Modular and Extra-modular Second Language Knowledge of Unaccusativity and Unergativity by Najdi Arabic L2 Learners of English

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To Deem and Nawaf, for the love and the laughs.

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Abstract

The existence of two types of second language knowledge, namely acquired and learned, implicit and explicit (or more accurately, modular and extra-modular second-language knowledge) has long been accepted by different theories within the field of second language acquisition. However, this consensus is hampered in part by a lack of empirical evidence of how each type of second language might manifest itself in the production and comprehension of the second-language learner. Adopting the Modular Cognitive Framework (Truscott & Sharwood Smith, 2004a; 2004b), this thesis aims to establish a detailed account of the nature of development of the two types of knowledge; how different input experiences stimulate the development of different types of L2 knowledge. The thesis also aims to explore how L1 cross-linguistic influence would fade with more frequent encounters with L2. The linguistic constructions tested are unaccusative and unergative verbs. The basis of choosing the linguistic constructions is the L2 English classroom practice of oversimplifying the notion of intransitivity and avoiding explicit teaching of syntactic and semantic aspects of the unaccusative and its argument. The study incorporates two empirical tasks measuring L2 comprehension and production: a reaction-time reading comprehension task, comparing Najdi Arabic L2 English learners' response time to sentences with unaccusative verbs compared to response time to sentences with unergative verbs and an error-correction and rule-verbalisation task comparing Najdi Arabic learners' ability to correct ungrammatical sentences with unaccusative verbs compared to correcting ungrammatical sentences with unergative verbs. Findings from the current experimental study supports what the Competing Systems Hypothesis (Rothman, 2008) seems to suggest: while L2 production could be guided by both modular as well as extra-modular L2 knowledge, L2 comprehension could only be guided by modular L2 knowledge.

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List of Abbreviations and Acronyms

ANOVA	Analysis of variance
APT	Acquisition by Processing Theory
AS	Auditory Structure
CESL	Centre of English as a Second Language
CL	Corpus Linguistics
CP	Complimentizer Phrase
CS	Conceptual Structure
CSH	Competing Systems Hypothesis
ESL	English as a second language
FP	Functional Phrase
FTFA	Full Transfer Full Access
GB	Government Binding
IP	Inflection Phrase
L1	First Language
L2	Second Language
LLB	Learned Linguistic Behaviour
LLK	Learned Linguistic Knowledge
LTM	Long Term Memory
MCF	Modular Cognitive Framework
MOGUL	Modular Online Growth and Use of Language
ND	Negative data
NegP	Negation Phrase
NP	Noun Phrase
PLD	Primary Linguistic Data
POpS	Perceptual Output Structure
PS	Phonological Structure
RT	Reaction time
SLA	Second Language Acquisition
SS	Syntactic Structure
TESOL	Teaching English as a Second Language
TOEFL	Test of English as a Foreign Language
UG	Universal Grammar
UTAH	Uniformity of Theta Assignment Hypothesis
VP	Verb Phrase
WM	Working Memory

Chapter 1   Introduction

1.1   Inspiration

As a second-language speaker, I have always been fascinated by language in my own mind; the interaction between Arabic (my mother tongue) and English, and what I used to think of as the 'mismatch' between the English in my head and what I was capable of producing in unprompted daily conversations. I used to express a fairly understandable but ungrammatical English during conversation, followed by a phase of self-reflection (and mostly frustration) around the difficulty I had in using the knowledge I already had. I used to 'study' English grammar books from cover to cover, thinking of them as easy to understand, but this knowledge did not seem to work effectively for unplanned events where I had to communicate in English. Instead, it only added to what I would call after-conversation over-analysing.

Before becoming a linguist, it occurred to me that there were actually two processes underway in my mind: one rich mass of knowledge that was only available when I had enough time and another unknown, undefined mass of knowledge that took control in more spontaneous communication. The former was accessible; I could clearly see and reflect upon it, but the latter puzzled me as I could not consciously see or know its limitations and boundaries or how to improve it, as one time I might say "Marcia *loves* pizza", and another I might say "Marcia *love* pizza". As a learner, this was a challenge, because it is difficult to know whether or not this mysterious system has acquired the third person singular present tense. This is exactly what directed me towards the field of linguistics and what inspired this thesis: to explore what language is, and how those two different types of language knowledge are developed and processed.

1.2   The study

The goal of this thesis is to explore how input stimulates the development of different types of second-language knowledge. It presents a detailed study of English unaccusativity and unergativity in the production and comprehension of Najdi Arabic L2 learners of English. The thesis pioneers the in-depth study of the mental representations of unaccusativity and unergativity in different stages of development of a second language, using the Modular Cognitive Framework (MCF – previously referred to as Modular Online Growth and Use of Language or MOGUL) (Truscott & Sharwood Smith, 2004a; 2004b). The thesis directs attention to the type of L2 knowledge behind L2 production and L2 comprehension; that is, what type of L2 knowledge might guide L2 production and what type of L2 knowledge might guide L2 comprehension. This particular issue seems to be overlooked by generative research, where the type of L2 knowledge which is typically studied is, mostly, assumed to be modular L2 knowledge within the language faculty. In this thesis, emphasis is placed on investigating the right

linguistic structure in an attempt to identify what type of L2 knowledge is guiding L2 production and L2 comprehension.

The choice to investigate two classes of intransitive verbs is based on the fact that L2 English teaching of intransitivity is pedagogically oversimplified. In a classroom setting, for example, the intransitive verb is introduced paired with the transitive verb, with the distinction between the two being the in/ability to take an object. This grammatical rule can only be applied to the unergative class of intransitives (e.g. *the baby cried*). However, this is not the case with the unaccusative class of intransitive verbs. Learning unaccusative structure might not be straightforward for L2 English learners because what is in the subject position (e.g. *the window broke*) in an unaccusative construction is not the action doer but a semantic object. What might add to the learner's confusion are encounters with the input to sentences such as *the window is broken,* where pedagogical rules are explicit about the movement of the object to the subject position and the requirement of functional morphology to mark the verb as passive. Again, this is not the case with unaccusative verbs – a structure that is not explicitly taught in the language classroom. That is, there is no pedagogical instruction on the use of unaccusative verb and its arguments neither in the current English classroom nor in English grammar books. Learning unaccusative verbs is especially challenging for L1 Arabic learners of L2 English, because Arabic assigns specific morphemes to mark unaccusativity.

The assumption held in the current thesis is that developing L2 knowledge for unaccusative structure would happen naturalistically; triggered purely by the grasp of the meanings and concepts related to the unaccusative verb itself. This might stimulate the development of modular L2 knowledge inside the language faculty, which will be referred to here as Modular Implicit L2 Knowledge. On the other hand, the development of L2 knowledge for unergative structure might benefit from the metalinguistic knowledge encountered in the classroom, which might stimulate the development of metalinguistic knowledge outside the language faculty, referred to in this thesis as Extra-modular Implicit L2 Knowledge (if this type of knowledge is procedural, placing no heavy burden on memory) or Extra-modular Explicit L2 Knowledge (if this type of knowledge is still declarative). Thus, investigating these two structures would allow the neatest possible comparison between Modular and Extra-modular types of L2 knowledge; their growth and interactions (if any). This is explored through experimental data from Najdi Arabic L2 learners of English within different stages of L2 development.

1.3 Theoretical Framework (MCF) and theoretical assumptions

There seems to be a strong consensus, since Krashen, that there are two types of language knowledge affecting the production of the second language, namely learned

and acquired knowledge. Since then, generative research seems to widely accept this notion, but with no attempts to tease these two types of knowledge apart when conducting empirical research. This is due to the difficulty of distinguishing between the two types of language knowledge during second-language production or comprehension. It is difficult to empirically test whether acquired or learned knowledge is in charge of language production and comprehension. The effect has been that these two types of language knowledge are, at best, taken for granted in the field of second-language acquisition (SLA), and have therefore gone empirically unexplored and under-theorised.

The complexity of the notion seem extremely difficult to test, but exploring the nature and workings of each of these two types of knowledge, and the type of L2 input that might stimulate the development of each of them, adds depth to our understanding of a core part of SLA: the second-language learner. Thus, we are in need of a detailed mental framework, within which the two types of L2 knowledge can be discussed in terms of how they develop and interact. The current thesis pioneers a more detailed view of these two types of L2 knowledge, benefiting from the mental architecture offered by MCF (Truscott & Sharwood Smith, 2004a; Truscott & Sharwood Smith, 2004b; Sharwood Smith & Truscott, 2014; Truscott, 2015a; 2017). While MCF is a theoretically driven framework, it seems to be the most detailed account available of how language works within a broader understanding of the mechanisms of mind. This is why it is seen as an ideal framework for the discussion of the two types of L2 knowledge and how they interact. MOGUL is the part of the framework that specialises in language and seems to be the most suitable theoretical account to tease apart modular and extra-modular types of L2 knowledge. The MCF framework proposes a mental architecture that can account for generative as well as cognitive views of the two types of second-language knowledge and of SLA in general. The cognitive approach to language development is more processing-driven than the generative approach, which tends to explore second-language knowledge itself, with no serious concerns of how this knowledge develops. MOGUL (the part of the framework specialise in language) posits a (generative) module of language that is distinct from other cognitive processes and not available to consciousness, which explains the acquired type of L2 knowledge (Truscott & Sharwood Smith, 2004a; 2004b). The framework can also explain the learned type of L2 knowledge through a proposed conceptual system that can accommodate metalinguistic L2 knowledge.

While this thesis assumes an innate language module for language development in the understanding of the generative approach, it also assumes a cognitive mental architecture to explore questions of inner processes of the domain-specific language module and the more domain-general mental system operating in adult second-language

development. In my point of view, the two can be seen as compatible, regardless of the conventional view that it has to be one or the other. For this particular reason, it is thought that MCF, with its innateness-of-language orientation and its emphasis on of the process of language development, is the most suitable theoretical framework to facilitate the current investigation.

Following Sharwood Smith & Truscott (2006), this thesis advances a view of first-language transfer, within which it is assumed that syntactic representations of the L1 co-exist with L2 representations in the syntactic store of the language faculty. This would imply that L1 representations are not transferred from one location to another, rather L1 and L2 representations are stored in one place. Findings from the current data suggest that the initial state of L2 development is very much guided by L1 representations. Adopting MCF, the question would not be whether there are effects on L1 transfer, but how this L1 cross-linguistic influence would fade with increased L2 encounters. Based on the data from the current study, L1 cross-linguistic influence would disappear through frequent internal register of the target L2 feature in the modular system. Frequency of occurrence in the external input does not seem to correlate with accuracy of performance from the participants of the current study as supported by the results from participants and the corpus test. L1 cross-linguistic influence would also fade from the learned system through explicit instructed input, as supported by the higher accuracy in responses from the beginner and intermediate group in unergative verbs than their responses in unaccusative verbs, but their lower accuracy in responses in unergative verbs than unaccusative verbs in the advanced group.

Results from the current data also seem to suggest that while at the level of production the two types of knowledge might work simultaneously to contribute to the second-language performance, at the level of level of comprehension it would be the workings of acquired or modular knowledge which might contribute to second-language comprehension. These findings support what Rothman's (2008) Competing System Hypothesis (CSH) seems to suggest: that effects of learned knowledge can only be evident during L2 production, and not L2 comprehension. However, CSH has not been very clear in this regard. For this reason, I develop a more detailed view of CSH within the current view of the two types of L2 knowledge, benefiting from the detailed account of language development offered by MCF. I also make use of theories of psychology (Baars 1988; McGovern & Baars 2007) to arrive at the best possible explanation of the current findings; why learned knowledge would intervene at the level of L2 production, but not at the level of L2 comprehension.

1.4 Overview and research questions

The intent of this study is to investigate mental representations of unaccusative and unergative verbs in Najdi Arabic L2 English learners. Emphasis is placed on the effect of input on the development of acquired L2 knowledge or learned L2 knowledge, and how either type of L2 knowledge would manifest itself during L2 production and L2 comprehension. In other words, the study investigates what types of L2 knowledge might guide L2 production and L2 comprehension of unaccusative and unergative constructions. The methodology has to be carefully designed to enable the exploration of these questions. The empirical tasks of the current study were set to catch the development of these two types of knowledge from different angles. The results from the two empirical tasks together shed light on aspects of these two types of language knowledge.

Two empirical tasks were administered to a sample of Najdi Arabic L2 learners of English in Saudi Arabia and the UK to examine their L2 production and L2 comprehension. The first is a reaction-time reading comprehension task to measure response time to sentences with unaccusative verbs compared with the response time to sentences with unergative verbs. The second empirical test is an error correction and rule verbalisation task to measure Najdi Arabic learners' ability to correct ungrammatical sentences with unaccusative verbs compared to correcting ungrammatical sentences with unergative verbs. In this task, learners were also required to explain in terms of instruction-based grammatical rules why the given sentences were ungrammatical in English. The study was guided by the following core theoretical concerns:

i. extra-modular L2 knowledge intervention at the level of production;
ii. extra-modular L2 knowledge intervention at the level of comprehension;
iii. effects of L1 cross-linguistic influence, especially on the initial stage of L2 development; and
iv. metalinguistic knowledge of unaccusative verbs, as compared to unergative verbs.

These theoretical concerns were put forward for empirical investigation through the following questions:

1. Is there a difference between the ability to correct ungrammatical utterances of unergative structure compared to the ability to correct ungrammatical utterances of unaccusative structure in the production of Najdi Arabic L2 learners of English?
2. Is there a difference in the reading pace of Najdi Arabic L2 English learners between sentences with unaccusative constructions and unergative constructions?

3. Is there a difference between lower proficiency learners and higher proficiency learners with regard to their L2 knowledge of unaccusative and unergative construction?

4. Is there a difference between the ability of Arabic L2 learners to verbalise instruction-based rules about the use of unaccusative verbs compared to the ability to verbalise violated rules about the use of unergative verbs?

1.5 Organisation of the study

The rest of the thesis is organised as follows:

Chapter 2 reviews literature on the two types of second-language knowledge and how they are dealt with in both generative and cognitive approaches. It also introduces key terminology of consciousness from current theories of psychology. The chapter presents a detailed discussion of the theoretical framework adopted in the current thesis: MCF.

Chapter 3 reviews theories of L1 transfer and discusses classroom input. Chapter 3 concludes with a discussion of the CSH and its importance to the current study.

Chapter 4 reviews previous research on intransitivity and the sub-classes of intransitive verbs; unaccusative and unergative verbs. The chapter also presents some of the previous research on the SLA of unaccusative and unergative verbs.

Chapter 5 describes the experimental tasks testing Najdi Arabic L2 English learners' L2 knowledge of unaccusative and unergative verbs.

Chapter 6 reports data analysis and results from the empirical tests.

Chapter 7 discusses major findings of the study and their theoretical implications.

Chapter 8 concludes the thesis with some directions for future research.

Chapter 2   Types of Second Language Knowledge

2.1   Organisation

In this chapter I review the literature on the notion of the two types of second-language knowledge; then I discuss the importance of understanding the meaning of consciousness and its relevance to the scope of my research. I then discuss in detail the framework adopted in this thesis: Modular Cognitive Framework (MCF). Finally, I establish a detailed and thorough account of the two types of second-language knowledge in light of the framework adopted.

Section 2.3 is an overview of the discussion of the two types of second-language knowledge in the literature from a generative as well as cognitive point of view. Section 2.4 reviews the meaning of consciousness and other related concepts and their significance to the field of second-language acquisition (SLA). Section 2.5 discusses the theoretical framework, the mental architecture proposed and the place of the language faculty within this architecture. Section 2.6 revisits terminology of the two types of L2 knowledge proposed in the literature, and their meaning.

2.2   Introduction

The purpose of the current study is not only to investigate L2 linguistic performance, but also to explore what could be known about what type of L2 knowledge is involved in a certain linguistic performance. In this chapter, a comprehensive account of the difference between so-called acquired and learned L2 knowledge is reviewed as discussed in the literature. However, in any discussion of the difference between the two types of L2 knowledge, there always seems to be a reference to the concept of consciousness/awareness as a cut-point between what is acquired and what is learned. The paradox, as noted by Truscott (1998) is that the notion of consciousness or awareness is assumed to be collectively understood in the common-sense meaning of the word – that is as understood on an everyday basis without an attempt to establish a more scientific explanation of this phenomenon as the basis to defining the two types of second-language knowledge widely accepted in the field. In this chapter, I discuss the concept of consciousness from a psychological point of view to provide solid grounds for the discussion of the two types of L2 knowledge.

For the purpose of this thesis, it is also important to adopt a theoretical framework that can provide detailed explanations of the types of L2 knowledge in terms of development and processing. This must be a framework that can give insights into how these two types of knowledge develop, what mental system is responsible for the growth of each and how the two interact (if at all). This framework is MCF, which is thought to be the most appropriate framework available to accommodate the scope of the current

thesis. At the end of this chapter, the types of L2 knowledge are reconsidered in light of the framework adopted.

In the following section, I start with a review of the literature on the two types of L2 knowledge, and how they are described from a generative as well as a cognitive point of view.

2.3   Types of second-language knowledge: a historical overview

The core assumption of this thesis is the existence of two types of language knowledge working together to contribute to the final product of a second language. The starting point of this distinction between the two types of language knowledge can be traced by considering the relevance of consciousness in the research of SLA. One of the earliest to emphasise the importance of consciousness in understanding the nature of SLA was Krashen (1981; 1982; 1985)' through his 'monitor' model. Krashen suggests that there exists two types of second-language knowledge, differentiating between language acquisition and learning. For Krashen, language learning is a conscious process; language acquisition, on the other hand, is an unconscious process producing unconscious knowledge. The latter underlies the fluent and automatic use of language, whereas the former acts like a conscious monitor, modifying what the unconscious system is producing. Krashen is credited with articulating this distinction in terms of language teaching and learning, which was widely accepted in the field of SLA. In the following section, I discuss early literature on the notion of the two types of L2 knowledge to provide the basis for the investigation of the two types of L2 knowledge in the current thesis.

