.000	8648
Distance x ungramm.	-0.010	0.016	-0.036	0.016	0.750	1.000	11786

3.7 Discussion and conclusion

The current experiment aimed to determine the extent to which distance moderates learners' sensitivity to ungrammaticality in Subj-V gender- and number-agreement processing in the L2. I examined both types of agreement between a matrix

subject DP and a matrix verb in two contrasting LD conditions (i.e., adjacent and separated), while holding SD constant. Two predictions were formulated:

P1. ELAs will be less sensitive to ungrammaticality in gender agreement when the matrix subject noun and matrix verb are separated than when they are adjacent.

P2. ELAs will be less sensitive to ungrammaticality in number agreement when the matrix subject noun and matrix verb are separated than when they are adjacent.

These two predictions were tested at four critical regions each. The first region (i.e., t+0) was the location of the target verb, and the remaining regions (i.e., t+1, t+2 and t+3) were spillover regions. In Table 3.12, for each agreement type and also each region of interest, I indicate whether the ELAs in this study were less sensitive to ungrammaticality in the separated condition than the adjacent condition.

Table 3.12

Were Learners Less Sensitive to Ungrammaticality in the Separated Condition than the Adjacent Condition?: Subject-Verb Agreement: Experiment Two

Region	*Gender*	*Number*
t+0	No	No
t+1	No	No
t+2	Yes*	No
t+3	Yes	No

Note. * The evidence for an effect was weak.

Based on these findings, P1 was confirmed for t+3 and (with the caveat that the evidence for an effect in this case was weak) t+2. P2 was not confirmed at any region.

The findings of Experiment Two have some bearing on various theories of L2 acquisition and/or processing. First of all, the findings for gender agreement support the Linear Distance Principle (LDP; Keating, 2005) and the Linear Distance Hypothesis (LDH; O'Grady et al., 2003), both of which hold that sensitivity to inflectional violations declines under a higher load of intervening words. For number agreement, distance did not moderate learners' sensitivity to ungrammaticality at any of the four critical regions of interest. Hence, the findings of this experiment discredit the LDP and the LDH for this type of agreement. Given that the L1 has a (relatively simple) system of number agreement, but no system of gender agreement, this contrast between the results for both types of agreement in the current experiment is surprising if we assume that the processing of agreement in general can be facilitated by positive transfer.

The results of the present study are also in line with those of one previous investigation which also focused on LD effects in L2 Subj-V agreement processing. Recall from Section 3.3.1 that, in Foote's (2011) research on English-speaking learners of Spanish, distance did not moderate learners' sensitivity to ungrammaticality in number agreement at the region before the target, or at the target itself (although this type of effect was observed at the spillover region). Thus, at one critical region at least, the results of the present experiment are similar to those obtained by Foote (2011), since, in each study, distance did not moderate learners' sensitivity to ungrammaticality in number agreement in L2 processing at the target. Note also that Foote's findings resemble my own even though the learners in her study were at advanced level while those in the current study were intermediates. Further investigation is needed to elucidate the role played by L2 proficiency in an experiment dealing specifically with LD effects in L2 Subj-V agreement processing.

Lastly, the results for all four regions of interest (see Table 3.12) warrant detailed consideration. Specifically, there is the general question of where exactly in a series of critical regions distance starts to moderate learners' sensitivity to agreement violations. In the present experiment, this question is only relevant to gender agreement, since, for number agreement, distance did not moderate learners' sensitivity to ungrammaticality at any of the four critical regions. Notice in Table 3.12 that the moderating effect of distance on learners' sensitivity to ungrammaticality first becomes evident at t+2. Similar results have previously been reported in other research on L2 agreement processing in general. For example, in Coughlin and Tremblay (2011), intermediate English-speaking learners of French did not show sensitivity to number anomalies until they reached the spillover region. Likewise, in Song's (2015a) research on the processing of simple DPs and partitive structures by advanced Korean L2 learners of English, participants did not show sensitivity to missing plural inflection until the second spillover region. In seeking to explain these delayed effects of ungrammaticality on L2 agreement processing, Sabourin and Stowe (2008) suggest that L2 learners are able to recognise ungrammaticality when they encounter it at the critical region, but are unable to react immediately to the violation. In short, if the agreement anomaly has any effect, this is not observed until the spillover region.

CHAPTER FOUR

EXPERIMENT THREE: SUBJECT-VERB AGREEMENT: SUBJECT-OBJECT ASYMMETRIES AND LINEAR DISTANCE IN RELATIVE CLAUSES

4.1 Introduction

Like Experiment Two, Experiment Three focuses on sentences containing relative clauses (RCs) in which this type of constituent attaches to a definite determiner phrase (DP). Note also that, as all the RCs in the present experiment are attached to the matrix subject (rather than the matrix object or some other constituent), the RC intervenes between the matrix subject and the matrix verb.

Two variables are investigated in the current study: RC type; and, for each type of RC, the linear distance (LD) between the matrix subject and the matrix verb. For this purpose, I compare subject-verb (Subj-V) gender- and number-agreement processing in the second language (L2) in two pairs of contrasting syntactic constructions.[62] In the first pair, the two agreeing items are separated by an SRC or an object-headed relative clause (ORC). These two structures are shown in (1a) and (1b), respectively (2 = second person; 3 = third person; ASRT = assertive particle; ASP = aspect; M = masculine; NOM = nominative; PERF = perfective; SG = singular; controller in bold, target in italics).

[62] As in Experiment Two, person agreement is controlled in this experiment: all subjects are third person.

(1) (a) **ʔatˤ-tˤa:lib-u** ʔallaði: qad sa:ʕad-a-k-a

the-student.M.SG-NOM that.M.SG ASRT help.PERF-3SG.M-2SG-M

daras-a

study.PERF-3SG.M

‘The student that had helped you studied’

(b) **ʔatˤ-tˤa:lib-u** ʔallaði: qad sa:ʕadØ-t-a

the-student.M.SG-NOM that.M.SG ASRT help.PERF-2SG-M

daras-a

study.PERF-3SG.M

‘The student that you had helped studied’

Note that the contrast between SRC and ORC implies a difference in the size of the filler-gap domain, where the filler is the relative pronoun (RP), and the gap is either the RC subject in an SRC, or the RC object in an ORC (Hawkins, 1999, 2004; see Section 1.3.3). I exemplify this difference in (2); the SRC case is in (2a), and the ORC case is in (2b) (adapted from Rattanasak et al., 2022, p. 6; e = empty category).

(2) (a) The reporters$_i$ [who$_i$ e$_i$ attack the senator] dislike the editor.

(b) The reporters$_i$ [who$_i$ the senator attacks e$_i$] dislike the editor.

From this standpoint, asymmetries in the L2 processing of SRCs vs. ORCs can be regarded as an effect of LD (cf. the topic of the present study). To avoid confusion with

the use of LD as a predictor variable below, I will treat the contrast between SRC and ORC as a contrast in RC type—which, *in turn*, should be understood to imply a contrast in LD between the filler and the gap *within* the RC.

In the second pair of contrasting syntactic constructions under investigation in this experiment, the LD between the matrix subject and the matrix verb is manipulated for each type of RC. In the short condition, the two agreeing items are three words apart, as shown in (1a) and (1b) above; in the long condition, the LD between these items is six words. Compare the short-SRC condition in (1a) with the long-SRC condition in (3) (IMP = imperfective; IND = indicative; controller in bold, target in italics).

(3) **ʔatˤ-tˤa:lib-u** ʔallaði: ya-ʕrif-u
the-interpreter.M.SG-NOM that.M.SG 3IMP-know-IND.SG.M

l-muʕalim-u:na ʔnna-hu qad sa:ʕad-a-k-a
the-teacher.M-DUAL.NOM that-he ASRT help.PERF-3SG.M-2SG-M

daras-a
study.PERF-3SG.M
'The student that the teachers know (that) had helped you studied.'

To date, as far as I know, only one study has investigated how RC type affects the L2 processing of Subj-V agreement inflection on the matrix verb (Rattanasak et al., 2022). By contrast, several studies have looked at how RC type affects the L2 processing of the matrix verb pe se (i.e., without the involvement of Subj-V agreement; Bulut et al., 2016; Cunnings & Fujita, 2023; Hu et al., 2022; Li et al., 2016; Mitsugi et

al., 2010; Sung et al., 2016). These experiments (including Rattanasak et al., 2022) have yielded evidence for so-called 'subject-object asymmetries' such that L2 learners find it more difficult to process ORCs than SRCs (or, less often, SRCs than ORCs).

However, there are some methodological concerns regarding certain features of the studies in question: Rattanasak et al. (2022) were concerned only with number agreement; proficiency was not investigated, or even assessed systematically, in this collection of studies as a whole, as some researchers looked at intermediate learners (Hu et al., 2022; Li et al., 2016), one looked at near-proficient learners (Bulut et al., 2016), another looked at both intermediate and advanced levels (Cunnings & Fujita, 2023), one looked at learners at A1-B1 proficiency levels (Sung et al., 2016), and one did not specify the learners' proficiency at all (Mitsugi et al., 2010); in two of these studies, learners from heterogeneous L1 backgrounds were pooled into one group (Cunnings & Fujita, 2023; Li et al., 2016); relatively low numbers of subjects took part in some of the experiments under consideration (Bulut et al., 2016; Hu et al., 2022; Mitsugi et al., 2010); some studies in this area examined only one spillover region (Bulut et al., 2016; Cunnings & Fujita, 2023; Hu et al., 2022; Rattanasak et al., 2022); and, in Sung et al. (2016), reading times (RTs) in the SRC and ORC conditions were difficult to compare precisely. In addition, some inconsistencies are found in the results of these studies. These inconsistencies may have been due, at least in part, to the small numbers of participants recruited in Bulut et al. (2016), Hu et al. (2022) and Mitsugi et al. (2010).

The present experiment addresses the issues I pointed out above. It also extends research in this area in certain respects. First, I know of only one previous study in which the LD between the subject DP and the matrix verb was manipulated in the manner shown in (1a) vs. (3) above (Sung et al., 2016). Thus, the specific goal

of the current study is to investigate the moderating effects of *two* variables on learners' sensitivity to ungrammaticality: RC type, and the LD between the matrix subject and the matrix verb. Also, note that Rattanasak et al.'s (2022) experiment focused on L2 learners of English whose first language (L1; i.e., Thai) lacks inflection in general. For this reason, it is unclear what the findings may be if the L1 has its own system of Subj-V agreement inflection. The third way in which I extend research in this area is by focusing on L2 Arabic.

This chapter is organised as follows. Theoretical background on the syntactic structure of ORCs is provided in Section 4.2; this supplements the background on the structure of SRCs that I presented in Section 3.2.3. In Section 4.3.1, I summarise previous work on the effects of RC type on L2 agreement processing. Limitations and gaps are identified in Section 4.3.2. Section 4.4 states the focus of the present experiment. Recall from Section 2.5 that the same methodology is used for each experiment reported in this thesis; in Section 4.5, those aspects of the methodology which are specific to Experiment Three are described. The results follow in Section 4.6. Section 4.7 discusses these findings in light of the predictions formulated earlier, and brings the chapter to a close.

4.2 Theoretical background: object-headed relative clauses

In this section, I provide the theoretical background on Arabic morphosyntax which is relevant to Experiment Three. The section is concerned with how ORCs differ syntactically from SRCs. In (4a) (identical to [5] in Section 3.2.3, repeated here for convenience), I exemplify an SRC; in (4b), I provide the ORC counterpart to (4a).

(4) (a) ʔatˁ-tˁaːlib-u ʔallaði: qad saːʕad-a-k-a
the-student.M.SG-NOM that.M.SG ASRT help.PERF-3SG.M-2SG-M
'the student that had helped you'

(b) ʔatˁ-tˁaːlib-u ʔallaði: qad saːʕadØ-t-a
the-student.M.SG-NOM that.M.SG ASRT help.PERF-2SG-M
'the student that you had helped'

The SRC in (3a) has the syntactic structure schematised in Figure 4.1, while the ORC in (3b) has the structure in Figure 4.2 (AsrtP = assertive phrase, CP = complementiser phrase, DP = determiner phrase, NP = noun phrase, Spec = specifier, TP = tense phrase, VP = verb phrase).[63]

[63] As in Experiment Two, for the sake of simplicity, I have omitted the Taxis and Aspect Phrase (Tax-AspP) projection, and the movement of the relative pronoun (RP) from the RC object position, from all the syntactic representations for stimulus sentences (cf. Figure 3.2). This has no bearing on the calculation of the LD or structural distance (SD) between controller and target in any of these sentences.

Figure 4.1

Syntactic Representation of (4a)

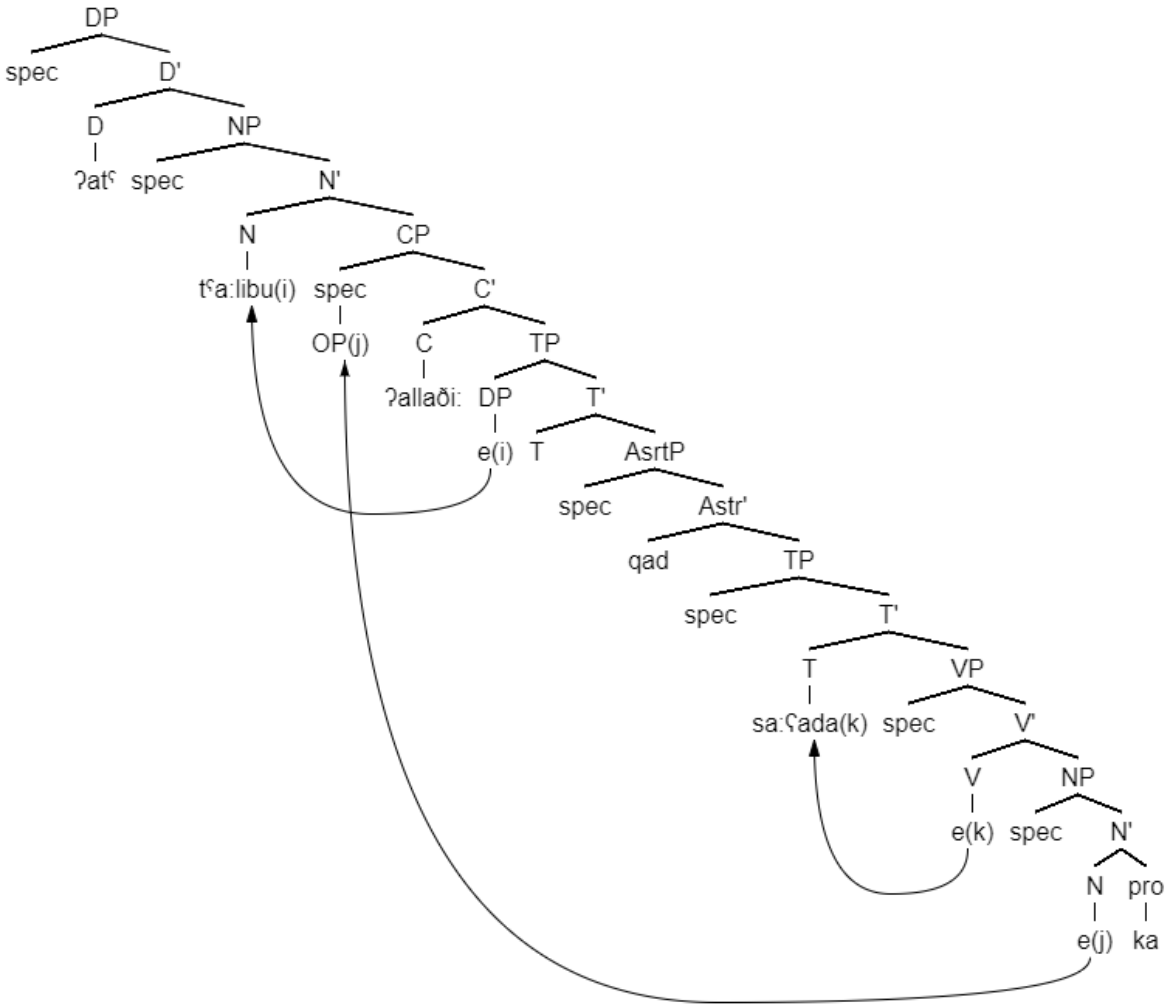
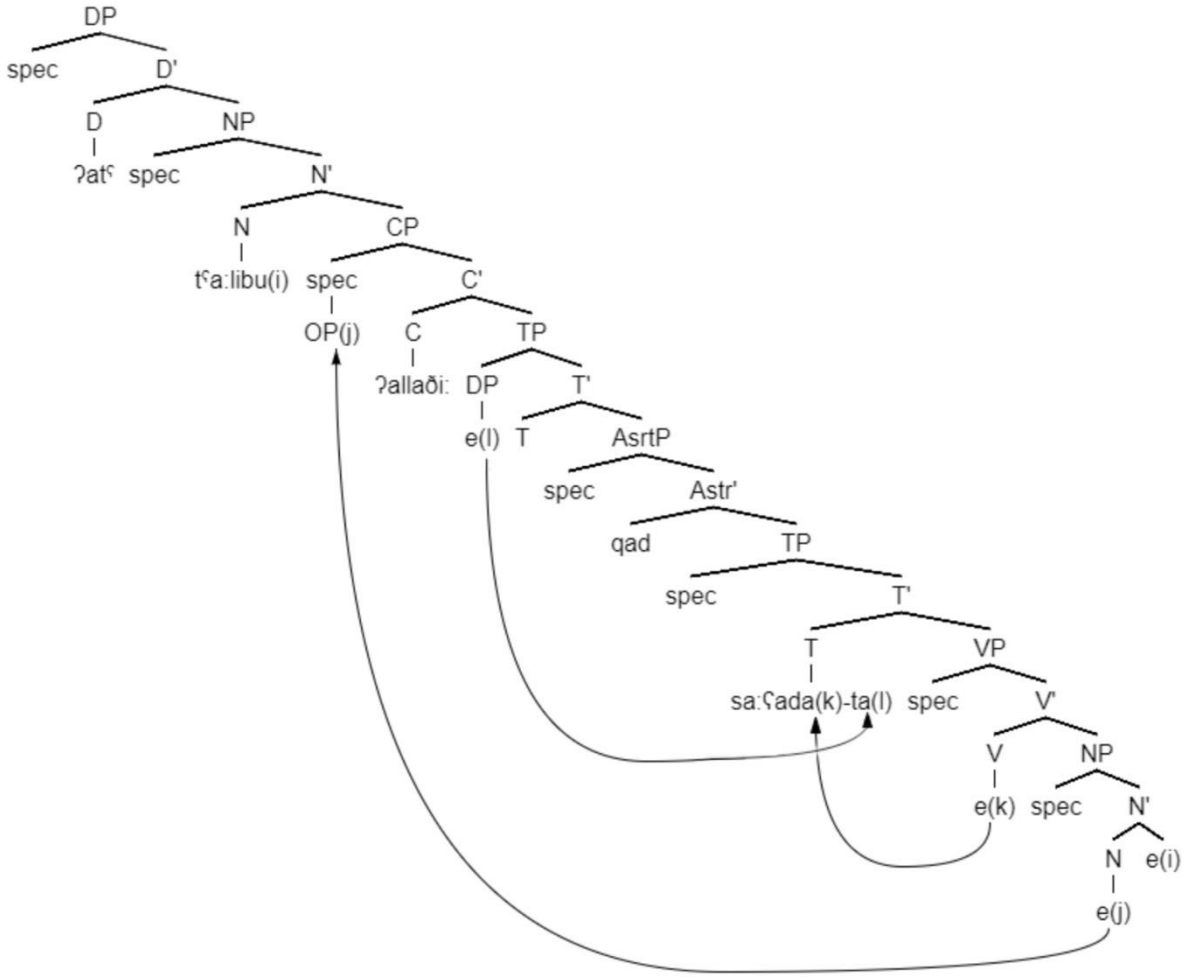


Figure 4.2

Syntactic Representation of (4b)



In Arabic, if the matrix subject is definite, SRCs and ORCs differ in terms of whether or not a resumptive pronoun may be used to encode the RC object.[64] In an ORC, the RC object can be expressed either by a resumptive pronoun or by a gap; however, in an SRC, only a gap is permitted (Algadi, 2013; Ali, 2004; Galal, 2004). I exemplify the use of a resumptive pronoun and a gap for the RC object in (5a) and

[64] A resumptive pronoun refers to an element or structure that repeats or summarises the meaning of the previous element (Hamdallah & Tushyeh, 1998).

(5b), respectively.[65] Note that (5b) is the same as (4b) except that, in (5b), I show coreferentiality using subscript notation, and also make explicit the gap that results from movement of the RC object.

(5) (a) ʔatˤ-tˤa:lib-u$_i$ ʔallaði e$_i$ qad sa:ʕadØ-t-a-hu
the-student.M.SG-NOM that.M.SG ASRT help.PERF-2SG-M-3SG.M
'(lit.) the student$_i$ that e$_i$ you had helped him'

(b) ʔatˤ-tˤa:lib-u$_i$ ʔallaði: qad sa:ʕadØ-t-a e$_i$
the-student.M.SG-NOM that.M.SG ASRT help.PERF-2SG-M
'the student$_i$ that you had helped e$_i$'

In (5a), the RC object is encoded as a resumptive pronoun, *-hu* 'him', suffixed to the RC verb *sa:ʕadØta* 'helped', while the matrix subject *ʔatˤtˤa:libu* 'the student' is coreferential with the RP *ʔallaði* 'that' and the resumptive pronoun *-hu*. In (5b), the matrix subject is coreferential with the RP and the gap (Mohammed Ali, 2004).

4.3 Literature review

This section consists of two subsections. Section 4.3.1 summarises one previous study of how RC type impacts the L2 processing of Subj-V agreement inflection on the matrix verb in the L2. Section 4.3.2 summarises existing research concerned with the L2 processing of subject-object asymmetries in RC processing,

[65] The RP and the resumptive pronoun must agree with the matrix subject in gender, number, person and case (Algadi, 2013; Galal, 2004).

albeit without the involvement of Subj-V agreement. I identify limitations and gaps in this body of work as a whole in Section 4.3.3.

4.3.1 Relative-clause type with subject-verb agreement

Rattanasak et al. (2022) investigated whether or not the processing of Subj-V agreement on the matrix verb is influenced by RC type in the L2. Forty upper-intermediate Thai learners of English (whose first language lacks inflection in general) and 40 native speakers of English did a non-cumulative word-by-word moving-window self-paced reading task. Twenty sets of experimental sentences were included, each containing four conditions. Two of these conditions were SRCs, as exemplified in (6a) and (6b), and the other two were ORCs, as in (6c) and (6d). The grammaticality of the matrix verb was manipulated such that half of the sentences were grammatical and the other half were ungrammatical; the grammatical conditions are illustrated in (6a) and (6c), while the ungrammatical conditions are illustrated in (6b) and (6d) (adapted from Rattanasak et al., 2022, p. 7).

(6) (a) The guys$_i$ that$_i$ know the driver want to buy a new car.

(b) *The guys$_i$ that$_i$ know the driver wants to buy a new car.

(c) The guys$_i$ that the driver knows$_i$ want to buy a new car.

(d) *The guys$_i$ that the driver knows$_i$ wants to buy a new car

Rattanasak et al. recorded RTs at the critical region (i.e., the matrix verb ‘want(s)’) and the spillover region (i.e., the following word, ‘to’).

The results for the L2 learners showed a main effect of RC type, and an interaction between RC type and ungrammaticality, at both regions of interest. This

interaction effect implied that these participants were less sensitive to ungrammaticality in the ORC condition than the SRC condition. The same results were obtained for the native speakers of English. Rattanasak et al. (2022) attribute the reduced sensitivity of the L2 learners to ungrammaticality in the ORC condition, to the fact that the L1 lacks Subj-V inflectional morphology.[66]

4.3.2 Relative-clause type without subject-verb agreement

Mitsugi et al. (2010) investigated whether ORCs are more difficult to process than SRCs using a non-cumulative self-paced reading task based on a word-by-word moving-window paradigm. Sixteen English-speaking learners of Japanese, 16 Korean learners of Japanese, and 16 native speakers of Japanese took part. There were 20 sentences of each RC type. The SRCs and ORCs used in the experiment are exemplified in (7a) and (7b), respectively (adapted from Mitsugi et al., 2010, pp. 130-131; ACC = accusative, LOC = locative).

(7) (a) apaato-de yasashii ruumumeito-o ketta
apartment-LOC kind roommate-ACC kick-PAST

kodomo-ga kouen-de hon-o yonda
child-NOM park-LOC book-ACC read-PAST
'The child that kicked the kind roommate in the apartment read the book in the park.'

[66] Note that this does not explain why the native speakers in their experiment *also* exhibited this reduced sensitivity to ungrammaticality.

(b) apaato-de yasashii ruumumeito-ga ketta
apartment-LOC kind roommate-NOM kick-PAST

kodomo-ga kouen-de hon-o yonda
child-NOM park-LOC book-ACC read-PAST
'The child that the kind roommate kicked in the apartment read the book in the park.'

The critical region was the head of the RC (i.e., *kodomo* 'child'). The RTs at the critical region in both RC types were compared. Each sentence was followed by two 'Yes/No' questions in which the participant was asked to identify the agents of the RC verb and of the matrix verb.

The results for the native speakers showed a main effect of RC type such that ORCs were read slower than SRCs. This pattern was also observed in the results for the Korean learners of Japanese. By contrast, the findings for the English-speaking learners of Japanese revealed no main effect of RC type. The results from the comprehension questions showed that the native speakers were accurate in answering both questions; however, the learners in both L2 groups found it easier to identify the agent of the matrix verb than that of the RC verb.

Bulut et al. (2016) investigated the processing of SRCs and ORCs using an eye-tracking paradigm. The study involved 14 Turkish learners of English. They were near-proficient L2 speakers, as they were at C1 level according to the Common European Framework of Reference (CEFR). The experimental materials were taken from Traxler et al. (2002). A total of 12 contrasting SRC vs. ORC pairs of items were

employed in the experiment; these are illustrated in (8a) and (8b), respectively (adapted from Bulut et al., 2016, p. 51; MV = matrix verb).

(8)	Head Noun	RC	MV	Rest
(a)	The banker/	who irritated the lawyer/	played/	tennis every Saturday.
(b)	The banker/	who the lawyer irritated/	played/	tennis every Saturday.

All the RCs had a head noun (e.g., ‘banker’), and either an RC object or an RC subject (e.g., ‘lawyer’). Each experimental sentence was followed by a ‘True/False’ comprehension question that checked participants’ understanding of the semantic and syntactic relations among the head noun, the matrix verb and the RC verb. Overall, ORCs were more difficult to process than SRCs. Also, comprehension questions about ORCs were answered significantly less correctly than those concerned with SRCs.

Bulut et al. reported three RTs: total fixation duration, first fixation duration, and visit count at four regions: the head noun, the RC, the matrix verb and the rest region, as shown in (8) above. The total fixation-durations at the matrix verb and RC regions were both significantly greater in the ORC than the SRC condition; however, no effect of RC type was detected at either the head noun or the rest region. The first fixation duration did not show any difference between the two RC conditions at any of the four regions under examination. The visit count revealed the following: at the head noun, there was no difference between the two RC conditions; however, at the RC, the matrix region and the rest region, there were more visits in the ORC condition than the SRC condition. Overall, the data suggested that ORCs are more difficult to process than SRCs.

As for the comprehension questions, Turkish participants who scored less than 70% were excluded; hence, their RT data was also excluded. The data showed that questions concerned with SRCs were answered correctly more often than questions concerned with ORCs.

Li et al. (2016) examined the L2 processing of Chinese RCs using a self-paced reading task. L2 learners from various L1 backgrounds took part: 18 speakers of Russian, eight of Japanese, six of Korean, five of Thai, two of Vietnamese, one of Italian, and one of Mongolian. All of them were at above-intermediate proficiency in the L2. Twenty-four sets of target sentences were presented in four conditions each; of these conditions, two are relevant to the current experiment, as the RC was attached to the matrix subject in each case. I exemplify an SRC sentence in (9a), and an ORC sentence in (9b) (adapted from Li et al., 2016, p. 203).

(9) (a) [shushi furen de] jingli yujianle mushi suoyi xinli hen
knows tycoon de manager met priest so feeling very

gaoxing.
happy.'
'The manager who knows the tycoon met the priest so feeling very happy.'

(b) [furen shushi de] jingli yujianle mushi suoyi xinli hen
tycoon knows de manager met priest so feeling very

happy
gaoxing.
'The manager who the tycoon knows met the priest so feeling very happy.'

After each sentence, a 'True/False' question checked the participant's comprehension. For the complete sentence and for the whole RC itself, there was no difference between the RTs for the SRC and ORC conditions; however, at the head noun (e.g., *jingli* 'manager' in [9]), RTs were longer in the ORC condition than the SRC condition. Likewise, in the comprehension questions, the participants were less accurate with responding to ORC sentences than SRC sentences.

Sung et al. (2016) probed the effects of subject-object asymmetries, plus the LD between the matrix subject and the associated gap for each type of RC. Thirty-six Japanese learners of Chinese at A1-B1 proficiency on the CEFR, plus 38 native speakers of Mandarin Chinese, did an eye-tracking task followed by a reading-comprehension task. The eye-movement task was based on 30 sentences containing SRCs and 30 sentences containing ORCs. Once the participant finished reading each sentence, they were asked to answer a 'True/False' question to ensure that they had understood the sentence. In half of each set of 30 sentences, the LD between the matrix subject and the associated gap was short; in the other half, the LD was long. In the long condition, one of the nouns in the sentence was preceded by a modifier. In (10a) to (10d), respectively, I exemplify the following conditions: short SRC, short

ORC, long SRC and long ORC (adapted from Sung et al., 2016, p. 6; REL = relativiser; matrix subject in bold, gap in italics).[67]

(10) (a) [*e* jieshao laoshi de]$_{RC}$ **xiaozhang** shuohua hen keqi
GAP introduce teacher REL **principal** talk very polite
'The principal who introduced the teacher talked in a very polite manner.'
LD = 3 words (i.e., *jieshao laoshi de*)

(b) [xiaozhang jieshao *e* de]$_{RC}$ **laoshi** shuohua hen keqi
principal introduce GAP REL **teacher** talk very polite
'The teacher who the principal introduced talked in a very polite manner.'
LD = 1 words (i.e., *de*)

(c) [*e* jieshao shangke-renzhen-de laoshi de]$_{RC}$ **xiaozhang**
GAP introduce seriously-teaching teacher REL **principal**

shuohua hen keqi
talk very politely
'The principal who introduced the hard-working teacher talked in a very polite manner.'
LD = 4 words (i.e., *shangke-renzhen-de jieshao laoshi de*)

[67] Sung et al. did not control for SD in their experiment; therefore, it is possible that, in addition to an increase in LD, the SD between the subject DP and the matrix verb also increased in the long SRC and long ORC conditions in (10c) and (10d), respectively. An analysis of the syntactic structures of these two sentence types would resolve this issue; however, this is beyond the scope of the present experiment.

(d) [xiaozhang **jieshao** *e* de]$_{RC}$ shangke-renzhen-de **laoshi**

principal **introduce** GAP REL seriously-teaching **teacher**

shuohua hen keqi

talk very polite

'The hard-working teacher who the principal introduced talked in a very polite manner.'

LD = 2 words (i.e., *de shangke-renzhen-de*)

Notice that, in Chinese, the RC *precedes* the head noun that it modifies; therefore, the LD between the matrix subject and the matrix verb does not change.

All things considered, the results obtained by Sung et al. indicate that both groups of participants found ORCs easier to process than SRCs. The authors attribute this to the fact that the matrix subject is closer to the associated gap in the former condition than the latter. In addition, both groups spent less time processing the matrix subject in the long condition than the short condition. Sung et al. speculate that, in the long condition, the modifier facilitated processing of the following noun by providing information which enabled participants to predict the upcoming noun; for example, consider the semantic similarity between the modifier and the following noun in *shangke-renzhen-de laoshi* 'seriously-teaching teacher'.

Hu et al. (2022) investigated the processing of Chinese RCs by 20 intermediate Italian third-language (L3) learners of Chinese, and 20 native Chinese speakers. They compared two theories of language processing: the Dependency Locality Theory (DLT; Gibson, 1998, 2000) and the Structural Distance Hypothesis (SDH; Hawkins, 2004; O'Grady, 1997; O'Grady et al., 2003). The DLT focuses on the number of

referents that intervene between the filler and the gap (i.e., the matrix subject noun, and the RC subject or object),[68] whereas the SDH makes predictions based on the SD between these two items. In (11a) and (11b), I exemplify an SRC and an ORC in Chinese, respectively.

(11) (a) [e_i yāoqǐng fùháo de] guānyuán$_i$

invite tycoon REL official

'the official that invited the tycoon'

number of intervening referents = 2 (i.e., *yāoqǐng fùháo*)

(b) [fùháo yāoqǐng e_i de] guānyuán$_i$

tycoon invite REL official

'the official that the tycoon invited'

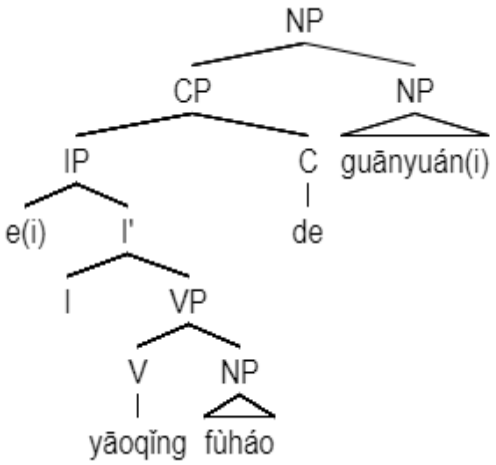
number of intervening referents = 0

The syntactic structures which correspond to (11a) and (11b) are presented in Figures 4.3 and 4.4, respectively (adapted from Hu et al., 2022, pp. 895-896; IP = inflection phrase).

[68] This need not be the same as the LD between these two items, since, when calculating LD, we count words rather than referents.

Figure 4.3

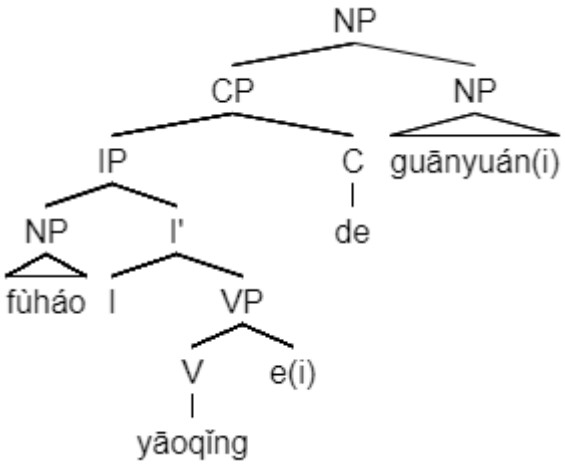
Syntactic Representation of (11a)



SD = 4 (i.e., IP, CP, NP, NP)

Figure 4.4

Syntactic Representation of (11b)



SD = 5 (i.e., VP, IP, CP, NP, NP)

The DLT and the SDH make different predictions for the processing of Chinese RCs. According to the DLT, learners might be expected to struggle when processing

an SRC, as the number of intervening referents between filler and gap is larger than in an ORC. By contrast, the SDH predicts that readers will have trouble processing ORCs, as the SD between filler and gap is larger than in an SRC.