This notion of acquired unconscious knowledge has its roots in the theory of Universal Grammar (UG) (Chomsky 1965; 1972; 1975; 1977; 1980; 1981; 1995; 2000). Krashen's monitor model was largely based on the Chomskyan ideas of the nature of first-language acquisition. Many details of these proposals have changed greatly since Krashen developed his model, but the main idea remains: language acquisition is driven by an abstract unconscious language-specific innate module in the mind that is separated and isolated from other general cognitive modules. The theory of UG states that this innate language module mediates the acquisition of language, because it consists of universal principles general to all languages, and parameters set (and maybe reset) to specific language values. From a UG perspective, there are no reference to *learning* language, assuming that languages are acquired via the processes performed by the innate module of language. This innate module is the specialist system, which operates unconsciously, and is responsible for language acquisition.

Among UG advocates there is a consensus that the nature of language acquisition is essentially unconscious, with an agreement that learners might use other

cognitive processes to develop their metalinguistic knowledge, which assists in forming the outcome product of a second language (L2). Metalinguistic knowledge of a second language refers to the conceptual knowledge about language, which "is necessarily tied to sounds and written forms" of language (Sharwood Smith & Truscott, 2014, p. 165). Conceptual knowledge can be gained around any subject – language is no exception. Metalinguistic knowledge also refers to the knowledge of grammatical rules and regularities of how a certain language formulates, and the conventions around how we use language. From generative perspective, conscious intervention to language learning seems to have no direct influence on the acquired knowledge of a second language or unconscious syntactic/phonological development.

The early work of Schwartz (1986) was a development of Krashen's acquisition-learning distinction in a more UG-oriented approach based on Fodor's (1983) account of modularity. Schwartz (1986) suggests that what is known about mental structures is in complete harmony with Chomsky's theory of the language faculty, and Krashen's theory of the acquisition-learning distinction. Schwartz hypothesises two types of knowledge: linguistic competence, which refers to the knowledge in the language faculty/module, and learned linguistic knowledge (LLK), which refers to Krashen's conscious learned knowledge. Schwartz (1986) adopted Fodor's theory of mind as a framework and put Krashen's acquisition-learning distinction into it. Language acquisition refers to processes taking place in the specialist system built for language (i.e. the language faculty), while language learning refers to processes taking place outside the specialist system domain. Language acquisition refers to the knowledge that is encapsulated in the language module, and language learning refers to conscious beliefs about the rules and regularities of language. These two types of knowledge are qualitatively different, as stated by Schwartz (1993), and this difference views learned knowledge and acquired knowledge as two forever-separated entities in the mind, introducing the notion of the 'no-interface' position in generative research, which will be discussed in detail in section 2.3.4.

Since the focus of generative research is fundamentally on acquired knowledge (because it is assumed to operate within UG constrains to develop linguistic competence), Schwartz maintained that a learner can never be said to have true language if the grammar of that language is not yet "cognized": "that is only when the knowledge underlying language is both unconscious and inferentially unintegrated" (Schwartz, 1986, p. 144). This, in fact, shows the assumption generative researchers hold that conscious learning serves to provide mere metalinguistic knowledge outside the language faculty, the innate module where the majority of language processes would take place.

Schwartz (1993) distinguishes the overt linguistic behaviour from the underlying knowledge system, and maintains that performance does not necessarily reflect competence, but should, to a certain extent, give indications of underlying competence. Schwartz (1993) differentiated between two types of language knowledge and two types of linguistic behaviours: i) *performance,* the linguistic behaviour that is directed by *competence*; ii) *learned linguistic behaviour (LLB)* that is directed by *LLK.* The former corresponds to Krashen's unconscious knowledge, and the latter to conscious learning. This distinction enables Schwartz to account for the reason why explicit and negative data can cause changes in L2 learners' linguistic behaviour. She maintains that explicit and negative data can cause change in *LLK*, and not necessarily in *linguistic competence*. Any changes in the linguistic behaviour of L2 learners – especially at early stages of second-language exposure – would not indicate any linguistic development in second-language competence. Negative data, in this sense, refers to sentences that are ungrammatical in a certain language; explicit data refers to the descriptive information about the rules and regularities of a certain language; and positive data refers to sentences that are grammatical in a certain language. The latter type of data would positively affect and give rise to linguistic competence. Facts and descriptive data about the grammaticality and ungrammaticality of a target language, however, would not cause change in the linguistic competence of a second language.

Schwartz (1993) further investigates the notion of negative and explicit data in relation to Fodor's theory of the modularity of mind. She refers to a key principle in defining a module in Fodor's theory, which is *information encapsulation;* a principle that is also relevant to the framework adopted to explain the current empirical data (the framework is discussed in more detail in section 2.5)*.* This principle of *information encapsulation* outlines a module as fundamentally autonomous, that is, its processes do not interact with any other cognitive processes in the mind. In the case of the language module, explicit descriptive data about the language is not readable and cannot be processed by the code of the language module. Schwartz assumes that what gets fed into the L2 language module is the *primary linguistic data* (PLD) (i.e. positive data), making no difference between L1 and L2 in the process of constructing grammar. This aspect of *information encapsulation* disallows negative and explicit data in the language module; as it can only read a certain type of input – primary linguistic knowledge. Negative and explicit data, however, is processed and stored in the *central processing system*. What gets into the language faculty are the instances of language that carry these pieces of information (the utterances themselves). Information about the rules and regularities of a target language are somehow available in the mind (through explicit data), but the problem is that the language module cannot process and store them because such data violates the codes of the module. Schwartz interpreted this as a

"translation problem" (1993, p. 158) as this data needs to be transformed into different kind of data that the language module can read. This means, as suggested by Schwartz, that the development of linguistic competence or acquired knowledge is solely driven by primary linguistic knowledge (i.e. positive data), but not by explicit and negative data.

Traditionally, acquired knowledge has been the focus of generative research because of its interest in UG constrained second-language knowledge. This is because learned knowledge is seen as irrelevant to the development of L2 linguistic competence. The result is that the issue of the relationship between acquired and learned knowledge has not received much attention or discussion in the field. SLA's traditional goal could have been expected to focus on what cannot be instructed (White, 2003). Recently, generative researchers have developed an interest in investigating acquired as well as learned L2 knowledge and the effect of each on the final product of L2 (for example, Rothman, 2008; Whong et al., 2013; 2014; Marsden et al., 2018).

Opposing theoretical orientations assuming indistinctness of language from other types of knowledge such as cognitive research assumes similar distinctions between implicit and explicit knowledge. However, these two types of knowledge are both seen as a product of learning with no domain-specialist process (i.e. acquisition) that is any distinct from learning (N. Ellis, 1994; 2005). Thus, language learning can result in explicit knowledge as well as implicit knowledge, depending on the type of input being encountered (the issue of input will be discussed in more detail in Chapter 3). In the following two sections, I first discuss the generative acquisition-learning distinction, where empirical research that is interpreted as evidence to this distinction is integrated throughout the discussion. Then, the distinction between implicit and explicit learning within the cognitive approach is discussed.

2.3.1 The acquired-learned distinction

As mentioned above, within the generative approach, the distinction between the two types of language knowledge is referred to as acquired vs. learned knowledge in Krashen's understanding of the terms. This distinction was driven by early empirical work showing that attentive conscious second-language learning has no direct positive impact on the development of spontaneous production of L2, and is narrowed to monitored and controlled language use. Schumann (1978) looked at the effect formal instruction can have on the development of L2 English negation in a naturalistic environment. The formal instruction seems to have no effect in the development of spontaneous production (i.e. acquired knowledge), but showed major effect in the development of monitored, controlled language use (learned knowledge). Schumann (1978) concluded that the learner's spontaneous second language did not develop, and interpreted the reason behind that as the subject not being socially and psychologically motivated as he was scarcely engaged in English society, and the formal instruction was not strong enough

to overcome the pidginisation caused by social and psychological distance. Pidginisation, as articulated by Schumann (1978), refers to language use that is "restricted to the communication of denotative referential information and is not used for integrative and expressive functions." (1978, p. 114). Kadia (1988) conducted an empirical study over a period of nine weeks to investigate the effect of grammar instruction on the accuracy of monitored and spontaneous second language production. Kadia reported that formal instruction had limited effects on the development of spontaneous performance, and positive changes only showed in controlled performance. As reported by Kadia, the subject had rich metalinguistic knowledge of L2, but her spontaneous performance was similar to immigrants who have never received formal instruction. The subject achieved very limited progress in grammar during an eight-month period of formal instruction and immigration to the target language community.

Lightbown (1985) suggests that formal instruction (i.e. explicit data, or descriptive data about rules of language) cannot completely alter a learner's stage of development, rather it can speed up or slow the rate of development of the learner's interlanguage, which depends on the extent of appropriate matching between instruction and the learner's current level of acquisition. Lightbown (1985) further suggests that even if L2 learners are encountering restricted formal input (and maybe slightly different from authentic input) in the classroom setting, the process of acquisition is not different from any other process of acquisition taking place in another context (e.g. a naturalistic context). This can account for the findings that developmental stages of acquisition and grammatical errors made by L2 learners are similar, regardless of the context.

Interlanguage, in this sense, refers to Selinker's (1972) unique linguistic organisation developed by the L2 learner which preserves features from both their first and second language. Relevant to the notion of interlanguage development is the notion of fossilisation, which is also relevant to the discussion of findings from the current thesis. Fossilisation refers to the adult second language learner's inability to reach a native-like language ability or 'competence'. Towell and Hawkins (1994, p.2) refers to this phenomenon as 'stopping short' of native-like competence and Schachter (1990) refers to it as incompleteness, hinting at the non-progression nature of second language learning despite the continuous exposure to input for the majority of adult second language learners. Explanations to fossilization can be categorized as cognitive, socio-affective, environmental and neurobiological (Han, 2003, p. 28). The focus in the current thesis is on the cognitive explanation and the effect of classroom input on fossilised L2. This is reconsidered in Chapter 7 where results are discussed.

It is important to note here that there are limitations to binary nativelikeness as the target, as the knowledge of two or more languages in the mind can be seen as one system by unique multilingual individuals. This implies that those different languages

within the mind would be affected by one another and it is not only the case of the first language affecting the second. This view challenges the assumption that the monolingual native speaker is the ideal model of a language, implying that the second language user is to some extent deficient (refer to Cook, 1991; Cook & Li Wei, 2016 for more discussion on this topic).

The distinction between acquired and learned L2 knowledge could also be linked to research investigating the issue of adult L2 learners having substantial difficulty reaching ultimate attainment compared to younger L2 learners, positing the assumption of the existence of two autonomous cognitive systems in the mind, such as the competition model by Felix (1985; 1987), which is consistent with Chomsky's model of modularity (Chomsky, 1980; 1981; Fodor, 1983; Hornstein & Lightfoot, 1981). Felix (1985) proposed the competition model, which indicates that the difference between children and adult language acquisition can be attributed to the existence of two cognitive systems operating on the input. While younger language learners acquire the language they encounter through an innate cognitive system equipped with already available universal principles specifically built for language acquisition, adult learners have another, largely separate cognitive system operating in other general cognitive tasks, and essentially inadequate for the task of acquiring a language. These two autonomous domain-specific and domain-general cognitive systems compete with one another during adult language acquisition. For Felix, the reason for adult failure in ultimate attainment is that "the general problem-solving system is inappropriately transferred onto the domain of language acquisition without the possibility of excluding it either consciously or unconsciously from operating on the relevant input data" (Felix, 1985, p. 50). As vague as these few lines might read, it only shows the concern of earlier research into the existence of two mental systems cooperating in the process of second-language learning in adulthood.

As indicated above, early research in generative SLA has led to the conclusion that there is disassociation between what is taught to the L2 learner and what has been acquired. This is because SLA and maybe language acquisition in general does not imply mere surface learning of morphemes or, say, word order, rather it is the growth of abstract principles which mostly develop and work unconsciously during meaningful language exposure. This has also led to the exploration of the idea of two cognitive systems operating simultaneously to contribute to the second language production in adults.

Similarly, the existence of two types of L2 knowledge is also assumed within the cognitive approach. While the cognitive approach differs in its understanding of the essence of language, it holds similar understanding to that of the generative approach

on the types of L2 knowledge. This is discussed in more detail below, along with the terminology used in cognitive research to refer to such phenomena.

2.3.2   The implicit-explicit distinction

While this thesis assumes an innate language module for language development in the understanding of the generative approach, it also assumes a cognitive mental architecture to explore the questions of inner processes of the domain-specific language module and the more domain-general mental system operating in adult second-language development. From my point of view, the two can be seen as compatible, regardless of the conventional view that it has to be one or the other. For this reason, it is thought that it is of considerable relevance to discuss the distinction between the two types of second-language knowledge in cognitive perspective, as the cognitive approach to language development is more processing-driven than the generative approach, which tends to explore second-language knowledge itself, with no serious concerns about how this knowledge develops (Gregg, 1996).

The distinction between the two types of language knowledge seems to be accepted within cognitive research as well, but the nature of those types of knowledge differs. Within cognitive research, linguistic knowledge – explicit and implicit – is not distinct from other types of conceptual knowledge on certain subjects that might be built into a skill on that particular subject. Language learning, within cognitive research, seems to be seen as a nothing-special skill, as it is always compared in the literature with prototypical skills such as driving and playing piano (Truscott, 2015a; 2015b).

Within the cognitive approach, language is viewed as a dynamic system whose regularities are deduced from the learner's experience with linguistic data (N. Ellis, 1994; 2002; 2005; 2011). Ellis, as any other SLA researcher, asserts that linguistic processing is mainly implicit, and the operations of language acquisition are mainly tuned by the products of implicit processes. Ellis describes implicit learning as occurring naturally and unconsciously through the interactions between implicit learning mechanisms and available environmental data. He maintains that our implicit systems process the input unconsciously, permitting our conscious selves awareness of the meaning and not the form. Consciousness is recruited when more novelty input is encountered for the purpose of successful learning and problem solving. Ellis equates language learning with any other cognitive task, and views language learning as an automatic capacity that needs additional collaborative conscious support when this automatic capacity goes awry.

For Ellis, language learning is usage-based; that is, the more frequently a certain structure is used, the more readily available its representation is in the mind for future use. Ellis seems to assign the difference between the implicit learning processes of L1 and L2 to L1 transfer. He asserts that "[i]n contrast to the infant, the L2 learner's

neocortex has already been tuned to the L1, incremental learning has slowly committed it to a particular configuration, and it has reached a point of entrenchment where the L2 is perceived through mechanisms optimized for the L1." (N. Ellis, 2011, p. 40). Second language learners need to recruit consciousness to compensate for the implicit practices that are not fully available for L2. Ellis, like Krashen, emphasises that implicit and explicit learning are fundamentally distinct types of language knowledge, and one cannot turn into the other. Ellis holds the view that implicit and explicit types of language knowledge (i.e. memory) are stored separately in the mind, in distinct content and form. Ellis, however, views explicit knowledge as having the ability to impose positive effects on implicit learning.

Agreeing with Truscott's (2015a) critique of Ellis's views on the implicit and explicit distinction that while Ellis's account of implicit and explicit knowledge and learning is relatively neat, "explicitly acquired instances are connected in appropriate ways by implicitly acquired associations, forming a tightly integrated system consisting of both implicit and explicit knowledge" (2015a, p. 152), this separation is problematic for Ellis's theory. Truscott suggests that if explicit knowledge of form-meaning associations has an effect on implicit learning, then the activation of implicit learning will necessarily involve the activation of explicit knowledge as well. This means that the separation between implicit and explicit knowledge and learning is not possible in Ellis's theory. Truscott states that it is a natural result of the reliance of the confused notion of *noticing*. The latter theory assumes that in order for implicit learning to be triggered, certain things in the input should be noticed with no concerns in the field to comprehensively account for the meaning of *noticing* within a cognitive theory. This problem can only be overcome through a detailed account of the nature of the mental systems and how information is represented, processed and stored. The cognitive approach, with its focus on the dynamic structure and its ban of the innate, does not seem to provide sufficient account in this regard (Truscott's, 2015a).

The two approaches, generative and cognitive, seem to have very similar understanding of the nature of acquired or implicit language knowledge: being the natural way of learning a language, a point also made by other SLA researchers (e.g. R. Ellis, 2005b; Whong et al., 2014). Both approaches agree that language takes place naturally, effortlessly and most importantly unconsciously. Throughout this thesis, I use the term 'implicit language knowledge' to refer to the type of language knowledge that grows unconsciously, within the understanding of both generative and cognitive approaches. In the following section, I discuss how different SLA (generative and cognitive) researchers define the notion of implicit and explicit types of knowledge. Then I discuss the most agreed-upon aspects of implicit linguistic knowledge to provide a clear definition of what implicit knowledge essentially is, and what differentiates it from explicit

knowledge. The definitions of implicit and explicit types of language knowledge are revised later in section 2.6, in light of the understanding of the mental framework adopted for the current thesis, which allows for a more detailed and precise discussion of the types of language knowledge.

2.3.3 Diverse definitions: the meaning of implicit and explicit language knowledge

The idea that implicit and explicit second language learning constitute different components of second-language knowledge is not a new concept in the field of SLA, but it seems to be often overlooked by SLA scholars. In this section, I review SLA research where this distinction is discussed and how different SLA researchers view and possibly define the two types of language knowledge.

Although there seem to be great similarities between the notion of acquired and implicit language knowledge within the two approaches, it should be noted that *acquired* does not correspond to *implicit* language knowledge. This is also true for the *learned-explicit* distinction. This seems to stem from each theory's understanding of the same phenomenon (discussed in more detail in section 1.6). *Acquired* knowledge is not available for conscious reflection, that is, the representations of acquired knowledge are stored *implicitly*. The development of *acquired* second-language knowledge, within the early generative understanding, seems to foster fluency and accuracy in language production and language comprehension. Learned knowledge representations might be stored *implicitly* and *explicitly,* depending on the representation's state in the memory. *Explicit* knowledge can take the form of metalinguistic knowledge, available for conscious introspection. It could include chunks of language stored as a result of formal classroom instruction, beliefs or generalisations about how language works.

Among generative SLA researchers, exploring this distinction between the two domains of language knowledge developing within second-language learners seems to be pioneered by Schwartz (1993). Schwartz (1993) views linguistic behaviour as a poor indicator of the underlying system of knowledge or interlanguage grammar. At the same time, it is the only overt manifestation of the underlying system. Schwartz, in discussing how the language system grows, asserts that the learner comes to know a certain language only through exposure to instances of the language. While this exposure is happening, the learner should not be conscious of the processes taking place. Language development is seen as an interaction between row language data and special in-built mechanisms in the learner's mind, out of the learner's intention and introspection. Schwartz calls this data PLD, as discussed earlier. PLD is necessary for the growth of the linguistic system. This view of the growth of the linguistic system is consistent with the theory of generative grammar, especially the notion of the logical problem of

acquisition – that is, the disassociation between the complexity of the system of linguistic knowledge and the data acquirers are exposed to. Acquirers come to know far more than what is presented to them in the environment. They do not only know which sentences are possible in the language, but also come to know which are not. Schwartz views implicit knowledge as the essence of language growth, which is driven by implicit processes interacting with row linguistic data.

Schwartz differentiates between PLD (Primary Linguistics Data), which results in linguistic competence, and LLK (Learned Linguistic Knowledge) or metalinguistic knowledge, a different notion of knowledge resulting in LLB (Learned Linguistic Behaviour). Schwartz views these two types of language knowledge as two separate entities in L2 acquirers: each is nourished with a different type of input, and contributes differently to the L2 learner's 'interlanguage' – the acquired knowledge contributing to spontaneous production, and the learned knowledge to the more controlled use of language.

VanPatten (2011) seems to support the distinction between the two types of second-language knowledge through his Stubborn Syntax theory. VanPatten (2011) states that most of language processing (and particularly syntactically driven aspects of language) happens beyond consciousness, and that syntax is resistant to explicit language teaching and learning. "The idea, then, is that as a particular aspect of language, syntax is 'gonna do its thing' in acquisition" (2011, p. 18). One classic example of interest here is the acquisition of English negations from Schumann (1978). The acquisition of English negation has been shown to develop in ordered stages as follows:

> Stage 1: Negation external with *no*.
> No drink beer. No want dinner.
> Stage 2: Negation moved internally.
> I no drink beer. He no want dinner.
> Stage 3: Appearance of unanalysed *don't* that alternates with and/or replaces *no*.
> I don't drink beer. He don't want dinner.
> Stage 4: Appearance of negation with modals and auxiliary *have*.
> I can't drink beer. He won't eat dinner.
> Stage 5: Appearance of analysed *do* with negation (native-like stage).
> *I don't drink beer. He doesn't want dinner.* (examples from VanPatten, 2011, p. 11)

Negation in English seems to have an ordered path of development, regardless of what is being taught. Extensive intentional learning of English negation would not move the L2 learner to the final stage of the analysed *do,* rather L2 learners develop following sequential order over time. This is supported by the empirical work of Schumann (1978) and his attempts with his subject. This notion has also been investigated with other syntactic structures and ordered stages of development (e.g. Ellis, 1989; Towell & Hawkins, 1994; Pienemann, 1984). Thus, as articulated by VanPatten, "the development of negation and other syntactically governed aspects of language seem to have their

own agenda and defy explicit external manipulation" (2011, p. 11; see also R. Ellis, 1994; Schwartz, 1998).

An interesting point here is that generative research refers to the distinction between the two types of language knowledge in relation to different phenomena in SLA research (the acquisition of English negation, for example). This reference to the distinction between the two types of knowledge seems to operate under the assumption that it is well-established and commonly understood, while it is blurry, with a lack of detailed understanding of the nature and inner workings of these two types of knowledge, and whether or not the two interact.

Within the cognitive approach, Ellis (2011) defines implicit learning as: "acquisition of knowledge about the underlying structure of a complex stimulus environment by a process that takes place naturally, simply, and without conscious operations" (2011, p. 38). Ellis differentiates it from explicit learning, which is "a more conscious operation, where the individual attends to particular aspects of the stimulus array and volunteers and tests hypotheses in a search for structure" (2011, p. 38). For Ellis, implicit learning happens with no attention to the linguistic form being learned, no awareness of what is being learned, and *no consciousness* of the learning operations happening. Ellis seems to have similar views to Schwartz and VanPatten of the *unconsciousness* of language learning or development (with particular reference to syntax). DeKeyser (2003, p. 314) defines implicit learning as "learning without awareness of what being learned", and asserts that deductive learning does not equate implicit learning, as learning can be both explicit and deductive, as when learners are provided with a number of samples and asked to identify the rules beneath these structures. Deductive learning can be defined as learning that starts with encountering instances of the language structure that are meant to be learned, and then realising the rules underlying this structure. This distinction by DeKeyser is important, but it seems problematic to assume that during any type of language exposure (in this example in the classroom context) only one type of learning, explicit or implicit, is happening. During language classroom exposure, learners might focus their attention on one particular aspect of language and develop their metalinguistic knowledge of it, but while this operation is taking place, implicit knowledge might be *unconsciously* triggered, causing certain aspects of language to develop. In other words, the combination of inductive and implicit learning might occur not only in first-language acquisition but also in SLA.

Of interest to the present discussion is the notion that incidental (as opposed to intentional) learning can be seen as one aspect of implicit learning. Hulstijn describes incidental learning as "the "picking up" of words and structures, simply by engaging in a variety of communicative activities, in particular reading and listening activities, during which the learner's attention is focused on the meaning rather than on the form of

language" (2003, p. 349). Although this description of the "picking up" nature of incidental learning implies that it happens *unconsciously*, Hulstijn maintains that incidental learning requires attention and noticing; attention that is not directed to achieve a particular structure of learning. Hulstijn (2003) seems to refer to attention directed to understanding meanings and concepts related to the message being conveyed, rather than understanding the linguistic structures underlying the formation of this utterance. However, Hulstijn is not explicit about whether this attention is directed to form or meaning, which makes this interpretation of attention unclear, as suggested by Truscott (1998).

As can be seen from the discussion above, the understanding of implicit language knowledge seems to have some common ground among SLA researchers. The most commonly discussed feature of implicit knowledge is that it occurs *unconsciously*; without the learner's intention to develop linguistic knowledge or the learner's awareness of the linguistic information implied in the input they are exposed to. Thus, the notion of implicit language knowledge can be defined as the knowledge resulting from processes operated by the language module (for the generative approach) or by general cognitive processes (for the cognitive approach), which is beyond the reach of consciousness and control. In the following section, I discuss the notion of the interface between implicit and explicit language knowledge.

2.3.4   The interfaces between implicit and explicit language knowledge

In the generative literature, a crucial aspect of the distinction between acquired and learned knowledge is that these two types of language knowledge are completely autonomous, that is, they are understood to be two distinct, isolated mental systems working independently. Language knowledge resulting from conscious learning is fundamentally different in nature to language knowledge resulting from unconscious acquisition. Both have their roles in the final product of L2, but the point is that learned knowledge does not turn into acquired knowledge. The latter is understood to be a domain-specific process that unconsciously operates with raw data to develop language, different from the former that gives rise to a more conceptual knowledge of how a language works. Those learned rules and regularities of language are never seen, within the generative approach, to cause a positive change in the L2 learner's acquired knowledge. The generative understanding of the interface between the two types of language knowledge seems to be influenced by Schwartz's (1993) discussion of the qualitative difference between the two types of linguistic knowledge (discussed above), which views acquired knowledge and learned knowledge as two separate systems working independently:

> [E]xplicit data and ND [negative data] help create another type of knowledge, one that should be seen as distinct from competence; whereas explicit data and

negative data effect LLK, they do not effect competence" (Schwartz, 1993, p. 160).

VanPatten's (2011) idea of 'stubborn syntax' emphasises this aspect of the distinction, as it suggests that explicit second-language instruction has limited effects on the development of syntax. That is, SLA stages will remain the same, regardless of classroom intervention or attentive second language learning. The development of syntax, for VanPatten, is not a result of learner-directed attention to particular features of the language, using general learning mechanisms to cause the cognitive change. Instead, it is the result of the interface between data available from the environment and innate language-specific mechanisms (UG). Syntax grows over time, as these language-specific mechanisms are meant to deal with data, not information *about* that data. Those mechanisms are designed to operate on samples of language that second language learners encounter in the input. VanPatten maintains that it is not explicit intervention that makes the difference, rather it is the internal processing of input (VanPatten, 2011).

Within the cognitive literature, the interface between the two types of linguistic knowledge generally falls into three positions: the no-interface, the weak interface and the strong interface. N. Ellis (2005) seems to hold a no-interface position, viewing language knowledge as operating within two distinct implicit and explicit systems, which is not exclusive to language knowledge and includes all types of knowledge.

> Explicit and implicit knowledge are distinct and dissociated; they involve different types of representation and are substantiated in separate parts of the brain … explicit knowledge does not become implicit knowledge nor can it be converted to it (N. Ellis, 2005, p. 307).

N. Ellis assumes a domain-specific module that operates beyond conscious reflection as a separate entity from the more controlled, conscious process of explicit learning.

The other end of the spectrum is the strong interface position. DeKeyser, one of the strongest advocates of the claim that explicit knowledge can turn into implicit knowledge, discussed the issue of automatisation intensively (Dekeyser, 1997; 1990; 1994; 1995; 1998; 2017). DeKeyser seems to equate automatising deliberately learned-explicit linguistic knowledge with implicit knowledge, and stresses the importance of practice to develop implicit second-language knowledge. For DeKeyser (2003), automaticity is not a *characteristic* of the learning process, rather it is the *result* of the learning process. DeKeyser states that explicitly learned knowledge can turn into implicit knowledge, in the sense that learners can lose awareness of the linguistic structure through practice. Over time and with practice, as articulated by DeKeyser, L2 learners will be able to automatise the knowledge they once learned explicitly, and will be able to use that knowledge fluently. DeKeyser supports his claim through an empirical study (DeKeyser, 1997) that reports L2 learners' ability to automatise the morpho-syntactic rules of an artificial language. DeKeyser starts with stimulating learners to build

metalinguistic knowledge about the structures. After learners reached certain criterion through metalinguistic tests on grammar and vocabulary, they engaged in comprehension and production practice for a period of eight weeks. Then, reaction time and error-rate tests were performed. DeKeyser interpreted the results as showing that learning morpho-syntactic features is a skill that develops slowly and gradually over time and with practice, and it follows the same learning curve for learning other non-linguistic skills.

To sum up, the meaning of implicit and explicit linguistic knowledge resides in one's adopted theory. Both theories, generative and cognitive, agree that there happens to be two distinct types of linguistic knowledge (explicit and implicit), but disagree on the nature of implicit language knowledge and how the two types of linguistic knowledge interact. As discussed earlier, the seemingly most agreed-upon definition of implicit language knowledge could be the knowledge resulting from processes operated by the language module (for the generative approach) or by general cognitive processes (for the cognitive approach), which is beyond the reach of consciousness and control. Consciousness is a key aspect of understanding the two types of language knowledge. The meaning of consciousness within the field of SLA research is far from clear, and the understanding of the concept differs among SLA researchers. In the following section, I discuss the notion of consciousness as understood in the field of psychology, and its significance to SLA.

2.4   Consciousness in psychology and its significance to SLA

Prior to discussing the concept of consciousness in the field of psychology, I discuss some key concepts related to the understanding of consciousness to gain a broad perspective of how this subject is understood in different theories of consciousness. These key concepts include perception, memory, attention and modularity of cognitive systems. They are discussed briefly below, as they are essential to the understanding of the mental framework adopted in the current thesis: MCF.

2.4.1   Key concepts

The notion of modularity of the mind assumes that the mind constitutes various specialist systems, based on the function that they carry out and the nature of the knowledge they process. The conceptual system, for example, is different from the linguistic system: each possessing different types of knowledge and processing this knowledge differently. A single module can also be divided into sub-modules, for further functional specialisation (Truscott, 2015a).

> *Perception* refers to:
>
> constructing representations for input from the senses. From another perspective, it is deciding what the senses are experiencing at the time, meaning

both what each modality (sense) is experiencing and how information from the various modalities fits together (Truscott, 2015a, p. 16).

Perception also has the role of processing and constructing input. That is, internal mental representations in perception are not copies of the external input, rather this external input is processed and then new internal representations are constructed, which later become products of perception (this notion of external and internal input is discussed in more detail in Chapter 3).

Memory refers to information in each system of the mind. There is no one system that is called memory, rather memories are found in different locations in the mind, each reflecting the nature of this specific type of memory within the corresponding system (Sharwood Smith & Truscott, 2014). For example, visual memories can be found in the visual system and auditory memories can be found in auditory system (Fuster, 2008; Gottfried et al., 2004; Martin, 2007; Rissman & Wagner, 2012). Accepting this view of memory LeDoux (2002) suggests that long-term memory (LTM) can be understood as changes happening to different systems of the mind as a result of experiencing external stimuli. LTM is to be differentiated from short term memory or working memory (WM), which operates under the assumption that relevant information is made temporarily available to different cognitive processes whenever needed (Sharwood Smith & Truscott, 2014). Similar to LTM, there have been assumed different varieties of WM in the field of neurology, such as visual WM (e.g. Hyun et al., 2009). The assumption here is that there is an LTM and a WM for each cognitive system of the mind.

Attention is commonly understood as focusing on specific stimuli. Different theories of consciousness view attention as the gate to consciousness (discussed in more detail in 2.4.2). Attention has the role of recognising and then selecting a particular representation – or even part of a representation – for further intensive processing, which results in this representation becoming more conscious (Jackendoff, 1987). Attention can also be viewed "not as a separate system but rather as the name for the process of gaining access to global workspace by reference to long-term or current goals" (McGovern & Baars, 2007, p. 200). Baars's 'global workplace' can be understood as consciousness, which interacts with the outside world in order to select the most relevant mental representation and spread it across the specialised mental systems of the mind (Baars, 1988). This directs the discussion to the main subject of the current section: consciousness.

2.4.2   The meaning of consciousness

Three different concepts have been used simultaneously in SLA literature to refer to consciousness: attention, awareness and conscious awareness. The reason so much ambiguity surrounds consciousness is because it is not an inherent subject in SLA, therefore, reference to cognitive psychology to understand the concept is necessary.

Dehaene (2014) suggests that the science of consciousness distinguishes three main concepts: vigilance, which refers to the state of wakefulness, with two possibilities varying when we are awake or asleep; attention, which is the state of focusing our mental resources on a specific piece of information; and conscious access, which is the state when the attended input enters our awareness and becomes available for self-reflection. This is what is referred to in SLA as awareness or conscious awareness. Among these three concepts, what counts as consciousness is conscious access, Dehaene (2014) argues. Vigilance and attention are not sufficient as such, rather, when we are awake and focused on a piece of information, this piece of information might and might not become conscious, depending on whether or not it is further processed.

If we are awake and paying attention to a piece of information, this means that we are trying to be conscious of it. This can either refer to conscious attention, such as attending deliberately to a grammar class; or unconscious/selective attention, such as attending to a sudden loud voice, or hearing the call of our name. This is one initial stage of the process. But whether our perception of what the teacher said in the grammar class, for example, lasts a short or a long time is not within our conscious control. Giving our attention to a piece of information does not guarantee that it will make it to our consciousness, it just makes it more likely to reach consciousness (Dehaene, 2014, p. 49).

What it means to be conscious of a piece of information is that one specific mental representation has been selected among many others that are crisscrossing the mind. This selected mental representation is made globally available to our high-level-decision systems because of its relevance to the current input making it more likely that we can deal with it effectively. Consciousness acts like a mental router whose role is to extract relevant information and dispatch it (Dehaene, 2014, p. 136) According to Baars's theory of consciousness (1988), consciousness can be seen as a device for sharing information across the mind. When a piece of information becomes conscious, it can be held in the conscious mind long after the stimulation has gone. This is because the mind brings it to the workspace and maintains it independently of the corresponding stimulation. Once it becomes conscious, it can be used in different ways (it might also be lost as a result of less frequent processing). One of the key features of the conscious state is the capacity to report whatever we are conscious of (Dehaene, 2014, p. 165).

The global workspace assumes that the mind consists of a modular set of processors and a routing system. Each mental module is responsible for a specific process or processes. These modules have a specific coding system to operate within their own representations. In the context of language, for example, syntactic knowledge is coded in the syntactic coding system which is distinct from that of the phonological coding system, or any other system of the mind. The flexible routing system is what

makes a representation shared across the modular systems of the mind. The availability of information in the workspace is what we experience as a conscious state of the shared piece of information (Dehaene, 2014, p. 168). This view of consciousness is the one adopted in the current thesis.

In light of the previous discussion, we can now enhance our understanding of the notion of acquired or implicit knowledge of a second language – mental representations that are not brought up to the global workspace, not simultaneously shared across other systems of the mind, and therefore unconscious. Representations of explicit or learned knowledge of a second language can be brought up to consciousness, where they are available to different mental systems.