A word-by-word reading-comprehension task was employed. Sixteen pairs of sentences were designed, each pair based on an SRC and an ORC. Each sentence was composed of a verb (V), a noun (N), the relativiser *de*, a head noun (HN), and the two words following the head noun (HN+1 and HN+2). I exemplify an SRC sentence in (12a) and an ORC sentence in (12b) (adapted from Hu et al., 2022, p. 901).

(12) (a)

Zànměi	dǎoyǎn	de	yǎnyuán	qùguò	yìdàlì
V	N	de	HN	HN+1	HN+2
praise	director	REL	actor	go-ASP	Italy

'The actor that praised the director has been to Italy.'

(b)

Dǎoyǎn	zànměi	de	yǎnyuán	qùguò	yìdàlì
N	V	de	HN	HN+1	HN+2
director	praise	REL	actor	go-ASP	Italy

'The actor that the director praised has been to Italy.'

Each sentence was also followed by a 'Correct/Incorrect' comprehension question.

In the data analysis, Hu et al. initially pooled together the results from both participant groups. At the HN region, there was a main effect of group, and an interaction between group and RC type; however, no main effect of RC type was evident. At the HN+1 region, there was a main effect of group.[69] At the HN+2 region, the only significant effect was a main effect of group. Hu et al. then analysed the data

[69] As Hu et al. do not report the main effect of RC type, or the interaction between group and RC type, I assume that these effects were not significant at this region.

from both groups separately. For the L3 group, at the HN region, a main effect of RC type was observed such that ORCs were read more slowly than SRCs; however, this main effect was not significant at the HN+1 region or the HN+2 region. Hence, for the L3 group, the results provide evidence for the SDH over the DLT, with the caveat that ORCs were read more slowly than SRCs at the HN region only. For the native group, no main effect of RC type was recorded at any of the three critical regions.

As for the comprehension questions, the L3 learners comprehended the stimulus sentences similarly in the SRC and the ORC conditions, and the same was true of the native speakers.

Cunnings and Fujita (2023) investigated the processing of SRCs and ORCs.[70] The eye movements of 80 learners of English in the intermediate-to-advanced proficiency range, and also 80 native speakers of English, were recorded using an SR Research Eyelink 1000 at a sample rate of 1000 Hz. In (13a) and (13b), I exemplify stimulus sentences based on an SRC and an ORC, respectively (adapted from Cunnings & Fujita, 2023, p. 546).

(13) (a) The boy that saw the girl yesterday afternoon, walked through the park. park.

(b) The boy that the girl saw yesterday afternoon, walked through the park.

Each sentence was followed by a comprehension question intended to gauge the participant's attentiveness while reading.[71]

[70] In addition, noun similarity was manipulated such that the matrix subject noun and the RC noun were either similar (i.e., two common nouns) or dissimilar (i.e., a common noun and a proper name).
[71] Only data from participants who scored at least 70% were included in the analysis. Cunnings and Fujita kept testing until they had recruited 80 participants with at least 70% accuracy.

RTs were measured at the whole RC, a spillover region that included the following words up to but not including the matrix verb, the matrix verb, and a final region consisting of the rest of the sentence. These regions are exemplified in (14) (adapted from Cunnings & Fujita, 2023, p. 546).

RC region spillover region matrix verb region

(14) The boy /that saw the girl /yesterday afternoon/, walked /

final region

through the park.

The RTs for the total view times at the RC region and the spillover region revealed significant main effects of group, region, and RC type. There were no interactions between group and region, between group and RC type, or between region and RC type. Also, there was no three-way interaction among group, RC type and region for either of the two regions (i.e., the RC region or the spillover region). The RTs for the total view times for the matrix verb and the final region together revealed significant main effects of group and region, and RC type. For the same regions (i.e., the matrix verb and the final region), there was no interaction effect between group and region, no interaction between group and RC type, or between RC type and region. However, a three-way interaction among group, RC type and region was observed.

To recap, as far as I know, the only study that has investigated RCs as a distance effect is the one conducted by Rattanasak et al. (2022). The results show

that Thai learners of English were more accurate in processing verbal agreement in the SRC condition than the ORC condition.

Other studies using RCs have attempted to answer the more general question of whether SRCs are less or more difficult to process than ORCs. Several studies provided evidence for the universal SRC preference in L2 processing (Bulut et al., 2016; Cunnings & Fujita, 2023; Hu et al., 2022; Li et al., 2016; Mitsugi et al., 2010). However, these findings were challenged by the results of Sung et al. (2016).

4.3.3 Limitations and gaps

In the previous section, I summarised one study dealing with the effect of RC type on Subj-V number-agreement processing in the L2 (Rattanasak et al., 2022). The specific focus of Rattanasak et al.'s experiment was to gauge the moderating effect of RC type on sensitivity to ungrammaticality in agreement inflection on the matrix verb.

In order to broaden the coverage of the present literature review, I also summarised experiments in which, in contrast to Experiment Three, the matrix verb in an RC sentence was *not* inflected for agreement. In contrast to Rattanasak et al. (2022), some of these studies were concerned with the effect of RC type on the processing of various critical regions in the sentence (i.e., not just the matrix verb). Note also that L2 learners from a variety of L1 backgrounds were involved in all of these experiments.

There are some methodological limitations in this body of literature. The first is that Rattanasak et al. (2022) were concerned only with number agreement. Other concerns are related to the participants in some of the studies under scrutiny. In two of them, learner proficiency was not operationalised systematically, plus the learner groups were not large. Bulut et al. (2016) investigated "near-proficient" learners (p.

50), while Mitsugi et al. (2010) did not specify the level of learners.[72] Bulut et al. (2016) recruited 14 learners, while Mitsugi et al. (2010) used 16 English and 16 Korean learners. In two other studies, learners from heterogeneous L1 backgrounds were pooled into one group (Cunnings & Fujita, 2023; Li et al., 2016).

Certain design features also merit consideration. In Sung et al. (2016), the words that were used as the subject noun in the stimulus sentences differ between the two RC conditions. In (15a) and (15b), respectively, I exemplify the words utilised for this purpose in the SRC and ORC conditions (adapted from Sung et al., 2016, p. 1; subject noun in bold).

(15) (a) jieshao laoshi de]$_{RC}$ **xiaozhang**
introduce teacher REL principal
‘The principal who introduced the teacher’

(b) [xiaozhang jieshao *e* de]$_{RC}$ **laoshi**
principal introduce GAP REL teacher
‘The teacher who the principal introduced’

Nor did Sung et al. control the number of words in each sentence; specifically, the long condition contained more words than the short condition. As a result, when they compared the RTs between the two LD conditions, the results may have been confounded by differences between the lengths of the sentences in these two conditions.

[72] They stated only that the learners were enrolled in either the fourth or sixth semester of a Japanese course at the time of the experiment.

It is also worth noting that, in certain experiments, spillover effects were investigated at only one region downstream from the matrix verb (Bulut et al., 2016; Cunnings & Fujita, 2023; Hu et al., 2022; Rattanasak et al., 2022), or not at all (Li et al., 2016; Mitsugi et al., 2010; Sung et al., 2016).

Spillover effects are worthy of attention in processing research concerned with subject-verb agreement involving RCs (plus LD), as difficulties with processing agreement in general might not be detectable at the target itself (Jiang, 2012). In line with this, effects of this type have been reported in previous studies in the area under scrutiny in the current experiment. For example, in each of Cunnings and Fujita (2023) and Rattanasak et al. (2022), there were effects at the target and one spillover region.

Finally, the evidence for an SRC or ORC preference in this body of work is not conclusive. Whereas the results for the Turkish learners of English in Bulut et al. (2016), the Russian, Japanese, Korean, Thai, Vietnamese, Italian, and Mongolian learners of Chinese in Li et al. (2016), the Italian learners of Chinese in Hu et al. (2022), the learners of English in Cunnings and Fujita (2023), and the Korean and English-speaking learners of Japanese in Mitsugi et al. (2010) indicate that ORCs are more difficult to process than SRCs, the Japanese learners of Chinese in Sung et al. (2016) showed an ORC preference. This anomalous result indicates a need for further research on L2 Subj-V gender- and number-agreement processing. Regarding the reasons for these inconsistencies, sample size may have played a role in Bulut et al. (2016), Hu et al. (2022) and Mitsugi et al. (2010).

In addition to the limitations identified above, there is a notable gap in previous research in this area: no study has examined the phenomenon under scrutiny in the current study using English-speaking learners of Arabic (ELAs).

4.4 The present experiment

The present study addresses the limitations of previous work in this area that were listed in Section 4.3.2:

(1) In addition to number agreement, I consider the processing of gender agreement.

(2) Learner proficiency is operationalised systematically, the learner group is larger than in some previous research in this area (*N* = 40), and this group is homogeneous in that it consists of participants from a single L1 background.

(3) The stimulus sentences associated with the SRC vs. ORC conditions contain the same matrix subject noun and matrix verb, followed by the same three words in the spillover regions. In (16), I demonstrate these using parts of stimulus sentences in the short SRC and ORC conditions (GEN = genitive; INDF = indefinite; controllers in bold, targets in italics, spillover regions underlined).[73]

(16) (a) **ʔal-mutardʒim-u** ʔallaði: qad wazˁzˁaffa-k-a
the-interpreter.M.SG-NOM that.M.SG ASRT hire.PERF.3SG.M-2SG-M

taħaddaθ-a <u>bi-fasˁa:ħ-at-i-n</u> <u>wa tˁala:q-at-i-n</u>
speak.PERF-3SG.M <u>with-eloquence-F-GEN-INDF</u> <u>and fluency-F-GEN-INDF</u>
'The interpreter that had hired you spoke eloquently and fluently.'

[73] Each sentence in (16) is *part* of a stimulus sentence from the current experiment. Further information regarding the design of the stimulus sentences will be provided in Section 4.5.

(b) **ʔal-mutardʒim-u** ʔallaði: qad wazˁzˁafØ-t-a

the-interpreter.M.SG-NOM that.M.SG ASRT hire.PERF-2SG-M

taħaddaθ-a bi-fasˁaːħ-at-i-n wa tˁalaːq-at-i-n

speak.PERF-3SG.M with-eloquence-F-GEN-INDF and fluency-F-GEN-INDF

'The interpreter that you had hired spoke eloquently and fluently.'

Notice that, in each case, the verb *taħaddaθa* 'speak' is followed by *bifasˁaːħatin wa tˁalaːqatin* 'eloquently and fluently'. In addition, the sentences in these two RC conditions are the same length (not exemplified in order to save space).

(4) Besides the target region, I examine spillover effects in depth by measuring RTs at the three regions that follow the target.

(5) In addressing the limitations in (1) to (4) above, I aim to gain an insight into the inconclusive results observed in previous work in this area regarding an 'ORC disadvantage' in L2 processing generally.

(6) I extend existing research in this area in three respects. First of all, the LD between the subject DP and the matrix verb is manipulated within each RC type. Although this was done by Sung et al. (2016), the results of only one previous study still leave open the possibility of extending work in this area (rather than addressing an insufficiency in existing research per se). Furthermore, as the L1 in Experiment Three has its own system of Subj-V agreement, it will be possible to investigate the effect of RC type on this type of agreement in this cross-linguistic scenario (cf. Rattanasak et al., 2022). The third extension of previous work is that the L2 learner group are ELAs.

Two pairs of predictions (Ps) will be tested in the current experiment. The first pair is related to RC type:

P1. (a) ELAs will be less sensitive to ungrammaticality in gender agreement in the ORC condition than the SRC condition.

(b) ELAs will be less sensitive to ungrammaticality in number agreement in the ORC condition than the SRC condition.

In the second pair of predictions, I manipulate distance (i.e., LD):

P2. (a) ELAs will be less sensitive to ungrammaticality in gender agreement when the distance between the subject DP and the matrix verb is long than when it is short.

(b) ELAs will be less sensitive to ungrammaticality in number agreement when the distance between the subject DP and the matrix verb is long than when it is short.

4.5 Methods

The participants, task and procedure were the same as those in Experiments One and Two; therefore, the current section is concerned only with the materials for Experiment Three. To conserve space, I will mention only those attributes of the materials that differed from the ones used in Experiments One and Two. There were 144 stimulus sentences counterbalanced for distance, RC type (henceforth, simply 'RC' for simplicity), and ungrammaticality. In (17), I exemplify the two RC conditions in Experiment Three using one of the (grammatical) sentence pairs from this experiment.

Note that, in terms of distance, these two sentences are both in the short condition. Stimulus sentences in the SRC and ORC conditions are shown in (17a) and (17b), respectively (controller in bold, target in italics).[74]

(17) (a) **ʔal-mutardʒim-u** ʔallaði: qad wazˤzˤaffa-k-a
the-interpreter.M.SG-NOM that.M.SG ASRT hire.PERF.3SG.M-2SG-M

taħaddaθa bi-fasˤa:ħ-at-i-n wa
speak.PERF.3SG.M with-eloquence-F-GEN-INDF and

tˤala:q-at-i-n wifqa raʔy-i: ʃ-ʃaxsˤsˤiy
fluency-F-GEN-INDF in opinion.M.SG-my the-personal.M.SG
'The interpreter that had hired you spoke eloquently and fluently, in my personal opinion.'

[74] (18a) and (18b) are the same as (17a) and (17b), respectively, except that, in (18), the phrase *wifqa raʔy-i: ʃ-ʃaxsˤsˤiy* 'in my personal opinion' is added to each stimulus sentence so that the total number of words in the sentence is 11.

(b) **ʔal-mutardʒim-u** ʔallaði: qad wazˁafØ-t-a

the-interpreter.M.SG-NOM that.M.SG ASRT hire.PERF-2SG-M

taħaddaθ-a bi-fasˁa:ħ-at-i-n wa

speak.PERF-3SG.M with-eloquence-F-GEN-INDF and

tˁala:q-at-i-n wifqa raʔy-i: ʃ-ʃaxsˁsˁiy

fluency-F-GEN-INDF in opinion.M.SG-my the-personal.M.SG

‘The interpreter that you had hired spoke eloquently and fluently, in my personal opinion.’

The counterparts to (17a) and (17b) in the long condition are exemplified in (18a) and (18b), respectively (controller in bold, target in italics).

(18) (a) **ʔal-mutardʒim-u** ʔallaði: ya-ʕrif-u

the-interpreter.M.SG-NOM that.M.SG 3IMP-know-IND.SG.M

l-munazʿzʿim-a:ni ʔnna-hu qad

the-organizer.M-DUAL.NOM that-3SG.M ASRT

wazʿzʿaf-a-k-a *taħaddaθ-a* bi-fasʿa:ħ-at-i-n

hire-PERF.3SG.M-2SG-M speak.PERF-3SG.M with-eloquence-F-GEN- INDF

wa tʿala:q-at-in

and fluency-F-GEN-INDF

'The interpreter that the two organisers know (that) had hired you spoke eloquently and fluently.'

(b) **ʔal-mutardʒim-u** ʔallaði: ya-ʕrif-u

the-interpreter.M.SG-NOM that.M.SG 3IMP-know-IND.SG.M

l-munazʿzʿim-a:ni ʔnna-k-a qad wazʿzʿaf-Ø-t-a

the-organizer.M-DUAL.NOM that-2SG-M ASRT hire-PERF-2SG-M

taħaddaθ-a bi-fasʿa:ħ-at-i-n wa tʿala:q-at-in

speak.PERF-3SG.M with-eloquence-F-GEN-INDF and fluency-F-GEN-INDF

'The interpreter that the two organisers know (that) you had hired spoke eloquently and fluently.'

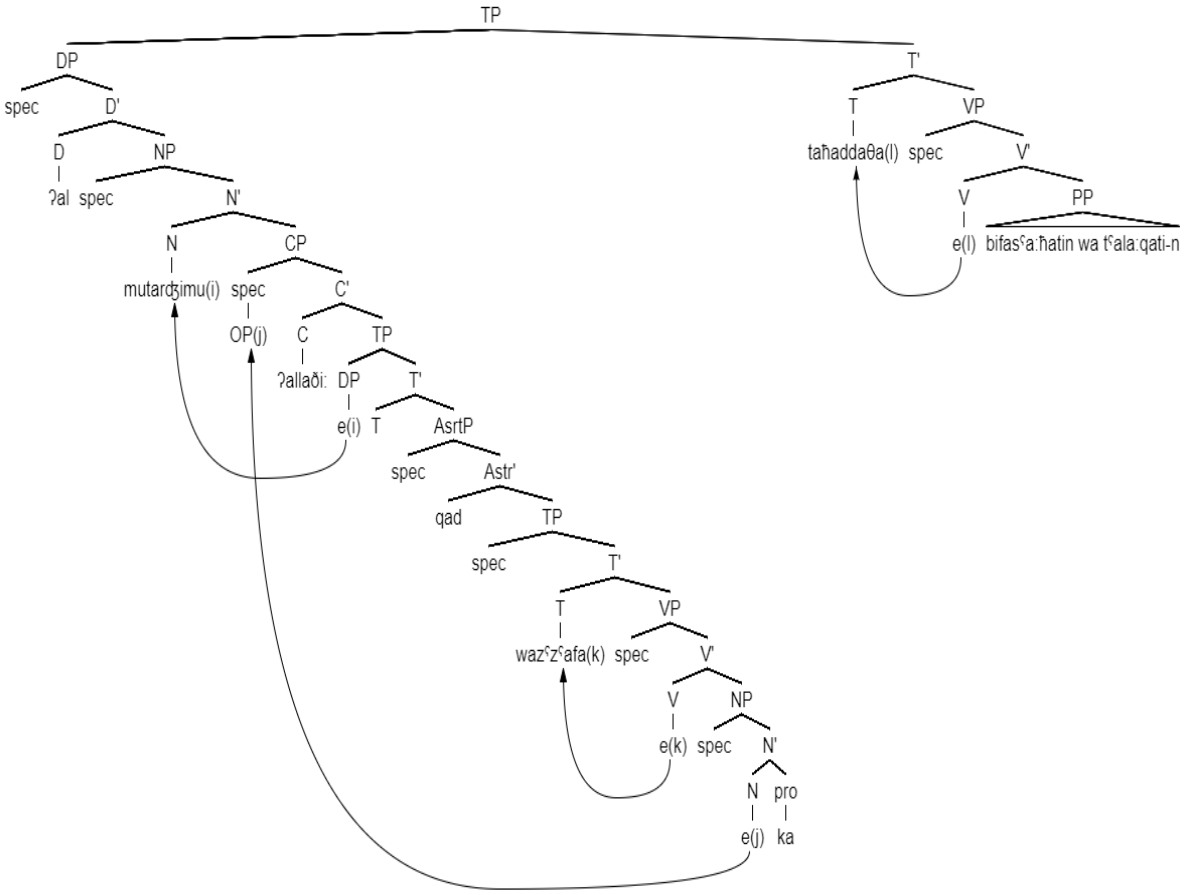
Notice that, in the long condition, *ya-ʕrif-u l-munazʕʕim-a:ni ʔnna-hu* ‘the two organisers know (that)’ is inserted into the RC.

In Section 4.2, we saw that, in an ORC sentence, a resumptive pronoun can be suffixed to the RC verb, plus, if it *is* used, this pronoun is coreferential with the matrix subject (and also the RP). In the ORC sentences in (16b) and (17b), I did not attach a resumptive pronoun to the RC verb. Since this pronoun carries the gender and number features of the matrix subject, if it *had* been attached to the RC verb, it may have ‘reminded’ the reader what these features were, thus facilitating processing of Subj-V agreement at the matrix verb and confounding the results.

As distance in the present experiment specifically means LD, SD needs to be controlled. In Figures 4.5 to 4.8 respectively, I show the trees that correspond to the short SRC in (16a), the short ORC in (16b), the long SRC in (18a), and the long ORC in (18b) (pro = pronoun).

Figure 4.5

Syntactic Representation of (16a)

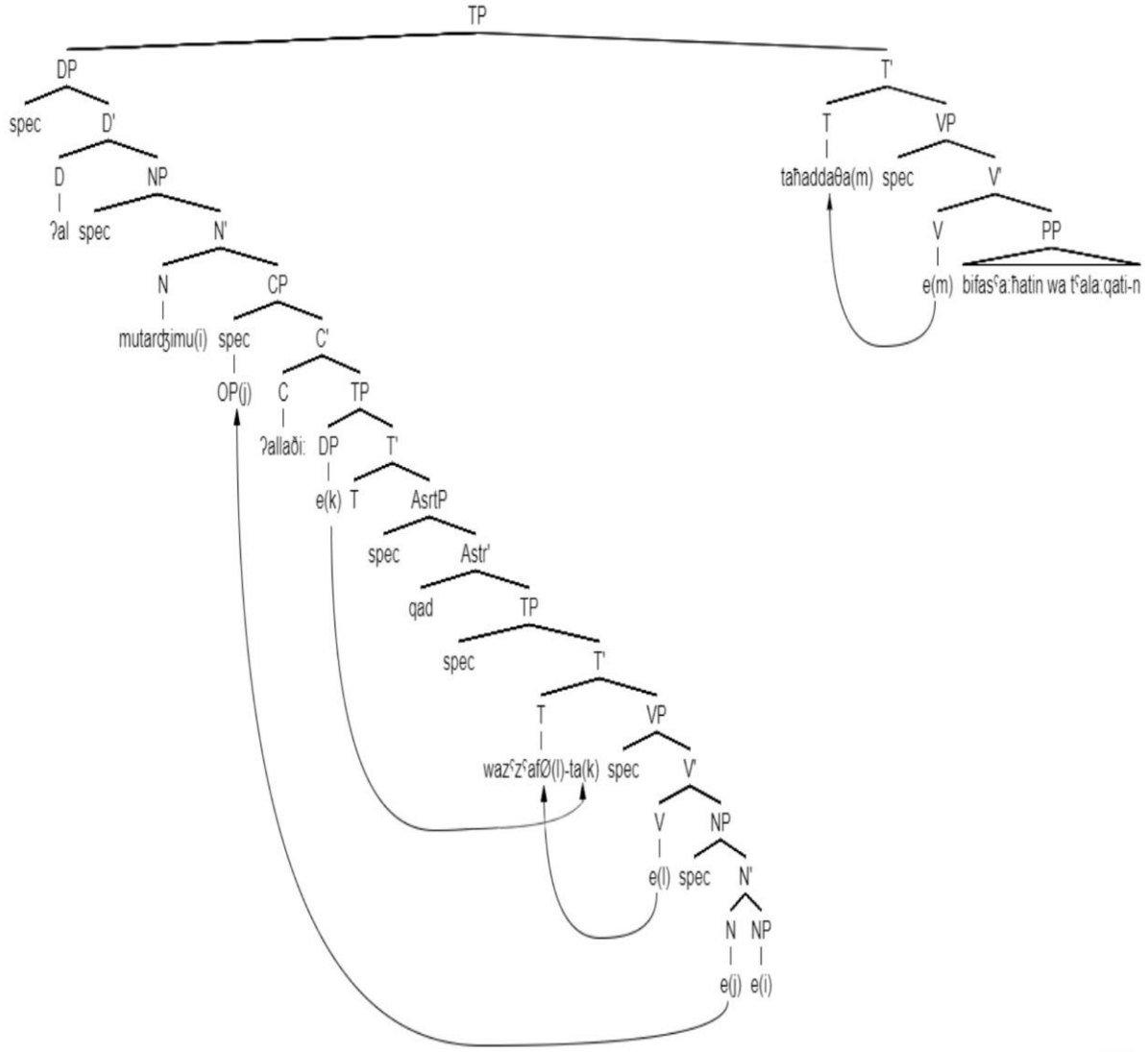


SD: 3 nodes (i.e., NP, DP and TP)

LD: 3 words (i.e., *ʔallaði: qad wazˁzˁafaka*)

Figure 4.6

Syntactic Representation of (16b)

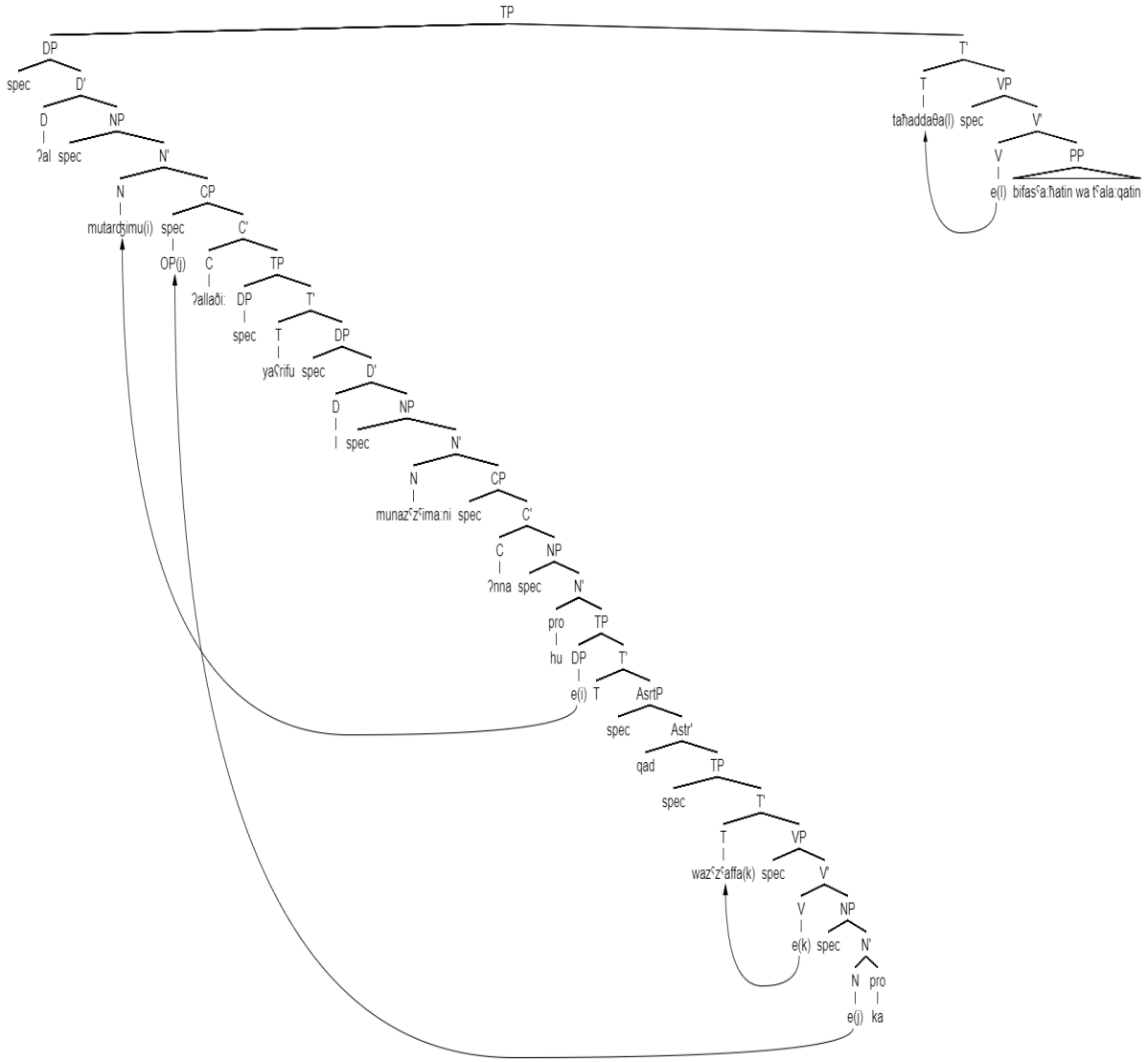


SD: 3 nodes (i.e., NP, DP and TP)

LD: 3 words (i.e., *ʔallaði: qad waz^{ʕ}z^{ʕ}afØta*)

Figure 4.7

Syntactic Representation of (18a)

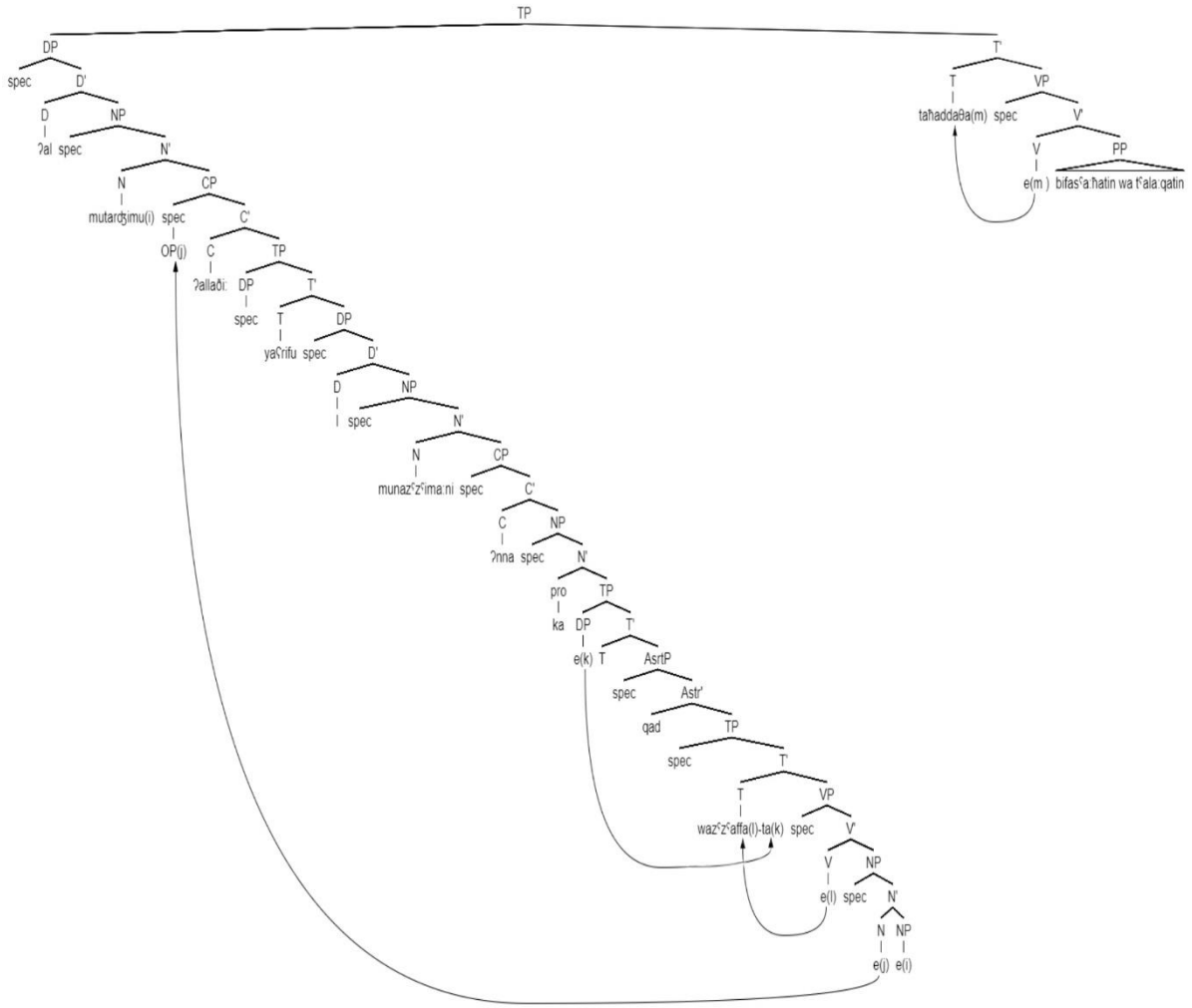


SD: 3 nodes (i.e., NP, DP and TP)

LD: 6 words (i.e., *ʔallaði: ya-ʕrif-u l-munazʿzʿima:ni ʔnnahu qad wazʿzʿafaka*)

Figure 4.8

Syntactic Representation of (18b)



SD: 3 nodes (i.e., NP, DP and TP)

LD: 6 words (i.e., *ʔallaði: ya-ʕrif-u l-munazʕzʕim-a:ni ʔnna-k-a qad wazʕzʕafØta*)

The regression models were the same as in Experiment Two.

4.6 Results

In Section 4.6.1, I present the results for the norming group and the native-speaker controls. In Section 4.6.2, the results for the ELAs are presented.[75]

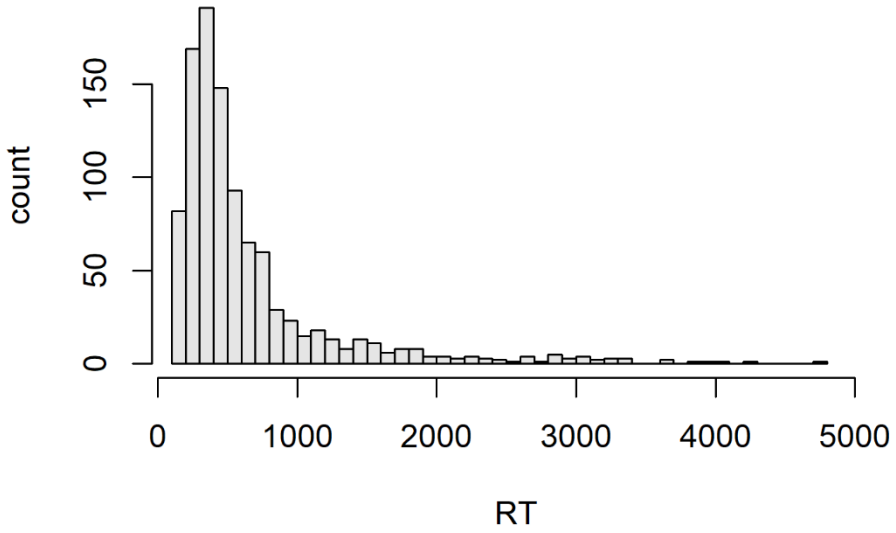
4.6.1 Native Speakers of Arabic

The results for the norming group confirmed that the stimulus sentences were grammatically acceptable, and that they were not semantically or pragmatically deviant.

In Figure 4.9, I provide a histogram showing the RT data from the control group for the grammatical stimulus sentences only.

Figure 4.9

Histogram Summarising the Control Group Data for Experiment Three



[75] Given that the two conditions for distance are 'short' and 'long' in the present experiment, to avoid confusion, I will distinguish between 'small' and 'large' RTs (rather than 'short' and 'long' RTs) in Section 4.6.2.