Due to the complexity of the current query, we need to put the question of second language development in the context of cognition in general. MCF provides a detailed account of how the systems of the mind work, and is thought to be the best available framework to address the main issues of this thesis. MCF further enriches the discussion of the two types of second-language knowledge (and their interfaces), and makes possible the challenging task of teasing apart the two types of second-language knowledge (implicit/acquired and explicit/learned) theoretically and possibly empirically.

2.5 Modular Cognitive Framework

MCF seems to be the most detailed account available of how language develops within a broader perspective of the mind. This is why it is seen as useful for the discussion of the two types of L2 knowledge and how they interact. Modular Online Growth and Use of Language (MOGUL) refers to the part of the framework that specialises in language, and seems to be the most suitable theoretical account to tease apart the modular and non-modular types of L2 knowledge. In the following section, I discuss why it is important to incorporate MCF to discuss the main scope of the current thesis. I also review the framework in more detail as discussed by its advocates, Truscott and Sharwood Smith (Sharwood Smith, 2017; Sharwood Smith & Truscott, 2005; 2006; 2014; Truscott, 2017; 2015a; 2015b; 2006; Truscott & Sharwood Smith, 2004a; 2004b; 2011).

2.5.1 Modular Cognitive Framework: the mental architecture

MCF proposes a mental architecture that can account for the generative as well as the cognitive views of the two types of second-language knowledge and of SLA in general. MCF posits a (generative) module of language that is distinct from other cognitive processes and not available to consciousness, which consists of two sub-modules; syntax or Syntactic Structure (SS) and phonology or Phonological Structure (PS) (Truscott & Sharwood Smith, 2004a; 2004b; Sharwood Smith & Truscott, 2005). This architecture is similar to the generative research presented in the writings of Jackendoff (1987), in the sense that there is a phonological module and the (morpho-) syntactic

module, which are connected to each other and to the outside modules of the architecture: namely the auditory system which is responsible for speech production and sign language, on one hand, and connected to the conceptual system responsible for meaning encoding on the other. Within this mental architecture, the scope of language can be seen to go far beyond the language module. This is illustrated in Figure 2.1. Figure 2.1 shows the core language system encapsulated in a frame. MCF refers to language as the language module, emphasising the notion of a domain-specific system, even though such systems have two modules, operating according to each one's own distinct principles. MCF also uses the term 'core' language system, suggesting that language extends beyond 'the core' to include language-related but not domain-specific areas of the mind, such as the conceptual system and the auditory system. The area outside the language faculty in Figure 2.1 is the conceptual system, which is not only

Figure 2.1 Language broadly defined (Sharwood Smith & Truscott, 2014, p. 14)
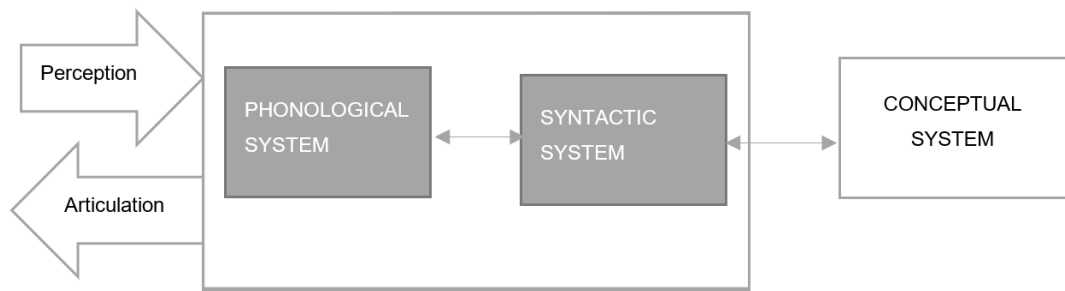
considered responsible for non-linguistic and linguistic conceptual cognition, but also associated with conscious manipulation. Conscious processes may have a direct effect on the use and growth of the linguistic conceptual structure (Sharwood Smith & Truscott, 2014).

The discussion of a mental architecture is attributed to Jackendoff (1987) who first suggests an explicit link between syntactic and phonological systems in one hand, and conceptual system on the other. Conceptual structure (covering semantics, pragmatics, and non-linguistic meanings) contributes to the development of the domain-specific, encapsulated, species-specific language system. The interface between these two systems may be regarded as domain-specific and part of the language faculty. Jackendoff (2002, p. 123) seems to view semantics as somehow part of the language faculty, as he refers to the tripartite of the language system (syntax, phonology and semantics). This could be interpreted as semantics being a generative system within the domain-specific area of the mind specialising in language. However, MCF maintains that semantics lies in the conceptual system outside the language faculty, but develop as a result of close interaction with the core language system. This part (i.e. semantics) of the conceptual system "has been colonized" by the core language system (Sharwood Smith

& Truscott, 2014, p. 16). Pragmatics (which also lies in the conceptual system) is in less interaction with the core language system and in closer interaction with general cognition (Sharwood Smith & Truscott, 2014; Truscott & Sharwood Smith, 2004a; 2004b).

What is true about the interface between conceptual structure and the language faculty is also true for the interface with the auditory system, which is located outside the domain-specific area of syntax and phonology. Because the auditory system codes what is referred to as speech sounds, it is no surprise that part of the auditory system is also 'colonised' by the core language system, as its development is highly dependent on its interaction with the phonological system in the encapsulated core language system. Sharwood Smith & Truscott (2014) differentiate between 'phonetic form' which lies in the auditory system, and 'phonological form' which is found within the core language system. Speech sounds, Sharwood Smith & Truscott (2014) maintain, are representations formed as a result of the interaction between the auditory and phonological systems. This can be better illustrated in Figure 2.2, below.

Figure 2.2 Language broadly defined: part 2 (Sharwood Smith & Truscott, 2014, p. 17)
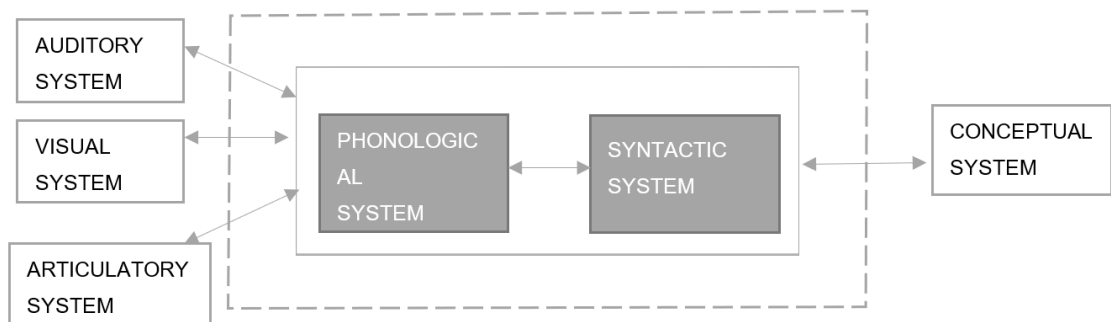
Figure 2.2 shows parts of language that are not presented in Figure 2.1. The inner rectangular frame represents the domain-specific language system. The outer rectangular frame represents language in the broader sense, consisting of perceptual systems (i.e. auditory, visual and articulatory systems) that have language-related information, but also contain non-linguistic information. Language-related knowledge can not only be found in the language faculty, but in almost all modules of the architecture. Language covers a number of different types of knowledge and skills, with the language module, indeed, having the main role to play in language development (Sharwood Smith & Truscott, 2014).

Even though mental systems are modular, each operating according to distinctive principles or rules, they share the same structure, each of which consists of a processor and a store having different purpose and function. Each module has a special coding system for the representations of the available information, and each is connected to one or more adjacent modules by means of interfaces to serve the overall function of cognition. In each processor exists a number of innate principles developed through "natural selection" (Truscott, 2015a, p. 73). The processor, along with its innate

principles, is regarded as an inherent part of each module. The information store, however, contains the acquired information and the combination of the innate parameters available from the processor, but shaped via experience or input. Thus, the combination of different parameters is a matter of learning, yet they obey the innate principles and the coding system of each particular module. The nature of these processors and stores is left open and dependent on one's adopted theory (assuming a UG-based innate built-in capacity for language in the current thesis). This particular aspect of MCF is what makes it the ideal theoretical framework for the current discussion of modular and non-modular types of L2 knowledge, as MCF can explain both types of L2 knowledge in one framework in a detailed manner. In the following section, I discuss the interfaces between modules of the mind from an MCF perspective.

2.5.2 Interface systems in Modular Cognitive Framework

In order to play their part in language development as a whole, modules have to have interface systems to handle current experience. Figure 2.2 shows these interfaces represented in arrows. Representations generated in modular systems can be combined or 'indexed' with other representations in adjacent modules. Therefore, arrows in Figure 2.2 do not represent a direct link from one store to another, rather they represent systematic interfaces between certain representations in neighbouring systems. To take an example in the language context, a phonological representation might be connected to a syntactic representation, such as a verb or adverb. These links are formed through repeated experiences or frequent processing.

Combined or indexed structures form processing chains that extend to adjacent modules and might extend across a number of modules. This integration between different structures from neighbouring modules has the purpose of contributing to the development of the system as a whole (whether a language system or other systems in the mind). To take an example of a 'chain', the activation of the PS /kid/ triggers the activation of the SS NOUN, and that triggers the activation of the conceptual structure YOUNG PERSON. This chain might also trigger the activation of more structures in different modules. The chain extends into the auditory structure, once an attempt to represent a fragment of speech is made. The chain also extends to other systems to represent visual and auditory structures associated with kids. The linguistic chain, therefore, is part of a larger and often more complex cognitive chain. The perceptual (e.g., visual, acoustic, articulatory) and conceptual part of the chain might be involved in conscious processes, but the linguistic part of the chain is out of the zone of conscious processes (Sharwood Smith & Truscott, 2014, p. 20). In the following section, I discuss the concept of the modularity of the mind as a key concept related to the framework adopted in the current thesis.

2.5.3   Modularity in the mind

In the field of psychology and neuroscience, there seems a great deal of evidence to support the notion that the mind is comprised of a number of specialised systems or processors to deal with certain types of information (Sharwood Smith & Truscott, 2014; Dehaene, 2014). Debate exists about which modules of the mind, if any, are genetically determined, and over how some non-specialised parts of the mind process information from different sources, and how these distinct pieces of information can be incorporated (e.g. Barkow et al., 1995; Gardner, 1993; Pinker, 1984; 1994).

The characteristics of the types of modules that have been discussed and have been the scope of interest in MCF are innate, using their own distinct codes to develop. Each has a unique system, which works in a largely independent manner. Modules can be composite, consisting of smaller modules which also work largely independently and have their own distinctive coding systems. These smaller modules can also contain even smaller modules working in an autonomous manner and having their distinct coding system, which might be made up of still smaller modules, and so on. The visual system may be the best example of a composite system: a system responsible for visual perception and consisting of a number of smaller independent sub-systems, specialising in different features of the process, such as motion and colour. Visual modules and other modules with a complex nature have a number of distinct codes – one coding system for each sub-module (Barkow et al., 1995; Gardner, 1993; Pinker, 1984; 1994).

These modules of the mind are believed to be present in most species, with some degree of variation. Modules can play a very prominent role in species survival, such as language and visual perception. Therefore, it is logical to hypothesise that such modules are innate parts of the cognitive system in general (Sharwood Smith & Truscott, 2014). These modules are present to ensure that each carries out their crucial function in an efficient manner. The result is a system that can carry out its functions in a quick, accurate and predetermined way, in contrast with a more flexible non-specialised system, but less efficient and accurate, that processes different types of inputs (Sharwood Smith & Truscott, 2014). For example, the construction of a new syntactic representation should be done much more efficiently by a system dealing only with this particular type of input than a more general system that deals with different types of input in different manners. Another advantage of encapsulated modules is that encapsulation prevents non-expert interfering. Conscious processes, for example, are not set to reach encapsulated specialised modules and make things disordered (Sharwood Smith & Truscott, 2014). Rather, conscious processes are restricted to other parts of the mind that integrate different sources of input from different modules, such as the conceptual system. Thus, it is a natural tendency for each encapsulated module to develop its own special code that is unable to directly read codes of different modules, which strengthens

the independent status of modules (Sharwood Smith & Truscott, 2014). Related to modularity of the mind is modularity of language, which is discussed in more detail in the following section.

2.5.4 Modularity in language and Universal Grammar

> [L]anguage comprises many different types of knowledge and ability, including phonetics, phonology, syntax, morphology, semantics, pragmatics, orthography and writing principles, lexical knowledge of various interrelated types, and often a great deal of metalinguistic knowledge (Sharwood Smith & Truscott, 2014, p. 31).

For this particular reason, language is an inherently complex and fussy notion that is not easily covered by the 'language module'. Some aspects of language show features of modularity, such as syntax, and should therefore be treated as distinct sub-modules (Sharwood Smith & Truscott, 2014).

Modularity and the notion of language's innate growth is at the very heart of MCF. Modularity became a dominant part in the modern linguistic field as a result of Chomsky's theory of UG. An interesting aspect of Chomskyan thinking is the metaphor of the language organ that is available for a particular function, is innately predetermined, and grows naturally. This view suggests that language develops in the same way any human physical organ naturally grows. The idea of UG is inseparable from the notion of the language organ (Sharwood Smith & Truscott, 2014). UG is a set of constraints that govern the world languages, and a set of primitives true to all natural languages. Languages select some of these primitives and organise them in diffident ways (Chomsky, 1965; 1981; 2000). UG states that all natural languages are governed by universal principles true to all languages; each language has a set of possible parameters that are set through exposure to the speech strings of this particular language. UG is reflected in MCF in the structural categories in syntactic and phonological modules. UG is also represented in the conceptual and auditory structures related to language. UG is also present in the interfaces between the two sub-modules of language (syntax and phonology) and the interfaces between them and the outside modules that have language-related knowledge, such as the conceptual system and the auditory system.

One of the primary arguments for the existence of language universals is the lack of a clear association between an individual's ability to succeed in developing a first language and their general intelligence (IQ). This lack of relationship is clear in cases where either language ability or IQ is impaired while the other is mostly intact. This can evidence of the dissociation between the two; that is the development of one does not require the development of the other (see Smith & Tsimpli, 1995 for detailed discussion of such evidence). It is also difficult to escape the conclusion that there is an innate knowledge for language pre-existing in every human being, when one considers the

ultimate success every child in every setting achieves, regardless of the limited abilities small children show in learning complex tasks such as mathematics.

MCF is greatly influenced by Jackendoff's theory of modularity (Jackendoff, 2002; 1991; 1993; 1997; 2000) which states that each mental system consists of two processors. The first is an integrative processor, where complex structures are built, within the module, from the input the system receives. The second is an interface processor where chains of adjacent modules are created to link the workings of these modules. For example, the function of the syntactic integrative processor is to manipulate representations within its own unique code, and this is true for the conceptual/semantic and the phonological systems as well. In this sense these integrative processors are encapsulated, that is, a particular integrative processor (e.g. syntactic) is not able to recognise and manipulate representations from another integrative processor (phonological). The function of the interface processor is not to convert representations from one code into the other, rather it is to link particular representations together, in order to cope with the experience during language processing.

In an attempt to apply Jackendoff's theory of modularity, Carroll (1999; 2001) asserts that input must be investigated within a theory of language processing. Therefore, she defined input as the representation that one processor receives from another adjacent processor. For example, input in the syntactic processor is received form an adjacent conceptual or phonological interface processor. For Carrol, input does not come from the outside; rather, each processor has its own input, that is representations. Carrol stressed this notion by referring to the standard sense of input (the input that is not yet processed) as 'stimulus'. This 'stimulus' turns into input once it is processed. In the current discussion and for the remainder of the thesis, I use the term 'internal input' for the between-module flow, and 'external input' to refer to physical input from the outside environment.

The significance of Jackendoff's model, Sharwood Smith & Truscott (2014) argued, is that it pays attention to the relationship between the language module and other parts of cognition, and is suitable for handling matters in language processing. The great significance of Carrol's application of Jackendoff's theory of modularity lies in the fact that it offers a more fine-grained approach to input and, accordingly, acquisition. MCF makes use of the leading insights from both Jackendoff's model and its application by Carrol, with some diversity from both in different ways, which is discussed below.

2.5.5 The language faculty in Modular Cognitive Framework

> MOGUL [currently referred to as MCF] is an information processing approach, in the literal sense of the term (Sharwood Smith & Truscott, 2014, p. 36).

In the architecture, each mental system consists of a processor and an information or memory store. The function of each processor is to manipulate representations in its

particular store. The proposed framework, Sharwood Smith & Truscott argue quite convincingly, offers the most scientific, fine-grained and precise way to understand the language module and the way it works, which brings great insight to how languages develop, from a within-the-mind perspective.

Language systems in MCF, as presented by Jackendoff (1987), consist of three sub-systems: phonological, syntactic and conceptual. Each sub-system consists of a processor (instantiating and establishing new representations) and a memory store (manipulating those representations). Language sub-systems are connected by means of interfaces, which have a bidirectional flow of information. The interfaces by themselves act like sub-systems of the module as a whole. In comprehension, for example, processing starts with the instantiation of an auditory (AS) representation in AS memory store, followed by activation of the corresponding phonological (PS) representation in the interface system, which becomes the input for the phonological system. Now, a PS representation is activated in the PS store, which becomes the raw material for the syntactic system (SS), as the PS_SS interface system activates the corresponding SS representation in SS store, and the store creates an SS representation obeying its own code. The SS representation triggers the activation of a conceptual (CS) representation. An SS_CS representation is now activated in the SS_CS interface system, which serves as input for conceptual processing. A CS is activated in the conceptual module that is combined with the output of AS, PS and SS (and other non-linguistic representations). This is the final outcome of linguistic processing, that is assigning meaning to a particular message (Sharwood Smith & Truscott, 2014). On the other hand, language production begins at the end point of language comprehension; that is with a CS representation, which activates a chain of representation in the syntactic, phonological and articulatory system. From an MCF perspective, UG is represented in the genetic nature of language processing. UG specifies the initial state of linguistic processors, the nature of the processors and the nature of the architecture as a whole (Sharwood Smith & Truscott, 2014).