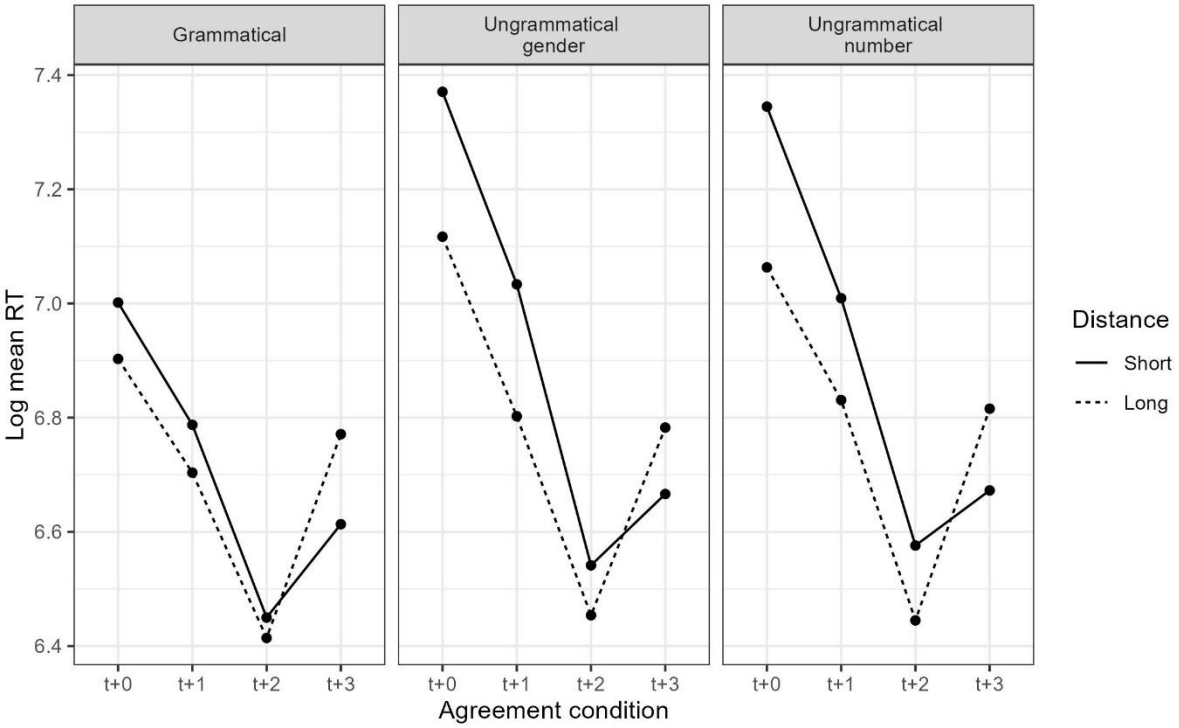
As in Experiments One and Two, most of the RTs are lower than 1000 ms, plus hardly any of these values are over 2000 ms. This pattern suggests that, on the whole, the control-group participants did not encounter any particular grammatical, semantic or pragmatic characteristics of the stimulus sentences that caused them to hesitate significantly when reading the sentences. From this, I conclude that the data collected from the ELAs reflected L2 processing rather than task effects.

4.6.2 ELAs

In Figure 4.10, I show the log-transformed values of the mean RTs for the ELA group at each critical region. These values are also categorised by distance and agreement condition.

Figure 4.10

Log Mean RTs for the Four Critical Regions by Distance in Each Agreement Condition in Experiment Three

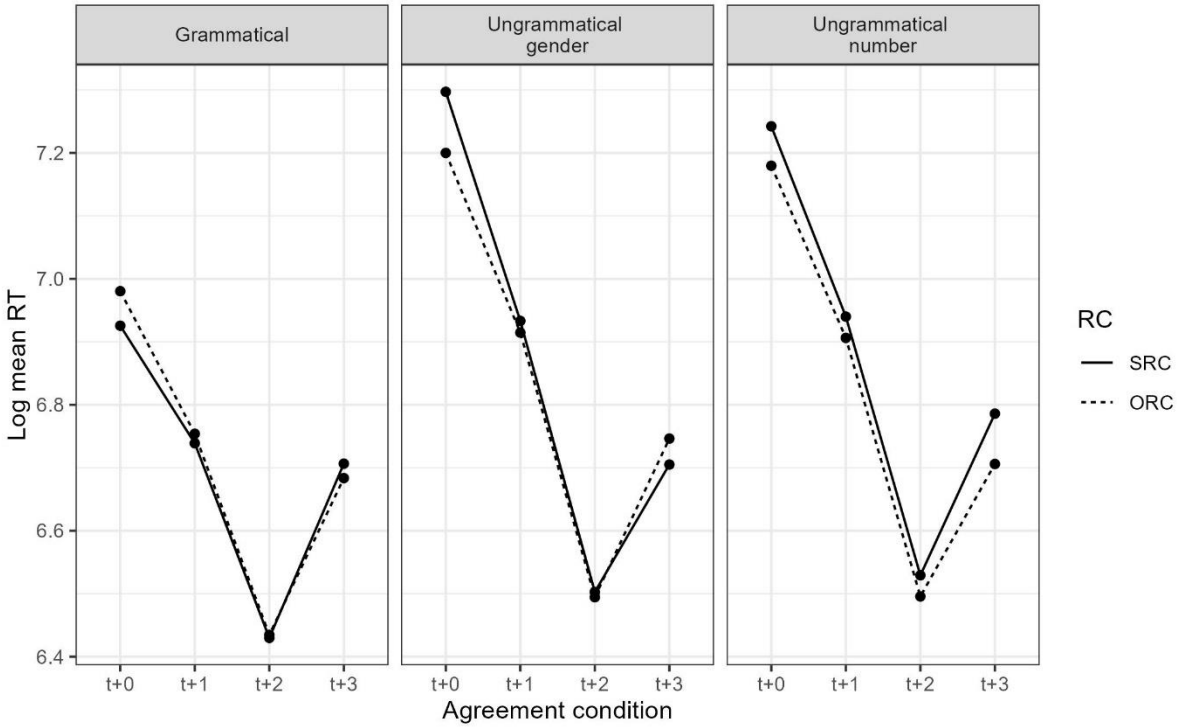


At each critical region, RTs were larger in both of the ungrammatical conditions than in the grammatical condition. RTs were smaller in the long condition than in the short condition, except for t+3.

In Figure 4.11, I show the log-transformed values of the mean RTs for the ELA group at each critical region. These values are also categorised by RC and agreement condition.

Figure 4.11

Log Mean RTs for the Four Critical Regions by RC in Each Agreement Condition in Experiment Three



At each critical region, RTs were larger in both of the ungrammatical conditions than in the grammatical condition. In the grammatical condition, across all four critical regions combined, there was no clear difference between the RTs in the two RC conditions. For each of the two ungrammatical conditions, RTs were smaller in the ORC condition than in the SRC condition; however, these differences were tiny in most cases.

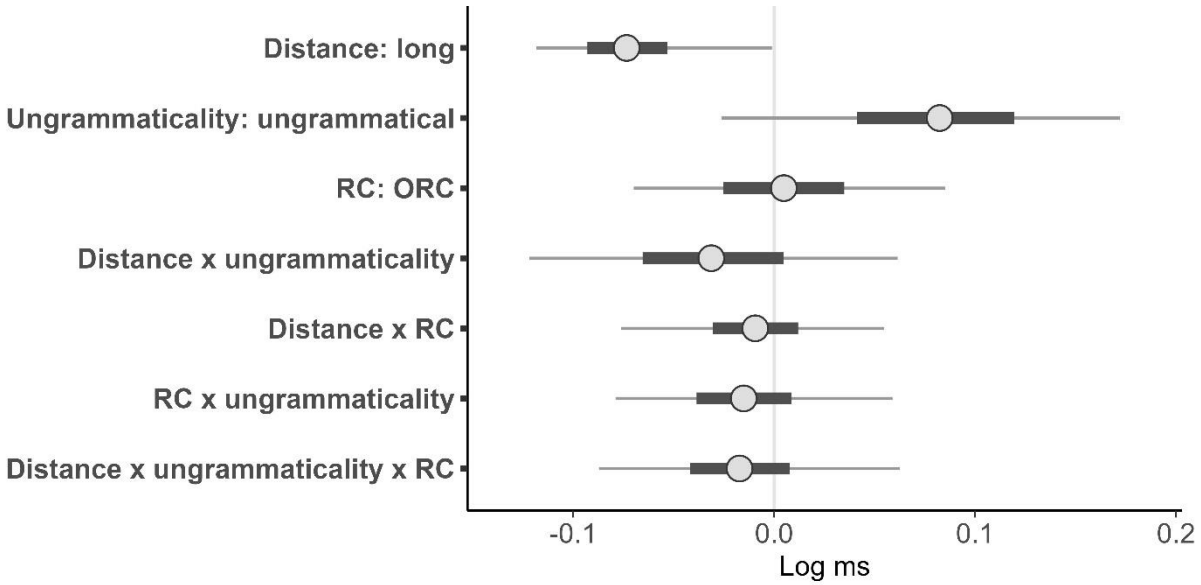
In the analysis which follows, we will pay particular attention to two results: the interactions between distance and ungrammaticality, and between RC and ungrammaticality. These results are important because they tell us whether or not the

ELAs' sensitivity to agreement violations is moderated by distance and RC, respectively.

I will deal with the results for gender agreement first. Each critical region will be examined in turn. Figure 4.12 shows the posterior distributions for the effects of distance, ungrammaticality and RC at t+0.

Figure 4.12

Posterior Distributions for the Effects of Distance, Ungrammaticality and RC on RTs at Region t+0: Gender Agreement: Experiment Three



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was a negative interaction between distance and ungrammaticality, indicated by the fact that most of the probable values of this parameter were negative (*pd* = 0.917; see Table 4.1). There was no main effect of RC; no interaction between distance and RC; no interaction between RC and

ungrammaticality; and no three-way interaction between distance, ungrammaticality and RC.

Table 4.1 presents the findings in detail (L = lower bound, n_{eff} = effective sample size, pd = probability of direction, SD = standard deviation of the distribution, U = upper bound).

Table 4.1

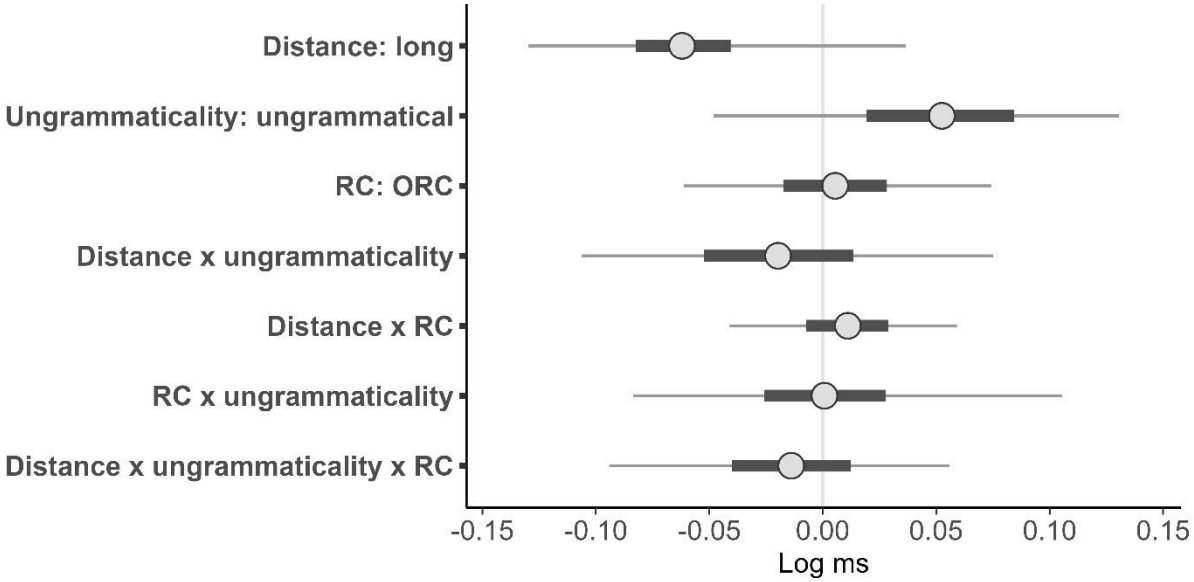
Effects of Distance, Ungrammaticality and RC on RTs at Region t+0: Gender Agreement: Experiment Three

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.849	0.053	6.763	6.932	1.000	1.009	1083
Distance: long	-0.073	0.013	-0.093	-0.053	1.000	1.000	10867
Ungramm.: ungr.	0.082	0.025	0.041	0.119	0.997	1.000	4814
RC: ORC	0.005	0.019	-0.025	0.035	0.606	1.000	7108
Distance x ungr.	-0.031	0.022	-0.065	0.005	0.917	1.000	7263
Distance x RC	-0.009	0.013	-0.031	0.012	0.773	1.000	9562
RC x ungramm.	-0.015	0.015	-0.039	0.009	0.852	1.001	7505
Dist. x ungr. x RC	-0.017	0.016	-0.042	0.008	0.869	1.000	88601

Figure 4.13 shows the posterior distributions for the effects of distance, ungrammaticality and RC at t+1.

Figure 4.13

Posterior Distributions for the Effects of Distance, Ungrammaticality and RC on RTs at Region t+1: Gender Agreement: Experiment Three



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was no main effect of RC; no interaction between distance and ungrammaticality; no interaction between distance and RC; no interaction between RC and ungrammaticality; and no three-way interaction between distance, ungrammaticality and RC.

Table 4.2 presents the findings in detail.

Table 4.2

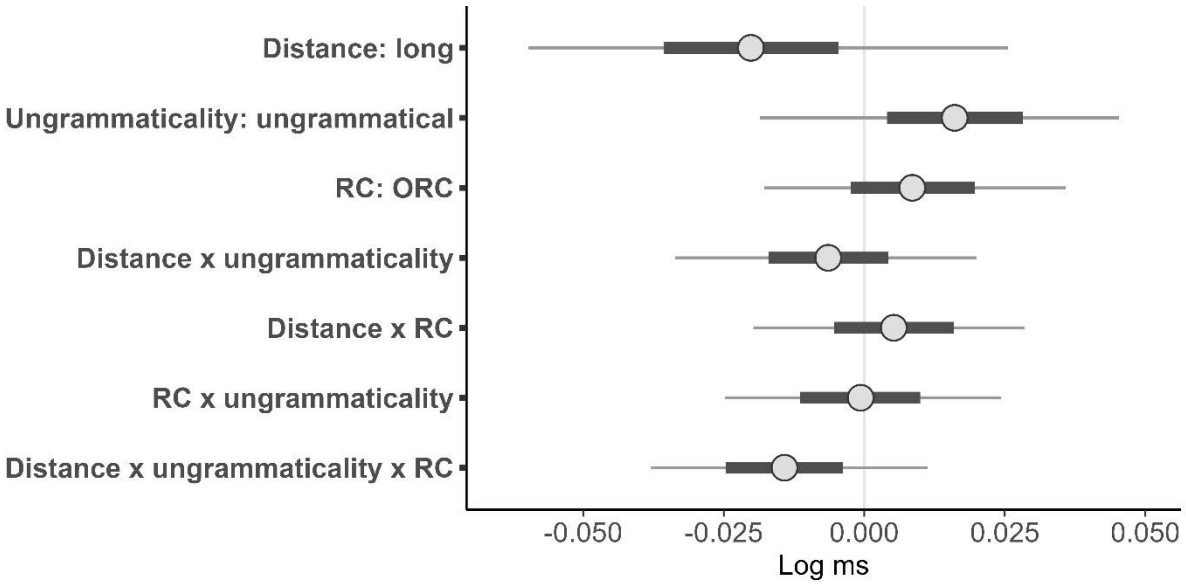
Effects of Distance, Ungrammaticality and RC on RTs at Region t+1: Gender Agreement: Experiment Three

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.607	0.059	6.514	6.702	1.000	1.002	1085
Distance: long	-0.062	0.013	-0.082	-0.041	1.000	1.000	7479
Ungramm.: ungr.	0.053	0.021	0.019	0.084	0.990	1.000	4735
RC: ORC	0.005	0.014	-0.017	0.028	0.658	1.000	6200
Distance x ungr.	-0.020	0.021	-0.052	0.013	0.839	1.000	6631
Distance x RC	0.011	0.011	-0.007	0.029	0.845	1.000	10704
RC x ungramm.	0.001	0.017	-0.026	0.028	0.515	1.000	8305
Dist. x ungr. x RC	-0.014	0.016	-0.040	0.012	0.808	1.000	8474

Figure 4.14 shows the posterior distributions for the effects of distance, ungrammaticality and RC at t+2.

Figure 4.14

Posterior Distributions for the Effects of Distance, Ungrammaticality and RC on RTs at Region t+2: Gender Agreement: Experiment Three



The main effect of distance was negative, while the main effect of ungrammaticality was positive. The main effect of RC was positive; however, it must be conceded that the evidence was somewhat weak (*pd* = 0.894; see Table 4.3). There was a negative three-way interaction between distance, ungrammaticality and RC. Thus, learners were less sensitive to the interaction between distance and ungrammaticality in the ORC condition than in the SRC condition. Alternatively, learners were less sensitive to the interaction between RC and ungrammaticality in the long condition than in the short condition. There was no interaction between distance and ungrammaticality, no interaction between distance and RC, and no interaction between RC and ungrammaticality.

Table 4.3 presents the findings in detail.

Table 4.3

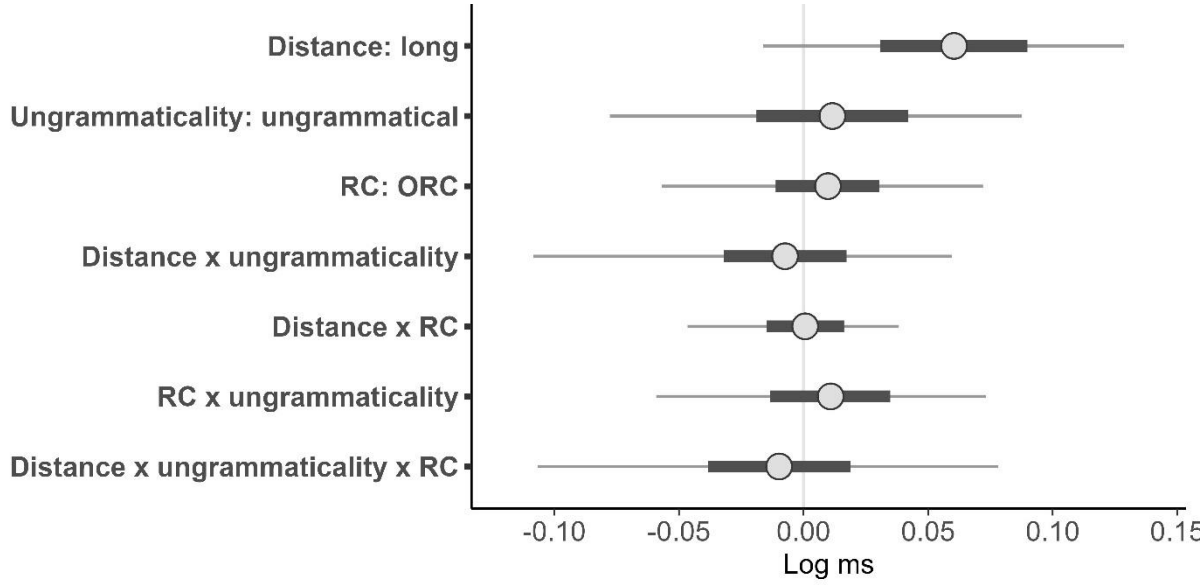
Effects of Distance, Ungrammaticality and RC on RTs at Region t+2: Gender Agreement: Experiment Three

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.275	0.060	6.181	6.372	1.000	1.002	866
Distance: long	-0.020	0.010	-0.036	-0.005	0.981	1.000	11418
Ungramm.: ungr.	0.016	0.008	0.004	0.028	0.982	1.000	11373
RC: ORC	0.009	0.007	-0.002	0.020	0.894	1.000	18043
Distance x ungr.	-0.006	0.007	-0.017	0.004	0.832	1.000	28609
Distance x RC	0.005	0.007	-0.005	0.016	0.786	1.000	27994
RC x ungramm.	-0.001	0.007	-0.011	0.010	0.533	1.000	26553
Dist. x ungr. x RC	-0.014	0.007	-0.025	-0.004	0.987	1.000	27353

Figure 4.15 shows the posterior distributions for the effects of distance, ungrammaticality and RC at t+3.

Figure 4.15

Posterior Distributions for the Effects of Distance, Ungrammaticality and RC on RTs at Region t+3: Gender Agreement: Experiment Three



The main effect of distance was positive. There was no main effect of ungrammaticality; no main effect of RC; no interaction between distance and ungrammaticality; no interaction between distance and RC; no interaction between RC and ungrammaticality; and no three-way interaction between distance, ungrammaticality and RC.

Table 4.4 presents the findings in detail.

Table 4.4

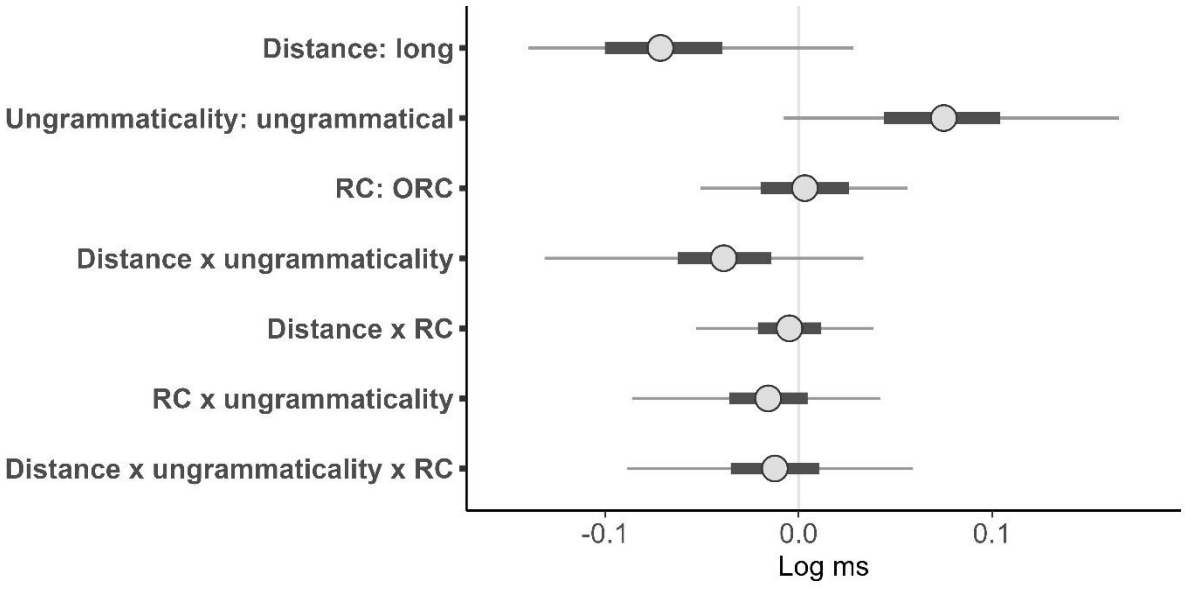
Effects of Distance, Ungrammaticality and RC on RTs at Region t+3: Gender Agreement: Experiment Three

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.480	0.061	6.383	6.578	1.000	1.005	886
Distance: long	0.060	0.018	0.031	0.090	0.999	1.000	4957
Ungramm.: ungr.	0.012	0.019	-0.019	0.042	0.738	1.000	6311
RC: ORC	0.010	0.013	-0.011	0.030	0.790	1.000	7677
Distance x ungr.	-0.007	0.016	-0.032	0.017	0.694	1.000	7446
Distance x RC	0.001	0.010	-0.015	0.016	0.531	1.000	14711
RC x ungramm.	0.011	0.015	-0.013	0.035	0.778	1.000	8070
Dist. x ungr. x RC	-0.010	0.018	-0.038	0.019	0.718	1.000	8853

The results for number agreement will be considered next. Figure 4.16 shows the posterior distributions for the effects of distance, ungrammaticality and RC at t+0.

Figure 4.16

Posterior Distributions for the Effects of Distance, Ungrammaticality and RC on RTs at Region t+0: Number Agreement: Experiment Three



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was a negative interaction between distance and ungrammaticality. There was a negative interaction between RC and ungrammaticality; however, it must be conceded that the evidence was somewhat weak (*pd* = 0.892; see Table 4.5). There was no main effect of RC; no interaction between distance and RC; and no three-way interaction between distance, ungrammaticality and RC.

Table 4.5 presents the findings in detail.

Table 4.5

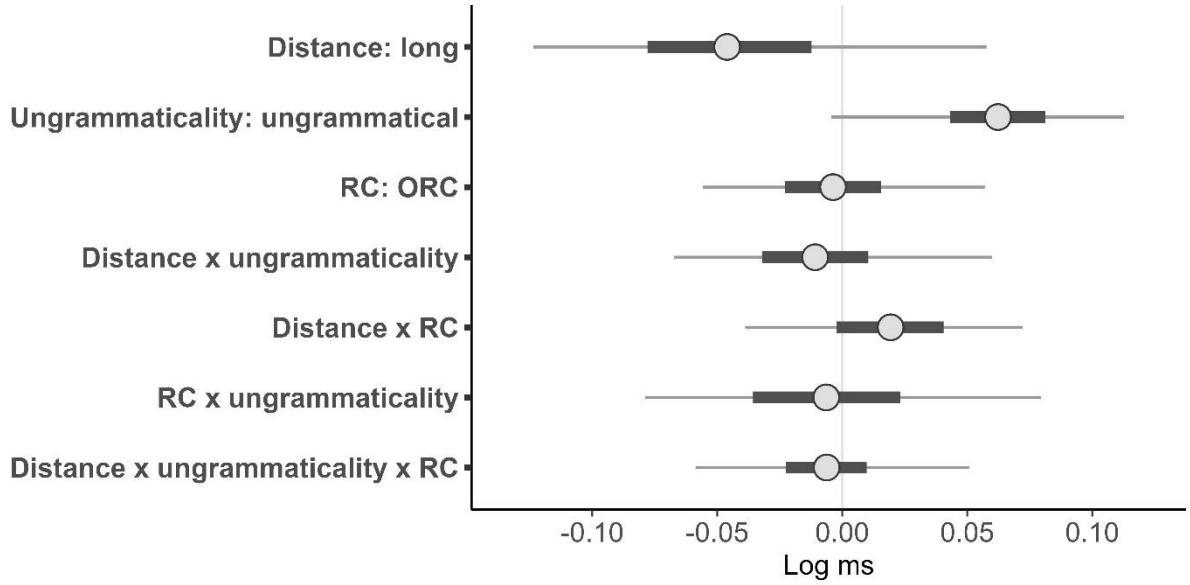
Effects of Distance, Ungrammaticality and RC on RTs at Region t+0: Number Agreement: Experiment Three

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.827	0.056	6.737	6.916	1.000	1.006	1070
Distance: long	-0.071	0.019	-0.100	-0.040	0.999	1.001	4698
Ungramm.: ungr.	0.075	0.019	0.044	0.104	0.999	1.001	3661
RC: ORC	0.003	0.014	-0.020	0.026	0.594	1.000	7461
Distance x ungr.	-0.039	0.015	-0.063	-0.014	0.991	1.000	6943
Distance x RC	-0.005	0.010	-0.021	0.012	0.680	1.000	14949
RC x ungramm.	-0.016	0.013	-0.036	0.005	0.892	1.000	7833
Dist. x ungr. x RC	-0.012	0.015	-0.035	0.011	0.813	1.000	9116

Figure 4.17 shows the posterior distributions for the effects of distance, ungrammaticality and RC at t+1.

Figure 4.17

Posterior Distributions for the Effects of Distance, Ungrammaticality and RC on RTs at Region t+1: Number Agreement: Experiment Three



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was a positive interaction between distance and RC, indicated by the fact that most of the probable values of this parameter were positive (*pd* = 0.926; see Table 4.6). There was no main effect of RC; no interaction between distance and ungrammaticality; no interaction between RC and ungrammaticality; and no three-way interaction between distance, ungrammaticality and RC.

Table 4.6 presents the findings in detail.

Table 4.6

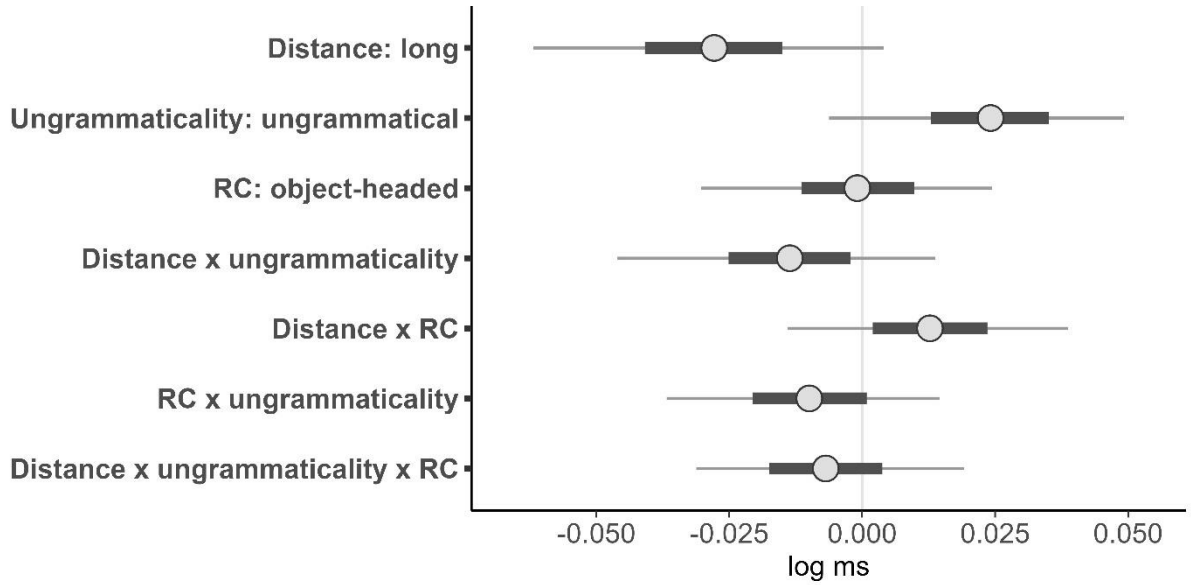
Effects of Distance, Ungrammaticality and RC on RTs at Region t+1: Number Agreement: Experiment Three

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.610	0.058	6.518	6.703	1.000	1.002	1211
Distance: long	-0.046	0.021	-0.078	-0.012	0.982	1.000	5936
Ungramm.: ungr.	0.062	0.012	0.043	0.081	1.000	1.000	10114
RC: ORC	-0.004	0.012	-0.023	0.015	0.622	1.000	9832
Distance x ungr.	-0.011	0.013	-0.032	0.010	0.800	1.000	8735
Distance x RC	0.019	0.014	-0.002	0.041	0.926	1.000	10367
RC x ungramm.	-0.006	0.019	-0.036	0.023	0.645	1.000	9294
Dist. x ungr. x RC	-0.006	0.010	-0.023	0.010	0.736	1.000	14587

Figure 4.18 shows the posterior distributions for the effects of distance, ungrammaticality and RC at t+2.

Figure 4.18

Posterior Distributions for the Effects of Distance, Ungrammaticality and RC on RTs at Region t+1: Number Agreement: Experiment Three



The main effect of distance was negative, while the main effect of ungrammaticality was positive. There was a negative interaction between distance and

ungrammaticality, and a positive interaction between distance and RC. There was a negative interaction between RC and ungrammaticality, based on the fact that most of the probable values of this parameter were negative (*pd* = 0.930; see Table 4.7). There was no main effect of RC; and no three-way interaction between distance, ungrammaticality and RC.

Table 4.7 presents the findings in detail.

Table 4.7

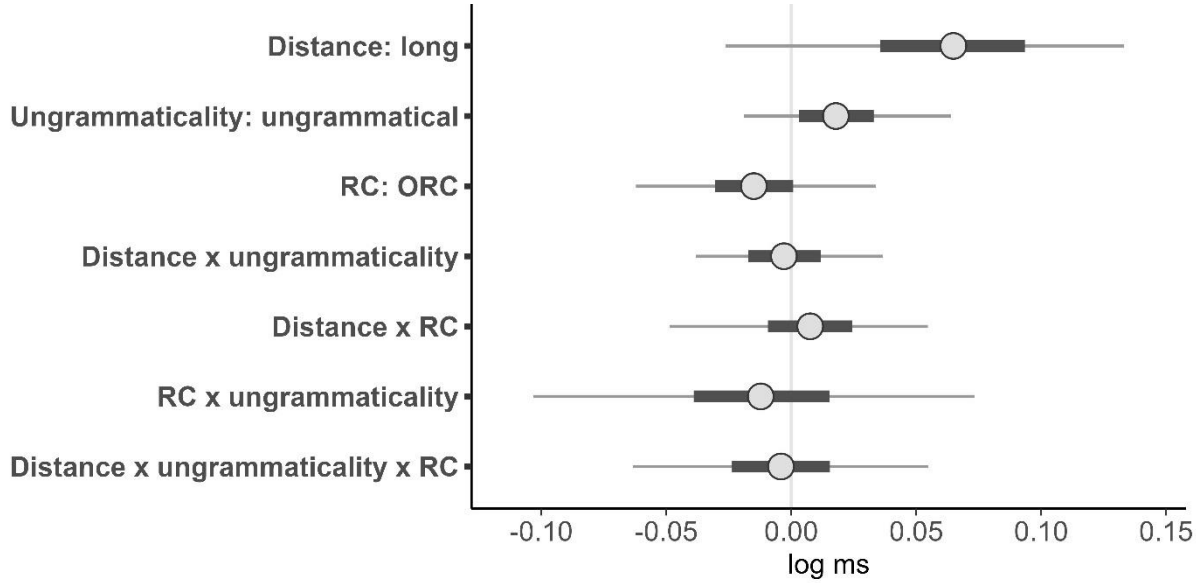
Effects of Distance, Ungrammaticality and RC on RTs at Region t+2: Number Agreement: Experiment Three

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.284	0.057	6.194	6.376	1.000	1.008	605
Distance: long	-0.028	0.008	-0.041	-0.015	1.000	1.000	9471
Ungramm.: ungr.	0.024	0.007	0.013	0.035	1.000	1.000	17594
RC: ORC	-0.001	0.007	-0.011	0.010	0.558	1.000	20088
Distance x ungr.	-0.014	0.007	-0.025	-0.002	0.972	1.000	16241
Distance x RC	0.013	0.007	0.002	0.024	0.970	1.000	21777
RC x ungramm.	-0.010	0.007	-0.021	0.001	0.930	1.000	22254
Dist. x ungr. x RC	-0.007	0.007	-0.018	0.004	0.851	1.000	24684

Figure 4.19 shows the posterior distributions for the effects of distance, ungrammaticality and RC at t+3.

Figure 4.19

Posterior Distributions for the Effects of Distance, Ungrammaticality and RC on RTs at Region t+3: Number Agreement: Experiment Three



The main effects of distance and ungrammaticality were positive. There was a negative main effect of RC, indicated by the fact that most of the probable values of this parameter were negative (*pd* = 0.935; see Table 4.8). There was no interaction between distance and ungrammaticality; no interaction between distance and RC; no interaction between RC and ungrammaticality; and no three-way interaction between distance, ungrammaticality and RC.

Table 4.8 presents the findings in detail.

Table 4.8

Effects of Distance, Ungrammaticality and RC on RTs at Region t+3: Number Agreement: Experiment Three

Parameter	$\hat{\beta}$	*SD*	*L*	*U*	*pd*	$\hat{R}$	n_{eff}
(Intercept)	6.486	0.062	6.387	6.582	1.000	1.009	555
Distance: long	0.065	0.018	0.036	0.093	0.999	1.001	3869
Ungramm.: ungr.	0.018	0.009	0.003	0.033	0.970	1.000	10952
RC: ORC	-0.015	0.010	-0.030	0.001	0.935	1.000	10103
Distance x ungr.	-0.003	0.009	-0.017	0.012	0.631	1.000	10283
Distance x RC	0.008	0.011	-0.009	0.024	0.771	1.000	9742
RC x ungramm.	-0.012	0.017	-0.039	0.015	0.775	1.000	6035
Dist. x ungr. x RC	-0.004	0.012	-0.024	0.015	0.640	1.000	7055

4.7 Discussion and conclusion

The present study aimed to determine the extent to which RC and distance (i.e., LD) moderate sensitivity to ungrammaticality in Subj-V gender- and number-agreement processing. I examined both types of agreement between a matrix subject DP and a matrix verb in two pairs of contrasting conditions, each while holding SD constant. In the first pair of contrasting conditions, I compared two types of RC: SRC vs. ORC; in the other pair, distance was manipulated in two conditions: short vs. long. Accordingly, two pairs of predictions were formulated. The first was concerned with RC:

P1. (a) ELAs will be less sensitive to ungrammaticality in gender agreement in the ORC condition than the SRC condition.

(b) ELAs will be less sensitive to ungrammaticality in number agreement in the ORC condition than the SRC condition.

The second pair of predictions focused on distance:

P2. (a) ELAs will be less sensitive to ungrammaticality in gender agreement when the distance between the subject DP and the matrix verb is long than when it is short.

(b) ELAs will be less sensitive to ungrammaticality in number agreement when the distance between the subject DP and the matrix verb is long than when it is short.

These two pairs of predictions were tested at four critical regions each. The first region (i.e., t+0) was the location of the target verb, and the remaining regions (i.e., t+1, t+2 and t+3) were spillover regions.

The results for RC will be considered first. In Table 4.9, for each agreement type and also each region of interest, I indicate whether the ELAs in this study were less sensitive to ungrammaticality in the ORC condition than the SRC condition.

Table 4.9

Were Learners Less Sensitive to Ungrammaticality in the ORC Condition than the SRC Condition?: Subject-Verb Agreement: Experiment Three

Region	*Gender*	*Number*
t+0	No	Yes*
t+1	No	No
t+2	No	Yes
t+3	No	No

Note. * The evidence for an effect was weak.

Based on these results, P1(a) was not confirmed for all regions, while P1(b) was confirmed for t+2 and (with the caveat that the evidence for an effect in this case was weak) t+0.

The findings of Experiment Three for RC have various implications. First of all, let us consider the results for gender agreement. Given that there was no interaction between RC and ungrammaticality at any of the four critical regions, the results for this type of agreement discredit the prevailing belief among researchers that learners are less sensitive to ungrammaticality in the ORC condition than the SRC condition.

However, we see a different pattern in the findings for number agreement, as, at two of the four critical regions (i.e., t+0 and t+2), the learners in this study *were* less sensitive to ungrammaticality in the ORC condition than the SRC condition. Given that the ELAs in this experiment were able to process Subj-V number agreement at two critical regions (including the matrix verb), the findings of this experiment support FTFA for this type of agreement.

It is also worth pondering why the results for the two types of agreement might have been different. As noted above, RC moderated the effect of ungrammaticality for number but not gender. Note, however, that gender agreement does not occur in the L1, whereas number agreement is present in the L1 (in the form of plural marking or Subj-V agreement). In this light, it is possible that the ELAs' acquisition (and therefore also processing) of number agreement was facilitated by positive transfer of this type of agreement from the L1. Before this conclusion can be accepted, though, an in-depth study of this putative facilitative effect is required. In particular, one could compare L2 learners from L1 backgrounds that contrast in terms of whether or not these L1s have agreement systems elsewhere in the language.

The results for RC are also broadly in line with those of one previous study which focused on the same issue as the present study (i.e., Subj-V agreement processing at the matrix verb), and which, moreover, investigated learners at a similar level of L2 proficiency to the ones in the current research. Recall from Section 4.3.1 that, in Rattanasak et al. (2022), Thai learners of English showed sensitivity to number-agreement anomalies in the SRC condition but not in the ORC condition. In this light, it is also worth comparing the acquisitional tasks that faced the L2 groups in both studies. The learners in Rattanasak et al. (2022) came from an L1 background that lacks a system of Subj-V agreement (i.e., Thai); by contrast, the L2 in that study (i.e., English) *has* an agreement system of this type, albeit a relatively simple one. In the present experiment, the learners came from an L1 with the aforementioned relatively simple system of Subj-V agreement, and had to acquire an L2 system of agreement for this property that was quite complex. Yet, as noted above, the results of the two studies were similar. This raises the possibility that, as far as L2 agreement processing is concerned, going from no system to a simple system poses a similar acquisitional challenge to going from a simple system to a complex one. Further investigation of this possibility may turn out to be profitable.

Finally, the findings for all four regions of interest (see Table 4.9) merit some discussion. To begin with, there is the general question of where exactly in a series of critical regions RC starts to moderate learners' sensitivity to agreement violations. In the present study, this question is only relevant to number agreement, since RC did not moderate the effect in question at any of the four critical regions for gender agreement. Notice in Table 4.11 that the moderating effect of RC on sensitivity to ungrammaticality first becomes evident at t+0. Similar results have previously been reported in other research on L2 RC processing in general. For example, in Bulut et

al. (2016), learners showed sensitivity to number anomalies at the target region (but not at the spillover region).

Second, when we take a synoptic perspective on the results for number agreement for all four critical regions, the learners in the present study did not exhibit a consistent pattern in their response to the moderating effect of RC type on sensitivity to ungrammaticality. There is weak evidence for an effect at t+0, but this has 'faded away' by t+1. As one moves downstream, we encounter an anomaly, as, at t+2, the learners again show less sensitivity to ungrammaticality in the ORC condition than the SRC condition. The result for t+2 suggests that the effect of an agreement violation that has apparently faded away can 'reassert itself' in delayed fashion. This effect is absent at t+3, however. Further investigation into this fluctuation in sensitivity to ungrammaticality across critical regions is needed, as it has not been reported in previous experiments that used self-paced reading, to the best of my knowledge. In Jegerski (2016), for example, a spillover effect effect is observed at two regions downstream from the target: the effect does not fade away and then reassert itself.

We now turn our attention to the results for distance. In Table 4.11, for each agreement type and also each region of interest, I indicate whether the ELAs in this study were less sensitive to ungrammaticality in the long condition than the short condition.

Table 4.10

Were Learners Less Sensitive to Ungrammaticality in the Long Distance Condition than the Short Distance Condition?: Subject-Verb Agreement: Experiment Three

Region	*Gender*	*Number*
t+0	Yes	Yes
t+1	No	No
t+2	No	Yes
t+3	No	No

Based on these results, P2(a) was confirmed only for t+0, while P2(b) was confirmed for t+0 and t+2. These findings have implications for the Linear Distance Principle (LDP; Keating, 2005) and the Linear Distance Hypothesis (LDH; O'Grady et al., 2003), both of which hold that sensitivity to inflectional violations declines under a higher load of intervening words. For gender and number agreement, the results of this experiment offer support for both of these theories of L2 processing, and also for FTFA.

Finally, the results for all four regions of interest (see Table 4.11) merit some detailed discussion. To begin with, there is the general question of where exactly in a series of critical regions distance starts to moderate learners' sensitivity to agreement violations. In the present study, this occurred at t+0 (i.e., the target itself) for both types of agreement. By contrast, in a study by Song (2015a) concerned with the processing of simple DPs and partitive structures by advanced Korean L2 learners of English, the learners did not show sensitivity to missing plural inflection until the second spillover region. One possible reason for the divergence between Song's results and my own is that Song manipulated SD rather than LD. Further research on divergences such as this one is needed.

Second, when we take a synoptic perspective on the results for all four critical regions, the learners in the present study did not exhibit a consistent pattern in their response to the moderating effect of distance on sensitivity to ungrammaticality for either type of agreement. Consider gender agreement first of all. We might reasonably conclude that the effect of the agreement violation at the target verb simply 'faded away' as the learner moved downstream. For number agreement, the ELAs show a pattern of responses that more plausibly suggests an attenuation in the effect of the agreement violation at the target region as one moves downstream. Once again, though, we encounter an anomaly, as, at t+2, the learners were less sensitive to ungrammaticality in the long condition than the short condition. This result suggests that the effect of an agreement violation that has apparently faded away can 'reassert itself' in delayed fashion. Further investigation into this aspect of L2 processing is clearly warranted.

CHAPTER FIVE: CONCLUSION

This study has explored whether or not the distance between the controller and the target (or, in one experiment, the filler and the gap) in an agreement relation moderates learners' sensitivity to ungrammaticality in second language (L2) processing. For this purpose, I investigated the processing of gender and number agreement in L2 Arabic. Two main contexts for each type of agreement were examined in the three experiments that were carried out in this study: a noun agreeing with a predicative adjective in a verbless sentence (Experiment One); and a matrix subject agreeing with a matrix verb (Experiments Two and Three). Forty intermediate English-speaking learners of Arabic (ELAs) plus four native speakers of Arabic did a word-by-word self-paced reading task; in addition, the learners' comprehension of the stimulus sentences was checked using a 'Yes/No' comprehension task. Reading times (RTs) were measured at the target region (t+0) plus three spillover regions (t+1, t+2 and t+3).

Distance was manipulated such that the controller and target were adjacent vs. separated (Experiments One and Two), or the distance between these two items was short vs. long (Experiment Three). In order to precisely gauge the moderating effect of the *linear* distance (LD) between controller and target on learners' sensitivity to agreement violations, the structural distance (SD) between these two items was kept constant between the two LD conditions in each experiment. The contrast between subject-headed relative clauses (SRCs) vs. object-headed relative clauses (ORCs) was also manipulated in Experiment Three: given that the distance between the filler and the gap inside the RC itself differs between these two types of RC, subject-object asymmetries in the L2 processing of RCs can plausibly be regarded as a distance effect, and were therefore appropriate for scrutiny within this study.

As for ungrammaticality, there were three agreement conditions: grammatical (in terms of both gender and number), ungrammatical gender, and ungrammatical number. Thus, when I focused on learners' sensitivity to agreement violations in the processing of gender agreement, two ungrammaticality conditions were involved: grammatical, and ungrammatical gender. Likewise, when number agreement was being investigated, the two ungrammaticality conditions were grammatical, and ungrammatical number.

In Experiment One, the noun and the predicative adjective were adjacent in one distance condition; in the other, these two items were separated by a noun and two attributive adjectives. I exemplify a stimulus sentence in the two distance conditions: adjacent in (1a), and separated in (1b) (GEN = genitive; INDF = indefinite; M = masculine; NOM = nominative; SG = singular; controller in bold, target in italics).

(1) (a) **ʔal-kita:b-u** *ʤadi:d-u-n*
the-book.M.SG-NOM new.M.SG-NOM-INDF
'The book is new.'

(b) **kita:b-u** tˁ-tˁa:lib-i l-muʤtahid-i
book.M.SG-NOM the-student.M.SG-GEN the-diligent.M.SG-GEN

l-muθa:bir-i *ʤadi:d-u-n*
the-persistent.M.SG-GEN new.m.sg-nom-INDF
'The persistent (and) diligent student's book is new.'

I predicted that, for each type of agreement, the ELAs would be less sensitive to ungrammaticality when the noun and the predicative adjective were separated than

when they were adjacent. The predictions for both types of agreement were upheld. In sum, these results suggest that, for ELAs, the task of computing agreement relations becomes more challenging when controller and target are separated than when they are adjacent.

Another important finding of Experiment One was that the results for the four regions of interest differed between the two forms of agreement. For gender agreement, the ELAs showed a decrease in sensitivity to ungrammaticality in the separated condition, compared to the adjacent condition, only at the target adjective; however, for number agreement, this decrease in sensitivity was noticeable at two of the three spillover regions, in addition to the target adjective. Thus, distance had a slightly stronger moderating influence on sensitivity to ungrammaticality for number than for gender. Note, however, that the learners' first language (L1) lacks a gender-agreement system, but *does* have a system of number agreement (albeit a relatively simple one). In this light, I speculated that the ELAs' acquisition of number agreement might have been facilitated by positive transfer of this type of agreement from the L1.

Experiment Two was concerned with the processing of subject-verb (Subj-V) agreement. In this experiment, the matrix subject and the matrix verb were adjacent in one distance condition; in the other, these two items were separated by a three-word SRC. These two conditions are illustrated in (2a) and (2b), respectively (2 = second person; 3 = third person; ASRT = assertive particle; PERF = perfective; controller in bold, target in italics).

(2) (a) **ʔatˤ-tˤa:lib-u** *darasa*

the-student.M.SG-NOM study.PERF.3SG.M

‘The student studied’

(b)	**ʔatˤ-tˤa:lib-u**	ʔallaði:	qad	sa:ʕada-k-a
	the-student.M.SG-NOM	that.M.SG	ASRT	help.PERF.3SG.M-2SG-M

darasa

study.PERF.3SG.M

‘The student that had helped you studied’

It was predicted that, for each type of agreement, the ELAs would be less sensitive to ungrammaticality when the matrix subject and the matrix verb were separated than when they were adjacent.

The findings for the four critical regions in the present experiment were different for the two types of agreement. For gender agreement, the ELAs were less sensitive to ungrammaticality in the separated condition than the adjacent condition, though this only occurred at the last two spillover regions (i.e., t+2 and t+3). Hence, the prediction for gender agreement was confirmed at these two regions. By contrast, for number agreement, the ELAs were not more or less sensitive to ungrammaticality in the separated condition than the adjacent condition at any of the four regions under consideration. Thus, in Experiment Two as a whole, the moderating effect of distance on sensitivity to ungrammaticality was slightly stronger for gender than number. This contrast between the results for both types of agreement in the current experiment was surprising if the processing of agreement in general is assumed to be facilitated by positive transfer.

In Experiment Three, I focused on Subj-V gender- and number-agreement processing in two pairs of contrasting syntactic constructions. In the first pair, the matrix subject and the matrix verb were separated by an SRC and an ORC, as exemplified in the stimulus sentences in (3a) and (3b), respectively.

(3) (a) **ʔal-mutardʒim-u** ʔallaði: qad wazˁzˁaffa-k-a
the-interpreter.M.SG-NOM that.M.SG ASRT hire.PERF.3SG.M-2SG-M

taħaddaθa bi-fasˁa:ħ-at-i-n wa
speak.PERF.3SG.M with-eloquence-F-GEN-INDF and

tˁala:q-at-i-n wifqa raʔy-i: ʃ-ʃaxsˁsˁiy
fluency-F-GEN-INDF in opinion.M.SG-my the-personal.M.SG
'The interpreter that had hired you spoke eloquently and fluently, in my personal opinion.'

(b) **ʔal-mutardʒim-u** ʔallaði: qad wazˁafØ-t-a
the-interpreter.M.SG-NOM that.M.SG ASRT hire.PERF-2SG-M

taħaddaθ-a	bi-fasˁa:ħ-at-i-n		wa
speak.PERF-3SG.M	with-eloquence-F-GEN-INDF		and
tˁala:q-at-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
fluency-F-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

'The interpreter that you had hired spoke eloquently and fluently, in my personal opinion.'

The predictions of this experiment were that, for each type of agreement, ELAs would be less sensitive to ungrammaticality when the matrix subject and the matrix verb were separated by an ORC than when they were separated by an SRC.

The results for the four critical regions in Experiment Three were different for the two types of agreement. For gender agreement, the ELAs were not more or less sensitive to ungrammaticality in the ORC condition than the SRC condition at any of the regions under consideration. By contrast, for number agreement, the ELAs were less sensitive to ungrammaticality in the ORC condition than the SRC condition. Thus, the moderating effect of RC on sensitivity to ungrammaticality was more powerful for number than gender. Note, however, that the L1 has no gender-agreement system, but *does* have a system of number agreement (though it is relatively simple). Given this contrast, I conjectured that the ELAs' acquisition of number agreement might have been boosted by L1 positive transfer of this type of agreement.

In the second set of contrasting syntactic constructions under scrutiny in this experiment, the distance between the matrix subject and the matrix verb was manipulated within each RC condition. In the short condition, the two agreeing

elements were three words apart, as shown in (3) above; in the long condition, the distance between these items was six words. For example, compare the short SRC and short ORC conditions in (3a) and (3b), with the long SRC and long ORC conditions in (4a) and (4b), respectively (IMP = imperfective; IND = indicative).

(4) (a) **ʔal-mutardʒim-u** ʔallaði: ya-ʕrif-u
the-interpreter.M.SG-NOM that.M.SG 3IMP-know-IND.SG.M

l-munazʿzʿim-a:ni ʔnna-hu qad
the-organizer.M-DUAL.NOM that-3SG.M ASRT

wazʿzʿaf-a-k-a *taħaddaθ-a* bi-fasʿa:ħ-at-i-n
hire-PERF.3SG.M-2SG-M speak.PERF-3SG.M with-eloquence-F-GEN- INDF

wa tʿala:q-at-in
and fluency-F-GEN-INDF
'The interpreter that the two organisers know (that) had hired you spoke eloquently and fluently.'

(b) **ʔal-mutardʒim-u** ʔallaði: ya-ʕrif-u
the-interpreter.M.SG-NOM that.M.SG 3IMP-know-IND.SG.M

l-munazˁzˁim-a:ni ʔnna-k-a qad wazˁzˁaf-Ø-t-a

the-organizer.M-DUAL.NOM that-2SG-M ASRT hire-PERF-2SG-M

taħaddaθ-a bi-fasˁa:ħ-at-i-n wa tˁala:q-at-in

speak.PERF-3SG.M with-eloquence-F-GEN-INDF and fluency-F-GEN-INDF

'The interpreter that the two organisers know (that) you had hired spoke eloquently and fluently.'

It was predicted that, for each type of agreement, the ELAs would be less sensitive to ungrammaticality in the long condition than the short condition. For gender agreement, distance moderated learners' sensitivity to ungrammaticality at t+0; however, for number agreement, this effect was evident at t+0 and t+2. Thus, the moderating effect of distance on sensitivity to ungrammaticality was slightly stronger for number than gender. I suggested that the ELAs' acquisition of number agreement might have been facilitated by positive transfer of this type of agreement from the L1.

Let us look more closely at the results of all three experiments combined. These results are summarised in Table 5.1. Note that different types of effects were involved in the experiments: adjacent vs. separated in Experiments One and Two, SRC vs. ORC in Experiment Three, and short vs. long in Experiment Three. In order to subsume these contrasts under a single type of contrast, I have focused on what all of the contrasts in the present study have in common: a contrast between a less distant condition and a more distant condition.

Table 5.1

Were Learners Less Sensitive to Ungrammaticality in the More Distant Condition than the Less Distant Condition?

Region	Expt. One		Expt. Two		Expt. Three			
	Distance		Distance		RC		Distance	
	Gen.	*Num.*	*Gen.*	*Num.*	*Gen.*	*Num.*	*Gen.*	*Num.*
t+0	Yes	Yes	No	No	No	Yes**	Yes	Yes
t+1	No	Yes	No	No	No	No	No	No
t+2	No*	No	Yes**	No	No	Yes	No	Yes
t+3	No	Yes**	Yes	No	No	No	No	No

Note. * Learners were *more* sensitive to ungrammaticality in the separated condition. ** The evidence for an effect was weak.

Three features of this set of results are noteworthy, all of which would likely repay further investigation. The first is that, in Experiments One and Three, the moderating effect of distance (and, in Experiment Three, of RC as well) on learners' sensitivity to ungrammaticality was slightly stronger for number than gender (based on how many critical regions this effect was observed at for each type of agreement). Hence, the results for Experiments One and Three raise the possibility that the moderating effect in question may have been boosted by positive transfer of number agreement from the L1. The problem with this speculation is that, in Experiment Two, distance moderated learners' sensitivity to ungrammaticality for gender agreement but not for number.

Second, there is the question of where in the stimulus sentence either distance or RC starts to moderate learners' sensitivity to agreement violations. In Experiment One, distance began to have this effect at t+0 (i.e., the target itself) for both types of

agreement. The same was true for the effect of distance in Experiment Three. However, in Experiment Three, RC did not start to moderate learners' sensitivity to agreement violations until t+2.

The third feature worth noting is that, for number agreement in Experiments One and Three, the effect of an agreement violation that apparently fades away after t+0 can 'reassert itself' in delayed fashion further downstream.

There are two possible limitations of the task design which must be acknowledged. First, some of the vocabulary may have been too low in frequency for intermediate-level participants (e.g., *wifqa* 'according to', *mutawa:dˤiʔ* 'humble'). Additionally, the RC structure may have been beyond the syntactic competence of some of these learners; if so, the crucial distinction SRCs and ORCs would have been insufficiently clear. These limitations may have affected the participants' comprehension of the stimulus sentences, which in turn would have caused increases in the RTs which were not due to processing difficulties per se.

The findings of the present study have implications for certain theories of L2 acquisition and/or processing. First of all, as we saw in Table 5.1, distance moderated learners' sensitivity to ungrammaticality in several experimental conditions. These results support the Linear Distance Principle (LDP; Keating, 2005) and the Linear Distance Hypothesis (LDH; O'Grady et al., 2003), both of which hold that sensitivity to inflectional violations declines under a higher load of intervening words. In addition, the results for distance and RC support the Full Transfer Full Access Hypothesis (FTFA; Schwartz & Sprouse, 1994, 1996). Although FTFA is a theory of L2 acquisition rather than processing, the findings in question indicate that learners are able to process morphological properties of the L2 which are not found in their L1.

In addition to the ones identified earlier, several directions for future research can be stated:

(1) Recall that, in each experiment in this study, I manipulated LD while holding SD constant. Instead, one could consider investigating the L2 processing of agreement by manipulating SD while holding LD constant (cf. Song, 2015a).

(2) Other techniques such as eye-tracking or event-related potentials could be used in order to determine if the findings of the current study can be replicated using these approaches. Subtle effects that were not evident in the present study may also be revealed.

(3) A production task could be utilised to explore whether or not distance moderates ELAs' sensitivity to ungrammaticality in this modality as well.

(4) It might be worth exploring whether or not the moderating effects of distance and RC on sensitivity to ungrammaticality observed in the current experiment for intermediate ELAs are also evident for beginner- or advanced-level ELAs.

(5) It would be interesting to compare the processing of the Arabic dual in an agreement relation by native speakers of Spanish (i.e., a language which is rich in inflection but lacks the dual) and English (i.e., a language which not only lacks the dual but is relatively impoverished in terms of inflectional marking generally).

(6) While the current study has demonstrated that distance and RC moderate learners' sensitivity to ungrammaticality, this does not exclude the possibility that these effects might themselves be predicted by other variables. One such factor is working memory. This is believed to include two functions: processing and storage (Just & Carpenter, 1992). Processing relates to the various calculations that occur during comprehension, as well as the resulting partial outcomes of the computations. Storage, on the other hand, refers to the individual's capacity to retain those outcomes

for further processing during comprehension. If processing and storage requirements exceed the available capacity, some data might be dumped from working memory. This data could include the agreement relation between a controller and a target. But working-memory capacity is assumed to differ amongst individuals (Keating, 2005). Thus, it would be worth investigating if, for instance, high-capacity individuals are better able to process agreement in the separated condition than low-capacity individuals.

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APPENDIX A

The results of the sentence norming from ten native speakers of Arabic are given in Table A1.

Table A1

Norming Results

ID	*Correct*	*Not correct*	*I can't decide*
Judge 1	72	0	0
Judge 2	72	0	0
Judge 3	72	0	0
Judge 4	72	0	0
Judge 5	72	0	0
Judge 6	72	0	0
Judge 7	72	0	0
Judge 8	72	0	0
Judge 9	71	0	1
Judge 10	70	0	2

APPENDIX B

Set 1. Noun-Adjective Agreement: Adjacent

Abbreviations. A = grammatical, C = controller (i.e., noun), F = feminine, G = ungrammatical gender, GEN = genitive, INDF = indefinite, M = masculine, N = ungrammatical number, NOM = nominative, PL = plural, S = set, SG = singular, T = target (i.e., adjective).

Note. Sentence ID (e.g., S101A) is constructed as follows: set number + sentence number within the set + ungrammaticality condition.

1.1 Grammatical

(S101A) C = M SG, T = M SG

ʔaʃ-ʃarħ-u	wa:dˤiħ-u-n	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i
the-explanation.M.SG-NOM	clear.M.SG-NOM-INDF	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˤiʕ-i	li-l-ħa:dˤir-i	wa	l-ɣa:ʔib-i	
and	the-humble.M.SG-GEN	for-the-present.M.SG-GEN	and	the-absent.M.SG-GEN	

‘The explanation is very clear, in my personal and humble opinion, for those (who are) present and absent.’

(S102A) C = M SG, T = M SG

ʔal-kita:b-u	mumtiʕ-u-n	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i
the-book.M.SG-NOM	interesting.M.SG-NOM-INDF	really	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˤiʕ-i	li-n-nisa:ʔ-i	wa	l-ʔatˤfa:li	
and	the-humble.M.SG-GEN	for-the-women.PL-GEN	and	the-children.PL-GEN	

‘The book is really interesting, in my personal and humble opinion, for women and children.’

(S103A) C = M DUAL, T = M DUAL

ʔal-qara:r-a:ni	muʔaθθir-a:ni	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-decision.M-DUAL.NOM	influential.M-DUAL.NOM	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	maħaliyy-a-n	wa	dawliyy-a-n
and	the.honest.M.SG-GEN	domestically.M.SG-ACC-INDF	and	internationally.M.SG-ACC-INDF

‘The two decisions are very influential, in my personal and honest opinion, domestically and internationally.’

(S104A) C = M DUAL, T = M DUAL

ʔatˁ-tˁalab-a:ni	ka:mil-a:ni	ʔalʔa:n	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-request.M-DUAL.NOM	complete.M-DUAL.NOM	now	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	li-lmura:ʤaʕ-at-i	wa	l-ʔiʕtima:d-i
and	the.honest.M.SG-GEN	for-review-F.SG-GEN	and	the-approval.M.SG-GEN

‘The two requests are now complete, in my personal and honest opinion, for review and approval.’

(S105A) C = M PL, T = M PL

ʔal-mudarris-u:na	mutaħammis-u:na	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-teacher.M-PL.NOM	keen.M-PL.NOM	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˁiʕ-i	li-l-muʃa:rak-at-i	wa	l-fawz-i
and	the-humble.M.SG-GEN	for-the-participating-F.SG-GEN	and	the-winning.M.SG-GEN

‘The teachers are very keen, in my personal and humble opinion, to participate and win.’

(S106A) C = M PL, T = M PL

ʔal-qa:til-u:na	ma:kir-u:na	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-killer.M-PL.NOM	cunning.M-PL.NOM	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	bi-l-ʔixtiba:ʔ-i	wa	l-fira:r-i
and	the-honest.M.SG-GEN	in-the-hiding.M.SG-GEN	and	the-escaping.M.SG-GEN

‘The killers are very cunning, in my personal and honest opinion, at hiding and escaping.’

(S107A) C = F SG, T = F SG

ʔat-tawsˤiy-at-u	qayyim-at-u-n	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i
the-recommendation-F.SG-NOM	valuable-F.SG-NOM-IND	really	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˤiʕ-i	li-t-tatˤwi:r-i	wa	t-taħdi:θ-i
and	the-humble.M.SG-GEN	for-the.development.M.SG-GEN	and	the.modernization.M.SG-GEN

‘The recommendation is really valuable, in my personal and humble opinion, for development and modernisation.’

(S108A) C = F SG, T = F SG

ʔasˤ-sˤa:l-at-u	mul:ʔima-at-u-n	ʔalʔa:n	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i
the-lounge-F.SG-NOM	suitable-F.SG-NOM-INDF	now	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˤiʕ-i	li-l-ʔistiqba:l-i	wa	t-tawdi:ʕ-i
and	the-humble.M.SG-GEN	for-welcoming.M.SG-GEN	and	the.farewelling.M.SG-GEN

‘The lounge is suitable now, in my personal and humble opinion, for welcoming and farewelling.’

(S109A) C = F DUAL, T = F DUAL

ʔal-kalim-at-a:ni	muʃadʒdʒiʕ-at-a:ni	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-speech-F-DUAL.NOM	encouraging-F-DUAL.NOM	really	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	li-l-fari:q-i	wa	l-mudarrib-i
and	the-honest.M.SG-GEN	for-the-team.M.SG-GEN	and	the-coach.M.SG-GEN

‘The two speeches are really encouraging, in my personal and honest opinion, for the team and the coach.

(S110A) C = F DUAL, T = F DUAL

ʔal-munazˁar-at-a:ni	muhimm-at-a:ni	dʒiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-debate-F-DUAL.NOM	important-F-DUAL.NOM	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	li-l-muraʃʃaħ-i	wa	n-na:xib-i
and	the.honest.M.SG-GEN	for-the-candidate.M.SG-GEN	and	the-voter.M.SG-GEN

‘The two debates are very important, in my personal and honest opinion, for the candidate and the voter.’

(S111A) C = F PL, T = F PL

ʔal-muħa:miy-a:t-u	mutamarris-a:t-u-n	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-lawyer(+H).F-PL-NOM	well-versed.F-PL-NOM-INDF	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˁiʕ-i	bi-l-hiʤr-at-i	wa	l-luʤu:ʔ-i
and	the-humble.M.SG-GEN	in-the-immigration-F.SG-GEN	and	the-asylum.M.SG-GEN

‘The lawyers are very well-versed, in my personal and humble opinion, in the immigration and the asylum (affairs).’

(S112A) C = F PL, T = F PL

ʔal-mumaθθil-a:t-u	ħa:zim-a:t-u-n	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-representative(+H).F-PL-NOM	resolute.F-PL-NOM-INDF	really	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	bi-n-niqa:ʃi	wa	l-muħa:war-at-i
and	the-honest.M.SG-GEN	in-the-discussing.M.SG-GEN	and	the-debating-F.SG-GEN

‘The representatives are really resolute, in my personal and honest opinion, in discussion and debate.’

1.2 Ungrammatical gender

(S101G) C = M SG, T = F SG

ʔaʃ-ʃarħ-u	wadiħ-at-u-n	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-explanation.M.SG-NOM	clear-F.SG-NOM-INDF	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˁiʕ-i	li-l-ħa:dˁir-i	wa	l-ɣa:ʔib-i
and	the-humble.M.SG-GEN	for-the-present.M.SG-GEN	and	the-absent.M.SG-GEN

‘The explanation is very clear, in my personal and humble opinion, for those (who are) present and absent.’

(S102G) C = M SG, T = F SG

ʔal-kita:b-u	mumtiʕ-at-u-n	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-book.M.SG-NOM	interesting-F.SG-NOM-INDF	really	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˁiʕ-i	li-n-nisa:ʔ-i	wa	l-ʔatˁfa:li
and	the-humble.M.SG-GEN	for-the-women.PL-GEN	and	the-children.PL-GEN

‘The book is really interesting, in my personal and humble opinion, for women and children.’

(S103G) C = M DUAL, T = F DUAL

ʔal-qara:r-a:ni	muʔθθir-at-a:ni	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-decision.M-DUAL.NOM	influential-F-DUAL.NOM	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	maħaliyy-a-n	wa	dawliyy-a-n
and	the.honest.M.SG-GEN	domestically.M.SG-ACC-INDF	and	internationally.M.SG-ACC-INDF

‘The two decisions are very influential, in my personal and honest opinion, domestically and internationally.’

(S104G) C = M DUAL, T = F DUAL

ʔatˁ-tˁalab-a:ni	ka:mil-at-a:ni	ʔalʔa:n	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-request.M-DUAL.NOM	complete-F-DUAL.NOM	now	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	li-lmura:ʤaʕ-at-i	wa	l-ʔiʕtima:d-i
and	the.honest.M.SG-GEN	for-review-F.SG-GEN	and	the-approval.M.SG-GEN

‘The two requests are now complete, in my personal and honest opinion, for review and approval.’

(S105G) C = M PL, T = F PL

ʔal-mudarris-u:na	mutaħammis-a:t-u-n	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-teacher.M-PL.NOM	keen-F.PL-NOM-IND	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˁiʕ-i	li-l-muʃa:rak-at-i	wa	l-fawz-i	
and	the-humble.M.SG-GEN	for-the-participating-F.SG-GEN	and	the-winning.M.SG-GEN	

‘The teachers are very keen, in my personal and humble opinion, to participate and win.’

(S106G) C = M PL, T = F PL

ʔal-qa:til-u:na	ma:kir-a:t-u-n	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-killer.M-PL.NOM	cunning-F.PL-NOM-IND	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	bi-l-ʔixtiba:ʔ-i	wa	l-fira:r-i	
and	the-honest.M.SG-GEN	in-the-hiding.M.SG-GEN	and	the-escaping.M.SG-GEN	

‘The killers are very cunning, in my personal and honest opinion, at hiding and escaping.’

(S107G) C = F SG, T = M SG

ʔat-tawsˁiy-at-u	qayyim-u-n	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-recommendation-F.SG-NOM	valuable.M.SG-NOM-IND	really	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˁiʕ-i	li-t-tatˁwi:r-i	wa	t-taħdi:θ-i
and	the-humble.M.SG-GEN	for-the.development.M.SG-GEN	and	the.modernization.M.SG-GEN

‘The recommendation is really valuable, in my personal and humble opinion, for development and modernisation.’

(S108G) C = F SG, T = M SG

ʔasˁ-sˁa:l-at-u	mul:ʔima-u-n	ʔalʔa:n	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-lounge-F.SG-NOM	suitable.M.SG-NOM-INDF	now	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˁiʕ-i	li-l-ʔistiqba:l-i	wa	t-tawdi:ʕ-i
and	the-humble.M.SG-GEN	for-welcoming.M.SG-GEN	and	the.farewelling.M.SG-GEN

‘The lounge is suitable now, in my personal and humble opinion, for welcoming and farewelling.’