The function of a processor is to manipulate items in the store in order to construct the relevant representations from the ones being activated. The stores of the language system, MCF assumes, are innate and inherently available. The syntax processor is seen as a group of structured sub-processors that all cooperate to handle a specific feature of a given syntactic representation being instantiated and created. MCF has adopted a generative view of language, and the nature of each syntactic sub-processor would depend on one's adopted linguistic theory (Sharwood Smith & Truscott, 2014). In a Principles and Parameter approach, for example, a sub-processor may represent an X-bar structure, and therefore be responsible for this specific feature when processing language input. The process of syntactic acquisition occurs in the syntactic

processor and in the interface system, where syntactic representations are connected with the corresponding representations in phonological and conceptual systems. The function of the interfaces is to assign indexes (combined representations) to items in the store, and to match activation levels (a notion that is discussed in more detail below) between items of adjacent modules. According to MCF, the flow of information within the interfaces is bidirectional (Sharwood Smith, 2017; Sharwood Smith & Truscott, 2014).

The function of a lexical store is to retain information relevant to its processor. These are also referred to as memories or sub-lexicons. A lexical store is also a setting for the processor to carry out its processing activity, which means that such stores correspond to LTM as well as WM. A lexical entry of any store represents a chain of connections within the linguistic sub-lexicon and in most cases extends beyond linguistic sub-lexicon/memory stores. Connections between items within one store are carried out directly by the processor, whereas connections between items in different modules are carried out by interfaces. Thus, the process of co-indexing refers to linking two items where boundaries apply (i.e. two items located in different modules). For example, the connections of the entity *kid* within and beyond the language system can be explained as follows: the PS contains the phonological form of entity, the SS consists of syntactic features of the entity, and the CS contains the meanings associated with kids. Each store consists of innately available primitives (universal principles general to all languages) obeying the code of the corresponding processor. The manipulations and combinations of these primitives are carried out by the innately specified processors to construct language-specific representations. Linguistic items/ representations are represented as chains of PS_SS_CS throughout linguistic stores. As mentioned earlier, this process of co-indexing (i.e. combining) representations is mediated by interfaces. In the following section, I discuss how the language faculty develops within MCF's understanding, as this serves as the theoretical basis for explaining data from the empirical tasks in this thesis.

2.5.6 The growth of the language faculty

Within MCF, the development of the language faculty involves notions that are essential to the understanding of how language growth is perceived. First, I discuss the nature of mental representations in stores. Second, I discuss the notion of activation of these representations. Finally, I discuss the Acquisition by Processing Theory, which represents the essence of MCF's account of language acquisition within the mental architecture proposed. All these notions sum up the key theoretical assumptions held in the current thesis, which also assist the teasing apart of the two types of L2 knowledge by providing a detailed account of the difference between the two, and how each develops.

2.5.7 Representations in stores

MCF does not specify characterisations or durability of representations. For MCF, any item available in the store is considered a representation. Representations are established as a direct effect of processing external input. Each representation is a unique combination of innately available primitives of the corresponding store.

Representations at the SS consist of syntactic categories and functional categories. Syntactic categories of words are combinations of category features such as [+V] and [+N], which are innately specified primitives in SS. That is, a syntactic category such as a verb or a noun represents a complex representation, built with other simple representations. Single syntactic categories or representations can be combined to form new representations. This process can be referred to as the sub-categorisation frame, which can be defined as:

> "the combination of the most basic syntactic structure (SS) of a word with one or more additional categories (SS representations). The combination of the SS representation of *kick* with [NP] is the frame of *kick*, for example. A subcategorization as such is in essence an SS item…" (Sharwood Smith & Truscott, 2014, p. 45).

Functional categories are representations in the syntactic processor that are innately predetermined. In the generative understanding of functional categories, they represent abstract features to reflect case, tense and agreement, for example. Relevant to the discussion of feature is the notion of feature value in generative linguistics, which states that any feature has either a [strong] or a [weak] value, determining how the parameter can be set, or reset. In MCF, these values ([strong] and [weak]) are representations in the SS. They represent complex representations made up with simpler representations of functional categories and feature values. The feature value in MCF is a matter of degree, which differentiates it from that of the generative approach, where the feature has a definite value, either [strong] or [weak]. In other words, [strong] and [weak] values in MCF can co-exist in the SS, and both values can be processed. One value might appear more frequently in processing, and that depends highly on its activation levels, which is discussed in more detail in section 2.5.8.

Conceptual representations in CS are not seen as a part of the language module, but a reference to CS representations is necessary to understand the development of SS representations, as representations of the conceptual modules are closely related to those in the syntactic module. The interface between the syntactic and conceptual structure is regarded as part of the core language module (Truscott, 2015a, p. 78). Conceptual representations consist of meanings and concepts of linguistic entities, and also metalinguistic knowledge of linguistic structures. Conceptual representations can be inserted into representations from the core language modules to assign meaning for syntactic categories of words as well as functional categories or representations in SS,

for example. An important point here is that the conceptual module can serve as a home for metalinguistic knowledge (as defined in section 2.3.1). Metalinguistic knowledge that is developed with the conceptual module can serve as the non-specialist system that can develop language knowledge; especially in adult second language development. I come back to this in the discussion of the two types of language knowledge in section 2.6.

In the following section I discuss the notion of the resting levels of activation and their relation to language development within MCF.

2.5.8 Activation of representations

Within MCF, each representation has an activation level, which determines the representation's availability for processing in WM. Relevant to the present discussion is the notion of resting level of activation that each representation in a store possess. A syntactic representation's resting level of activation, for example, might be high, as a result of this SS representation receiving stimulation that raises its activation level. In other words, it is processed quite frequently, which gradually causes its resting level of activation in the LTM to rise. However, this gradual change in the resting level of activation of a representation can also work in the opposite direction; that is, it can fall. The result is a low resting level of activation in the LTM as a consequence of the representation not receiving stimulation for processing. "An item's activation level is commonly seen as a function of its past use in processing and therefore reflecting learning by the system" (Sharwood Smith & Truscott, 2014, p. 68).

Representations can be stimulated to be active within and between stores through interface systems. When a representation in a particular store is active, it causes other related representations in the store to be active. That is, the activation of one representation raises the possibility that a related representation may be selected afterwards. This activated representation can also activate related representations in adjacent stores via means of interfaces.

Perceptual representations are constructed in the perceptual output structure (POpS) to represent external input from the senses, and these are expected to be able to achieve high levels of activation, in case information from the environment is processed.

Within this view of the activation of representations, the meaning of attention can be related to activation in the sense that what is activated are the representations constructed as a consequence of the information we pay attention to. Attention is a key process which determines whether or not a representation is activated, and that might increase its frequency of processing, which influences its resting levels. Spreading activation within and across stores might be viewed as consciousness following paths of associations. During processing, we become conscious of pieces of information that are

associated with and related to each other (Sharwood Smith & Truscott, 2014; Truscott, 2015a).

So far, the framework itself has been the focus of the discussion. The following section discusses a theory proposed within the framework: Acquisition by Processing Theory (APT), which is relevant to the discussion of how language develops.

2.5.9 Acquisition by Processing Theory

Within the view of a cognitive system of processors manipulating representations in stores, learning can only be seen as changes in the states of these representations, and their connections, "[t]hus, learning is lasting changes that occur in the set of representations during processing". Simply put, learning within MCF is "the lingering effect of processing" (Truscott, 2015a, p. 90). Two aspects of development are proposed with this cognitive system: the establishment of novel representations and the establishment of composite representations through strengthening connections between related representations across stores.

New representations are constructed within information stores as a result of input processing to cope with a given situation. This newly constructed and processed representation might linger after the process is complete; it is more readily available for future processing. The process also includes connecting different items within the store to establish novel representations. The process of establishing and connecting items within the store is part of the processor's operation of establishing sufficient representations to deal with current input. Within MCF, there is no such thing as special intelligent mechanisms for learning as a separate process. Learning, as discussed earlier, is changes in representations. These changes can be interpreted as higher resting levels of activation as a result of a continuous register in processing.

There is also the idea of establishing connections among representations across different stores. This process is very well known as co-indexing (see Jackendoff, 1997; 2002). The resulting representations are called an index, which is a composite representation made up of components from different stores. This process of establishing and strengthening connections among representations of adjacent stores is not carried out by processors within modules, but rather by the interface systems connecting two modules.

The process of development is the processors trying to produce a more coherent interpretation (available in stores) to handle the current input. It is not special 'intelligent' learning mechanisms, as articulated by Truscott (2015a), that can identify when processing of input goes awry, nor can it identify a certain gap in the current state of knowledge. Development within MCF can result in the construction of unsuitable representations that are likely to prove unhelpful in the long run and to have low activation levels as they become less frequently processed. The process of development

or learning is only a matter of selecting the most suitable representation available, from a great range of possibilities, to coherently interpret the input. Most of these possibilities of created representations fade away as a result of being valueless or irrelevant to the system, while some might have a higher activation level and a firmer position in the system. Simply put,

> [t]here is no figuring out the language, no hypotheses being tried out, no inferences across different cases, no 'aha' as the correct option is identified. There is just processing and success or failure therein (Truscott, 2015a, p. 91).

This being said, APT seem to provide the simplest view of language development available so far. It takes into consideration a wider range of cognitive processes from a neurological and psychological point of view. It maintains the innateness of cognitive modules, how these modules develop from within, and how they interface with each other to contribute to the development of the system as a whole. The framework would provide the simplest and most scientifically detailed account to the discussion of the two types of language knowledge, where these two types of language knowledge are stored, and how they develop. Having discussed the framework in some detail now, the final section of this chapter addresses how MCF would enrich the discussion of the complex notion of the existence of two types of second-language knowledge.

2.6   The types of second-language knowledge revisited

For the purpose of the current study, implicit and explicit second-language knowledge will be equated with the standard generative understanding of acquired and learned second-language knowledge, respectively. The terms 'implicit' and 'explicit' are used to refer to the distinction between the two types of knowledge for the remainder of this thesis. In the following section, I discuss the notion of Modular Implicit Second-Language Knowledge, Extra-modular Implicit and Explicit Second-Language Knowledge.

2.6.1   Modular Implicit Second-Language Knowledge and development

Within the current framework adopted, linguistic knowledge exists inside and outside the language module. Second-language knowledge within the language module (i.e. SS and PS) is implicit. The task of language *naturally* acquired should require no attention fixed towards it, because it is innately specified. The language organ metaphor actually implies that language grows automatically with no specific resources to intentionally develop the language module. Carrying out processes within the language module is a matter of fixed routines without the need for external resources. Thus the language module is an innately specified processing system, constrained by UG principles. What causes the changes in the system (i.e. causes the system to develop) is the fixed mapping between the language module and the input (or more precisely internal input from CS and POpS) (Sharwood Smith & Truscott, 2014). This can be referred to as what I will call Modular Implicit Second-Language Knowledge.

Modular implicit linguistic knowledge in the language module are presented in simple and co-indexed representations in SS and PS. It also includes combined representations or indexes in the interface systems which are parts of a processing chain across other modules of the mind. The linguistic knowledge is also presented in the constrained but variable (to a limited extent) primitives of the syntactic processor and phonological processor. These principles govern the workings of representations in the SS and PS stores, and form a part of the language knowledge within the module. For example:

The window broke.

The construction and development of the unaccusative item requires the construction and activation of different representations interconnected across a processing chain. Initially, the sentence is received as input for the syntactic system, then processes take different possibilities. The syntactic system might first produce unergative representations for it, as the SS processor should operate in a quick and efficient manner to produce representations that might be successful. Unergative might be the default option as its surface structure matches its deep structure; that is, what is in the subject position is the action doer in unergatives – unlike unaccusatives. This SS representation will be connected with another CS representation to assign meaning to the argument structure of the verb. Here, the ultimate CS representation resulting in the construction of a message for input does not accurately reflect what the sentence actually means. Therefore, the SS will not develop, and the SS does not construct an unaccusative item. This outcome of the process might be altered through additional non-linguistic input, such as visual representations; that is, seeing the window break as a result of freezing conditions. Another source of information can be conceptual representations (previously present at CS) such as having the common knowledge that the *window* cannot perform action. Any representation of a source will be realised as an active conceptual representation that the window is not the one 'doing the breaking' of the window. This additional representation would interrupt the process of the SS_CS interface trying to make the activation level of unergative items in the CS correspond to that in the SS. The failure route to construct the SS unaccusative item would be if the additional information was not strong enough to overcome the first co-indexed SS_CS representation constructed to create a message for the sentence. The alternative success route would be if the additional non-linguistic representation was not overwhelmed, where the current states of SS and CS have to be reconciled, and this would be directed at the SS. This involves changing the activation levels of components of the SS to match those of the CS. This would cancel the initially selected SS representation (unergative item) because the follow-up process makes it difficult for the SS to maintain or reconstruct its initial representation. One possible outcome is that the syntactic module will construct a new

representation (unaccusative item) which will lead the interface system to activate a corresponding conceptual representation and co-index the two SS and CS representations into a more complex representation. The SS unaccusative item is likely to remain at the SS store and remain co-indexed with its CS counterpart. This co-indexed representation is now more readily available for future use.

Modularity of the process makes direct interaction from CS impossible. However, semantic factors can intervene through the interface system trying to match levels of activation from the SS and the CS. This leads the CS to reject or accept representations produced in the syntactic system depending on its accuracy in representing the intended message. The accurate SS representation should be produced and should linger in the SS for future use. While Modular Implicit Second-Language Knowledge is encapsulated in the syntactic store, indirect conceptual intervention to the system is sufficient to trigger development of any given SS item.

2.6.2 Extra-modular Implicit and Explicit Second-Language Knowledge

The task of developing metalinguistic knowledge, however, requires the resources of attention, because conceptual structure is not resource-free and its pre-existing processes are not adequate to carry out the task of language learning. The conceptual system (where metalinguistic knowledge is stored) has no innate capacities to handle language acquisition, as it falls out of the language module. The term metalinguistic knowledge here refers to the second-language knowledge that L2 learners intentionally learn through conscious language learning – individually or in a formal setting (Sharwood Smith and Truscott, 2014). Metalinguistic knowledge stored in CS can be referred to as what I will call Extra-modular Implicit Second-Language Knowledge or Extra-modular Explicit Second-Language Knowledge, depending on the resting levels of activation. Metalinguistic knowledge in CS can be seen as representations about how certain linguistic structures work. Any simple or combined representation will have a resting level of activation, which is constantly changing depending on current use. The extra-modular implicit second-language representation has a high level of activation, because it is processed frequently enough to gain higher levels of activation and to be a well-established representation in the CS store. Related conceptual representations about grammatical information regarding this linguistic structure will have low activation levels. This is because retrieving such metalinguistic information about a certain linguistic structure is no longer necessary to deal with the current input as this knowledge has already been automatised. The extra-modular explicit second-language representation has low level of activation, because it is not yet a well-established CS representation in the store. Unlike the implicit representation, extra-modular explicit representation or index might include an additional CS representation about grammatical explanations related to this particular linguistic phenomenon that has not yet been proceduralised.

That is, the activation of this explicit representation might involve the activation of the additional CS representation about its metalinguistic information.

The transition from extra-modular explicit to extra-modular implicit language knowledge involves "engaing in an activity with the goal of becoming better at it" (DeKeyser, 2010, p. 50). The mastery of metalinguistic knowledge is a skill no different from any other cognitive skill, whose success mainly depends on practice. Skill, in this sense, is a type of procedural knowledge that can turn into automatised knowledge by means of practice (DeKeyser, 2017). Extra-modular Explicit Second-Language Knowledge in CS can be seen as declarative knowledge of how a language works. This might involve L2 learners being aware of rules and regularities of language and being able to reflect upon that knowledge. Extra-modular Implicit second-language knowledge can be seen as automatised knowledge, which places no heavy demands on WM as formal rules and regularities of language are held in LTM in CS, and no longer interrupt current processing in WM in CS. Extra-modular Implicit Second-Language Knowledge involves quick and effiecient production or perception of language, while explicit knowledge of language does not allow rapid or fluent language processing, as this explicit knowledge of grammar rules or other aspects of language (e.g. lexis, pragmatic conventions) is still held in WM, causing overt performance of the L2 to appear slow as there are many things to be processed along with language comprehension/production (Criado, 2016).

2.7 Summary and conclusion

Adopting MCF, I have been able to establish a detailed account of the two types of L2 knowledge; namely Modular Implicit L2 Knowledge and Extra-modular Implicit and Explicit L2 Knowledge. This is necessary for the purpose of the current thesis, which aims to tease apart those two types of L2 knowledge in real empirical data (discussed in Chapter 7).

In this chapter, I reviewed the discussion of the two types of knowledge within generative and cognitive approaches. This concludes as the existence of common ground between SLA researchers in the opposing approaches. The differentiation between implicit/acquired and explicit/learned types of L2 knowledge in both approaches involved the notion of consciousnesses, which is assumed to be commonly understood within the field SLA. Due to its significance, the notion of consciousness is discussed in this chapter to provide a solid understanding of the two types of L2 knowledge and what it means to be conscious/aware of a piece of information. Then, a detailed account of the theoretical framework MCF adopted for the current thesis was discussed. Finally, in the light of these discussions, the two types of L2 knowledge were revisited and thoroughly defined.

In the following chapter, the notions of L1 transfer and the importance of input to the development of L2 are discussed, due to their relevance to the research questions in this thesis.

Chapter 3   Effects of L1 and Input on the Development of L2

3.1   Organisation

This chapter reviews previous research on two main topics. First, the effects of L1 cross-linguistic influence on the development of L2 knowledge is discussed from different theoretical points of view. Second, classroom input is discussed, as it is the main type of input participants of the current study are exposed to. The discussion of L2 classroom input includes instructed second-language acquisition (SLA), metalinguistic input and natural input. Finally, the chapter also discusses the Competing System Hypothesis (CSH) as it makes claims that seem to be supported by findings from the current empirical data (see Chapter 7).

The organisation of the remainder of this chapter is as follows: section 3.3 is a historical overview of the most influential hypotheses on the notion of L1 transfer. In section 3.3.4 I discuss the L1 transfer from a Modular Cognitive Framework (MCF) perspective and introduce the term 'cross-linguistic influence' as a more accurate way to represent the view of L1 influence adopted in the current thesis. In section 3.4 I discuss instructed SLA, metalinguistic input and natural input as part of classroom input. In section 3.5 I discuss the claims within CSH (Rothman, 2008), because of its importance to the discussion of the current data.

3.2   Introduction

In this chapter I discuss different L1 transfer hypotheses, out of which Full Transfer Full Access (FTFA) is the most widely accepted, as it is evident in the initial state of L2 development and can be 'restructured' with increasing encounters with L2 input. In the generative understanding, this process of restructuring occurs whenever there is a conflict between L1 and L2 constraints. However, there is no clear or detailed account of how L1 rules are restructured, nor of how they interact with the target rules. FTFA gives little consideration to the mechanisms which trigger L2 development in real-time; it only focuses on properties of L2 knowledge. The framework adopted in the current thesis, MCF, proposes a processing-oriented account of L1 transfer, offering a precise and detailed treatment of L1 transfer and how it interacts with the development of L2, viewing the process as dynamic (Sharwood Smith & Truscott, 2006).

The L1 transfer view adopted in the current thesis is what is referred to as L1 cross-linguistic influence (Sharwood Smith, 1983) because this view of cross-linguistic influence takes into consideration the gradual nature of L2 development, viewing it as a gradual shift from L1 values dominating grammar to L2 gaining higher resting levels of activation. This view of L1 transfer offers ways of explaining transitional L2 development, which departs from traditional SLA property theories and focuses on how syntactic derivations are triggered. This is thought to be the most suitable approach to L1 transfer

for discussion of the development of the two types of second-language knowledge and their interactions with internal input.

Input and its interaction with the development of L2 knowledge is also a key concern in this thesis. For this reason, classroom input is discussed, as it is assumed to be part of the participants' experience of developing a second language. The notions of instructed input, metalinguistic input and natural input are also discussed as part of the input that Najdi Arabic L2 English learners experience during their L2 development. This chapter also discusses the notion of frequency of occurrence of certain linguistic entities in the external input and its relation to the learner's L2 development of those entities (if any).

The chapter concludes with CSH, proposed by Rothman (2008), which suggests that learned knowledge, or extra-modular L2 knowledge as it is referred to hereafter, intervenes in the L2 learner's production, but not comprehension. This would mean that the learned knowledge might show signs of intervention in empirical tests where L2 learners are asked to produce utterances in the target language (i.e. production tests), whereas this learned knowledge should not be able to show any signs of intervention in empirical tests investigating the L2 learner's comprehension abilities. In this chapter, I discuss reasons behind such assumptions and develop the CSH view of 'the learned knowledge intervention' benefiting from the transitional account of development provided by MCF. This is also discussed in further detail in Chapter 7, where empirical data is discussed.

3.3 Transfer

First, I consider different hypotheses about the influence of L1 on the development of second-language knowledge. I then examine data from different L2 acquisition studies to arrive at the best supported hypothesis of L1 influence of the development of second-language knowledge, which I discuss in standard generative terms. At the end of this section, I discuss L1 influence within the transitional account MCF offers to thoroughly explain the notion of L1 influence, where the process is viewed from an online processing perspective.

3.3.1 L1 transfer: a historical overview

In this section, I discuss different hypotheses of L1 transfer to provide the basis for discussing the MCF account of cross-linguistic influence on the development of L2 and in what way the MCF cross-linguistic influence account advances over standard generative hypotheses on L1 transfer. I compare different hypotheses of L1 transfer to the most widely accepted FTFA, which seems to be the most consistent with empirical data over other generative L1 transfer hypotheses.

Three views about the influence of L1 on L2's initial state of development will be considered in this section. The first is the full transfer view of L1 influence exemplified in the FTFA hypothesis of Schwartz & Sprouse (1994; 1996) and Schwartz (1998). The second is the partial transfer view, exemplified in the Minimal Trees hypothesis of Vainikka & Young-Scholten (1994; 1998; 1996a; 1996b). The more updated version of Minimal Trees is referred to as Organic Grammar (Vainikka & Young-Scholten, 2011), which draws direct connection between the stages that the learner goes through and the resulting syntactic structure. The final view is the no-L1 transfer view of Flynn & Martohardjono (1994). Both the FTFA hypothesis and the Minimal Trees hypothesis propose that the initial state of L2 grammar is influenced by L1. However, unlike the FTFA hypothesis, which proposes that both lexical and functional categories are transferred from L1, the Minimal Trees hypothesis posits that only lexical categories and their projections are transferred to the initial state of L2 grammar, and that L1 functional categories are neither available in the initial state nor transferable even in subsequent stages of L2 development. Only later in the development of L2 grammar do functional categories emerge, being triggered by L2 input and available from Universal Grammar (UG) (White, 2000). The Minimal Trees hypothesis predicts that learners with different L1s will show similarities when acquiring different properties of functional categories, whereas the FTFA hypothesis predicts that learners with different L1s will behave differently with regard to functional categories as a result of being influenced by L1. Both hypotheses, however, agree that differences are evident among learners with different L1s with regard to lexical categories. The no-L1 transfer hypothesis predicts that there will be no differences, whether in lexical or functional categories, in the interlanguages of L2 learners with different L1s, as L1 does not influence L2 grammar.

3.3.2 No-L1 transfer vs. full transfer

To examine the claim from the no-L1 transfer hypothesis, data from learners with different L1s should be considered. According to this hypothesis, learners are expected to behave similarly regardless of their L1. Consider Yuan (2001), as an example of a study examining the acquisition of the same L2 by two different L1 speakers to test the no-L1 transfer hypothesis. Yuan (2001) examined the L2 acquisition of Chinese by native speakers of English and French who were at different proficiency levels. Yuan (2001) examined production data and grammaticality judgements of Chinese word order. Chinese, like English, does not allow verb raising, whereas French allows the verb to raise. This difference is ascribed to the verb movement parameter, where Chinese and English have the [−] value and French has the [+] value. If the no-L1 transfer hypothesis is correct, French speakers will not be influenced by their L1 and will not be expected to raise the verb. Both French and English speakers are expected to behave like Chinese native speakers. Indeed, the results show that both French and English speakers treat

verb placement similarly from early stages of L2 acquisition, despite the fact that French and English have different feature strength. In other words, French learners neither produced nor accepted sentences where the verb raised, and they solely produced and accepted sentences where the verb did not raise. These findings seem to support the no-L1 transfer hypothesis, in the sense that L2 learners are similar to each other and L1 does not seem to play much of a role in the development of L2.

However, to best interpret the findings from Yuan's (2001) study, we shall compare it to a robust finding in SLA research, namely the persistent problem French learners of English have with regard to the placement of adverbs. Empirical evidence (e.g. White, 1992) shows that French learners of English experience this problem even after many years of exposure to English. That is, they tend to accept and produce sentences where the verb raises out of the verb phrase (VP), typically with adverbs such as, *Linda eats often pizza*. These findings are strongly supportive of the FTFA hypothesis, suggesting that French speakers are influenced by their L1. A crucial question we shall consider is how can such contrasting findings (Yuan's and White's) be accounted for?

From my perspective, although Yuan's study is consistent with the no-L1 transfer view, putting the two studies together might provide support to the FTFA hypothesis, which assumes that learners do transfer properties from L1, but can also restructure these properties to the appropriate L2 values on the basis of the evidence they are exposed to from L2 input. Thus, in the case of learning Chinese, French speakers seem not to have difficulty realising that Chinese is a [−] raising language because the evidence from L2 input is potentially strong, since Chinese places adverbs and negation in one position, and that might be sufficient for French speakers to override L1 transfer. However, in the case of learning English, French speakers have difficulty realising that English is also a [−] raising language. This could be because English is ambiguous with regard to raising verbs, because some verbs do raise, such as auxiliaries and the copula be, but not lexical verbs. Thus, initially, French speakers, with the transferred property of [+] verb raising from L1, might encounter instances of raised verbs from L2 input which raise the activation levels of their representations. The result is that English continues to be processed as a [+] verb raising language, which does not assist L2 learners in overriding L1 transfer and restructuring to the relevant L2 feature. The FTFA hypothesis provides a logical account of the data from French speakers learning Chinese and French speakers learning English, whereas the no-L1 transfer hypothesis does not provide a thorough explanation, which gives considerable advantage to the former.

3.3.3 Minimal trees vs. full transfer

Moving to the partial transfer view, one assumption of Minimal Trees is that there is influence from L1 on the lexical categories of the L2 initial state and on subsequent

stages, an assumption which is also shared by the FTFA hypothesis. In different empirical studies, Vainikka & Young-Scholten (1994; 1998; 1996a; 1996b) developed their ideas based on spontaneous production data from adult learners of German in a naturalistic setting. These learners are from different L1s, including Spanish and Italian, which are head-initial, as well as Korean and Turkish, which are head-final like German. The data shows that L2 learners behave differently with respect to word order, in a way that is consistent with L1 word order. These findings support the claim that the initial state of L2 grammar is influenced by L1 lexical categories and their projections. This is consistent with both hypotheses, as both agree that the L2 initial state includes L1 lexical categories, but disagree whether functional categories are present or not.

However, the initial claim of Vainikka & Young-Scholten (1994; 1998; 1996a; 1996b) is that functional categories are lacking in L2 grammar. The evidence they based their view on is that the least advanced learners of German (i) rarely show incidences of accurate subject-verb agreement; (ii) almost never use modals and auxiliaries; and (iii) never raise the verb out of the VP (in spite of the fact that German does raise the verb). This indicates the absence of the inflection phrase (IP). They also assert that the absence of *wh*-questions and embedded clauses introduced by complementisers is evidence of the lack of complimentizer phrase (CP). This might suggest that the functional categories are absent in the initial stage of L2 grammar (Vainikka & Young-Scholten, 1998; 1996b).

Vainikka and Young-Scholten propose a pattern of L2 development. According to their data, the initial stage consists of the lexical VP. The next stage of development of the L2 grammar is characterised by the emergence of a functional phrase (FP) (an English exemplification of an FP could be*: *she eat the apple*). This functional category does not exist in any language. At this stage, learners should reset the headedness of lexical categories according to L2 values. Vainikka and Young-Scholten propose such a category because, as their data shows, learners (i) start using modals and auxiliaries increasingly; (ii) show optional verb raising; (iii) lack subject-verb agreement, *wh*-movement and complementisers (Vainikka and Young-Scholten, 1998). In their suggested pattern, Vainikka and Young-Scholten needed a projection higher than the VP and different from the IP (as suggested by the absence of overt subject-verb morphology). Thus, they propose the projection (FP) for the verb to move to, which lacks inflectional morphology (White, 2003). In the next stage of development, the obligatory verb raising is present, and the accurate use of verb-subject inflectional morphology is evident, suggesting the emergence of the IP. In the final stage, the CP emerges, but none of the subjects in the study reached this stage because none of them produced subordinate clauses introduced by complementisers, as indicated by Vainikka & Young-Scholten.

However, many studies seem to provide evidence against Minimal Trees, namely the presence of functional categories from the initial state of L2 grammar. One of these studies is Haznedar (1997). Haznedar examined spontaneous data from a Turkish child, Erdem, who was learning English. The child was first interviewed at the age of 4 after spending three months in England, having spent the first two months in a Turkish-speaking environment and the third month in an English-speaking environment. This would suggest that data truly represented the initial state of Erdem's L2 grammar (White, 2003). Haznedar reports that Erdem initially produced head-final (in VP and negation phrase [NegP]) word order, which is consistent with the Turkish L1 word order, indicating the transfer of Turkish headedness in both lexical and functional categories. In subsequent stages of learning English, Erdem switches to the English order, producing head-initial VP and NegP. The data was interpreted as providing support to the FTFA account. Another study supporting the FTFA view is that of (Gavruseva and Ladiere, 1996). They examined spontaneous production data from a Russian-speaking child named Dasha, learning English. Dasha was interviewed after two months of exposure to English. Dasha produced subject-auxiliary inversion in yes-no questions (e.g. *can I see please?*), *wh*-questions (e.g. *what are we going to do?*), and subordinate clauses (e.g. *mama know that we go outside*), suggesting the presence of CP from an early stage of Dasha's L2 grammar.

Stauble (1984) also examines spontaneous data on the use of verbal morphology from adult learners of English. Stauble compares the accuracy of two groups, Spanish and Japanese, each of which represents three stages of L2 development: low-intermediate, intermediate and advanced. The subjects' exposure to English was mainly naturalistic. The results show that the two groups, L1 Spanish and L1 Japanese, differ in two functional domains; copula be (at the low-intermediate and the intermediate levels) and subject-verb agreement (at the advanced level), whereby, in both domains, L1 Spanish are more accurate than L1 Japanese. This seems to suggest L1 influence on functional categories because Spanish has a rich system of subject-verb agreement, while Japanese does not (Hawkins, 2001).

From my point of view, there seems to be an area of inconsistency between Minimal Trees and data from Stauble (1984). If Vainikka & Young-Scholten (1996a) are correct in their proposal that "no functional projections are transferred- neither initially, nor subsequently" (Vainikka & Young-Scholten, 1996a, p. 15), L2 learners should be predicted to have parallel development with regard to functional categories in subsequent stages, as a result of not being influenced by L1. However, the advanced Spanish speakers seem to be more accurate than the Japanese speakers with regard to subject-verb agreement. It seems challenging for Minimal Trees to account for the differences found between the two groups, as it assumes no influence from L1 in the

functional domain, whereas the FTFA view ascribes such phenomena to the full L1 influence on L2 grammar.

3.3.4 L1 Transfer and MCF

It is widely accepted that full transfer is evident in the initial stage of L2 development, which can be 'restructured' after encountering sufficient input for L2 learners to override L1-based rules or constraints. In generative terms, this process of restructuring occurs whenever there is conflict between the L1 constraints and the target grammar. However, there is no clear or detailed account of how L1 rules are restructured, nor how they interact with the target rules (Sharwood Smith & Truscott, 2006).

What seems necessary is a developed view of L1 transfer, where online processing and interconnected processes with different modules of the mind are taken into consideration. Agreeing with Sharwood Smith & Truscott (2006, p. 201), FTFA does not give much consideration to the mechanisms that trigger L2 development in real-time; it only focuses on properties of L2 knowledge. MCF offers a processing-oriented account of L1 transfer, offering a detailed account of L1 cross-linguistic influence and how it interacts with the development of L2, viewing the process as dynamic (Sharwood Smith & Truscott, 2006). In the following section, I discuss the MCF account on transfer, which is also the view adopted in this thesis.

As discussed earlier FTFA, as proposed by Schwartz & Sprouse (1994; 1996), proved quite successful in terms of offering logical interpretations to many empirical studies, and a clear account of L2 development (with some controversy over the 'full access' part of the theory) (cf. Bley-Vroman, 1990; Hawkins & Chan, 1997, among others). However, some important issues need to be resolved. Agreeing with Whong-Barr (2006, p. 191) the issue with the standard generative thinking is that transfer is viewed as a static process of transferring a set of rules from L1 to L2. It is essential to the discussion of the current thesis (i.e. the development of modular implicit, extra-modular implicit and explicit knowledge of language) to adopt an account of transfer that goes beyond the description of language-specific properties to explanation of the process of syntactic derivation from a 'developmental' or 'transitional' perspective (Sharwood Smith & Truscott, 2006 p. 201).

One issue of the concept of transfer, as suggested by Sharwood Smith & Truscott (2006) is that it implies the meaning of importing something from one location to another. But L1 elements that are said to move into the L2 system do not *leave* the L1 system, causing automatic L1 impoverishment. Transfer can only mean that the L2 system is a copy of the L1, without any changes or impoverishment in the latter. This implicates that L2 development involves full (or partial) copying into the L2 system from L1, which also implicates that the L2 learner can have two language systems in two different locations – one starting as a copy of the other. As understood by FTFA, L2 development starts

with the copied L1 system operating with new L2-based lexical items and L2-based phonological content. Within this view of transfer, L2 development is assumed to simply be a "relexicalised L1" (Sharwood Smith & Truscott, 2006, p. 203). Within this view of the interpretation of transfer as creating copies of L1 grammar to handle new language(s), one issue arises of how this process of copying is triggered, which is not covered by theories of L1 transfer such as FTFA (Sharwood Smith & Truscott, 2006). For example, is transfer of L1 grammar triggered by any encounter with foreign input?