(S109G) C = F DUAL, T = M DUAL

ʔal-kalim-at-a:ni	muʃadʒdʒiʕ-a:ni	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i
the-speech-F-DUAL.NOM	encouraging.M-DUAL.NOM	really	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˤ-sˤari:ħ-i	li-l-fari:q-i	wa	l-mudarrib-i
and	the-honest.M.SG-GEN	for-the-team.M.SG-GEN	and	the-coach.M.SG-GEN

‘The two speeches are really encouraging, in my personal and honest opinion, for the team and the coach.

(S110G) C = F DUAL, T = M DUAL

ʔal-munazˤar-at-a:ni	muhimm-a:ni	dʒiddan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i
the-debate-F-DUAL.NOM	important.M-DUAL.NOM	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˤ-sˤari:ħ-i	li-l-muraʃʃaħ-i	wa	n-na:xib-i
and	the.honest.M.SG-GEN	for-the-candidate.M.SG-GEN	and	the-voter.M.SG-GEN

‘The two debates are very important, in my personal and honest opinion, for the candidate and the voter.’

(S111G) C = F PL, T = M PL

ʔal-muħa:miy-a:t-u	mutamarris-u:-n	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-lawyer(+H).F-PL-NOM	well-versed.M-PL-NOM-INDF	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˁiʕ-i	bi-l-hiʤr-at-i	wa	l-luʤu:ʔ-i
and	the-humble.M.SG-GEN	in-the-immigration-F.SG-GEN	and	the-asylum.M.SG-GEN

‘The lawyers are very well-versed, in my personal and humble opinion, in the immigration and the asylum (affairs).’

(S112G) C = F PL, T = M PL

ʔal-mumaθθil-a:t-u	ħa:zim-u:na	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-representative(+H).F-PL-NOM	resolute.M-PL-NOM	really	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	bi-n-niqa:ʃi	wa	l-muħa:war-at-i
and	the-honest.M.SG-GEN	in-the-discussing.M.SG-GEN	and	the-debating-F.SG-GEN

‘The representatives are really resolute, in my personal and honest opinion, in discussion and debate.’

1.3 Ungrammatical number

(S101N) C = M SG, T = M PL

ʔaʃ-ʃarħ-u	wadiħ-u:na	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-explanation.M.SG-NOM	clear.M-PL.NOM	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˁiʕ-i	li-l-ħa:dˁir-i	wa	l-ɣa:ʔib-i
and	the-humble.M.SG-GEN	for-the-present.M.SG-GEN	and	the-absent.M.SG-GEN

‘The explanation is very clear, in my personal and humble opinion, for those (who are) present and absent.’

(S102N) C = M SG, T = M SG

ʔal-kita:b-u	mumtiʕ-u:na	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-book.M.SG-NOM	interesting.M-PL.NOM	really	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˁiʕ-i	li-n-nisa:ʔ-i	wa	l-ʔatˁfa:li
and	the-humble.M.SG-GEN	for-the-women.PL-GEN	and	the-children.PL-GEN

‘The book is really interesting, in my personal and humble opinion, for women and children.’

(S103N) C = M DUAL, T = M DUAL

ʔal-qara:r-a:ni	muʔθθir-u-n	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-decision.M-DUAL.NOM	influential.M.SG-NOM-INDF	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	maħaliyy-a-n	wa	dawliyy-a-n
and	the.honest.M.SG-GEN	domestically.M.SG-ACC-INDF	and	internationally.M.SG-ACC-INDF

‘The two decisions are very influential, in my personal and honest opinion, domestically and internationally.’

(S104N) C = M DUAL, T = M DUAL

ʔatˁ-tˁalab-a:ni	ka:mil-u-n	ʔalʔa:n	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-request.M-DUAL.NOM	complete.M.SG-NOM-INDF	now	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	li-lmura:ʤaʕ-at-i	wa	l-ʔiʕtima:d-i
and	the-honest.M.SG-GEN	for-review-F.SG-GEN	and	the-approval.M.SG-GEN

‘The two requests are now complete, in my personal and honest opinion, for review and approval.’

(S105N) C = M PL, T = M PL

ʔal-mudarris-u:na	mutaħammis-a:ni	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-teacher.M-PL.NOM	keen.M-DUAL.NOM	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˁiʕ-i	li-l-muʃa:rak-at-i	wa	l-fawz-i
and	the-humble.M.SG-GEN	for-the-participating-F.SG-GEN	and	the-winning.M.SG-GEN

‘The teachers are very keen, in my personal and humble opinion, to participate and win.’

(S106N) C = M PL, T = M PL

ʔal-qa:til-u:na	ma:kir-a:ni	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-killer.M-PL.NOM	cunning.M-DUAL.NOM	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	bi-l-ʔixtiba:ʔ-i	wa	l-fira:r-i
and	the-honest.M.SG-GEN	in-the-hiding.M.SG-GEN	and	the-escaping.M.SG-GEN

‘The killers are very cunning, in my personal and honest opinion, at hiding and escaping.’

(S107N) C = F SG, T = F PL

ʔat-tawsˤiy-at-u	qayyim-a:t-u-n	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i
the-recommendation-F.SG-NOM	valuable-F.PL-NOM-IND	really	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˤiʕ-i	li-t-tatˤwi:r-i	wa	t-taħdi:θ-i	
and	the-humble.M.SG-GEN	for-the.development.M.SG-GEN	and	the.modernization.M.SG-GEN	

‘The recommendation is really valuable, in my personal and humble opinion, for development and modernisation.’

(S108N) C = F SG, T = F PL

ʔasˤ-sˤa:l-at-u	mul:ʔima-a:t-u-n	ʔalʔa:n	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i
the-lounge-F.SG-NOM	suitable-F.PL-NOM-INDF	now	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˤiʕ-I	li-l-ʔistiqba:l-i	wa	t-tawdi:ʕ-i	
and	the-humble.M.SG-GEN	for-welcoming.M.SG-GEN	and	the.farewelling.M.SG-GEN	

‘The lounge is suitable now, in my personal and humble opinion, for welcoming and farewelling.’

(S109N) C = F DUAL, T = F SG

ʔal-kalim-at-a:ni	muʃadʒdʒiʕ-at-u-n	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-speech-F-DUAL.NOM	encouraging-F.SG-NOM-INDF	really	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	li-l-fari:q-i	wa	l-mudarrib-i
and	the-honest.M.SG-GEN	for-the-team.M.SG-GEN	and	the-coach.M.SG-GEN

‘The two speeches are really encouraging, in my personal and honest opinion, for the team and the coach.

(S110N) C = F DUAL, T = F SG

ʔal-munazˁar-at-a:ni	muhimm-at-u-n	dʒiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-debate-F-DUAL.NOM	important-F.SG-NOM-INDF	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	li-l-muraʃʃaħ-i	wa	n-na:xib-i
and	the.honest.M.SG-GEN	for-the-candidate.M.SG-GEN	and	the-voter.M.SG-GEN

‘The two debates are very important, in my personal and honest opinion, for the candidate and the voter.’

(S111N) C = F PL, T = F DUAL

ʔal-muħa:miy-a:t-u	mutamarris-at-a:ni	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-lawyer(+H).F-PL-NOM	well-versed-F-DUAL.NOM	very	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	l-mutawadˁiʕ-I	bi-l-hiʤr-at-i	wa	l-luʤu:ʔ-i
and	the-humble.M.SG-GEN	in-the-immigration-F.SG-GEN	and	the-asylum.M.SG-GEN

‘The lawyers are very well-versed, in my personal and humble opinion, in the immigration and the asylum (affairs).’

(S112N) C = F PL, T = F DUAL

ʔal-mumaθθil-a:t-u	ħa:zim-at-a:ni	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i
the-representative(+H).F-PL-NOM	resolute-F-DUAL.NOM	really	in	opinion.M.SG-my	the-personal.M.SG-GEN

wa	sˁ-sˁari:ħ-i	bi-n-niqa:ʃi	wa	l-muħa:war-at-i
and	the-honest.M.SG-GEN	in-the-discussing.M.SG-GEN	and	the-debating-F.SG-GEN

‘The representatives are really resolute, in my personal and honest opinion, in discussion and debate.’

APPENDIX C

Set 1. Noun-Adjective Agreement: Distant

Abbreviations. A = grammatical, C = controller (i.e., noun), F = feminine, G = ungrammatical gender, GEN = genitive, INDF = indefinite, M = masculine, N = ungrammatical number, NOM = nominative, PL = plural, S = set, SG = singular, T = target (i.e., adjective).

Notes. Sentence ID (e.g., S101A) is constructed as follows: set number + sentence number within the set + ungrammaticality condition. The term ‘middle’ refers to the material that intervenes between the controller and the target.

1.1 Grammatical

(S201A) C = M SG, middle = M DUAL, T = M SG

ʃarħ-u	l-ʔusta:ð-ayni	l-qadi:r-ayni	l-marmu:q-ayni	wa:dˤiħ-u-n
explanation.M.SG-NOM	the-professor.M-DUAL.GEN	the-respected.M-DUAL.GEN	the-eminent.M-DUAL.GEN	clear.M.SG-NOM-INDF

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	l-mutawadˤiʕ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The two eminent (and) respected professors’ explanation is very clear, in my personal and humble opinion.’

(S202A) C = M SG, middle = M PL, T = M SG

kita:b-u	l-xirri:ʤ-i:na	l-mutafawwiq-i:na	l-mutamayyiz-i:na	mumtiʕ-u-n
book.M.SG-NOM	the-graduate.M-PL.GEN	the-excellent.M-PL.GEN	the-distinguished.M-PL.GEN	interesting.M.SG-NOM-INDF

fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	l-mutawadˤiʕ-i
really	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The distinguished (and) excellent graduates’ book is really interesting, in my personal and humble opinion.’

(S203A) C = M DUAL, middle = M SG, T = M DUAL

qara:r-a:	r-raʔi:ss-i	l-ħa:liyy-i	l-maħbu:b-i	muʔaθθir-a:ni
decision.M-DUAL.NOM	the-president.M.SG-GEN	the-current-GEN	the-loved.M.SG-GEN	influential.M-DUAL.NOM

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The loved (and) current president’s two decisions are very influential, in my personal and honest opinion.’

(S204A) C = M DUAL, middle = M PL, T = M DUAL

tˁalab-a:	l-mutaqaddim-i:na	tˁ-tˁamu:ħ-i:na	l-mutafa:ʔil-i:na	ka:mil-a:ni
request.M-DUAL.NOM	the-applicant.M-PL.GEN	the-ambitious.M-PL.GEN	the-optimistic.M-PL.GEN	complete.M-DUAL.NOM

ʔalʔa:n	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
now	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The optimistic (and) ambitious applicants’ two requests are now complete, in my personal and honest opinion.’

(S205A) C = M PL, middle = M SG, T = M PL

mudarris-u:	tˤ-tˤa:lib-i	l-muʤtahid-i	l-muθa:bir-i	mutaħammis-u:n
teacher.M-PL.NOM	the-student.M.SG-GEN	the-diligent.M.SG-GEN	the-persistent.M.SG-GEN	keen.M-PL.NOM

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	l-mutawadˤiʕ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The persistent (and) diligent student’s teachers are very keen, in my personal and humble opinion.’

(S206A) C = M PL, middle = M DUAL, T = M PL

qa:til-u:	ʃ-ʃa:hid-ayni	r-raʔi:s-ayni	ʃ-ʃahi:r-ayni	ma:kir-u:na
killer.M-PL.NOM	the-witness.M-DUAL.GEN	the-main.M-DUAL.GEN	the-famous.M-DUAL.GEN	cunning.M-PL.NOM

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	sˤ-sˤari:ħ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The two famous (and) main witnesses’ killers are very cunning, in my personal and honest opinion.’

(S207A) C = F SG, middle = F DUAL, T = F SG

tawsˤiy-at-u	l-ba:ħiθ-ayni	l-muxadˤram-ayni	l-mubdiʕ-ayni
recommendation-F.SG-NOM	the-researcher.M-DUAL.GEN	the-veteran.M-DUAL.GEN	the-innovative.M-DUAL.GEN

qayyim-at-u-n	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	l-mutawadˤiʕ-i
valuable-F.SG-NOM-IND	really	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The two veteran (and) innovative researchers’ recommendation is really valuable, in my personal and humble opinion.’

(S208A) C = F SG, middle = F PL, T = F SG

sˤa:l-at-u	l-musa:fir-i:na	l-muɣa:dir-i:na	l-mutˤaʕʕam-i:na	mula:ʔima-at-u-n
lounge-F.SG-NOM	the-passenger.M-PL.GEN	the-departing.M-PL.GEN	the-vaccinated.M-PL.GEN	suitable-F.SG-NOM-INDF

ʔalʔa:n	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	l-mutawadˤiʕ-i
now	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The departing (and) vaccinated passengers’ lounge is suitable now, in my personal and humble opinion.’

(S209A) C = F DUAL, middle = F SG, T = F DUAL

kalim-at-a:	l-mudi:r-i	t-tanfi:ðiyy-i	l-ʤadi:d-i	muʃadʒdʒiʕ-at-a:ni
speech-F-DUAL.NOM	the-director.M.SG-GEN	the-executive.M.SG-GEN	the-new.M.SG-GEN	encouraging-F-DUAL.NOM

fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
really	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The new (and) executive director’s two speeches are really encouraging, in my personal and honest opinion.’

(S210A) C = F DUAL, middle = F PL, T = M DUAL

munazˁar-at-a:	l-muraʃʃaħ-i:na	r-riʔa:ssiy-i:na	l-ba:riz-i:na
debate-F-DUAL.NOM	the-candidate.M-PL.GEN	the-presidential.M-PL.GEN	the-prominent.M-PL.GEN

muhimm-a:ni	ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
important.M-DUAL.NOM	very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The prominent (and) presidential candidates’ two debates are very important, in my personal and honest opinion.’

(S211A) C = F PL, middle = F SG, T = F PL

muħa:miy-a:t-u	r-raʔi:ss-i	l-maxlu:ʔ-i	s-sabiq-i	mutamarris-a:t-u-n
lawyer(+H)-F.PL-NOM	the-president.M.SG-GEN	the-ousted.M.SG-GEN	the-former.M.SG-GEN	well-versed.F-PL-NOM-INDF

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	l-mutawadˁiʕ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The former (and) ousted president’s lawyers are very well-versed, in my personal and humble opinion.’

(S212A) C = F PL, middle = F DUAL, T = F PL

mumaθθil-a:t-u	l-fari:q-ayni	d-dawliy-ayni	l-muʃa:rik-ayni
representative(+H)-F.PL-NOM	the-team.M-DUAL.GEN	the-international.M-DUAL.GEN	the-participating.M-DUAL.GEN

ħa:zim-a:t-u-n	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
resolute.F-PL-NOM-INDF	really	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The two international (and) participating teams’ representatives are really resolute, in my personal and honest opinion.’

1.2 Ungrammatical gender

(S201G) C = M SG, middle = M DUAL, T = F SG

ʃarħ-u	l-ʔusta:ð-ayni	l-qadi:r-ayni	l-marmu:q-ayni	wadiħ-at-u-n
explanation.M.SG-NOM	the-professor.M-DUAL.GEN	the-respected.M-DUAL.GEN	the-eminent.M-DUAL.GEN	clear-F.SG-NOM-INDF

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	l-mutawadˤiʕ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The two eminent (and) respected professors’ explanation is very clear, in my personal and humble opinion.’

(S202G) C = M SG, middle = M PL, T = F SG

kita:b-u	l-xirri:ʤ-i:na	l-mutafawwiq-i:na	l-mutamayyiz-i:na	mumtiʕ-at-u-n
book.M.SG-NOM	the-graduate.M-PL.GEN	the-excellent.M-PL.GEN	the-distinguished.M-PL.GEN	interesting-F.SG-NOM-INDF

fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	l-mutawadˤiʕ-i
really	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The distinguished (and) excellent graduates’ book is really interesting, in my personal and humble opinion.’

(S203G) C = M DUAL, middle = M SG, T = F DUAL

qara:r-a:	r-raʔi:ss-i	l-ħa:liyy-i	l-maħbu:b-i	muʔθθir-at-a:ni
decision.M-DUAL.NOM	the-president.M.SG-GEN	the-current-GEN	the-loved.M.SG-GEN	influential-F-DUAL.NOM

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The loved (and) current president’s two decisions are very influential, in my personal and honest opinion.’

(S204G) C = M DUAL, middle = M PL, T = F DUAL

tˁalab-a:	l-mutaqaddim-i:na	tˁ-tˁamu:ħ-i:na	l-mutafa:ʔil-i:na	ka:mil-at-a:ni
request.M-DUAL.NOM	the-applicant.M-PL.GEN	the-ambitious.M-PL.GEN	the-optimistic.M-PL.GEN	complete-F-DUAL.NOM

ʔalʔa:n	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
now	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The optimistic (and) ambitious applicants’ two requests are now complete, in my personal and honest opinion.’

(S205G) C = M PL, middle = M SG, T = F PL

mudarris-u:	tˤ-tˤa:lib-i	l-muʤtaɦid-i	l-muθa:bir-i	mutaħammis-a:t-u-n
teacher.M-PL.NOM	the-student.M.SG-GEN	the-diligent.M.SG-GEN	the-persistent.M.SG-GEN	keen-F.PL-NOM-IND

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	l-mutawadˤiʕ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The persistent (and) diligent student’s teachers are very keen, in my personal and humble opinion.’

(S206G) C = M PL, middle = M DUAL, T = F PL

qa:til-u:	ʃ-ʃa:hid-ayni	r-raʔi:s-ayni	ʃ-ʃahi:r-ayni	ma:kir-a:t-u-n
killer.M-PL.NOM	the-witness.M-DUAL.GEN	the-main.M-DUAL.GEN	the-famous.M-DUAL.GEN	cunning-F.PL-NOM-IND

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	sˤ-sˤari:ħ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The two famous (and) main witnesses’ killers are very cunning, in my personal and honest opinion.’

(S207G) C = F SG, middle = F DUAL, T = M SG

tawsˤiy-at-u	l-ba:ħiθ-ayni	l-muxadˤram-ayni	l-mubdiʕ-ayni
recommendation-F.SG-NOM	the-researcher.M-DUAL.GEN	the-veteran.M-DUAL.GEN	the-innovative.M-DUAL.GEN

qayyimm-u-n	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-I	w	al-mutawadˤiʕ-i
valuable.M.SG-NOM-IND	really	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The two veteran (and) innovative researchers’ recommendation is really valuable, in my personal and humble opinion.’

(S208G) C = F SG, middle = F PL, T = M SG

sˤa:l-at-u	l-musa:fir-i:na	l-muɣa:dir-i:na	l-mutˤaʕʕam-i:na	mula:ʔima-u-n
lounge-F.SG-NOM	the-passenger.M-PL.GEN	the-departing.M-PL.GEN	the-vaccinated.M-PL.GEN	suitable.M.SG-NOM-INDF

ʔalʔa:n	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	l-mutawadˤiʕ-i
now	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The departing (and) vaccinated passengers’ lounge is suitable now, in my personal and humble opinion.’

(S209G) C = F DUAL, middle = F SG, T = F DUAL

kalim-at-a:	l-mudi:r-i	t-tanfi:ðiyy-i	l-ʤadi:d-i	muʃadʒdʒiʔ-a:ni
speech-F-DUAL.NOM	the-director.M.SG-GEN	the-executive.M.SG-GEN	the-new.M.SG-GEN	encouraging.M-DUAL.NOM

fiʔlan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
really	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The new (and) executive director’s two speeches are really encouraging, in my personal and honest opinion.’

(S210G) C = F DUAL, middle = F PL, T = M DUAL

munazˁar-at-a:	l-muraʃʃaħ-i:na	r-riʔa:ssiy-i:na	l-ba:riz-i:na	muhimm-a:ni
debate-F-DUAL.NOM	the-candidate.M-PL.GEN	the-presidential.M-PL.GEN	the-prominent.M-PL.GEN	important.M-DUAL.NOM

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The prominent (and) presidential candidates’ two debates are very important, in my personal and honest opinion.’

(S211G) C = F PL, middle = F SG, T = M PL

muħa:miy-a:t-u	r-raʔi:ss-i	l-maxlu:ʔ-i	s-sabiq-i	mutamarris-u:na
lawyer(+H)-F.PL-NOM	the-president.M.SG-GEN	the-ousted.M.SG-GEN	the-former.M.SG-GEN	well-versed.M-PL.NOM

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	l-mutawadˁiʕ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The former (and) ousted president’s lawyers are very well-versed, in my personal and humble opinion.’

(S212G) C = F PL, middle = F DUAL, T = M PL

mumaθθil-a:t-u	l-fari:q-ayni	d-dawliy-ayni	l-muʃa:rik-ayni
representative(+H)-F.PL-NOM	the-team.M-DUAL.GEN	the-international.M-DUAL.GEN	the-participating.M-DUAL.GEN

ħa:zim-u:na	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
resolute.M-PL.NOM	really	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The two international (and) participating teams’ representatives are really resolute, in my personal and honest opinion.’

1.3 Ungrammatical number

(S201N) C = M SG, middle = M DUAL, T = M PL

ʃarħ-u	l-ʔusta:ð-ayni	l-qadi:r-ayni	l-marmu:q-ayni	wadiħ-u:na
explanation.M.SG-NOM	the-professor.M-DUAL.GEN	the-respected.M-DUAL.GEN	the-eminent.M-DUAL.GEN	clear.M-PL.NOM

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	l-mutawadˤiʕ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The two eminent (and) respected professors’ explanation is very clear, in my personal and humble opinion.’

(S202N) C = M SG, middle = M PL, T = M PL

kita:b-u	l-xirri:ʤ-i:na	l-mutafawwiq-i:na	l-mutamayyiz-i:na	mumtiʕ-u:na
book.M.SG-NOM	the-graduate.M-PL.GEN	the-excellent.M-PL.GEN	the-distinguished.M-PL.GEN	interesting.M-PL.NOM

fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	l-mutawadˤiʕ-i
really	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The distinguished (and) excellent graduates’ book is really interesting, in my personal and humble opinion.’

(S203N) C = M DUAL, middle = M SG, T = M SG

qara:r-a:	r-raʔi:ss-i	l-ħa:liyy-i	l-maħbu:b-i	muʔθθir-u-n
decision.M-DUAL.NOM	the-president.M.SG-GEN	the-current-GEN	the-loved.M.SG-GEN	influential.M.SG-NOM-INDF

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The loved (and) current president’s two decisions are very influential, in my personal and honest opinion.’

(S204N) C = M DUAL, middle = M PL, T = M SG

tˁalab-a:	l-mutaqaddim-i:na	tˁ-tˁamu:ħ-i:na	l-mutafa:ʔil-i:na	ka:mil-u-n
request.M-DUAL.NOM	the-applicant.M-PL.GEN	the-ambitious.M-PL.GEN	the-optimistic.M-PL.GEN	complete.M.SG-NOM-INDF

ʔalʔa:n	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
now	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The optimistic (and) ambitious applicants’ two requests are now complete, in my personal and honest opinion.’

(S205N) C = M PL, middle = M SG, T = M DUAL

mudarris-u:	tˤ-tˤa:lib-i	l-muʤtaħid-i	l-muθa:bir-i	mutaħammis-a:ni
teacher.M-PL.NOM	the-student.M.SG-GEN	the-diligent.M.SG-GEN	the-persistent.M.SG-GEN	enthusiastic.M-DUAL.NOM

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	l-mutawadˤiʕ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The persistent (and) diligent student’s teachers are very keen, in my personal and humble opinion.’

(S206N) C = M PL, middle = M DUAL, T = M DUAL

qa:til-u:	ʃ-ʃa:hid-ayni	r-raʔi:ss-ayni	ʃ-ʃahi:r-ayni	ma:kir-a:ni
killer.M-PL.NOM	the-witness.M-DUAL.GEN	the-main.M-DUAL.GEN	the-famous.M-DUAL.GEN	cunning.M-DUAL.NOM

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˤiyy-i	wa	sˤ-sˤari:ħ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The two famous (and) main witnesses’ killers are very cunning, in my personal and honest opinion.’

(S207N) C = F SG, middle = F DUALALA, T = F PL

tawsˤiy-at-u	l-baːħiθ-ayni	l-muxadˤram-ayni	l-mubdiʕ-ayni
recommendation-F.SG-NOM	the-researcher.M-DUAL.GEN	the-veteran.M-DUAL.GEN	the-innovative.M-DUAL.GEN

qayyimm-aːt-u-n	fiʕlan	wifqa	raʔy-iː	ʃ-ʃaxsˤiyy-I	wa	l-mutawadˤiʕ-i
valuable-F.PL-NOM-IND	really	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The two veteran (and) innovative researchers’ recommendation is really valuable, in my personal and humble opinion.’

(S208N) C = F SG, middle = F PL, T = F PL

sˤaːl-at-u	l-musaːfir-iːna	l-muɣaːdir-iːna	l-mutˤaʕʕam-iːna	mulaːʔima-aːt-u-n
lounge-F.SG-NOM	the-passenger.M-PL.GEN	the-departing.M-PL.GEN	the-vaccinated.M-PL.GEN	suitable-F.PL-NOM-INDF

ʔalʔaːn	wifqa	raʔy-iː	ʃ-ʃaxsˤiyy-i	wa	l-mutawadˤiʕ-i
now	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The departing (and) vaccinated passengers’ lounge is suitable now, in my personal and humble opinion.’

(S209N) C = F DUAL, middle = F SG, T = F SG

kalim-at-a:	l-mudi:r-i	t-tanfi:ðiyy-i	l-ʤadi:d-i	muʃadʒdʒiʕ-at-u-n
speech-F-DUAL.NOM	the-director.M.SG-GEN	the-executive.M.SG-GEN	the-new.M.SG-GEN	encouraging-F.SG-NOM-INDF

fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
really	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The new (and) executive director’s two speeches are really encouraging, in my personal and honest opinion.’

(S210N) C = F DUAL, middle = F PL, T = F SG

munazˁar-at-a:	l-muraʃʃaħ-i:na	r-riʔa:ssiy-i:na	l-ba:riz-i:na	muhimm-at-u-n
debate-F-DUAL.NOM	the-candidate.M-PL.GEN	the-presidential.M-PL.GEN	the-prominent.M-PL.GEN	important-F.SG-NOM-INDF

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The prominent (and) presidential candidates’ two debates are very important, in my personal and honest opinion.’

(S211N) C = F PL, middle = F SG, T = F DUAL

muħa:miy-a:t-u	r-raʔi:ss-i	l-maxlu:ʔ-i	s-sabiq-i	mutamarris-at-a:ni
lawyer(+H)-F.PL-NOM	the-president.M.SG-GEN	the-ousted.M.SG-GEN	the-former.M.SG-GEN	well-versed-F-DUAL.NOM

ʤiddan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	l-mutawadˁiʕ-i
very	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the-humble.M.SG-GEN

‘The former (and) ousted president’s lawyers are very well-versed, in my personal and humble opinion.’

(S212N) C = F PL, middle = F DUAL, T = F DUAL

mumaθθil-a:t-u	l-fari:q-ayni	d-dawliy-ayni	l-muʃa:rik-ayni
representative(+H)-F.PL-NOM	the-team.M-DUAL.GEN	the-international.M-DUAL.GEN	the-participating.M-DUAL.GEN

ħa:zim-at-a:ni	fiʕlan	wifqa	raʔy-i:	ʃ-ʃaxsˁiyy-i	wa	sˁ-sˁari:ħ-i
resolute-F-DUAL.NOM	really	in	opinion.M.SG-my	the-personal.M.SG-GEN	and	the.honest.M.SG-GEN

‘The two international (and) participating teams’ representatives are really resolute, in my personal and honest opinion.’

APPENDIX D

Set 7. Subject-Verb Agreement: Adjacent

Abbreviations. A = grammatical, C = controller (i.e., noun), F = feminine, G = ungrammatical gender, GEN = genitive, INDF = indefinite, M = masculine, N = ungrammatical number, NOM = nominative, PL = plural, S = set, SG = singular, T = target (i.e., adjective).

Notes. Sentence ID (e.g., S701A) is constructed as follows: set number + sentence number within the set + ungrammaticality condition.

1.1 Grammatical

(S701A) C = M SG, T = M SG

ʔal-mutardʒim-u	taħaddaθ-a	bi-fasˁa:ħ-at-i-n	wa	tˁala:q-at-in	wifqa	raʔy-i:
the-interpreter.M.SG-NOM	speak.PERF-3SG.M	with-eloquence-F-GEN-INDF	and	fluency-F-GEN	in	opinion.M.SG-my

ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The interpreter spoke eloquently and fluently, in my personal opinion and my own estimation.’

(S702A) C = M SG, T = M SG

ʔatˁ-tˁa:lib-u	daras-a	bi-dʒidd-i-n	wa	ʔidʒtiha:dd-i-n	wifqa
the-student.M.SG-NOM	study.PERF-3SG.M	with-earnestness.M-GEN-INDF	and	diligence.M-GEN-INDF	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The student studied earnestly and diligently, in my personal opinion and my own estimation.’

(S703A) C = M DUAL, T = M DUAL

ʔal-muwazˁzˁf-a:ni	ʕamilØ-a:	bi-kafa:ʔ-at-i-n	wa	ʔisˁra:r-i-n	wifqa
the-employee.M-DUAL.NOM	work.PERF-3DUAL.M	with-efficiency-F-GEN-INDF	and	persistence.M-GE-INDFN	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The two employees worked efficiently and persistently, in my personal opinion and my own estimation.’

(S704A) C = M DUAL, T = M DUAL

ʔal-xabi:r-a:ni	taħawarØ-a:	bi-hudu:ʔ-i-n	wa	ʕaqla:niyy-at-i-n	wifqa
the-expert.M-DUAL.NOM	debate.PERF-3DUAL.M	with-calmness-M-GEN-INDF	and	rationality-F-GEN-INDF	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The two experts debated calmly and rationally, in my personal opinion and my own estimation.’

(S705A) C = M PL, T = M PL

ʔal-musa:fir-u:na	ʔintazˁarØ-u:	bi-ʔadab-i-n	wa	sˁabr-i-n	wifqa	raʔy-i:
the-passenger.M-PL.NOM	wait.PERF-3PL.M	with-politeness.M-GEN-INDF	and	patience.M-GEN-INDF	in	opinion.M.SG-my

ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The passengers waited politely and patiently, in my personal opinion and my own estimation.’

(S706A) C = M PL, T = M PL

ʔal-muħaqqiq-u:na	ħarrafØ-u:	ʔal-waqa:ʔiʕ-a	wa	n-nata:ʔʤ-a	wifqa	raʔy-i:
the-investigator.M-PL.NOM	distort.PERF-3PL.M	the-fact.PL-ACC	and	the-result.PL-ACC	in	opinion.M.SG-my

ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The investigators distorted the facts and the results, in my personal opinion and my own estimation.’

(S707A) C = F SG, T = F SG

ʔaʃ-ʃa:ʕir-at-u	ʔa-ðhal-atø	ʔal-muʃa:hid-i:na	wa	l-muʃtarik-i:na	wifqa	raʔy-i:
the-poet-F.SG-NOM	amaze.PERF-3SG.F	the-spectator.M-PL.ACC	and	the-participant.M-PL.ACC	in	opinion.M.SG-my

ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The poet amazed the spectators and the participants, in my personal opinion and my own estimation.’

(S708A) C = F SG, T = F SG

ʔal-mutasa:biq-at-u	ʔadʒa:b-atø	bi-fitˁn-at-i-n	wa	ħirsˁ-i-n	wifqa
the-contestant-F.SG-NOM	answer.PERF-3SG.F	with-shrewdness-F-GEN-INDF	and	attentiveness.M-GE-INDFN	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The contestant answered shrewdly and attentively, in my personal opinion and my own estimation.’

(S709A) C = F DUAL, T = F DUAL

ʔal-ʕa:lim-at-a:ni	tafawwaq-ata:	bi-tˁtˁib-i	wa	l-ʔadab-i	wifqa
the-scientist-F-DUAL.NOM	excel.PERF-3DUAL.F	with-the.medicine.M-GEN	and	the-literature.M.SG-GEN	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The two scientists excelled in medicine and literature, in my personal opinion and my own estimation.’

(S710A) C = F DUAL, T = F DUAL

ʔal-muraʃʃaħ-at-a:ni	qaddar-ata:	d-daʕm-a	wa	l-muʃa:rak-at-a	wifqa
the-candidate-F-DUAL.NOM	value.PERF-3DUAL.F	the-support.M-ACC	and	the-participation-F.SG-ACC	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The two candidates valued the support and the participation, in my personal opinion and my own estimation.’

(S711A) C = F PL, T = F PL

ʔal-muwazˁzˁf-a:t-u	ʃa:rakØ-na	bi-naʃa:tˁ-i-n	wa	ħama:s-i-n	wifqa
the-employee-F.PL-NOM	participate.PERF-3PL.F	with-activeness.M-GEN-INDF	and	enthusiasm.M-GEN-INDF	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The employees participated actively and enthusiastically, in my personal opinion and my own estimation.’

(S712A) C = F PL, T = F PL

ʔal-mura:sil-a:t-u	ʔiltazamØ-na	bi-l-qawaʔid-i	wa	l-ʔanzˁim-at-i	wifqa	raʔy-i:
the-reporter-F.PL-NOM	adhere.PERF-3PL.F	with-the-rule.PL-GEN	and	the-regulation-F.PL-GEN	in	opinion.M.SG-my

ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The reporters adhered to the rules and regulations, in my personal opinion and my own estimation.

1.2 Ungrammatical Gender

(S701G) C = M SG, T = F SG

ʔal-mutarʤim-u	taħaddaθ-atØ	bi-fasˁa:ħ-at-i-n	wa	tˁala:q-at-in	wifqa	raʔy-i:
the-interpreter.M.SG-NOM	speak.PERF-3SG.F	with-eloquence-F-GEN-INDF	and	fluency-F-GEN	in	opinion.M.SG-my

ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The interpreter spoke eloquently and fluently, in my personal opinion and my own estimation.’

(S702G) C = M SG, T = F SG

ʔatˁ-tˁa:lib-u	daras-atØ	bi-ʤidd-i-n	wa	ʔiʤtiha:dd-i-n	wifqa	raʔy-i:
the-student.M.SG-NOM	study.PERF-3SG.F	with-earnestness.M-GEN-INDF	and	diligence.M-GEN-INDF	in	opinion.M.SG-my

ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The student studied earnestly and diligently, in my personal opinion and my own estimation.’

(S703G) C = M DUAL, T = F DUAL

ʔal-muwazˁzˁf-a:ni	ʕamil-ata:	bi-kafa:ʔ-at-i-n	wa	ʔisˁra:r-i-n	wifqa
the-employee.M-DUAL.NOM	work.PERF-3DUAL.F	with-efficiency-F-GEN-INDF	and	persistence.M-GE-INDFN	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The two employees worked efficiently and persistently, in my personal opinion and my own estimation.’