Transitional issues with FTFA arise when the copied L2 grammar starts to develop and diverge from the original L1 grammar, which is not accounted for by FTFA (Sharwood Smith & Truscott, 2006). The property-driven nature of the research inspired by FTFA might have caused confused (inaccurate) interpretations of findings, because learners do not pass through discrete stages of development jumping from stage to another, rather they show a great deal of optionality where they seem to be in two different developmental stages simultaneously (for a detailed account of optionality see Truscott, 2006). Thus, what is transferred can manifest itself along with the set of data that is to replace it (Sharwood Smith & Truscott, 2006). In other words, L2 learners can show properties of both the transferred L1 and the newly created L2 properties simultaneously (e.g. Robertson & Sorace, 1999; Vainikka & Young-Scholten, 1994).

MCF explains how these changes occur over time, moving from stage to another, via the processing-oriented notions of competition and activation levels. For MCF, L2 syntactic acquisition is the establishment of new representations with their feature values in the language module, which is subdivided into syntactic structure (SS), phonological structure (PS) and the interface system between conceptual structure (CS) and SS. Each representation is created separately and then connected via interface systems across the SS, PS and CS sub-modules. Each has a lexical store where a processor works to form new representations for the current input. For these representations to be available in working memory (WM), the processor selects the most appropriate item available, while also instantiating new items and replacing old ones whenever necessary.

In processing unfamiliar L2 input, for example, internal input would be created in auditory and perceptual modules, which would trigger the workings of the phonological module. PS system would assign these newly created representations phonological interpretations, using structures already available in its store and creating when necessary new features (according to the principles of UG). Unfamiliar input would be assigned L1 phonological representations. The new L2 system develops as new structures are indexed as L2, which will result in new sets of structures tagged as L2, sharing the same phonological store (Sharwood Smith & Truscott, 2006).

The formation of a chain will continue, and the created L2 phonological representation will trigger the workings of the syntactic module. The syntactic processor

would assign syntactic interpretation to the representation from the available triggered structure from the syntactic store. The syntactic processor would also aim at constructing, when appropriate, new elements (features and categories), obeying principles of UG. Any syntactic item activated in the syntactic WM would trigger the workings of the conceptual module to assign conceptual interpretation to the representation in the same way as the phonological and syntactic modules. The result is a set of chains of connected representations PS<>SS<>CS created in conceptual WM. The parser must select the most appropriate chain of representations for the current context, and in accordance with UG (Sharwood Smith & Truscott 2006).

Portions of the input of which equivalent representations are unavailable in the current stores are temporarily assigned an "empty, placeholder structure ('?'), for which the processor provides a best-fit solution, operating according to universal principles. So a PS<>?<>? String, for example, will still be processed, and syntactic and conceptual processors will try to complete the job as best they can." (Sharwood Smith & Truscott, 2006, p. 209).

3.3.4.1 L1 cross-linguistic influence

Cross-Linguistic Influence was initially proposed by Sharwood Smith (1983) as an alternative term to accommodate theory-neutral discussion, include the notion of avoiding L1 transfer and language attrition, and to include discussion of L2 learner strategies that might affect L2 development. Relevant to the current discussion, L1 cross-linguistic influence does not appeal to the confused notion of transferring L1 structures into the L2 system. Within the MCF view of L2 development, L1 influence is a natural consequence of processing. Thus, within this view of L2 development, it is not a question of whether L1 properties transfer to the L2 system, it is a question of how this process occurs and what triggers it.

When a second language is introduced to the language module, it is added to the exact same mental processors and stores that accommodate the L1 system. In real-time processing, both L1 and L2 items are available for use in representations, whether it is L1 or L2 that is being used. Given the fact that L1 items have been activated intensively over a lifetime, they have high resting levels of activation, which means they are selected and appear in L2 representations. For example, the high activation level of the L1 [strong] value for (*I*) will dominate L2 production over its proper [weak] value, producing an ungrammatical verb raising. As the L2 learner encounters L2 input, the L2 items gain higher resting levels of activation and become more able to participate in the competition to get selected. This view of L1 influence does not imply the notion of 'copying', rather "[t]he phenomena follow from well-established characteristics of bilingual processing" (Sharwood Smith & Truscott, 2014, p. 320).

Such a view of L1 influence takes into consideration the gradual nature of successful L2 acquisition, rather than viewing the process as discrete stages of development. It offers a coherent account of the gradual shift from L1 dominating the grammar to L2 gaining higher resting levels of activation, within which a predicted (and maybe extended) period of optionality might be evident in the learner's L2, where both L1 and L2 values overlap during L2 processing. In other words, MCF, like no other existing theory in SLA, offers an explanation of how L1 and L2 values co-exist in the language module, which is a consequence of processing. Processing here refers to competitions among representations in the language module that are based on resting levels which get altered during processing. For example, in the initial stage of L2 development, low L2 activation levels are altered, gaining gradual increase as internal input in perceptual structure slowly raise their levels.

To sum up, MCF provides detailed yet simple ways of explaining transitional L2 development and mental processes by which internal input (perceptual or conceptual representations constructed to handle the external stimulus) triggers changes in the learner's L2 grammar, as well as explaining how these changes in the learner's grammar influence performance overtly. MCF departs from the standard debate in the literature with regard to the question of L1 transfer, and focuses instead on how L2 syntactic derivation is triggered and how L2 syntactic representations are developed in the most detailed way available so far. It departs from a property-specific discussion of the topic, which can be seen as a partial discussion of the issue to the deep roots of how, in the first place, such a process is instantiated. This is the reason it is thought to be the most suitable view of L1 influence available to accommodate the current discussion of the development of the two types of second-language knowledge and their interaction with external input (the notion of input is discussed in greater detail in section 3.4). For the remainder of this thesis, I use the term L1 cross-linguistic influence to refer to L1 effects on the development of L2, as such term is a more accurate reflection of the view adopted in the current study.

3.3.4.2   L1 influence and the types of second-language knowledge

Returning to the topic of the distinction between the two types of second-language knowledge, I will briefly recall types of linguistic knowledge and discuss them within the notion of L1 cross-linguistic influence.

Within the language module, the task of language *naturally* acquired should require no attention fixed towards it, because it is innately specified. Language is viewed as *growing* automatically with no specific resources to intentionally develop the language module. Carrying out processes within the language module is a matter of fixed routines, without the need for external resources. And this is what is referred to in the current thesis as modular implicit L2. The task of developing metalinguistic knowledge, however,

requires the resources of attention, as CS is not resource-free and its pre-existing processes are not adequate to carry out the task of language learning. The conceptual system (where metalinguistic knowledge is stored) has no innate capacities to handle language acquisition, as it falls out of the language module. The development of metalinguistic knowledge involves conscious language learning, individually or in a formal setting (Sharwood Smith & Truscott, 2014). Metalinguistic knowledge stored in CS is referred to as extra-modular implicit L2 and explicit L2, depending on the resting levels of activation. Extra-modular implicit L2 representations have high resting levels of activation and are more readily available for future use. Extra-modular explicit L2 representations would place heavy demands on WM to be retrieved because of the low levels of activation. Representations gain higher levels of activation as they are more frequently processed during L2 encounter.

The type of knowledge that is affected by cross-linguistic influence, as explained within MCF, is modular implicit L2, as L1 syntactic items (features and categories) form the basis of the initial state of the L2. However, extra-modular implicit L2 and explicit L2 can show some L1-guided overt performance, as a result of analytical strategies of how L1 works to overcome the shortcomings of knowledge of L2. In other words, when metalinguistic rules and regularities about how L2 works are absent, L2 learners might consult their analytical skills as well as their conceptual knowledge of L1 to handle the current L2 input. This, however, is not the same process of L1 cross-linguistic influence within the language module, which falls out of conscious introspection. It is a conscious type of influence in the sense of additional intentional resource to enhance language learning.

3.3.5 Conclusion

Although FTFA succeeded in explaining SLA empirical data, it says nothing about how L2 syntactic derivation is initiated and how L2 syntactic representations are developed. This gives advantages to the more transitional and developmental account of cross-linguistic influence offered by MCF, which also seems to be able to enrich the discussion of the scope of the current thesis: that is, the development of the two types of L2 knowledge and how these interact with external input to develop. This latter notion of input is discussed in greater detail in the following section.

3.4 Classroom input

In this section, I discuss classroom input as it is assumed to be the type of second-language input that participants of the current study have encountered. As a starting point, I must make some clarifications. First, the current study is not an intervention study, rather it is assumed that Najdi Arabic L2 learners/speakers of English have built knowledge of unergative verbs in a formal classroom context, compared to unaccusative

verbs that are assumed to have been learned incidentally[1] (without focusing attention in order to learn the structure). Second, I assume that second-language knowledge are mental representations within and beyond the language module. SLA is underlying processes, on which formal intervention is meant to have effects. As illustrated in MCF, L2 learners can develop both automatised extra-modular and modular type of language knowledge, with extra-modular processes requiring more deliberate practice, yet both types of language knowledge might reach a high level of sophistication.

In the following sections, I discuss the notion of instructed input, metalinguistic input and natural input as parts of classroom input.

3.4.1 Instructed SLA

The focus of attention in the field of instructed SLA has been to establish whether or not instruction (as the manipulation of input/output) positively affect the development of the learner interlanguage. The main focus of research has been to investigate the effectiveness of instruction in assisting learners with what they are taught in a formal setting. Another key question is the extent to which some forms of intervention are more effective than others. In this section, I review the effectiveness of instruction on grammar development.

3.4.1.1 Grammatical intervention

There is great deal of evidence to support the idea that grammar instruction can help learners improve grammatical accuracy in their elicited performance in experimental studies. Norris & Ortega (2000) conducted a meta-analysis of 51 empirical studies that use the measure of learning as either "selected response" or "constrained constructed response". They report a size effect of 1.46 for the 'selected response' and 1.20 for the 'constrained constructed response', showing that positive effects of form-focused instruction are evident in the learning outcomes when measured in these two methods (Norris & Ortega, 2000, p. 440). Form-focused instruction was reported to be durable through delayed post-tests. The conclusion that can be drawn from such data is that instruction is effective on the development of learner performance of certain grammatical features (R. Ellis, 2005a).

The evidence related to the effectiveness of grammar instruction for the development of the targeted grammatical features in the learner's communicative unplanned language use is somehow unclear. This mirrors the challenges researchers have when designing instruments to elicit spontaneous production for the tested L2 features. Norris & Ortega (2000) only locate eight empirical studies that use the measure 'free constructed response', where instruction seems to have greatly reduced effects.

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[1] I discuss the rationale behind choosing these two structures in Chapter 4.

The effect size for 'free constructed response' is reported as half that of the 'selected response' and 'constrained constructed response'. They suggest that "particular outcome measure types may result in very different observations about the effectiveness of a treatment" (Norris & Ortega, 2000 p. 199). R. Ellis (2002) reported 11 studies using free oral production measures. Significant effectiveness of instruction was only evident in six studies, where positive effects were also found in delayed post-tests. This can draw two conclusions. First, grammar instruction does not seem to always assist L2 learners in developing the targeted grammatical feature in spontaneous production. Second, when positive effects are evident, they seem durable (R. Ellis, 2005a).

Grammar instruction does not prove to beat the natural route of acquisition (i.e. stages of development involving the order in which certain grammatical features are acquired, as found by empirical studies). The effectiveness of grammar instruction on the natural route of acquisition is best illustrated in studies comparing instructed and naturalistic language learning (e.g. Ellis, 1989; Pica, 1983), where the order of acquisition is reported to be the same for both groups, for the acquisition of grammatical morphemes and the acquisition of syntactic structures, such as German word order and English relative clauses. Such findings directed Pienemann (1985) to propose the teachability hypothesis, which suggests that instruction should target grammatical features of the developmental stage following the one that the L2 learner is already in. This hypothesis was further supported by Pienemann's own empirical work (e.g. Pienemann, 1989). However, findings from (Spada & Lightbown, 1999) challenge this hypothesis, showing that routes of acquisition may not be altered by grammar instruction. The study also suggests that grammar instruction does not have to be specifically designed to the next stage of development of each individual learner, as participants at stage 2 of L2 development benefited the most from instructed input that focuses on question formation of stage 4 and 5, but only progress to stage 3. The concluded remark here is that grammatical instruction may help learners to advance more rapidly within the natural route of acquisition.

Another area where the effectiveness of instruction can be tested is by investigating L2 learners' metalinguistic knowledge. Research by Norris & Ortega (2001) indicates that the effect size of instruction is much smaller when measured through metalinguistic judgement than selected response and constrained constructed response, yet higher than that of free constructed response. Research by Alderson, Clapham & Steel (1997) suggest that there is only a weak relationship between L2 learners' metalinguistic knowledge and their actual proficiency level or stage of L2 development. For example, a beginner learner might have an amount of metalinguistic knowledge about how the target language works, yet might still have difficulty in spontaneous unplanned communication. This amount of metalinguistic knowledge has nothing to do

with the learner's real-time language production/comprehension. In MCF terms, this type of knowledge would only be conceptual declarative knowledge about how a certain language works, which is of little use to the learner's communication purposes as it requires time and extensive processing in order to be retrieved.

To sum up, the effectiveness of intervention indicates that grammatical instruction: i) might result in increasing accuracy in test-like activities; ii) yet, might not necessarily result in improved spontaneous language use; iii) might assist learners to progress more quickly within the natural route of language development; iv) might enrich L2 learners' metalinguistic knowledge. However, doubts exist to the practicality of such type of knowledge. Finally, it appears from the discussion above, that when grammatical instruction shows positive effects on L2 learners' performance, this effect seems durable.

3.4.1.1.1   Types of intervention

Long (1991) and Long & Robinson (1998) suggest that intervention can be divided into three types, corresponding to where the learner's attention is focused; whether on meaning, forms, or a mixture of meaning as well as forms. Within this view, focus on meaning treatments requires rich quality input provided to L2 learners alongside the opportunity for meaningful use of the second language, which will cause the incidental development of the second language. Long (1991) differentiated between two types of direct form-focused instruction; focus-on-forms and focus-on-form. The former requires a planned approach to form-focused instruction, which can be selecting a certain form to focus on for the treatment. Learners are expected to learn one form at a time in a systematic manner. The latter involves drawing learners' attention to form when resolving tasks. Thus, focus-on-form, as defined by Long, is a kind of indirect intervention, while focus-on-forms is a type of direct intervention.

Many studies have focused on comparing the effectiveness of implicit-oriented instruction with explicit instruction, which were included in Norris & Ortega's (2000) meta-analysis. Instructional treatments were categorised as explicit when rule verbalisation and analysis is part of the instruction provided, and implicit if "neither rule presentation nor direction to attend to particular forms were part of the treatment" (p. 167). In these studies, explicit types of instruction were concluded to be more effective than implicit treatments. However, Norris & Ortega noted that the measurement seem to have biased the results in favour of explicit treatments, as the learning outcome was measured through test-like elicited responses rather than spontaneous communicative use, which might have tapped into learners' explicit knowledge of the structure. Norris & Ortega also pointed out that explicit measurements invovled a variety of instructional options for eliciting learners' responses, placing fewer restrictions on the learner's part, whereas implicit knowledge was measured in confining ways (e.g. instructing L2 learners to memorise a set of utterances). Therefore, caution should be taken when concluding that

implicit instructional treatments are less effective than explicit ones, as the experimental method in which reponses are elicited can play an important part in biasing findings to certain conclusions (R. Ellis, 2005a).

3.4.2 Metalinguistic input

Explicit language knowledge "is the declarative and often anomalous knowledge of the phonological, lexical, grammatical, pragmatic and socio-critical features of an L2 together with the metalanguage for labelling this knowledge. It is held consciously and is learnable and verbalisable" (Ellis, 2004, p. 245). This type of language knowledge that L2 learners develop is a result of encountering metalinguistic input mostly in a classroom setting. This is assumed to apply to Najdi Arabic L2 learners in the current study in their L2 learning of unergative verbs. This type of input offers a learnable, verbalisable and consciously introspected type of language knowledge. In other words, metalinguistic input entails explanations of how a certain structural feature works, and facilitates the ability to understand and articulate grammatical rule explanations.

However, there is consensus among SLA researchers that implicit knowledge is the source of fluent and confident communication in a second language. One might argue that it is implicit knowledge that should be the focus of instructional treatments, but why is that? According to the skill-building hypothesis (Dekeyser, 1998) for example, explicit knowledge can be proceduralised through practice and can turn into implicit knowledge (i.e. the centre of L2 learning). In contrast, generative approaches (Krashen, 1981; Ellis, 1998) view language as mainly implicit, developing naturally through comprehensible input. The point where theories agree is that L2 learners should be given a chance to practice in communicative activities, which will help in developing their performance and competence in the L2 (R. Ellis, 2005a).

The value of offering L2 learners metalinguistic input has been and perhaps remains a conflicted subject in language pedagogy. Metalinguistic input can be understood in relation to two main points. First, whether or not metalinguistic input is valuable to the development of an L2 by itself, and second, whether or not this type of input facilitates the development of implicit knowledge.

Metalinguistic knowledge can be viewed as offering value to the L2 learner if it is used in actual performance in the L2. One position is that the L2 learner can benefit from metalinguistic input in forming L2 knowledge to monitor their performance (Krashen, 1982). This type of performance, however, requires learners' attention to be directed to form (rather than meaning), and requires a sufficient amount of time. Another position can argue that metalinguistic knowledge is also useful in the sense that it can be accessed for the purpose of forming messages to accommodate the task at hand. This is especially true if the rules are automatised to some degree and no longer place heavy burden on memories, but this process is only developed over time. Yuan & Ellis (2003)

indicated that L2 learners perform significantly more accurately in terms of grammar when they are given time to plan their responses. This can only emphasise the importance of metalinguistic knowledge to improve the outcome and that learners require time to access such knowledge.