(S704G) C = M DUAL, T = F DUAL

ʔal-xabi:r-a:ni	taħawar-ata:	bi-hudu:ʔ-i-n	wa	ʕaqla:niyy-at-i-n	wifqa
the-expert.M-DUAL.NOM	debate.PERF-3DUAL.F	with-calmness-M-GEN-INDF	and	rationality-F-GEN-INDF	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The two experts debated calmly and rationally, in my personal opinion and my own estimation.’

(S705G) C = M PL, T = F PL

ʔal-musa:fir-u:na	ʔintazˁarØ-na	bi-ʔadab-i-n	wa	sˁabr-i-n	wifqa
the-passenger.M-PL.NOM	wait.PERF-3PL.F	with-politeness.M-GEN-INDF	and	patience.M-GEN-INDF	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The passengers waited politely and patiently, in my personal opinion and my own estimation.’

(S706G) C = M PL, T = F PL

ʔal-muħaqqiq-u:na	ħarrafØ-na	ʔal-waqa:ʔiʕ-a	wa	n-nata:ʔʤ-a	wifqa	raʔy-i:
the-investigator.M-PL.NOM	distort.PERF-3PL.F	the-fact.PL-ACC	and	the-result.PL-ACC	in	opinion.M.SG-my

ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The investigators distorted the facts and the results, in my personal opinion and my own estimation.’

(S707G) C = F SG, T = M SG

ʔaʃ-ʃa:ʕir-at-u	ʔaðhal-a	ʔal-muʃa:hid-i:na	wa	l-muʃtarik-i:na	wifqa	raʔy-i:
the-poet-F.SG-NOM	amaze.PERF-3SG.M	the-spectator.M-PL.ACC	and	the-participant.M-PL.ACC	in	opinion.M.SG-my

ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The poet amazed the spectators and the participants, in my personal opinion and my own estimation.’

(S708G) C = F SG, T = M SG

ʔal-mutasa:biq-at-u	ʔadʒa:b-a	bi-fitˁn-at-i-n	wa	ħirsˁ-i-n	wifqa
the-contestant-F.SG-NOM	answer.PERF-3SG.M	with-shrewdness-F-GEN-INDF	and	attentiveness.M-GE-INDF	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The contestant answered shrewdly and attentively, in my personal opinion and my own estimation.’

(S709G) C = F DUAL, T = M DUAL

ʔal-ʕa:lim-at-a:ni	tafawwaqa-a:	bi-tˁtˁib-i	wa	l-ʔadab-i	wifqa
the-scientist-F-DUAL.NOM	excel.PERF-3DUAL.M	with-the.medicine.M-GEN	and	the-literature.M.SG-GEN	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The two scientists excelled in medicine and literature, in my personal opinion and my own estimation.’

(S710G) C = F DUAL, T = M DUAL

ʔal-muraʃʃaħ-at-a:ni	qaddara-a:	d-daʕm-a	wa	l-muʃa:rak-at-a	wifqa
the-candidate-F-DUAL.NOM	value.PERF-3DUAL.M	the-support.M-ACC	and	the-participation-F.SG-ACC	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The two candidates valued the support and the participation, in my personal opinion and my own estimation.’

(S711G) C = F PL, T = M PL

ʔal-muwazˁzˁf-a:t-u	ʃa:rakØ-u:	bi-naʃa:tˁ-i-n	wa	ħama:s-i-n	wifqa
the-employee-F.PL-NOM	participate.PERF-3PL.M	with-activeness.M-GEN-INDF	and	enthusiasm.M-GEN-INDF	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The employees participated actively and enthusiastically, in my personal opinion and my own estimation.’

(S712G) C = F PL, T = M PL

ʔal-mura:sil-a:t-u	ʔiltazamØ-u:	bi-l-qawaʔid-i	wa	l-ʔanzˁim-at-i	wifqa	raʔy-i:
the-reporter-F.PL-NOM	adhere.PERF-3PL.M	with-the-rule.PL-GEN	and	the-regulation-F.PL-GEN	in	opinion.M.SG-my

ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The reporters adhered to the rules and regulations, in my personal opinion and my own estimation.’

1.1 Ungrammatical Number

(S701N) C = M SG, T = M PL

ʔal-mutardʒim-u	taħaddaθ∅-u:	bi-fasˁa:ħ-at-i-n	wa	tˁala:q-at-in	wifqa	raʔy-i:
the-interpreter.M.SG-NOM	speak.PERF-3PL.M	with-eloquence-F-GEN-INDF	and	fluency-F-GEN	in	opinion.M.SG-my

ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The interpreter spoke eloquently and fluently, in my personal opinion and my own estimation.’

(S702N) C = M SG, T = M PL

ʔatˁ-tˁa:lib-u	daras∅-u:	bi-dʒidd-i-n	wa	ʔidʒtiha:dd-i-n	wifqa
the-student.M.SG-NOM	study.PERF-3PL.M	with-earnestness.M-GEN-INDF	and	diligence.M-GEN-INDF	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The student studied earnestly and diligently, in my personal opinion and my own estimation.’

(S703N) C = M DUAL, T = M SG

ʔal-muwazˁzˁf-a:ni	ʕamil-a	bi-kafa:ʔ-at-i-n	wa	ʔisˁra:r-i-n	wifqa
the-employee.M-DUAL.NOM	work.PERF-3SG.M	with-efficiency-F-GEN-INDF	and	persistence.M-GE-INDFN	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The two employees worked efficiently and persistently, in my personal opinion and my own estimation.’

(S704N) C = M DUAL, T = M SG

ʔal-xabi:r-a:ni	taħawar-a	bi-hudu:ʔ-i-n	wa	ʕaqla:niyy-at-i-n	wifqa
the-expert.M-DUAL.NOM	debate.PERF-3SG.M	with-calmness-M-GEN-INDF	and	rationality-F-GEN-INDF	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The two experts debated calmly and rationally, in my personal opinion and my own estimation.’

(S705N) C = M PL, T = M DUAL

ʔal-musa:fir-u:na	ʔintazˁar-a:	bi-ʔadab-i-n	wa	sˁabr-i-n	wifqa
the-passenger.M-PL.NOM	wait. PERF-3DUAL.M	with-politeness.M-GEN-INDF	and	patience.M-GEN-INDF	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The passengers waited politely and patiently, in my personal opinion and my own estimation.’

(S706N) C = M PL, T = M DUAL

ʔal-muħaqqiq-u:na	ħarraf-a:	ʔal-waqa:ʔiʕ-a	wa	n-nata:ʔʤ-a	wifqa	raʔy-i:
the-investigator.M-PL.NOM	distort.PERF-3DUAL.M	the-fact.PL-ACC	and	th-result.PL-ACC	in	opinion.M.SG-my

ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The investigators distorted the facts and the results, in my personal opinion and my own estimation.’

(S707N) C = F SG, T = F PL

ʔaʃ-ʃa:ʕir-at-u	ʔaðhalø-na	ʔal-muʃa:hid-i:na	wa	l-muʃtarik-i:na	wifqa	raʔy-i:
the-poet-F.SG-NOM	amaze.PERF-3PL.F	the-spectator.M-PL.ACC	and	the-participant.M-PL.ACC	in	opinion.M.SG-my

ʃ-ʃaxsˤsˤiy	wa	taqdi:r-i:	ð-ða:tiy
the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The poet amazed the spectators and the participants, in my personal opinion and my own estimation.’

(S708N) C = F SG, T = F PL

ʔal-mutasa:biq-at-u	ʔadʒa:baø-na	bi-fitˤn-at-i-n	wa	ħirsˤ-i-n	wifqa
the-contestant-F.SG-NOM	answer.PERF-3PL.F	with-shrewdness-F-GEN-INDF	and	attentiveness.M-GE-INDF N	in

raʔy-i:	ʃ-ʃaxsˤsˤiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The contestant answered shrewdly and attentively, in my personal opinion and my own estimation.’

(S709N) C = F DUAL, T = F SG

ʔal-ʕa:lim-at-a:ni	tafawwaqa-atØ	bi-tˁtˁib-i	wa	l-ʔadab-i	wifqa
the-scientist-F-DUAL.NOM	excel.PERF-3SG.F	with-the.medicine.M-GEN	and	the-literature.M.SG-GEN	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The two scientists excelled in medicine and literature, in my personal opinion and my own estimation.’

(S710N) C = F DUAL, T = F SG

ʔal-muraʃʃaħ-at-a:ni	qaddara-atØ	d-daʕm-a	wa	l-muʃa:rak-at-a	wifqa
the-candidate-F-DUAL.NOM	value.PERF-3SG.F	the-support.M-ACC	and	the-participation-F.SG-ACC	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The two candidates valued the support and the participation, in my personal opinion and my own estimation.’

(S711N) C = F PL, T = F DUAL

ʔal-muwazˁzˁf-a:t-u	ʃa:rak-ata:	bi-naʃa:tˁ-i-n	wa	ħama:s-i-n	wifqa
the-employee-F.PL-NOM	participate.PERF-3DUAL.F	with-activeness.M-GEN-INDF	and	enthusiasm.M-GEN-INDF	in

raʔy-i:	ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:	ð-ða:tiy
opinion.M.SG-my	the-personal.M.SG	and	estimation.M.SG-my	the-self

‘The employees participated actively and enthusiastically, in my personal opinion and my own estimation.’

(S712N) C = F PL, T = F DUAL

ʔal-mura:sil-a:t-u	ʔiltazam-ata:	bi-l-qawaʔid-i	wa	l-ʔanzˁim-at-i	wifqa	raʔy-i:
the-reporter-F.PL-NOM	adhere.PERF-3DUAL.F	with-the-rule.PL-GEN	and	the-regulation-F.PL-GEN	in	opinion.M.SG-my

ʃ-ʃaxsˁsˁiy	wa	taqdi:r-i:		ð-ða:tiy
the-personal.M.SG	and	estimation.M.SG-my		the-self

‘The reporters adhered to the rules and regulations, in my personal opinion and my own estimation.’

APPENDIX E

Set 3. Subject-Verb Agreement: Distant (Subject Relative Clause)

Abbreviations. A = grammatical, C = controller (i.e., noun), F = feminine, G = ungrammatical gender, GEN = genitive, INDF = indefinite, M = masculine, N = ungrammatical number, NOM = nominative, PL = plural, S = set, SG = singular, T = target (i.e., adjective).

Notes. Sentence ID (e.g., S301A) is constructed as follows: set number + sentence number within the set + ungrammaticality condition.

1.1 Grammatical

(S301A) C = M SG, T = M SG

ʔal-mutarʤim-u	ʔallaði:	qad	wazˁzˁaff-a-k-a	taħaddaθ-a	bi-fasˁa:ħ-at-i-n	wa
the-interpreter.M.SG-NOM	that.M.SG	ASRT	hire.PERF-3SG.M-2SG-M	speak.PERF-3SG.M	with-eloquence-F-GEN-INDF	and

tˁala:q-at-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
fluency-F-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The interpreter that had hired you spoke eloquently and fluently, in my personal opinion.’

(S302A) C = M SG, T = M SG

ʔatˁ-tˁa:lib-u	ʔallaði:	qad	sa:ʕad-a-k-a	daras-a	bi-ʤidd-i-n	wa
the-student.M.SG-NOM	that.M.SG	ASRT	help.PERF-3SG.M-2SG-M	study.PERF-3SG.M	with-earnestness.M-GEN-INDF	and

ʔiʤtiha:dd-in	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
diligence.M.SG-GEN	in	opinion.M.SG-my	the-personal.M.SG

‘The student that had helped you studied earnestly and diligently, in my personal opinion.’

(S303A) C = M DUAL, T = M DUAL

ʔal-muwazˁzˁaf-a:ni ʔallað-a:ni qad tˁalab-a:-k-a ʕamil-a: bi-kafa:ʔ-at-i-n

the-employee.M-DUAL.NOM that.M-DUAL ASRT call.PERF-3DUAL.M-2SG-M work.PERF-3DUAL.M with-efficiency-F-GEN-INDF

wa ʔisˁra:r-i-n wifqa raʔy-i: ʃ-ʃaxsˁsˁiy

and persistence.M-GEN-INDF in opinion.M.SG-my the-personal.M.SG

‘The two employees that had called you worked efficiently and persistently, in my personal opinion.’

(S304A) C = M DUAL, T = M DUAL

ʔal-xabi:r-a:ni ʔallað-a:ni qad nasˁaħ-a:-k-a taħa:war-a: bi-hudu:ʔ-i-n

the-expert.M-DUAL.NOM that.M-DUAL ASRT advise.PERF-3DUAL.M-2SG-M debate.PERF-3DUAL.M with-calmness.M-GEN-INDF

wa ʕaqla:niyy-at-i-n wifqa raʔy-i: ʃ-ʃaxsˁsˁiy

and rationality-F-GEN-INDF in opinion.M.SG-my the-personal.M.SG

‘The two experts that had advised you debated calmly and rationally, in my personal opinion.’

(S305A) C = M PL, T = M PL

ʔal-musa:fir-u:na	ʔallað-i:na	qad	ra:faqØ-u:-k-a	ʔintazˁarØ-u:	bi-ʔadab-i-n
the-passenger.M-PL.NOM	that.M-PL	ASRT	accompany.PERF-3PL.M-2SG-M	wait.PERF-3PL.M	with-politeness.M-GEN-INDF

wa	sˁabr-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	patience.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The passengers that had accompanied you waited politely and patiently, in my personal opinion.’

(S306A) C = M PL, T = M PL

ʔal-muħaqqiq-u:na	ʔallað-i:na	qad	qa:balØ-u:-k-a	ħarrafØ-u:	l-waqa:ʔiʕ-a
the-investigator.M-PL.NOM	that.M-PL	ASRT	interview.PERF-3PL.M-2SG-M	distort.PERF-3PL.M	the-fact.PL-ACC

wa	n-nata:ʔʤ-a	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	the-result.PL-ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The investigators that had interviewed you distorted the facts and the results, in my personal opinion.’

(S307A) C = F SG, T = F SG

ʔaʃ-ʃa:ʕir-at-u	ʔallati:	qad	daʕ-at-k-a	ʔaðhal-atØ	l-muʃa:hid-i:na
the-poet-F.SG-NOM	that.F.SG	ASRT	invite.PERF-F -3SG-2SG-M	amaze.PERF-3SG.F	the-spectator.M-PL.ACC

wa	l-muʃtarik-i:na	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	the-participant.M-PL.ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The poet that the had invited you amazed the spectators and the participants, in my personal opinion.’

(S308A) C = F SG, T = F SG

ʔal-mutasa:biq-at-u	ʔallati:	qad	madaħ-at-k-a	ʔadʒa:b-atØ	bi-fitˁn-at-i-n
the-contestant-F.SG-NOM	that.F.SG	ASRT	praise.PERF-3SG.F-2SG-M	answer.PERF-3SG.F	with-shrewdness-F-GEN-INDF

wa	ħirsˁ-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	attentiveness.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The contestant that had praised you answered shrewdly and attentively, in my personal opinion.’

(S309A) C = F DUAL, T = F DUAL

ʔal-ʕa:lim-at-a:ni	ʔallat-a:ni	qad	karram-ata:-k-a	tafawwaq-ata:	bi-tˁ-tˁib-i
the-scientist-F-DUAL.NOM	that.F-DUAL	ASRT	honour.PERF-3DUAL.F-2SG-M	excel.PERF-3DUAL.F	with-the-medicine.M-GEN

wa	l-ʔadab-i	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	the-literature.M-GEN	in	opinion.M.SG-my	the-personal.M.SG

‘The two scientists that had honoured you excelled in medicine and literature, in my personal opinion.’

(S310A) C = F DUAL, T = F DUAL

ʔal-muraʃʃaħ-at-a:ni	ʔallat-a:ni	qad	za:r-ata:-k-a	qaddar-ata:	d-daʕm-a	wa
the-candidate-F-DUAL.NOM	that.F-DUAL	ASRT	visit.PERF-3DUAL.F-2SG-M	value.PERF-3DUAL.F	the-support.M-ACC	and

l-muʃa:rak-at-a	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
the-participation-F.SG-ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The two candidates that had visited you valued the support and the participation, in my personal opinion.’

(S311A) C = F PL, T = F PL

ʔal-muwazˁzˁf-a:t-u	ʔallawa:ti:	qad	raʃʃaħØ-na-k-a	ʃa:rakØ-na	bi-naʃa:tˁ-i-n
the-employee-F.PL-NOM	that.F.PL	ASRT	nominate.PERF-3PL.F-2SG-M	participate.PERF-3PL.F	with-activeness.M-GEN-INDF

wa	ħama:s-in	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	enthusiasm.M-GEN	in	opinion.M.SG-my	the-personal.M.SG

‘The employees that had nominated you participated actively and enthusiastically, in my personal opinion.’

(S312A) C = F PL, T = F PL

ʔal-mura:sil-a:t-u	ʔallawa:ti:	qad	baʕaθØ-na-k-a	ʔiltazamØ-na	bi-l-qawaʔid-i	wa
the-reporter-F.PL-NOM	that.F.PL	ASRT	send.PERF-3PL.F-2SG-M	adhere.PERF-3PL.F	with-the-rule.PL-GEN	and

l-ʔanzˁim-at-i	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
the-regulation-F.PL-GEN	in	opinion.M.SG-my	the-personal.M.SG

‘The reporters that had sent you adhered to the rules and regulations, in my personal opinion.’

1.2 Ungrammatical Gender

(S301G) C = M SG, T = F SG

ʔal-mutardʒim-u	ʔallaði:	qad	wazˁzˁaffa-k-a	taħaddaθ-atØ	bi-fasˁa:ħ-at-i-n	wa
the-interpreter.M.SG-NOM	that.M.SG	ASRT	hire.PERF-3SG.M-2SG-M	speak.PERF-3SG.F	with-eloquence-F-GEN-INDF	and

tˁala:q-at-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
fluency-F-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The interpreter that had hired you spoke eloquently and fluently, in my personal opinion.’

(S302G) C = M SG, T = F SG

ʔatˁ-tˁa:lib-u	ʔallaði:	qad	sa:ʕada-k-a	daras-atØ	bi-dʒidd-i-n	wa
the-student.M.SG-NOM	that.M.SG	ASRT	help.PERF-3SG.M-2SG-M	study.PERF-3SG.F	with-earnestness.M-GEN-INDF	and

ʔidʒtiha:d-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
diligence.M.SG-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The student that had helped you studied earnestly and diligently, in my personal opinion.’

(S303G) C = M DUAL, T = F DUAL

ʔal-muwazˤzˤaf-a:ni	ʔallað-a:ni	qad	tˤalab-a:-k-a	ʕamil-ata:	bi-kafa:ʔ-at-i-n
the-employee.M-DUAL.NOM	that.M-DUAL	ASRT	call.PERF-3DUAL.M-2SG-M	work.PERF-3DUAL.F	with-efficiency-F-GEN-INDF

wa	ʔisˤra:r-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˤsˤiy
and	persistence.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The two employees that had called you worked efficiently and persistently, in my personal opinion.’

(S304G) C = M DUAL, T = F DUAL

ʔal-xabi:r-a:ni	ʔallað-a:ni	qad	nasˤaħ-a:-k-a	taħawar-ata:	bi-hudu:ʔ-i-n
the-expert.M-DUAL.NOM	that.M-DUAL	ASRT	advise.PERF-3DUAL.M-2SG-M	debate.PERF-3DUAL.F	with-calmness.M-GEN-INDF

wa	ʕaqla:niyy-at-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˤsˤiy
and	rationality-F-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The two experts that had advised you debated calmly and rationally, in my personal opinion.’

(S305G) C = M PL, T = F PL

ʔal-musa:fir-u:na	ʔallað-i:na	qad	ra:faqØ-u:-k-a	ʔintazˁarØ-na	bi-ʔadab-i-n
the-passenger.M-PL.NOM	that.M-PL	ASRT	accompany.PERF-3PL.M-2SG-M	wait.PERF-3PL.F	with-politeness.M-GEN-INDF

wa	sˁabr-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	patience.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The passengers that had accompanied you waited politely and patiently, in my personal opinion.’

(S306G) C = M PL, T = F PL

ʔal-muħaqqiq-u:na	ʔallað-i:na	qad	qa:balØ-u:-k-a	ħarrafØ-na	l-waqa:ʔiʕ-a
the-investigator.M-PL.NOM	that.M-PL	ASRT	interview.PERF-3PL.M-2SG-M	distort.PERF-3PL.F	the-fact.PL-ACC

wa	n-nata:ʔdʒ-a	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	the-result.PL-ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The investigators that had interviewed you distorted the facts and the results, in my personal opinion.’

(S307G) C = F SG, T = M SG

ʔaʃ-ʃa:ʕir-at-u	ʔallati:	qad	daʕ-at-k-a	ʔaðhal-a	l-muʃa:hid-i:na	wa
the-poet-F.SG-NOM	that.F.SG	ASRT	invite.PERF-3SG.F-2SG-M	amaze.PERF-3SG.M	the-spectator.M-PL.ACC	and

l-muʃtarik-i:na	wifqa	raʔy-i:	ʃ-ʃaxsˤsˤiy
the-participant.M-PL.ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The poet that the had invited you amazed the spectators and the participants, in my personal opinion.’

(S308G) C = F SG, T = M SG

ʔal-mutasa:biq-at-u	ʔallati:	qad	madaħ-at-k-a	ʔadʒa:b-a	bi-fitˤn-at-i-n
the-contestant-F.SG-NOM	that.F.SG	ASRT	praise.PERF-3SG.F-2SG-M	answer.PERF-3SG.M	with-shrewdness-F-GEN-INDF

wa	ħirsˤ-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˤsˤiy
and	attentiveness.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The contestant that had praised you answered shrewdly and attentively, in my personal opinion.’

(S309G) C = F DUAL, T = M DUAL

ʔal-ʕa:lim-at-a:ni	ʔallat-a:ni	qad	karram-ata:-k-a	tafawwaq-a:	bi-tˁ-tˁib-i
the-scientist-F-DUAL.NOM	that.F-DUAL	ASRT	honour.PERF-3DUAL.F-2SG-M	excel.PERF-3DUAL.M	with-the-medicine.M-GEN

wa	l-ʔadab-i	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	the-literature.M-GEN	in	opinion.M.SG-my	the-personal.M.SG

‘The two scientists that had honoured you excelled in medicine and literature, in my personal opinion.’

(S310G) C = F DUAL, T = M DUAL

ʔal-muraʃʃaħ-at-a:ni	ʔallat-a:ni	qad	za:r-ata:-k-a	qaddar-a:	d-daʕm-a	wa
the-candidate-F-DUAL.NOM	that.F-DUAL	ASRT	visit.PERF-3DUAL.F-2SG-M	value.PERF-3DUAL.M	the-support.M-ACC	and

l-muʃa:rak-at-a	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
the-participation-F.SG-ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The two candidates that had visited you valued the support and the participation, in my personal opinion.’

(S311G) C = F PL, T = M PL

ʔal-muwazˁzˁf-a:t-u	ʔallawa:ti:	qad	raʃʃaħØ-na-k-a	ʃa:rakØ-u:	bi-naʃa:tˁ-i-n
the-employee-F.PL-NOM	that.F.PL	ASRT	nominate.PERF-3PL.F-2SG-M	participate.PERF-3PL.M	with-activeness.M-GEN-INDF

wa	ħama:s-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	enthusiasm.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The employees that had nominated you participated actively and enthusiastically, in my personal opinion.’

(S312G) C = F PL, T = M PL

ʔal-mura:sil-a:t-u	ʔallawa:ti:	qad	baʕaθØ-na-k-a	ʔiltazamØ-u:	bi-l-qawaʔid-i	wa
the-reporter-F.PL-NOM	that.F.PL	ASRT	send.PERF-3PL.F-2SG-M	adhere.PERF-3PL.M	with-the-rule.PL-GEN	and

l-ʔanzˁim-at-i	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
the-regulation-F.PL-GEN	in	opinion.M.SG-my	the-personal.M.SG

‘The reporters that had sent you adhered to the rules and regulations, in my personal opinion.’

1.3 Ungrammatical Number

(S301N) C = M SG, T = M PL

ʔal-mutardʒim-u	ʔallaði:	qad	wazˁzˁaff-a-k-a	taħaddaθ∅-u:	bi-fasˁa:ħ-at-i-n	wa
the-interpreter.M.SG-NOM	that.M.SG	ASRT	hire.PERF-3SG.M-2SG-M	speak.PERF-3PL.M	with-eloquence-F-GEN-INDF	and

tˁala:q-at-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
fluency-F-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The interpreter that had hired you spoke eloquently and fluently, in my personal opinion.’

(S302N) C = M SG, T = M PL

ʔatˁ-tˁa:lib-u	ʔallaði:	qad	sa:ʕad-a-k-a	daras∅-u:	bi-dʒidd-i-n	wa
the-student.M.SG-NOM	that.M.SG	ASRT	help.PERF-3SG.M-2SG-M	study.PERF-3PL.M	with-earnestness.M-GEN-INDF	and

ʔidʒtiha:dd-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
diligence.M.SG-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The student that had helped you studied earnestly and diligently, in my personal opinion.’

(S303N) C = M DUAL, T = M PL

ʔal-muwazˁzˁaf-a:ni	ʔallað-a:ni	qad	tˁalab-a:-k-a	ʕamil-a	bi-kafa:ʔ-at-i-n
the-employee.M-DUAL.NOM	that.M-DUAL	ASRT	call.PERF-3DUAL.M-2SG-M	work.PERF-3SG.M	with-efficiency-F-GEN-INDF

wa	ʔisˁra:r-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	persistence.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The two employees that had called you worked efficiently and persistently, in my personal opinion.’

(S304N) C = M DUAL, T = M PL

ʔal-xabi:r-a:ni	ʔallað-a:ni	qad	nasˁaħ-a:-k-a	taħawar-a	bi-hudu:ʔ-i-n
the-expert.M-DUAL.NOM	that.M-DUAL	ASRT	advise.PERF-3DUAL.M-2SG-M	debate.PERF-3SG.M	with-calmness.M-GEN-IND

wa	ʕaqla:niyy-at-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	rationality-F-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The two experts that had advised you debated calmly and rationally, in my personal opinion.’

(S305N) C = M PL, T = M DUAL

ʔal-musa:fir-u:na	ʔallað-i:na	qad	ra:faqØ-u:-k-a	ʔintazˁar-a:	bi-ʔadab-i-n
the-passenger.M-PL.NOM	that.M-PL	ASRT	accompany.PERF-3PL.M-2SG-M	wait. PERF-3DUAL.M	with-politeness.M-GEN-INDF

wa	sˁabr-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	patience.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The passengers that had accompanied you waited politely and patiently, in my personal opinion.’

(S306N) C = M PL, T = M DUAL

ʔal-muħaqqiq-u:na	ʔallað-i:na	qad	qa:balØ-u:-k-a	ħarraf-a:	l-waqa:ʔiʕ-a
the-investigator.M-PL.NOM	that.M-PL	ASRT	interview.PERF-3PL.M-2SG-M	distort.PERF-3DUAL.M	the-fact.PL-ACC

wa	n-nata:ʔʤ-a	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	the-result.PL-ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The investigators that had interviewed you distorted the facts and the results, in my personal opinion.’

(S307N) C = F SG, T = F PL

ʔaʃ-ʃa:ʕir-at-u	ʔallati:	qad	daʕ-at-k-a	ʔaðhalØ-na	l-muʃa:hid-i:na	wa
the-poet-F.SG-NOM	that.F.SG	ASRT	invite.PERF-3SG.F-2SG-M	amaze.PERF-3PL.F	the-spectator.M-PL.ACC	and

l-muʃtarik-i:na	wifqa	raʔy-i:	ʃ-ʃaxsˤsˤiy
the-participant.M-PL.ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The poet that the had invited you amazed the spectators and the participants, in my personal opinion.’

(S308N) C = F SG, T = F PL

ʔal-mutasa:biq-at-u	ʔallati:	qad	madaħ-at-k-a	ʔadʒa:baØ-na	bi-fitˤn-at-i-n
the-contestant-F.SG-NOM	that.F.SG	ASRT	praise.PERF-3SG.F-2SG-M	answer.PERF-3PL.F	with-shrewdness-F-GEN-INDF

wa	ħirsˤ-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˤsˤiy
and	attentiveness.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The contestant that had praised you answered shrewdly and attentively, in my personal opinion.’

(S309N) C = F DUAL, T = F SG

ʔal-ʕa:lim-at-a:ni	ʔallat-a:ni	qad	karram-ata:-k-a	tafawwaq-atØ	bi-tˁ-tˁib-i
the-scientist-F-DUAL.NOM	that.F-DUAL	ASRT	honour.PERF-3DUAL.F-2SG-M	excel.PERF-3SG.F	with-the-medicine.M-GEN

wa	l-ʔadab-i	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	the-literature.M-GEN	in	opinion.M.SG-my	the-personal.M.SG

‘The two scientists that had honoured you excelled in medicine and literature, in my personal opinion.’

(S310N) C = F DUAL, T = F SG

ʔal-muraʃʃaħ-at-a:ni	ʔallat-a:ni	qad	za:r-ata:-k-a	qaddar-atØ	d-daʕm-a	wa
the-candidate-F-DUAL.NOM	that.F-DUAL	ASRT	visit.PERF-3DUAL.F-2SG-M	value.PERF-3SG.F	the-support.M-ACC	and

l-muʃa:rak-at-a	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
the-participation-F.SG-ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The two candidates that had visited you valued the support and the participation, in my personal opinion.’

(S311N) C = F PL, T = F DUAL

ʔal-muwazˁzˁf-a:t-u	ʔallawa:ti:	qad	raʃʃaħØ-na-k-a	ʃa:rak-ata:	bi-naʃa:tˁ-i-n
the-employee-F.PL-NOM	that.F.PL	ASRT	nominate.PERF-3PL.F-2SG-M	participate.PERF-3DUAL.F	with-activeness.M-GEN-INDF

wa	ħama:s-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	enthusiasm.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The employees that had nominated you participated actively and enthusiastically, in my personal opinion.’

(S312N) C = F PL, T = F DUAL

ʔal-mura:sil-a:t-u	ʔallawa:ti:	qad	baʕaθØ-na-k-a	ʔiltazam-ata:	bi-l-qawaʔid-i	wa
the-reporter-F.PL-NOM	that.F.PL	ASRT	send.PERF-3PL.F-2SG-M	adhere.PERF-3DUAL.F	with-the-rule.PL-GEN	and

l-ʔanzˁim-at-i	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
the-regulation-F.PL-GEN	in	opinion.M.SG-my	the-personal.M.SG

‘The reporters that had sent you adhered to the rules and regulations, in my personal opinion.’

APPENDIX F

Set 4. Subject-Verb Agreement: Long Subject Relative Clause

Abbreviations. A = grammatical, C = controller (i.e., noun), F = feminine, G = ungrammatical gender, GEN = genitive, INDF = indefinite, M = masculine, N = ungrammatical number, NOM = nominative, PL = plural, S = set, SG = singular, T = target (i.e., adjective).

Notes. Sentence ID (e.g., S401A) is constructed as follows: set number + sentence number within the set + ungrammaticality condition. The term ‘middle’ refers to the material that intervenes between the controller and the target.

1.1 Grammatical

(S401A) C = M SG, middle = M DUAL, T = M SG

ʔal-mutardʒim-u	ʔallaði:	ya-ʕrif-u	l-munazʿzʿim-a:ni	ʔnna-hu	qad	wazʿzʿaf-a-k-a
the-interpreter.M.SG-NOM	that.M.SG	3IMP-know-IND.SG.M	the-organizer.M-DUAL.NOM	that-3SG.M	ASRT	hire.PERF-3SG.M-2SG-M

taħaddaθ-a	bi-fasʿa:ħ-at-i-n	wa	tʿala:q-at-i-n
speak.PERF-3SG.M	with-eloquence-F-GEN-INDF	and	fluency-F-GEN-INDF

‘The interpreter that the two organizers know (that) had hired you spoke eloquently and fluently.’

(S402A) C = M SG, middle = M PL, T = M SG

ʔatʿ-tʿa:lib-u	ʔallaði:	ya-ʕrif-u	l-muʕalim-u:na	ʔnna-hu	qad	sa:ʕad-a-k-a
the-student.M.SG-NOM	that.M.SG	3IMP-know-IND.SG.M	the-teacher.M-PL.NOM	that-3SG.M	ASRT	help.PERF-3SG.M-2SG-M

daras-a	bi-ʤidd-i-n	wa	ʔiʤtiha:dd-i-n
study.PERF-3SG.M	with-earnestness.M-GEN-INDF	and	diligence.M.SG-GEN-INDF

‘The student that the teachers know (that) had helped you studied earnestly and diligently.’

(S403A) C = M DUAL, middle = M SG, T = M DUAL

ʔal-muwazˁzˁaf-a:ni	ʔallað-a:ni	ya-ʕrif-u	l-muʃrif-u	ʔanna-huma:	qad
the-employee.M-DUAL.NOM	that.M-DUAL	3IMP-know-IND.SG.M	the-supervisor.M.SG-NOM	that-3DUAL	ASRT

tˁalab-a:-k-a	ʕamil-a:	bi-kafa:ʔ-at-i-n	wa	ʔisˁra:r-i-n
call.PERF-3DUAL.M-2SG-M	work.PERF-3DUAL.M	with-efficiency-F-GEN-INDF	and	persistence.M-GEN-INDF

‘The two employees that the supervisor knows (that) had called you worked efficiently and persistently.’

(S404A) C = M DUAL, middle = M PL, T = M DUAL

ʔal-xabi:r-a:ni	ʔallað-a:ni	ya-ʕrif-u	l-muði:ʕ-u:na	ʔanna-huma:	qad
the-expert.M-DUAL.NOM	that.M-DUAL	3IMP-know-IND.SG.M	the-reporter.M-PL.NOM	that-3DUAL	ASRT

nasˁaħ-a:-k-a	taħa:war-a:	bi-hudu:ʔ-i-n	wa	ʕaqla:niyy-at-i-n
advise.PERF-3DUAL.M-2SG-M	debate.PERF-3DUAL.M	with-calmness.M-GEN-INDF	and	rationality-F-GEN-INDF

‘The two experts that the reporters know (that) had advised you debated calmly and rationally.’

(S405A) C = M PL, middle = M SG, T = M PL

ʔal-musa:fir-u:na	ʔallað-i:na	ya-ʕrif-u	l-musʔu:l-u	ʔanna-hum	qad
the-passenger.M-PL.NOM	that.M-PL	3IMP-know-IND.SG.M	the-officer.M-SG.NOM	that-3PL.M	ASRT

ra:faqØ-u:-k-a	ʔintazʕarØ-u:	bi-ʔadab-i-n	wa	sʕabr-i-n
accompany.PERF-3PL.M-2SG-M	wait.PERF-3PL.M	with-politeness.M-GEN-INDF	and	patience.M-GEN-INDF

‘The passengers that the officer knows (that) had accompanied you waited politely and patiently.’

(S406A) C = M PL, middle = M DUAL, T = M PL

ʔal-muħaqqiq-u:na	ʔallað-i:na	ya-ʕrif-u	sʕ-sʕaħafiyy-a:ni	ʔanna-hum	qad
the-investigator.M-PL.NOM	that.M-PL	3IMP-know-IND.SG.M	the-journalist.M-DUAL.NOM	that-3PL.M	ASRT

qa:balØ-u:-k-a	ħarrafØ-u:	l-waqa:ʔiʕ-a	wa	n-nata:ʔʤ-a
interview.PERF-3PL.M-2SG-M	distort.PERF-3PL.M	the-fact.PL-ACC	and	the.result.PL-ACC

‘The investigators that the two journalists know (that) had interviewed you distorted the facts and the results.’

(S407A) C = F SG, middle = M DUAL, T = F SG

ʔaʃ-ʃa:ʕir-at-u	ʔallati:	ya-ʕrif-u	sˁ-sˁadi:q-a:ni	ʔanna-ha	qad	daʕ-at-k-a
the-poet-F.SG-NOM	that.F.SG	3IMP-know-IND.SG.M	the-friend.M-DUAL.NOM	that-3SG.F	ASRT	invite.PERF-3SG.F-2SG-M

ʔaðhal-at	l-muʃa:hid-i:na	wa	l-muʃtarik-i:na
amaze.PERF-3SG.F	the-spectator.M-PL.ACC	and	the-participant.M-PL.ACC

‘The poet that the two friends know (that) had invited you amazed the spectators and the participants.’

(S408A) C = F SG, middle = M PL, T = F SG

ʔal-mutasa:biq-at-u	ʔallati:	ya-ʕrif-u	l-muħakkim-u:na	ʔanna-ha	qad	madaħ-at-k-a
the-contestant-F.SG-NOM	that.F.SG	3IMP-know-IND.SG.M	the-judge.M-PL.NOM	that-3SG.F	ASRT	praise.PERF-3SG.F-2SG-M

ʔadʒa:b-at	bi-fitˁn-at-i-n	wa	ħirsˁ-i-n
answer.PERF-3SG.F	with-shrewdness-F-GEN-INDF	and	attentiveness.M-GEN-INDF

‘The contestant that the judges know (that) had praised you answered shrewdly and attentively.’

(S409A) C = F DUAL, middle = M SG, T = F DUAL

ʔal-ʕa:lim-at-a:ni	ʔallat-a:ni	ya-ʕrif-u	r-raʔi:ss-u	ʔanna-huma:	qad
the-scientist-F-DUAL.NOM	that.F-DUAL	3IMP-know-IND.SG.M	the-president.M.SG-NOM	that-3DUAL	ASRT

karram-ata:-k-a	tafawwaq-ata:	bi-tˁ-tˁib-i	wa	l-ʔadab-i
honour.PERF-3DUAL.F-2SG-M	excel.PERF-3DUAL.F	with-the-medicine.M-GEN	and	the-literature.M.SG-GEN

‘The two scientists that the president knows (that) had honored you excelled in medicine and literature.’

(S410A) C = F DUAL, middle = M PL, T = F DUAL

ʔal-muraʃʃaħ-at-a:ni	ʔallat-a:ni	ya-ʕrif-u	l-muwatˁin-u:na	ʔanna-huma:	qad
the-candidate-F-DUAL.NOM	that.F-DUAL	3IMP-know-IND.SG.M	the-citizen.M-PL.NOM	that-3DUAL	ASRT

za:r-ata:-k-a	qaddar-ata:	d-daʕm-a	wa	l-muʃa:rak-at-a
visit.PERF-3DUAL.F-2SG-M	value.PERF-3DUAL.F	the-support.M-ACC	and	the-participation-F.SG-ACC

‘The two candidates that the citizens know (that) had visited you valued the support and the participation.’

(S411A) C = F PL, middle = M SG, T = F PL

ʔal-muwazˁzˁf-a:t-u	ʔallawa:ti:	ya-ʕrif-u	l-mudi:r-u	ʔanna-hunna	qad
the-employee-F.PL-NOM	that.F.PL	3IMP-know-IND.SG.M	the-manager.M.SG-NOM	that-3PL.F	ASRT

raʃʃaħØ-na-k-a	ʃa:rakØ-na	bi-naʃa:tˁ-i-n	wa	ħama:s-i-n
nominate.PERF-3PL.F-2SG-M	participate.PERF-3PL.F	with-activeness.M-GEN-INDF	and	enthusiasm.M-GEN-INDF

‘The employees that the manager knows (that) had nominated you participated actively and enthusiastically.’

(S412A) C = F PL, middle = M DUAL, T = F PL

ʔal-mura:sil-a:t-u	ʔallawa:ti:	ya-ʕrif-u	l-muħarrir-a:ni	ʔanna-hunnaa	qad
the-reporter-F.PL-NOM	that.F.PL	3IMP-know-IND.SG.M	the-editor.M-DUAL.NOM	that-3PL.F	ASRT

baʕaθØ-na-k-a	ʔiltazamØ-na	bi-l-qawaʔid-i	wa	l-ʔanzˁim-at-i
send.PERF-3PL.F-2SG-M	adhere.PERF-3PL.F	with-the-rule.PL-GEN	and	the-regulation-F.PL-GEN

‘The reporters that the two editors know (that) had sent you adhered to the rules and regulations.’

1.2 Ungrammatical Gender

(S401G) C = M SG, middle = M DUAL, T = F SG

ʔal-mutardʒim-u	ʔallaði:	ya-ʕrif-u	l-munazʿzʿim-a:ni	ʔnna-hu	qad
the-interpreter.M.SG-NOM	that.M.SG	3IMP-know-IND.SG.M	the-organizer.M-DUAL.NOM	that-3SG.M	ASRT

wazʿzʿaf-a-k-a	taħaddaθ-atØ	bi-fasʿa:ħ-at-i-n	wa	tʿala:q-at-i-n
hire.PERF-3SG.M-2SG-M	speak.PERF-3SG.F	with-eloquence-F-GEN-INDF	and	fluency-F-GEN-INDF

‘The interpreter that the two organizers know (that) had hired you spoke eloquently and fluently.’

(S402G) C = M SG, middle = M PL, T = F SG

ʔatʿ-tʿa:lib-u	ʔallaði:	ya-ʕrif-u	l-muʕalim-u:na	ʔnna-hu	qad
the-student.M.SG-NOM	that.M.SG	3IMP-know-IND.SG.M	the-teacher.M-PL.NOM	that-3SG.M	ASRT

sa:ʕad-a-k-a	daras-atØ	bi-dʒidd-i-n	wa	ʔidʒtiha:dd-i-n
help.PERF-3SG.M-2SG-M	study.PERF-3SG.F	with-earnestness.M-GEN-INDF	and	diligence.M.SG-GEN-INDF

‘The student that the teachers know (that) had helped you studied earnestly and diligently.’

(S403G) C = M DUAL, middle = M SG, T = F DUAL

ʔal-muwazˁzˁaf-a:ni	ʔallað-a:ni	ya-ʕrif-u	l-muʃrif-u	ʔanna-huma:	qad
the-employee.M-DUAL.NOM	that.M-DUAL	3IMP-know-IND.SG.M	the-supervisor.M.SG-NOM	that-3DUAL	ASRT

tˁalab-a:-k-a	ʕamil-ata:	bi-kafa:ʔ-at-i-n	wa	ʔisˁra:r-i-n
call.PERF-3DUAL.M-2SG-M	work.PERF-3DUAL.F	with-efficiency-F-GEN-INDF	and	persistence.M-GEN-INDF

‘The two employees that the supervisor knows (that) had called you worked efficiently and persistently.’

(S404G) C = M DUAL, middle = M PL, T = F DUAL

ʔal-xabi:r-a:ni	ʔallað-a:ni	ya-ʕrif-u	l-muði:ʕ-u:na	ʔanna-huma:	qad
the-expert.M-DUAL.NOM	that.M-DUAL	3IMP-know-IND.SG.M	the-reporter.M-PL.NOM	that-3DUAL	ASRT

nasˁaħ-a:-k-a	taħawar-ata:	bi-hudu:ʔ-i-n	wa	ʕaqla:niyy-at-i-n
advise.PERF-3DUAL.M-2SG-M	debate.PERF-3DUAL.F	with-calmness.M-GEN-INDF	and	rationality-F-GEN-INDF

‘The two experts that the reporters know (that) had advised you debated calmly and rationally.’

(S405G) C = M PL, middle = M SG, T = F PL

ʔal-musa:fir-u:na	ʔallað-i:na	ya-ʕrif-u	l-musʔu:l-u	ʔanna-hum	qad
the-passenger.M-PL.NOM	that.M-PL	3IMP-know-IND.SG.M	the-officer.M-SG.NOM	that-3PL.M	ASRT

ra:faqØ-u:-k-a	ʔintazʕarØ-na	bi-ʔadab-i-n	wa	sʕabr-i-n
accompany.PERF-3PL.M-2SG-M	wait.PERF-3PL.F	with-politeness.M-GEN-INDF	and	patience.M-GEN-INDF

‘The passengers that the officer knows (that) had accompanied you waited politely and patiently.’

(S406G) C = M PL, middle = M DUAL, T = F PL

ʔal-muħaqqiq-u:na	ʔallað-i:na	ya-ʕrif-u	sʕ-sʕaħafiyy-a:ni	ʔanna-hum	qad
the-investigator.M-PL.NOM	that.M-PL	3IMP-know-IND.SG.M	the-journalist.M-DUAL.NOM	that-3PL.M	ASRT

qa:balØ-u:-k-a	ħarrafØ-na	l-waqa:ʔiʕ-a	wa	n-nata:ʔʤ-a
interview.PERF-3PL.M-2SG-M	distort.PERF-3PL.F	the-fact.PL-ACC	and	the.result.PL-ACC

‘The investigators that the two journalists know (that) had interviewed you distorted the facts and the results.’

(S407G) C = F SG, middle = M DUAL, T = M SG

ʔaʃ-ʃa:ʕir-at-u	ʔallati:	ya-ʕrif-u	sˤ-sˤadi:q-a:ni	ʔanna-ha:	qad	daʕ-at-k-a
the-poet-F.SG-NOM	that.F.SG	3IMP-know-IND.SG.M	the-friend.M-DUAL.NOM	that-3SG.F	ASRT	invite.PERF-3SG.F-2SG-M

ʔaðhal-a	l-muʃa:hid-i:na	wa	l-muʃtarik-i:na
amaze.PERF-3SG.M	the-spectator.M-PL.ACC	and	the-participant.M-PL.ACC

‘The poet that the two friends know (that) had invited you amazed the spectators and the participants.’

(S408G) C = F SG, middle = M PL, T = M SG

ʔal-mutasa:biq-at-u	ʔallati:	ya-ʕrif-u	l-muħakkim-u:na	ʔanna-ha:	qad	madaħ-at-k-a
the-contestant-F.SG-NOM	that.F.SG	3IMP-know-IND.SG.M	the-judge.M-PL.NOM	that-3SG.F	ASRT	praise.PERF-3SG.F-2SG-M

ʔadʒa:b-a	bi-fitˤn-at-i-n	wa	ħirsˤ-i-n
answer.PERF-3SG.M	with-shrewdness-F-GEN-INDF	and	attentiveness.M-GEN-INDF

‘The contestant that the judges know (that) had praised you answered shrewdly and attentively.’

(S409G) C = F DUAL, middle = F SG, T = M DUAL

ʔal-ʕa:lim-at-a:ni	ʔallat-a:ni	ya-ʕrif-u	r-raʔi:ss-u	ʔanna-huma:	qad
the-scientist-F-DUAL.NOM	that.F-DUAL	3IMP-know-IND.SG.M	the-president.M.SG-NOM	that-3DUAL	ASRT

karram-ata:-k-a	tafawwaqa-a:	bi-tˁ-tˁib-i	wa	l-ʔadab-i
honour.PERF-3DUAL.F-2SG-M	excel.PERF-3DUAL.M	with-the-medicine.M-GEN	and	the-literature.M.SG-GEN

‘The two scientists that the president knows (that) had honored you excelled in medicine and literature.’

(S410G) C = F DUAL, middle = M PL, T = M DUAL

ʔal-muraʃʃaħ-at-a:ni	ʔallat-a:ni	ya-ʕrif-u	l-muwatˁin-u:na	ʔanna-huma:	qad
the-candidate-F-DUAL.NOM	that.F-DUAL	3IMP-know-IND.SG.M	the-citizen.M-PL.NOM	that-3DUAL	ASRT

za:r-ata:-k-a	qaddara-a:	d-daʕm-a	wa	l-muʃa:rak-at-a
visit.PERF-3DUAL.F-2SG-M	value.PERF-3DUAL.M	the-support.M-ACC	and	the-participation-F.SG-ACC

‘The two candidates that the citizens know (that) had visited you valued the support and the participation.’

(S411G) C = F PL, middle = M SG, T = M PL

ʔal-muwazˁzˁf-a:t-u	ʔallawa:ti:	ya-ʕrif-u	l-mudi:r-u	ʔanna-hunna	qad
the-employee-F.PL-NOM	that.F.PL	3IMP-know-IND.SG.M	the-manager.M.SG-NOM	that-3PL.F	ASRT

raʃʃaħØ-na-k-a	ʃa:rakØ-u:	bi-naʃa:tˁ-i-n	wa	ħama:s-i-n
nominate.PERF-3PL.F-2SG-M	participate.PERF-3PL.M	with-activeness.M-GEN-INDF	and	enthusiasm.M-GEN-INDF

‘The employees that the manager knows (that) had nominated you participated actively and enthusiastically.’

(S412G) C = F PL, middle = M DUAL, T = M PL

ʔal-mura:sil-a:t-u	ʔallawa:ti:	ya-ʕrif-u	l-muħarrir-a:ni	ʔanna-hunnaa	qad
the-reporter-F.PL-NOM	that.F.PL	3IMP-know-IND.SG.M	the-editor.M-DUAL.NOM	that-3PL.F	ASRT

baʕaθØ-na-k-a	ʔiltazamØ-u:	bi-l-qawaʔid-i	wa	l-ʔanzˁim-at-i
send.PERF-3PL.F-2SG-M	adhere.PERF-3PL.M	with-the-rule.PL-GEN	and	the-regulation-F.PL-GEN

‘The reporters that the two editors know (that) had sent you adhered to the rules and regulations.’

1.3 Ungrammatical Number

(S401N) C = M SG, middle = M DUAL, T = M PL

ʔal-mutardʒim-u	ʔallaði:	ya-ʕrif-u	l-munazʿzʿim-a:ni	ʔnna-hu	qad
the-interpreter.M.SG-NOM	that.M.SG	3IMP-know-IND.SG.M	the-organizer.M-DUAL.NOM	that-3SG.M	ASRT

wazʿzʿaf-a-k-a	taħaddaθØ-u:	bi-fasʿa:ħ-at-i-n	wa	tʿala:q-at-i-n
hire.PERF-3SG.M-2SG-M	speak.PERF-3PL.M	with-eloquence-F-GEN-INDF	and	fluency-F-GEN-INDF

‘The interpreter that the two organizers know (that) had hired you spoke eloquently and fluently.’

(S402N) C = M SG, middle = M PL, T = M PL

ʔatʿ-tʿa:lib-u	ʔallaði:	ya-ʕrif-u	l-muʕalim-u:na	ʔnna-hu	qad
the-student.M.SG-NOM	that.M.SG	3IMP-know-IND.SG.M	the-teacher.M-PL.NOM	that-3SG.M	ASRT

sa:ʕad-a-k-a	darasØ-u:	bi-dʒidd-i-n	wa	ʔidʒtiha:dd-i-n
help.PERF-3SG.M-2SG-M	study.PERF-3PL.M	with-earnestness.M-GEN-INDF	and	diligence.M.SG-GEN-INDF

‘The student that the teachers know (that) had helped you studied earnestly and diligently.’

(S403N) C = M DUAL, middle = M SG, T = M SG

ʔal-muwazˁzˁaf-a:ni	ʔallað-a:ni	ya-ʕrif-u	l-muʃrif-u	ʔanna-huma:	qad
the-employee.M-DUAL.NOM	that.M-DUAL	3IMP-know-IND.SG.M	the-supervisor.M.SG-NOM	that-3DUAL	ASRT

tˁalabØ-a:-k-a	ʕamil-a	bi-kafa:ʔ-at-i-n	wa	ʔisˁra:r-i-n
call.PERF-3DUAL.M-2SG-M	work.PERF-3SG.M	with-efficiency-F-GEN-INDF	and	persistence.M-GEN-INDF

‘The two employees that the supervisor knows (that) had called you worked efficiently and persistently.’

(S404N) C = M DUAL, middle = M PL, T = M SG

ʔal-xabi:r-a:ni	ʔallað-a:ni	ya-ʕrif-u	l-muði:ʕ-u:na	ʔanna-huma:	qad
the-expert.M-DUAL.NOM	that.M-DUAL	3IMP-know-IND.SG.M	the-reporter.M-PL.NOM	that-3DUAL	ASRT

nasˁaħØ-a:-k-a	taħa:war-a	bi-hudu:ʔ-i-n	wa	ʕaqla:niyy-at-i-n
advise.PERF-3DUAL.M-2SG-M	debate.PERF-3SG.M	with-calmness.M-GEN-INDF	and	rationality-F-GEN-INDF

‘The two experts that the reporters know (that) had advised you debated calmly and rationally.’

(S405N) C = M PL, middle = M SG, T = M DUAL

ʔal-musa:fir-u:na	ʔallað-i:na	ya-ʕrif-u	l-musʔu:l-u	ʔanna-hum	qad
the-passenger.M-PL.NOM	that.M-PL	3IMP-know-IND.SG.M	the-officer.M-SG.NOM	that-3PL.M	ASRT

ra:faqØ-u:-k-a	ʔintazʕar-a:	bi-ʔadab-i-n	wa	sʕabr-i-n
accompany.PERF-3PL.M-2SG-M	wait.PERF-3DUAL.M	with-politeness.M-GEN-INDF	and	patience.M-GEN-INDF

‘The passengers that the officer knows (that) had accompanied you waited politely and patiently.’

(S406N) C = M PL, middle = M DUAL, T = M DUAL

ʔal-muħaqqiq-u:na	ʔallað-i:na	ya-ʕrif-u	sʕ-sʕaħafiyy-a:ni	ʔanna-hum	qad
the-investigator.M-PL.NOM	that.M-PL	3IMP-know-IND.SG.M	the-journalist.M-DUAL.NOM	that-3PL.M	ASRT

qa:balØ-u:-k-a	ħarraf-a:	l-waqa:ʔiʕ-a	wa	n-nata:ʔʤ-a
interview.PERF-3PL.M-2SG-M	distort.PERF-3DUAL.M	the-fact.PL-ACC	and	the-result.PL-ACC

‘The investigators that the two journalists know (that) had interviewed you distorted the facts and the results.’

(S407N) C = F SG, middle = M DUAL, T = F PL

ʔaʃ-ʃa:ʕir-at-u ʔallati: ya-ʕrif-u sˁ-sˁadi:q-a:ni ʔanna-ha: qad daʕ-at-k-a

the-poet-F.SG-NOM that.F.SG 3IMP-know-IND.SG.M the-friend.M-DUAL.NOM that-3SG.F ASRT invite.PERF-3SG.F-2SG-M

ʔaðhalØ-na l-muʃa:hid-i:na wa l-muʃtarik-i:na

amaze.PERF-3PL.F the-spectator.M-PL.ACC and the-participant.M-PL.ACC

‘The poet that the two friends know (that) had invited you amazed the spectators and the participants.’

(S408N) C = F SG, middle = M PL, T = F PL

ʔal-mutasa:biq-at-u ʔallati: ya-ʕrif-u l-muħakikm-u:na ʔanna-ha: qad madaħ-at-k-a

the-contestant-F.SG-NOM that.F.SG 3IMP-know-IND.SG.M the-judge.M-PL.NOM that-3SG.F ASRT praise.PERF-3SG.F-2SG-M

ʔadʒa:bØ-na bi-fitˁn-at-i-n wa ħirsˁ-i-n

answer.PERF-3PL.F with-shrewdness-F-GEN-INDF and attentiveness.M-GEN-INDF

‘The contestant that the judges know (that) had praised you answered shrewdly and attentively.’

(S409N) C = F DUAL, middle = M SG, T = F SG

ʔal-ʕa:lim-at-a:ni ʔallat-a:ni ya-ʕrif-u r-raʔi:s-su ʔanna-huma: qad

the-scientist-F-DUAL.NOM that.F-DUAL 3IMP-know-IND.SG.M the.president.M.SG-NOM that-3DUAL ASRT

karram-ata:-k-a tafawwaqa-atØ bi-tˁ-tˁib-i wa l-ʔadab-i

honour.PERF-3DUAL.F-2SG-M excel.PERF-3SG.F with-the-medicine.M-GEN and the-literature.M.SG-GEN

‘The two scientists that the president knows (that) had honored you excelled in medicine and literature.’

(S410N) C = F DUAL, middle = M PL, T = F SG

ʔal-muraʃʃaħ-at-a:ni ʔallat-a:ni ya-ʕrif-u l-muwatˁin-u:na ʔanna-huma: qad

the-candidate-F-DUAL.NOM that.F-DUAL 3IMP-know-IND.SG.M the-citizen.M-PL.NOM that-3DUAL ASRT

za:r-ata:-k-a qaddar-atØ d-daʕm-a wa l-muʃa:rak-at-a

visit.PERF-3DUAL.F-2SG-M value.PERF-3SG.F the-support.M-ACC and the-participation-F.SG-ACC

‘The two candidates that the citizens know (that) had visited you valued the support and the participation.’

(S411N) C = F PL, middle = M SG, T = F DUAL

ʔal-muwazˁzˁf-a:t-u	ʔallawa:ti:	ya-ʕrif-u	l-mudi:r-u	ʔanna-hunna	qad
the-employee-F.PL-NOM	that.F.PL	3IMP-know-IND.SG.M	the-manager.M.SG-NOM	that-3PL.F	ASRT

raʃʃaħØ-na-k-a	ʃa:rak-ata:	bi-naʃa:tˁ-i-n	wa	ħama:s-i-n
nominate.PERF-3PL.F-2SG-M	participate.PERF-3DUAL.F	with-activeness.M-GEN-INDF	and	enthusiasm.M-GEN-INDF

‘The employees that the manager knows (that) had nominated you participated actively and enthusiastically.’

(S412N) C = F PL, middle = M DUAL, T = F DUAL

ʔal-mura:sil-a:t-u	ʔallawa:ti:	ya-ʕrif-u	l-muħarrir-a:ni	ʔanna-hunnaa	qad
the-reporter-F.PL-NOM	that.F.PL	3IMP-know-IND.SG.M	the-editor.M-DUAL.NOM	that-3PL.F	ASRT

baʕaθØ-na-k-a	ʔiltazam-ata:	bi-l-qawaʔid-i	wa	l-anzˁim-at-i
send.PERF-3PL.F-2SG-M	adhere.PERF-3DUAL.F	with-the-rule.PL-GEN	and	the-regulation-F.PL-GEN

‘The reporters that the two editors know (that) had sent you adhered to the rules and regulations.’

APPENDIX G

Set 5. Subject-Verb Agreement: Short Object Relative Clause

Abbreviations. A = grammatical, C = controller (i.e., noun), F = feminine, G = ungrammatical gender, GEN = genitive, INDF = indefinite, M = masculine, N = ungrammatical number, NOM = nominative, PL = plural, S = set, SG = singular, T = target (i.e., adjective).

Notes. Sentence ID (e.g., S501A) is constructed as follows: set number + sentence number within the set + ungrammaticality condition.

1.1 Grammatical

(S501A) C = M SG, T = M SG

ʔal-mutardʒim-u	ʔallaði:	qad	wazˁzˁafØ-t-a	taħaddaθ-a	bi-fasˁa:ħ-at-i-n	wa
the-interpreter.M.SG-NOM	that.M.SG	ASRT	hire.PERF-2SG-M	speak.PERF-3SG.M	with-eloquence-F-GEN-INDF	and

tˁala:q-at-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
fluency-F-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The interpreter that you had hired spoke eloquently and fluently, in my personal opinion.’

(S502A) C = M SG, T = M SG

ʔatˁ-tˁa:lib-u	ʔallaði:	qad	sa:ʕadØ-t-a	daras-a	bi-dʒidd-i-n	wa
the-student.M.SG-NOM	that.M.SG	ASRT	help.PERF-2SG-M	study.PERF-3SG.M	with-earnestness.M-GEN-INDF	and

ʔidʒtiha:dd-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
diligence.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The student that you had helped studied earnestly and diligently, in my personal opinion.’

(S503A) C = M DUAL, T = M DUAL

ʔal-muwazˁzˁf-a:ni	ʔallað-a:ni	qad	tˁalabØ-t-a	ʕamil-a:	bi-kafa:ʔ-at-i-n	wa
the-employee.M-DUAL.NOM	that.M-DUAL	ASRT	call.PERF-2SG-M	work.PERF-3DUAL.M	with-efficiency-F-GEN-INDF	and

ʔisˁra:r-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
persistence.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The two employees that you had called worked$_i$ efficiently and persistently, in my personal opinion.’

(S504A) C = M DUAL, T = M DUAL

ʔal-xabi:r-a:ni	ʔallað-a:ni	qad	nasˁaħØ-t-a	taħawar-a:	bi-hudu:ʔ-i-n
the-expert.M-DUAL.NOM	that.M-DUAL	ASRT	advise.PERF-2SG-M	debate.PERF-3DUAL.M	with-calmness-M-GEN-INDF

wa	ʕaqla:niyy-at-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy	
and	rationality-F-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG	

‘The two experts that you had advised debated calmly and rationally, in my personal opinion.’

(S505A) C = M PL, T = M PL

ʔal-musa:fir-u:na	ʔallað-i:na	qad	ra:faqØ-t-a	ʔintazˁarØ-u:	bi-ʔadab-i-n
the-passenger.M-PL.NOM	that.M-PL	ASRT	accompany.PERF-2SG-M	wait.PERF-3PL.M	with-politeness.M-GEN-INDF

wa	sˁabr-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	patience.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The passengers that you had accompanied waited politely and patiently, in my personal opinion.’

(S506A) C = M PL, T = M PL

ʔal-muħaqqiq-u:na	ʔallað-i:na	qad	qa:balØ-t-a	ħarrafØ-u:	l-waqa:ʔiʕ-a	wa
the-investigator.M-PL.NOM	that.M-PL	ASRT	interview.PERF-2SG-M	distort.PERF-3PL.M	the-fact.PL-ACC	and

n-nata:ʔʤ-a	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy	
the-result.PL-ACC	in	opinion.M.SG-my	the-personal.M.SG	

‘The investigators that you had interviewed distorted the facts and the results, in my personal opinion.’

(S507A) C = F SG, T = F SG

ʔaʃ-ʃa:ʕir-at-u	ʔallati:	qad	daʕawØ-t-a	ʔaðhal-at	l-muʃa:hid-i:na	wa
the-poet-F.SG-NOM	that.F.SG	ASRT	invite.PERF-2SG-M	amaze.PERF-3SG.F	the-spectator.M-PL.ACC	and

l-muʃtarik-i:na	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
the-participant.M-PL.ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The poet that you had invited amazed the spectators and the participants, in my personal opinion.’

(S508A) C = F SG, T = F SG

ʔal-mutasa:biq-at-u	ʔallati:	qad	madaħØ-t-a	ʔadʒa:b-at	bi-fitˁn-at-i-n
the-contestant-F.SG-NOM	that.F.SG	ASRT	praise.PERF-2SG-M	answer.PERF-3SG.F	with-shrewdness-F-GEN-INDF

wa	ħirsˁ-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	attentiveness.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The contestant that you had praised answered shrewdly and attentively, in my personal opinion.’

(S509A) C = F DUAL, T = F DUAL

ʔal-ʕa:lim-at-a:ni	ʔallat-a:ni	qad	karramØ-t-a	tafawwaq-ata:	bi-tˁ-tˁib-i
the-scientist-F-DUAL.NOM	that.F-DUAL	ASRT	honour.PERF-2SG-M	excel.PERF-3DUAL.F	with-the-medicine.M-GEN

wa	l-ʔadab-i	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	the-literature.M.SG-GEN	in	opinion.M.SG-my	the-personal.M.SG

‘The two scientists that you had honoured excelled in medicine and literature, in my personal opinion.’

(S510A) C = F DUAL, T = F DUAL

ʔal-muraʃʃaħ-at-a:ni	ʔallat-a:ni	qad	zurØ-t-a	qaddar-ata:	d-daʕm-a	wa
the-candidate-F-DUAL.NOM	that.F-DUAL	ASRT	visit.PERF-2SG-M	value.PERF-3DUAL.F	the-support.M-ACC	and

l-muʃa:rak-at-a	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
the-participation-F.SG-ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The two candidates that you had visited valued the support and the participation, in my personal opinion.’

(S511A) C = F PL, T = F PL

ʔal-muwazˁzˁf-a:t-u	ʔallawa:ti:	qad	raʃʃahØ-t-a	ʃa:rakØ-na	bi-naʃa:tˁ-i-n
the-employee-F.PL-NOM	that.F.PL	ASRT	nominate.PERF-2SG-M	participate.PERF-3PL.F	with-activeness.M-GEN-INDF

wa	ħama:s-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	enthusiasm.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The employees that you had nominated participated actively and enthusiastically, in my personal opinion.’

(S512A) C = F PL, T = F PL

ʔal-mura:sil-a:t-u	ʔallawa:ti:	qad	baˁaθØ-t-a	ʔiltazamØ-na	bi-l-qawaʔid-i	wa
the-reporter-F.PL-NOM	that.F.PL	ASRT	send.PERF-2SG-M	adhere.PERF-3PL.F	with-the-rule.PL-GEN	and

l-ʔanzˁim-at-i	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
the-regulation-F.PL-GEN	in	opinion.M.SG-my	the-personal.M.SG

‘The reporters that you had sent adhered to the rules and regulations, in my personal opinion.’

1.2 Ungrammatical Gender

(S501G) C = M SG, T = M SG

ʔal-mutardʒim-u	ʔallaði:	qad	wazˁzˁafØ-t-a	taħaddaθ-atØ	bi-fasˁa:ħ-at-i-n	wa
the-interpreter.M.SG-NOM	that.M.SG	ASRT	hire.PERF-2SG-M	speak.PERF-3SG.F	with-eloquence-F-GEN-INDF	and

tˁala:q-at-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
fluency-F-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The interpreter that you had hired spoke eloquently and fluently, in my personal opinion.’

(S502G) C = M SG, T = F SG

ʔatˁ-tˁa:lib-u	ʔallaði:	qad	sa:ʕadØ-t-a	daras-atØ	bi-dʒidd-i-n	wa
the-student.M.SG-NOM	that.M.SG	ASRT	help.PERF-2SG-M	study.PERF-3SG.F	with-earnestness.M-GEN-INDF	and

ʔidʒtiha:dd-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
diligence.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The student that you had helped studied earnestly and diligently, in my personal opinion.’

(S503G) C = M DUAL, T = F DUAL

ʔal-muwazˁzˁf-a:ni	ʔallað-a:ni	qad	tˁalabØ-t-a	ʕamil-ata:	bi-kafa:ʔ-at-i-n
the-employee.M-DUAL.NOM	that.M-DUAL	ASRT	call.PERF-2SG-M	work.PERF-3DUAL.F	with-efficiency-F-GEN-INDF

wa	ʔisˁra:r-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	persistence.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The two employees that you had called worked efficiently and persistently, in my personal opinion.’

(S504G) C = M DUAL, T = F DUAL

ʔal-xabi:r-a:ni	ʔallað-a:ni	qad	nasˁaħØ-t-a	taħawar-ata:	bi-hudu:ʔ-i-n
the-expert.M-DUAL.NOM	that.M-DUAL	ASRT	advise.PERF-2SG-M	debate.PERF-3DUAL.F	with-calmness-M-GEN-INDF

wa	ʕaqla:niyy-at-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	rationality-F-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The two experts that you had advised debated calmly and rationally, in my personal opinion.’

(S505G) C = M PL, T = F PL

ʔal-musa:fir-u:na	ʔallað-i:na	qad	ra:faqØ-t-a	ʔintazˁarØ-na	bi-ʔadab-i-n
the-passenger.M-PL.NOM	that.M-PL	ASRT	accompany.PERF-2SG-M	wait.PERF-3PL.F	with-politeness.M-GEN-INDF

wa	sˁabr-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	patience.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The passengers that you had accompanied waited politely and patiently, in my personal opinion.’

(S506G) C = M PL, T = F PL

ʔal-muħaqqiq-u:na	ʔallað-i:na	qad	qa:balØ-t-a	ħarrafØ-na	l-waqa:ʔiʕ-a
the-investigator.M-PL.NOM	that.M-PL	ASRT	interview.PERF-2SG-M	distort.PERF-3PL.F	the-fact.PL-ACC

wa	n-nata:ʔdʒ-a	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	the-result.PL-ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The investigators that you had interviewed distorted the facts and the results, in my personal opinion.’

(S507G) C = F SG, T = M SG

ʔaʃ-ʃa:ʕir-at-u	ʔallati:	qad	daʕawØ-t-a	ʔaðhal-a	l-muʃa:hid-i:na	wa
the-poet-F.SG-NOM	that.F.SG	ASRT	invite.PERF-2SG-M	amaze.PERF-3SG.M	the-spectator.M-PL.ACC	and

l-muʃtarik-i:na	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
the-participant.M-PL.ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The poet that you had invited amazed the spectators and the participants, in my personal opinion.’

(S508G) C = F SG, T = M SG

ʔal-mutasa:biq-at-u	ʔallati:	qad	madaħØ-t-a	ʔadʒa:b-a	bi-fitˁn-at-i-n
the-contestant-F.SG-NOM	that.F.SG	ASRT	praise.PERF-2SG-M	answer.PERF-3SG.M	with-shrewdness-F-GEN-INDF

wa	ħirsˁ-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	attentiveness.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The contestant that you had praised answered shrewdly and attentively, in my personal opinion.’

(S509G) C = F DUAL, T = M DUAL

ʔal-ʕa:lim-at-a:ni	ʔallat-a:ni	qad	karramØ-t-a	tafawwaq-a:	bi-tˁ-tˁib-i
the-scientist-F-DUAL.NOM	that.F-DUAL	ASRT	honour.PERF-2SG-M	excel.PERF-3DUAL.M	with-the-medicine.M-GEN

wa	l-ʔadab-i	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	the-literature.M.SG-GEN	in	opinion.M.SG-my	the-personal.M.SG

‘The two scientists that you had honoured excelled in medicine and literature, in my personal opinion.’

(S510G) C = F DUAL, T = M DUAL

ʔal-muraʃʃaħ-at-a:ni	ʔallat-a:ni	qad	zurØ-t-a	qaddar-a:	d-daʕm-a	wa
the-candidate-F-DUAL.NOM	that.F-DUAL	ASRT	visit.PERF-2SG-M	value.PERF-3DUAL.M	the-support.M-ACC	and

l-muʃa:rak-at-a	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
the-participation-F.SG-ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The two candidates that you had visited valued the support and the participation, in my personal opinion.’

(S511G) C = F PL, T =M PL

ʔal-muwazˁzˁf-a:t-u	ʔallawa:ti:	qad	raʃʃahØ-t-a	ʃa:rakØ-u:	bi-naʃa:tˁ-i-n
the-employee-F.PL-NOM	that.F.PL	ASRT	nominate.PERF-2SG-M	participate.PERF-3PL.M	with-activeness.M-GEN-INDF

wa	ħama:s-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	enthusiasm.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The employees that you had nominated participated actively and enthusiastically, in my personal opinion.’

(S512G) C = F PL, T = M PL

ʔal-mura:sil-a:t-u	ʔallawa:ti:	qad	baʕaθØ-t-a	ʔiltazamØ-u:	bi-l-qawaʔid-i	wa
the-reporter-F.PL-NOM	that.F.PL	ASRT	send.PERF-2SG-M	adhere.PERF-3PL.M	with-the-rule.PL-GEN	and

l-ʔanzˁim-at-i	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
the-regulation-F.PL-GEN	in	opinion.M.SG-my	the-personal.M.SG

‘The reporters that you had sent adhered to the rules and regulations, in my personal opinion.’

1.3 Ungrammatical Number

(S501N) C = M SG, T = M PL

ʔal-mutardʒim-u	ʔallaði:	qad	wazˁzˁafØ-t-a	taħaddaθØ-u:	bi-fasˁaːħ-at-i-n	wa
the-interpreter.M.SG-NOM	that.M.SG	ASRT	hire.PERF-2SG-M	speak.PERF-3PL.M	with-eloquence-F-GEN-INDF	and

tˁalaːq-at-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
fluency-F-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The interpreter that you had hired spoke eloquently and fluently, in my personal opinion.’

(S502N) C = M SG, T = M PL

ʔatˁ-tˁaːlib-u	ʔallaði:	qad	saːʕadØ-t-a	darasØ-u:	bi-dʒidd-i-n	wa
the-student.M.SG-NOM	that.M.SG	ASRT	help.PERF-2SG-M	study.PERF-3PL.M	with-earnestness.M-GEN-INDF	and

ʔidʒtihaːdd-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
diligence.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The student that you had helped studied earnestly and diligently, in my personal opinion.’

(S503N) C = M DUAL, T = M SG

ʔal-muwazˁzˁf-a:ni	ʔallað-a:ni	qad	tˁalabØ-t-a	ˁamil-a	bi-kafa:ʔ-at-i-n
the-employee.M-DUAL.NOM	that.M-DUAL	ASRT	call.PERF-2SG-M	work.PERF-3SG.M	with-efficiency-F-GEN-INDF

wa	ʔisˁra:r-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	persistence.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The two employees that you had called worked$_i$ efficiently and persistently, in my personal opinion.’

(S504N) C = M DUAL, T = M SG

ʔal-xabi:r-a:ni	ʔallað-a:ni	qad	nasˁaħØ-t-a	taħa:war-a	bi-hudu:ʔ-i-n
the-expert.M-DUAL.NOM	that.M-DUAL	ASRT	advise.PERF-2SG-M	debate.PERF-3SG.M	with-calmness-M-GEN-INDF

wa	ˁaqla:niyy-at-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	rationality-F-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The two experts that you had advised debated calmly and rationally, in my personal opinion.’

(S505N) C = M PL, T = M DUAL

ʔal-musa:fir-u:na	ʔallað-i:na	qad	ra:faqØ-t-a	ʔintazˁar-a:	bi-ʔadab-i-n
the-passenger.M-PL.NOM	that.M-PL	ASRT	accompany.PERF-2SG-M	wait.PERF-3DUAL.M	with-politeness.M-GEN-INDF

wa	sˁabr-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	patience.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The passengers that you had accompanied waited politely and patiently, in my personal opinion.’

(S506N) C = M PL, T = M DUAL

ʔal-muħaqqiq-u:na	ʔallað-i:na	qad	qa:balØ-t-a	ħarraf-a:	l-waqa:ʔiʕ-a
the-investigator.M-PL.NOM	that.M-PL	ASRT	interview.PERF-2SG-M	distort.PERF-3DUAL.M	the-fact.PL-ACC

wa	n-nata:ʔʤ-a	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	the-result.PL-ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The investigators that you had interviewed distorted the facts and the results, in my personal opinion.’

(S507N) C = F SG, T = F PL

ʔaʃ-ʃa:ʕir-at-u	ʔallati:	qad	daʕawØ-t-a	ʔaðhalØ-na	l-muʃa:hid-i:na	wa
the-poet-F.SG-NOM	that.F.SG	ASRT	invite.PERF-2SG-M	amaze.PERF-3PL.F	the-spectator.M-PL.ACC	and

l-muʃtarik-i:na	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
the-participant.M-PL.ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The poet that you had invited amazed the spectators and the participants, in my personal opinion.’

(S508N) C = F SG, T = F PL

ʔal-mutasa:biq-at-u	ʔallati:	qad	madaħØ-t-a	ʔadʒa:bØ-na	bi-fitˁn-at-i-n
the-contestant-F.SG-NOM	that.F.SG	ASRT	praise.PERF-2SG-M	answer.PERF-3PL.F	with-shrewdness-F-GEN-INDF

wa	ħirsˁ-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	attentiveness.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG

‘The contestant that you had praised answered shrewdly and attentively, in my personal opinion.’

(S509N) C = F DUAL, T = F SG

ʔal-ʕa:lim-at-a:ni	ʔallat-a:ni	qad	karramØ-t-a	tafawwaqa-atØ	bi-tˁ-tˁib-i
the-scientist-F-DUAL.NOM	that.F-DUAL	ASRT	honour.PERF-2SG-M	excel.PERF-3SG.F	with-the-medicine.M-GEN

wa	l-ʔadab-i	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
and	the-literature.M.SG-GEN	in	opinion.M.SG-my	the-personal.M.SG

‘The two scientists that you had honoured excelled in medicine and literature, in my personal opinion.’

(S510N) C = F DUAL, T = M DUAL

ʔal-muraʃʃaħ-at-a:ni	ʔallat-a:ni	qad	zurØ-t-a	qaddar-atØ	d-daʕm-a	wa
the-candidate-F-DUAL.NOM	that.F-DUAL	ASRT	visit.PERF-2SG-M	value.PERF-3SG.F	the-support.M-ACC	and

l-muʃa:rak-at-a	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy
the-participation-F.SG-ACC	in	opinion.M.SG-my	the-personal.M.SG

‘The two candidates that you had visited valued the support and the participation, in my personal opinion.’

(S511N) C = F PL, T = F DUAL

ʔal-muwazˁzˁf-a:t-u	ʔallawa:ti:	qad	raʃʃahØ-t-a	ʃa:rak-ata:	bi-naʃa:tˁ-i-n
the-employee-F.PL-NOM	that.F.PL	ASRT	nominate.PERF-2SG-M	participate.PERF-3DUAL.F	with-activeness.M-GEN-INDF

wa	ħama:s-i-n	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy	
and	enthusiasm.M-GEN-INDF	in	opinion.M.SG-my	the-personal.M.SG	

‘The employees that you had nominated participated actively and enthusiastically, in my personal opinion.’

(S512N) C = F PL, T = S DUAL

ʔal-mura:sil-a:t-u	ʔallawa:ti:	qad	baʕaθØ-t-a	ʔiltazam-ata:	bi-l-qawaʔid-i	wa
the-reporter-F.PL-NOM	that.F.PL	ASRT	send.PERF-2SG-M	adhere.PERF-3DUAL.F	with-the-rule.PL-GEN	and

l-ʔanzˁim-at-i	wifqa	raʔy-i:	ʃ-ʃaxsˁsˁiy	
the-regulation-F.PL-GEN	in	opinion.M.SG-my	the-personal.M.SG	

‘The reporters that you had sent adhered to the rules and regulations, in my personal opinion.’

APPENDIX H

Set 6. Subject-Verb Agreement: Long Object Relative Clause

Abbreviations. A = grammatical, C = controller (i.e., noun), F = feminine, G = ungrammatical gender, GEN = genitive, INDF = indefinite, M = masculine, N = ungrammatical number, NOM = nominative, PL = plural, S = set, SG = singular, T = target (i.e., adjective).

Notes. Sentence ID (e.g., S601A) is constructed as follows: set number + sentence number within the set + ungrammaticality condition. The term ‘middle’ refers to the material that intervenes between the controller and the target.

1.1 Grammatical

(S601A) C = M SG, middle = M DU, T = M SG

ʔal-mutardʒim-u	ʔallaði:	ya-ʕrif-u	l-munazʿzʿim-a:ni	ʔnna-k-a	qad	wazʿzʿafØ-t-a
the-interpreter.M.SG-NOM	that.M.SG	3IMP-know-IND.SG.M	the-organizer.M-DUAL.NOM	that-2SG-M	ASRT	hire.PERF-2SG-M

taħaddaθ-a	bi-fasʿa:ħ-at-i-n	wa	tʿala:q-at-i-n
speak.PERF-3SG.M	with-eloquence-F-GEN-INDF	and	fluency-F-GEN-INDF

‘The interpreter that the two organizers know (that) you had hired spoke eloquently and fluently.’

(S602A) C = M SG, middle = M PL, T = M SG

ʔatʿ-tʿa:lib-u	ʔallaði:	ya-ʕrif-u	l-muʕalim-u:na	ʔnna-k-a	qad	sa:ʕadØ-t-a
the-student.M.SG-NOM	that.M.SG	3IMP-know-IND.SG.M	the-teacher.M-PL.NOM	that-2SG-M	ASRT	help.PERF-2SG-M

daras-a	bi-dʒidd-i-n	wa	ʔidʒtiha:dd-i-n
study.PERF-3SG.M	with-earnestness.M-GEN-INDF	and	diligence.M-GEN-INDF

‘The student that the teachers know (that) you had helped studied earnestly and diligently.’

(S603A) C = M DU, middle = M SG, T = M DU

ʔal-muwazˁzˁf-a:ni	ʔallað-a:ni	ya-ʕrif-u	l-muʃrif-u	ʔnna-k-a	qad
the-employee.M-DUAL.NOM	that.M-DUAL	3IMP-know-IND.SG.M	the-supervisor.M.SG-NOM	that-2SG-M	ASRT

tˁalabØ-t-a	ʕamilØ-a:	bi-kafa:ʔ-at-i-n	wa	ʔisˁra:r-i-n
call.PERF-2SG-M	work.PERF-3DUAL.M	with-efficiency-F-GEN-INDF	and	persistence.M-GEN-INDF

‘The two employees that the supervisor knows (that) you had called worked efficiently and persistently.’

(S604A) C = M DU, middle = M PL, T = M DU

ʔal-xabi:r-a:ni	ʔallað-a:ni	ya-ʕrif-u	l-muði:ʕ-u:na	ʔnna-k-a	qad
the-expert.M-DUAL.NOM	that.M-DUAL	3IMP-know-IND.SG.M	the-reporter.M-PL.NOM	that-2SG-M	ASRT

nasˁaħØ-t-a	taħawarØ-a:	bi-hudu:ʔ-i-n	wa	ʕaqla:niyy-at-i-n
advise.PERF-2SG-M	debate.PERF-3DUAL.M	with-calmness-M-GEN-INDF	and	rationality-F-GEN-INDF

‘The two experts that the reporters know (that) you had advised debated calmly and rationally.’

(S605A) C = M PL, middle = M SG, T = M PL

ʔal-musa:fir-u:na	ʔallað-i:na	ya-ʕrif-u	l-musʔu:l-u	ʔnna-k-a	qad
the-passenger.M-PL.NOM	that.M-PL	3IMP-know-IND.SG.M	the-officer.M.SG-NOM	that-2SG-M	ASRT

ra:faqØ-t-a	ʔintazˁarØ-u:	bi-ʔadab-i-n	wa	sˁabr-i-n
accompany.PERF-2SG-M	wait.PERF-3PL.M	with-politeness.M-GEN-INDF	and	patience.M-GEN-INDF

‘The passengers that the officer knows (that) you had accompanied waited politely and patiently.’

(S606A) C = M PL, middle = M DU, T = M PL

ʔal-muħaqqiq-u:na	ʔallað-i:na	ya-ʕrif-u	sˁ-sˁaħafiyy-a:ni	ʔnna-k-a	qad
the-investigator.M-PL.NOM	that.M-PL	3IMP-know-IND.SG.M	the-journalist.M-DUAL.NOM	that-2SG-M	ASRT

qa:balØ-t-a	ħarrafØ-u:	ʔal-waqa:ʔiʕ-a	wa	n-nata:ʔʤ-a
interview.PERF-2SG-M	distort.PERF-3PL.M	the-fact.PL-ACC	and	the-result.PL-ACC

‘The investigators that the two journalists know (that) you had interviewed distorted the facts and the results.’

(S607A) C = F SG, middle = F DU, T = F SG

ʔaʃ-ʃa:ʕir-at-u	ʔallati:	ya-ʕrif-u	sˁ-sˁadi:q-a:ni	ʔnna-k-a	qad	daʕawØ-t-a
the-poet-F.SG-NOM	that.F.SG	3IMP-know-IND.SG.M	the-friend.M-DUAL.NOM	that-2SG-M	ASRT	invite.PERF-2SG-M

ʔaðhal-at	l-muʃa:hid-i:na	wa	l-muʃtarik-i:na
amaze.PERF-3SG.F	the-spectator.M-PL.ACC	and	the-participant.M-PL.ACC

‘The poet that two friends know (that) you had invited amazed the spectators and the participants.’

(S608A) C = F SG, middle = F PL, T = F SG

ʔal-mutasa:biq-at-u	ʔallati:	ya-ʕrif-u	l-muħakkim-u:na	ʔnna-k-a	qad
the-contestant-F.SG-NOM	that.F.SG	3IMP-know-IND.SG.M	the-judge.M-PL.NOM	that-2SG-M	ASRT

madaħØ-t-a	ʔaʤa:b-at	bi-fitˁn-at-i-n	wa	ħirsˁ-i-n
praise.PERF-2SG-M	answer.PERF-3SG.F	with-shrewdness-F-GEN-INDF	and	attentiveness.M-GEN-INDF

‘The contestant that the judges know (that) you had praised answered shrewdly and attentively.’

(S609A) C = F DU, middle = F SG, T = F DU

ʔal-ʕa:lim-at-a:ni	ʔallat-a:ni	ya-ʕrif-u	r-raʔi:ss-u	ʔnna-ka	qad
the-scientist-F-DUAL.NOM	that.F-DUAL	3IMP-know-IND.SG.M	the-president.M.SG-NOM	that-2SG.M	ASRT

karramØ-t-a	tafawwaq-ata:	bi-tˁ-tˁib-i	wa	l-ʔadab-i
honour.PERF-2SG-M	excel.PERF-3DUAL.F	with-the-medicine.M-GEN	and	the-literature.M.SG-GEN

‘The two scientists that the president knows (that) you had honoured excelled in medicine and literature.’

(S610A) C = F DU, middle = F PL, T = F DU

ʔal-muraʃʃaħ-at-a:ni	ʔallat-a:ni	ya-ʕrif-u	l-muwatˁin-u:na	ʔnna-k-a	qad
the-candidate-F-DUAL.NOM	that.F-DUAL	3IMP-know-IND.SG.M	the-citizen.M-PL.NOM	that-2SG-M	ASRT

zurØ-t-a	qaddar-ata:	d-daʕm-a	wa	l-muʃa:rak-at-a
visit.PERF-2SG-M	value.PERF-3DUAL.F	the-support.M-ACC	and	the-participation-F.SG-ACC

‘The two candidates that the citizens know (that) you had visited valued the support and the participation.’

(S611A) C = F PL, middle = F SG, T = F PL

ʔal-muwazˁzˁf-a:t-u	ʔallawa:ti:	ya-ʕrif-u	l-mudi:r-u	ʔnna-k-a	qad
the-employee-F.PL-NOM	that.F.PL	3IMP-know-IND.SG.M	the-manager.M.SG-NOM	that-2SG-M	ASRT

raʃʃahØ-t-a	ʃa:rakØ-na	bi-naʃa:tˁ-i-n	wa	ħama:s-i-n
nominate.PERF-2SG-M	participate.PERF-3PL.F	with-activeness.M-GEN-INDF	and	enthusiasm.M-GEN-INDF

‘The employees that the manager knows (that) you had nominated participated actively and enthusiastically.’

(S612A) C = F PL, middle = F DU, T = F PL

ʔal-mura:sil-a:t-u	ʔallawa:ti:	ya-ʕrif-u	l-muħarrir-a:ni	ʔnna-k-a	qad	baʕaθØ-t-a
the-reporter-F.PL-NOM	that.F.PL	3IMP-know-IND.SG.M	the-editor.M-DUAL.NOM	that-2SG-M	ASRT	send.PERF-2SG-M

ʔiltazamØ-na	bi-l-qawaʔid-i	wa	l-ʔanzˁim-at-i
Adhere.PERF-3PL.F	with-the-rule.PL-GEN	and	the-regulation-F.PL-GEN

‘The reporter that the two editors know (that) you had sent adhered to the rules and regulations.’

1.2 Ungrammatical Gender

(S601G) C = M SG, middle = M DU, T = F SG

ʔal-mutardʒim-u	ʔallaði:	ya-ʕrif-u	l-munazʿzʿim-a:ni	ʔnna-k-a	qad
the-interpreter.M.SG-NOM	that.M.SG	3IMP-know-IND.SG.M	the-organizer.M-DUAL.NOM	that-2SG-M	ASRT

wazʿzʿafØ-t-a	taħaddaθ-atØ	bi-fasʿa:ħ-at-i-n	wa	tʿala:q-at-i-n
hire.PERF-2SG-M	speak.PERF-3SG.F	with-eloquence-F-GEN-INDF	and	fluency-F-GEN-INDF

‘The interpreter that the two organizers know (that) you had hired spoke eloquently and fluently.’

(S602G) C = M SG, middle = M PL, T = F SG

ʔatʿ-tʿa:lib-u	ʔallaði:	ya-ʕrif-u	l-muʕalim-u:na	ʔnna-k-a	qad	sa:ʕadØ-t-a
the-student.M.SG-NOM	that.M.SG	3IMP-know-IND.SG.M	the-teacher.M-PL.NOM	that-2SG-M	ASRT	help.PERF-2SG-M

daras-atØ	bi-ʤidd-i-n	wa	ʔiʤtiha:dd-i-n
study.PERF-3SG.F	with-earnestness.M-GEN-INDF	and	diligence.M-GEN-INDF

‘The student that the teachers know (that) you had helped studied earnestly and diligently.’

(S603G) C = M DUAL, middle = M SG, T = F DUAL

ʔal-muwazˁzˁf-a:ni	ʔallað-a:ni	ya-ʕrif-u	l-muʃrif-u	ʔnna-k-a	qad
the-employee.M-DUAL.NOM	that.M-DUAL	3IMP-know-IND.SG.M	the-supervisor.M.SG-NOM	that-2SG-M	ASRT

tˁalabØ-t-a	ʕamil-ata:	bi-kafa:ʔ-at-i-n	wa	ʔisˁra:r-i-n
call.PERF-2SG-M	work.PERF-3DUAL.F	with-efficiency-F-GEN-INDF	and	persistence.M-GEN-INDF

‘The two employees that the supervisor knows (that) you had called worked efficiently and persistently.’

(S604G) C = M DUAL, middle = M PL, T = F DUAL

ʔal-xabi:r-a:ni	ʔallað-a:ni	ya-ʕrif-u	l-muði:ʕ-u:na	ʔnna-k-a	qad
the-expert.M-DUAL.NOM	that.M-DUAL	3IMP-know-IND.SG.M	the-reporter.M-PL.NOM	that-2SG-M	ASRT

nasˁaħØ-t-a	taħawar-ata:	bi-hudu:ʔ-i-n	wa	ʕaqla:niyy-at-i-n
advise.PERF-2SG-M	debate.PERF-3DUAL.F	with-calmness-M-GEN-INDF	and	rationality-F-GEN-INDF

‘The two experts that the reporters know (that) you had advised debated calmly and rationally.’

(S605G) C = M PL, middle = M SG, T = F PL

ʔal-musa:fir-u:na	ʔallað-i:na	ya-ʕrif-u	l-musʔu:l-u	ʔnna-k-a	qad
the-passenger.M-PL.NOM	that.M-PL	3IMP-know-IND.SG.M	the-officer.M.SG-NOM	that-2SG-M	ASRT

ra:faqØ-t-a	ʔintazʕarØ-na	bi-ʔadab-i-n	wa	sʕabr-i-n
accompany.PERF-2SG-M	wait.PERF-3PL.F	with-politeness.M-GEN-INDF	and	patience.M-GEN-INDF

'The passengers that the officer knows (that) you had accompanied waited politely and patiently.'

(S606G) C = M PL, middle = M DUAL, T = F PL

ʔal-muħaqqiq-u:na	ʔallað-i:na	ya-ʕrif-u	sʕ-sʕaħafiyy-a:ni	ʔnna-k-a	qad
the-investigator.M-PL.NOM	that.M-PL	3IMP-know-IND.SG.M	the-journalist.M-DUAL.NOM	that-2SG-M	ASRT

qa:balØ-t-a	ħarafØ-na	l-waqa:ʔiʕ-a	wa	n-nata:ʔʤ-a
interview.PERF-2SG-M	distort.PERF-3PL.F	the-fact.PL-ACC	and	the-result.PL-ACC

'The investigators that the two journalists know (that) you had interviewed distorted the facts and the results.'

(S607G) C = F SG, middle = F DUAL, T = M SG

ʔaʃ-ʃa:ʕir-at-u	ʔallati:	ya-ʕrif-u	sˁ-sˁadi:q-a:ni	ʔnna-k-a	qad	daʕawØ-t-a
the-poet-F.SG-NOM	that.F.SG	3IMP-know-IND.SG.M	the-friend.M-DUAL.NOM	that-2SG-M	ASRT	invite.PERF-2SG-M

ʔaðhal-a	l-muʃa:hid-i:na	wa	l-muʃtarik-i:na
amaze.PERF-3SG.M	the-spectator.M-PL.ACC	and	the-participant.M-PL.ACC

‘The poet that two friends know (that) you had invited amazed the spectators and the participants.’

(S608G) C = F SG, middle = F PL, T = M SG

ʔal-mutasa:biq-at-u	ʔallati:	ya-ʕrif-u	l-muħakkim-u:na	ʔnna-k-a	qad	madaħØ-t-a
the-contestant-F.SG-NOM	that.F.SG	3IMP-know-IND.SG.M	the-judge.M-PL.NOM	that-2SG-M	ASRT	praise.PERF-2SG-M

ʔadʒa:b-a	bi-fitˁn-at-i-n	wa	ħirsˁ-i-n
answer.PERF-3SG.M	with-shrewdness-F-GEN-INDF	and	attentiveness.M-GEN-INDF

‘The contestant that the judges know (that) you had praised answered shrewdly and attentively.’

(S609G) C = F DUAL, middle = F SG, T = M DUAL

ʔal-ʕa:lim-at-a:ni	ʔallat-a:ni	ya-ʕrif-u	r-raʔi:ss-u	ʔnna-ka	qad	karramØ-t-a
the-scientist-F-DUAL.NOM	that.F-DUAL	3IMP-know-IND.SG.M	the-president.M.SG-NOM	that-2SG.M	ASRT	honour.PERF-2SG-M

tafawaqa-a:	bi-tˁ-tˁib-i	wa	l-ʔadab-i
excel.PERF-3DUAL.M	with-the-medicine.M-GEN	and	the-literature.M.SG-GEN

‘The two scientists that the president knows (that) you had honoured excelled in medicine and literature.’

(S610G) C = F DUAL, middle = F PL, T = M DUAL

ʔal-muraʃʃaħ-at-a:ni	ʔallat-a:ni	ya-ʕrif-u	l-muwatˁin-u:na	ʔnna-k-a	qad	zurØ-t-a
the-candidate-F-DUAL.NOM	that.F-DUAL	3IMP-know-IND.SG.M	the-citizen.M-PL.NOM	that-2SG-M	ASRT	visit.PERF-2SG-M

qaddara-a:	d-daʕm-a	wa	l-muʃa:rak-at-a
value.PERF-3DUAL.M	the-support.M-ACC	and	the-participation-F.SG-ACC

‘The two candidates that the citizens know (that) you had visited valued the support and the participation.’

(S611G) C = F PL, middle = F SG, T = M PL

ʔal-muwazˁzˁf-a:t-u	ʔallawa:ti:	ya-ʕrif-u	l-mudi:r-u	ʔnna-k-a	qad
the-employee-F.PL-NOM	that.F.PL	3IMP-know-IND.SG.M	the-manager.M.SG-NOM	that-2SG-M	ASRT

raʃʃahØ-t-a	ʃa:rakØ-u:	bi-naʃa:tˁ-i-n	wa	ħama:s-i-n
nominate.PERF-2SG-M	participate.PERF-3PL.M	with-activeness.M-GEN-INDF	and	enthusiasm.M-GEN-INDF

'The employees that the manager knows (that) you had nominated participated actively and enthusiastically.'

(S612G) C = F PL, middle = F DUAL, T = M PL

ʔal-mura:sil-a:t-u	ʔallawa:ti:	ya-ʕrif-u	l-muħarrir-a:ni	ʔnna-k-a	qad	baʕaθØ-t-a
the-reporter-F.PL-NOM	that.F.PL	3IMP-know-IND.SG.M	the-editor.M-DUAL.NOM	that-2SG-M	ASRT	send.PERF-2SG-M

ʔiltazamØ-u:	bi-l-qawaʔid-i	wa	l-ʔanzˁim-at-i
adhere.PERF-3PL.M	with-the-rule.PL-GEN	and	the-regulation-F.PL-GEN

'The reporter that the two editors know (that) you had sent adhered to the rules and regulations.'

1.3 Ungrammatical Number

(S601N) C = M SG, middle = M DU, T = M PL

ʔal-mutardʒim-u	ʔallaði:	ya-ʕrif-u	l-munazʿzʿim-a:ni	ʔnna-k-a	qad
the-interpreter.M.SG-NOM	that.M.SG	3IMP-know-IND.SG.M	the-organizer.M-DUAL.NOM	that-2SG-M	ASRT

wazʿzʿafØ-t-a	taħaddaθØ-u:	bi-fasʿa:ħ-at-i-n	wa	tʿala:q-at-i-n
hire.PERF-2SG-M	speak.PERF-3PL.M	with-eloquence-F-GEN-INDF	and	fluency-F-GEN-INDF

‘The interpreter that the two organizers know (that) you had hired spoke eloquently and fluently.’

(S602N) C = M SG, middle = M PL, T = M PL

ʔatʿ-tʿa:lib-u	ʔallaði:	ya-ʕrif-u	l-muʕalim-u:na	ʔnna-k-a	qad	sa:ʕadØ-t-a
the-student.M.SG-NOM	that.M.SG	3IMP-know-IND.SG.M	the-teacher.M-PL.NOM	that-2SG-M	ASRT	help.PERF-2SG-M

darasØ-u:	bi-dʒidd-i-n	wa	ʔidʒtiha:dd-i-n
study.PERF-3PL.M	with-earnestness.M-GEN-INDF	and	diligence.M-GEN-INDF

‘The student that the teachers know (that) you had helped studied earnestly and diligently.’

(S603N) C = M DUAL, middle = M SG, T = M SG

ʔal-muwazˁzˁf-a:ni	ʔallað-a:ni	ya-ʕrif-u	l-muʃrif-u	ʔnna-k-a	qad
the-employee.M-DUAL.NOM	that.M-DUAL	3IMP-know-IND.SG.M	the-supervisor.M.SG-NOM	that-2SG-M	ASRT

tˁalabØ-t-a	ʕamil-a	bi-kafa:ʔ-at-i-n	wa	ʔisˁra:r-i-n
call.PERF-2SG-M	work.PERF-3SG.M	with-efficiency-F-GEN-INDF	and	persistence.M-GEN-INDF

‘The two employees that the supervisor knows (that) you had called worked efficiently and persistently.’

(S604N) C = M DUAL, middle = M PL, T = M SG

ʔal-xabi:r-a:ni	ʔallað-a:ni	ya-ʕrif-u	l-muði:ʕ-u:na	ʔnna-k-a	qad	nasˁaħØ-t-a
the-expert.M-DUAL.NOM	that.M-DUAL	3IMP-know-IND.SG.M	the-reporter.M-PL.NOM	that-2SG-M	ASRT	advise.PERF-2SG-M

taħa:war-a	bi-hudu:ʔ-i-n	wa	ʕaqla:niyy-at-i-n
debate.PERF-3SG.M	with-calmness-M-GEN-INDF	and	rationality-F-GEN-INDF

‘The two experts that the reporters know (that) you had advised debated calmly and rationally.’

(S605N) C = M PL, middle = M SG, T = M DUAL

ʔal-musa:fir-u:na	ʔallað-i:na	ya-ʕrif-u	l-musʔu:l-u	ʔnna-k-a	qad	ra:faqØ-t-a
the-passenger.M-PL.NOM	that.M-PL	3IMP-know-IND.SG.M	the-officer.M.SG-NOM	that-2SG-M	ASRT	accompany.PERF-2SG-M

ʔintazʕar-a:	bi-ʔadab-i-n	wa	sʕabr-i-n
wait.PERF-3DUAL.M	with-politeness.M-GEN-INDF	and	patience.M-GEN-INDF

‘The passengers that the officer knows (that) you had accompanied waited politely and patiently.’

(S606N) C = M PL, middle = M DUAL, T = M DUAL

ʔal-muħaqqiq-u:na	ʔallað-i:na	ya-ʕrif-u	sʕ-sʕaħafiyy-a:ni	ʔnna-k-a	qad
the-investigator.M-PL.NOM	that.M-PL	3IMP-know-IND.SG.M	the-journalist.M-DUAL.NOM	that-2SG-M	ASRT

qa:balØ-t-a	ħarraf-a:	l-waqa:ʔiʕ-a	wa	n-nata:ʔʤ-a
interview.PERF-2SG-M	distort.PERF-3DUAL.M	the-fact.PL-ACC	and	the-result.PL-ACC

‘The investigators that the two journalists know (that) you had interviewed distorted the facts and the results.’

(S607N) C = F SG, middle = F DUAL, T = F PL

ʔaʃ-ʃa:ʕir-at-u	ʔallati:	ya-ʕrif-u	sˁ-sˁadi:q-a:ni	ʔnna-k-a	qad	daʕawØ-t-a
the-poet-F.SG-NOM	that.F.SG	3IMP-know-IND.SG.M	the-friend.M-DUAL.NOM	that-2SG-M	ASRT	invite.PERF-2SG-M

ʔaðhalØ-na	l-muʃa:hid-i:na	wa	l-muʃtarik-i:na
amaze.PERF-3PL.F	the-spectator.M-PL.ACC	and	the-participant.M-PL.ACC

‘The poet that two friends know (that) you had invited amazed the spectators and the participants.’

(S608N) C = F SG, middle = F PL, T = F PL

ʔal-mutasa:biq-at-u	ʔallati:	ya-ʕrif-u	l-muħakkim-u:na	ʔnna-k-a	qad	madaħØ-t-a
the-contestant-F.SG-NOM	that.F.SG	3IMP-know-IND.SG.M	the-judge.M-PL.NOM	that-2SG-M	ASRT	praise.PERF-2SG-M

ʔadʒa:bØ-na	bi-fitˁn-at-i-n	wa	ħirsˁ-i-n
answer.PERF-3PL.F	with-shrewdness-F-GEN-INDF	and	attentiveness.M-GEN-INDF

‘The contestant that the judges know (that) you had praised answered shrewdly and attentively.’

(S609N) C = F DUAL, middle = F SG, T = F SG

ʔal-ʕa:lim-at-a:ni	ʔallat-a:ni	ya-ʕrif-u	r-raʔi:ss-u	ʔnna-ka	qad
the-scientist-F-DUAL.NOM	that.F-DUAL	3IMP-know-IND.SG.M	the-president.M.SG-NOM	that-2SG.M	ASRT

karramØ-t-a	tafawwaqa-atØ	bi-tˤ-tˤib-i	wa	l-ʔadab-i
honour.PERF-2SG-M	excel.PERF-3SG.F	with-the-medicine.M-GEN	and	the-literature.M.SG-GEN

‘The two scientists that the president knows (that) you had honoured excelled in medicine and literature.’

(S610N) C = F DUAL, middle = F PL, T = F SG

ʔal-muraʃʃaħ-at-a:ni	ʔallat-a:ni	ya-ʕrif-u	l-muwatˤin-u:na	ʔnna-k-a	qad
the-candidate-F-DUAL.NOM	that.F-DUAL	3IMP-know-IND.SG.M	the-citizen.M-PL.NOM	that-2SG-M	ASRT

zurØ-t-a	qaddar-atØ	d-daʕm-a	wa	l-muʃa:rak-at-a
visit.PERF-2SG-M	value.PERF-3SG.F	the-support.M-ACC	and	the-participation-F.SG-ACC

‘The two candidates that the citizens know (that) you had visited valued the support and the participation.’

(S611N) C = F PL, middle = F SG, T = F DUAL

ʔal-muwazˁzˁf-a:t-u	ʔallawa:ti:	ya-ʕrif-u	l-mudi:r-u	ʔnna-k-a	qad
the-employee-F.PL-NOM	that.F.PL	3IMP-know-IND.SG.M	the-manager.M.SG-NOM	that-2SG-M	ASRT

raʃʃahØ-t-a	ʃa:rak-ata:	bi-naʃa:tˁ-i-n	wa	ħama:s-i-n
nominate.PERF-2SG-M	participate.PERF-3DUAL.F	with-activeness.M-GEN-INDF	and	enthusiasm.M-GEN-INDF

'The employees that the manager knows (that) you had nominated participated actively and enthusiastically.'

(S612N) C = F PL, middle = F DUAL, T = F DUAL

ʔal-mura:sil-a:t-u	ʔallawa:ti:	ya-ʕrif-u	l-muħarrir-a:ni	ʔnna-k-a	qad	baʕaθØ-t-a
the-reporter-F.PL-NOM	that.F.PL	3IMP-know-IND.SG.M	the-editor.M-DUAL.NOM	that-2SG-M	ASRT	send.PERF-2SG-M

ʔiltazam-ata:	bi-l-qawaʔid-i	wa	l-ʔanzˁim-at-i
Adhere.PERF-3DUAL.F	with-the-rule.PL-GEN	and	the-regulation-F.PL-GEN

'The reporter that the two editors know (that) you had sent adhered to the rules and regulations.'