In MCF terms, metalinguistic knowledge is stored as conceptual representations in the CS. When the external input triggers the activation of the CS, the activated representation can activate the equivalent syntactic representation in the language module. This process will raise the activation levels of such syntactic representation, which will assist in strengthening its readiness for future use. Metalinguistic knowledge can be viewed as explanations of grammatical rules stored in the CS as representations, the benefit of which is to help L2 learners understand the current L2 input with ease. For example, a sentence like *the dog was chased by Rosie* will encourage L2 learners at beginner stages to perhaps believe that *the dog* is the one doing the chasing because it appears first in the sentence. Metalinguistic input provides learners with explanations about grammar rules that can also facilitate the ease to which input is comprehended. Input comprehension is the key to developing the language module, specifically the syntactic module. Providing L2 learners with metalinguistic input can develop both Extra-modular and Modular Second-Language Knowledge. Metalinguistic input has its importance in two aspects of second-language development. First, in providing extra resources for learners to overcome the shortcomings of modular implicit L2 knowledge. Second, to help learners better understand L2 input in general, which indirectly triggers processes in the SS.

3.4.3   Natural input

Any L2 learner is very likely to be exposed to naturalistic input through social media, TV or in real-life encounters, even if they learn L2 mainly in a formal classroom. Language development is a slow process that requires hard work and time. Children learning their first language take up to five years to reach a high level of grammatical competence, during which they are exposed to extensive amounts of natural input. Similarly, L2 learners need to be and in some cases are exposed to massive amounts of quality input in order to acquire L2. Najdi Arabic L2 learners of English of the current study are no exception. Without quality exposure to the target language, L2 learners could not acquire it.

SLA research has typically dealt with the notion of input as this very simple idea of transforming something from the outside environment to the learner's mind. SLA research has always emphasised the importance of input encounter, but has not put as much emphasis on what it means to process input. Within MCF, input processing is a "complex and multi-stage construction process" which can be explained thoroughly through the mental architecture adopted in the current thesis (Truscott, 2015a p. 157).

Carroll (2001; 1999) defined input in relation to individual modules. Stimulations from the outside environment to the senses encourages the construction of a representation for the experience in one module, which stimulates the construction of another representation in the adjacent module. Within Carroll's view of input (which is very much compatible with MCF's view), there seems to be a series of different types of inputs corresponding to different modules. For example, input to the conceptual module comes from the syntactic module; input in the syntactic module comes from the phonological module; and input from the phonological module comes from the auditory module, which forms a lower-level processing product.

Relative to the current discussion is the Processability Theory (Pienemann, 1998; 2005), which is based on processing principles to account for the emergence of certain linguistic features during production. These principles are based on and inspired by the early work of Clahsen (1984) on naturalistic L2 learners who were migrant workers in Germany. The original idea was that, however L2 knowledge is represented in the learner's mind, the way L2 knowledge would develop in observable production would be constrained by how easy it was to process this particular linguistic structure. One classic example in the literature is the canonical word order; once words start appearing in the learner's production of the L2, they would stick to a specific word order (mainly subject-verb-object, regardless of the learner's L1). Not all grammatical features need to be ordered in a certain way. The so-called 'variational features', however, pose no processing challenge that requires a specific sequence (Meisel et al., 1981). Pienemann claims to provide a solution for the transitional issue of language acquisition, and therefore, he focuses on output with no purpose to indirectly tap into grammatical intuitions. For Pienemann, the point where a form could be said to have been acquired is that when the form starts to emerge in the learner's spontaneous production, irrespective of how frequent such form occurs in production. Within this view, it is possible to make a distinction between just arriving at a new stage of L2 development and developing into more fluent and consistent L2 production within the same stage.

For MCF, input flowing to the language module are representations in perceptual output structures (POpS), which themselves undergo intensive processing by sensory modules. POpS representations are directly input to the phonological module, and only indirectly to the syntactic module, which receives its input directly from the phonological module and then provides input to the conceptual module. A POpS representation can also serve as a piece of input to the conceptual module, whose work is to assign concepts and meanings to representations constructed in the languages module, as well as constructing conceptual metalinguistic representations. Finally, it must be noted that the flow of information during processing does not occur in one direction; rather it is

bidirectional. That is, input in the CS can serve as direct input to the syntactic structure and vice versa.

3.4.3.1 Frequency

An important topic that should be considered here is the role frequency might play in SLA. This is because of its relevance to the discussion of the current data in terms of the possible correlation between frequency of occurrence of the tested verbs as found, for example, in the British National Corpus, and the learner's L2 development. First, I deliver a brief review on the notion of Corpus Linguistics. Second, I discuss the relationship between frequency of occurrence of certain entities and the development of these entities within the learner's mind from an SLA perspective.

Corpus Linguistics (CL) is associated with searching through screens of word lists, big texts or a collection of small text, in an attempt to explore certain phenomena (McCarthy & O'Keeffe, 2010). CL is a practical tool to facilitate the empirical analysis of languages, and therefore add definition and description to the study of language. For example, CL refines the description of lexis which has led to an increase of empirical work on aspects of grammar and corpus-based reference grammar (Biber et al., 1999). Progressively, CL is used as a tool for broader research questions relating to language teaching and learning, pragmatics, discourse analysis and many more (McCarthy & O'Keeffe, 2010).

The origins of CL can be traced back to the notion of observable data, and how this notion has been considered among different theoretical schools. For historical linguistics, corpus-based data is important in the discussion of language change and evolution which is found in collections of texts across different periods of time (Johansson, 1995, p. 22). Modern linguistics has benefited a great deal from the textual collections of historical linguistics during the nineteenth century. However, the focus on data has shifted as linguistics developed from a data-based driven approach to a more intuitive and speculative approach (Tognini Bonelli, 2010, p. 14; Francis, 1992).

Indeed, frequency of occurrence played a major role in the research of SLA (e.g. N. Ellis, 2002; Schwartz & Terrell, 1983). Yet, it is argued (e.g. Sharwood Smith & Truscott, 2014) that the frequency of the physical outside input is only a superficial indicator of the inner system. If a certain entity is frequent in the external input, this does not determine that this entity will be more easily incorporated in the language system than other less frequent entities. The development of a second language is a matter of internal representations constructed for the external input, rather than the characteristics of the external input itself. These representations are instantiated by universals within processors to interact with internal representations that have already been constructed (already acquired knowledge). It should be kept in mind that the *internal frequency* of a representation within the language module might be very different from its *external*

frequency; that is the outside judgement of the learner's L2 experience (Sharwood Smith, 1993).

What is needed here, argued Sharwood Smith & Truscott (2014), is a new accout of frequency where a probablistic element would be incorporated. Within the MCF framework, the role of frequency lies in the notion of resting levels of activation, which is discussed in Chapter 2. This is different from the standard notion of frequency; it is an internal frequency of the use of a certain item during processing to construct new representations. Another key aspect of MCF's views on frequency is that the resting level of an item could gradually rise as a result of frequent processing:

> On a simple, naïve account of the process, this would mean that each use is accompanied by a fixed increment in resting level; in other words, the relation between frequency and resting activation level might be seen as linear. A more plausible view, though, is that it is logarithmic; activation level rises quickly in the early stages of a form's development but the effect of further input then diminishes: the curve gradually levels off to the point at which additional input, even very extesive input, has no discernible influence (Sharwood Smith & Truscott, 2014, p. 134).

This view of frequency has important implications on the discussion of the findings from the current study (discussed in Chapter 7).

In the following section, I discuss the CSH by Rothman (2008), as a relevant hypothesis to the discussion of findings from the present empirical tests. It discusses the intervention of the 'learned system' (i.e. extra-modular L2 knowledge) with L2 production and L2 comprehension, which is an important notion to the discussion of the current empirical data.

3.5   Competing Systems Hypothesis (Rothman, 2008)

Rothman (2008) proposed and tested CSH, which is built on Felix's competition model (1985). CSH suggests that within L2 learners, even learners with the highest levels of proficiency, there are two separate mental linguistic systems competing to contribute to L2 performance. It should be noted that CSH is not a hypothesis about the competition between L2 and L1 grammar, rather the competition in the mind occurs between the underlying grammatical competence (what is referred to as modular implicit L2 knowledge in this thesis) and learned metalinguistic knowledge which is formed through formal classroom exposure (in the current thesis: extra-modular explicit or implicit L2 knowledge). Within CSH, the first mental system is assumed to have developed through the interaction between L2 data and universal principles, whereas the second is assumed to have developed through obtaining declarative knowledge about how the target language works. While maintaining a modular view of language development, CSH refers to both mental systems as grammars, highlighting the comprehensive nature and the true mental status of the system of learned metalinguistic knowledge. In other words, CSH refers to this system as grammar (contrary to generative SLA traditions)

because, in advanced L2 learners, such a system would no longer be conscious or declarative in nature, but would have become proceduralised within the mind (Long & Rothman, 2013). Another reason for using the term 'grammar' to refer to learned knowledge is to facilitate discussions between linguistic researchers and language teachers who appear to view L2 performance as an accurate representation to the underlying mental grammar (Long & Rothman, 2013). This issue of building bridges between pedagogy and linguistics, however, is beyond the scope of the current thesis.

The difficulty to tease apart those two mental systems lies in the notion that the superficial performance of L2 learners is the same, be it modular or non-modular. As suggested by Rothman (2008), CSH can be empirically tested by investigating aspects of grammar where pedagogical rules about a given property of grammar and the actual mental representations for this grammatical property diverge. This is when testable predictions can be made.

3.5.1 Rothman (2008)

Rothman examined the grammatical aspect in L2 Spanish as an area of pedagogical oversimplification. Grammatical aspect refers to the boundedness of an event in terms of time; that is, either completed/bounded, which is referred to as [+ perfective] or uncompleted/unbounded which is referred to as [− perfective]. In Spanish, this distinction is marked morphologically either as preterit [+ perfective] or imperfect [− perfective]. See the following examples from Long & Rothman (2013, p 71):

1. PRETERIT
   Roberto dijo la verdad
   Roberto told the truth
2. IMPERFECT
   Roberto decía la verdad
   Roberto was telling/used to tell the truth. (Long & Rothman, 2013, p 71)

In English, this distinction is not encoded morphologically. See the following example from Long & Rothman (2013, p 72):

3. *John called his mother yesterday*. [+ perfective]
4. *John called her mother every day as a young adult*. [− perfective]

In English, habitual or past progressive events are conveyed in different ways, such as using modal verbs (*would* or *used to*), or using simple past morphology with an attached adverbial modifier such as *every day*. Thus, simple past in English can take two possible interpretations; either an episodic as in example 3 or an iterative as in example 4.

In Spanish, only imperfect can have two possible interpretations (different from those of English); progressive as in example 5 or iterative as in example 6 from Long & Rothman (2013, p. 72):

5. *Jorge caminaba a la escuela cuando vio el accidente*
   Jorge was walking to school when he saw the accident.
6. *Jorge siempre caminaba al parque antes de tomar su café.*

Jorge always walked to the park before drinking *his coffee.*

Summing up these distinctions between the two languages, the preterit can only have an episodic interpretation in Spanish, but has dual readings in English, whereas the imperfect can have multiple interpretation in Spanish, but does not exist in English at all.

Pedagogical practices present this distinction for English learners as discrete semantics to be defined by English translation counterparts, which results in some semantic distinctions being lost for the instructed learners. This oversimplified rule fails to account for the production and interpretation of certain Spanish input by English learners, as in example 7 below, where the preterit is used to emphasis the completeness of the time-based reference.

7. *Hudo varias manifestaciones en equella época.*
   There were various manifestations during that time period.

Such sentences within contexts like the one presented in example 7 provide the most appropriate area to test predictions from CSH by comparing naturalistic and instructed learners, who are predicted to deviate from native speakers. The study employed a production task, where participants were required to fill in the blanks with either preterit or imperfect. The task was designed to include cases where the required responses contradicted pedagogical practices. The instructed learners of this study exhibited significantly different production to native speakers. The instructed learners performance on the preterit and imperfect significantly deviated from that of the native speakers 25 per cent of the time on average. The naturalistic learners, however, showed only a 2.27 per cent divergence from the native speakers. Rothman suggested that this deviation of instructed learners from native speakers and naturalistic learners can be attributed to oversimplification and impreciseness of formal instruction.

The prediction that is proposed within CSH and relevant to the current discussion of the two types of L2 knowledge can be summarised in the following quote:

> These separate systems remain intact through advanced stages and essentially provide two filters for linguistic performance. This means that even when interlanguage reaches a steady-state in advanced learners that is representationally native-like in particular domains, the learned knowledge system can intercede, especially in highly monitored output, resulting in systematic errors. The prediction, therefore, is that once grammatical properties have been acquired at the mental representation level this system can interfere with production, but not comprehension. (Rothman, 2008, pp. 85–86)

In this quote Rothman proposes that the grammar of the learned knowledge intervenes in the L2 learner's production, but not comprehension. CSH, however, is quite vague in explaining why learned knowledge does not intercede at the level of comprehension.

This claim would mean that the system of learned knowledge might show signs of intervention in empirical tests where L2 learners are asked to produce utterances in the target language (i.e. production tests), whereas this system should not be able to

show any signs of intervention in empirical tests investigating the L2 learner's comprehension abilities. This might also suggest that even if the grammar of learned knowledge is developmentally ahead of the underlying mental grammar, this would only show in empirical tests that focus on production, but not in empirical tests where comprehension is investigated.

But why would the system of learned knowledge not intervene with comprehension? It might be because making sense of concepts and meanings of different linguistic or non-linguistic experiences falls within the work of conceptual module, which might not require any activation of representations (which are themselves conceptual) from the system of learned knowledge for comprehending L2 data. On the other hand, understanding meanings and concepts related to a certain L2 utterance heard or read by the L2 learner might require the activation of syntactic representations corresponding to those conceptual representations activated to account for meanings of this particular utterance. The activation of syntactic representations is an unconscious process, which certainly falls outside of the L2 learner's awareness.

I reconsider this issue of the system of extra-modular L2 knowledge (or learned knowledge, as articulated by Rothman) affecting L2 production but not comprehension in Chapter 7, where results from the current empirical study are discussed.

3.6 Summary and conclusion

Input and second-language development being the scope of this thesis, it is important to first review different theoretical views of L1 transfer. It is assumed here that it is not a question of whether L1-based rules 'transfer' to the new L2 system, rather it is seen as the starting point of any second-language learning journey. This view is the one proposed within MCF and referred to as L1 cross-linguistic influence rather than transfer.

Najdi Arabic learners who form the participants of the current study were or once had been classroom learners. Thus, classroom input was reviewed, providing background information on the nature of input that might have been received by the participants of the current study. Different notions within classroom input were also considered, such as metalinguistic input, natural input and the notion of frequency of occurrence in the external input, where the term internal frequency was introduced. The chapter concludes with CSH as one that incorporates important claims relevant to the current study. CSH predictions about the intervention of the learned system during L2 production but not during L2 comprehension seem to be met by data from the current empirical study (which will be discussed in greater detail in chapters 5, 6 and 7).

In the following chapter, I consider linguistic construction, intransitivity and the distinction between unaccusative and unergative verbs, which are thought to be the ideal linguistic structure to explore current research questions of development and input. I

discuss the rationale for choosing this particular phenomenon, linguistic facts in English and Arabic, as well as some related empirical work conducted on the SLA of unaccusative and unergative verbs.

Chapter 4 Intransitivity in English and Arabic

4.1 Introduction

This chapter reviews previous research on intransitivity and the sub-classes of intransitive verbs as the main structure to be explored in the current empirical study. The chapter also reviews previous research on the second-language acquisition (SLA) of unaccusative and unergative verbs.

Section 4.2 is a review on intransitivity in general and on the unaccusative hypothesis. In section 4.2.1 I discuss the rationale for choosing these two particular structures for the investigation of the current research question. Sections 4.2.2–4.2.6 discuss related syntactic topics such as argument structure, intransitivity, unaccusativity, unergativity, alternating vs. non-alternating, causative pattern and inchoative pattern. Section 4.3 is a review on SLA studies that are done on the development of unaccusative and unergative constructions. Section 4.4 summarises and concludes the chapter.

4.2 Intransitivity: linguistic structure in English and Arabic and second-language acquisition

Transitivity is a property of verbs relating to the notion of whether a certain verb can take an object. There is a distinction between transitive verbs which take objects and intransitive verbs that are unable to take objects. It is widely assumed that intransitive verbs are not a homogenous class, which was first suggested by the unaccusative hypothesis. The unaccusative hypothesis was first formulated by Perlmutter (1978) and then adopted by Burzio (1986) within the Government Binding (GB) framework (Chomsky, 1981). The hypothesis claims that there are two classes of intransitive verb, each realised by different syntactic configuration. These sub-classes are, the unaccusative verbs taking a deep-structure object (either simple or casual noun phrase NP) and no subject, and the unergative verbs taking a deep-structure subject and no object. Evidently both classes are associated with D-structure syntactic configurations, schematised in example 1.

1. Unaccusative verb: ___ [VP V NP/ CP]
   Unergative verb: NP [VP V] (Levin & Rappaport Hovav, 1995)

In terms of argument structure, an unaccusative verb takes a direct internal argument and an unergative verb takes an external argument, but does not take a direct internal argument; likewise an unaccusative verb does not take an external argument. As can be seen reflected in the name given to this verb class, the unaccusative verb cannot assign structural case to its object. Burzio (1986), having studied unaccusativity intensively, noted a correlation between taking an internal argument and the inability to assign accusative case. This is what is known as Burzio's Generalisation (Levin & Rappaport Hovav, 1995).

An unaccusative verb theta-marks themes in D-structure. In order to form the S-structure, the theme requires movement (raising) from a post-verbal position in D-structure to a subject position in S-structure. This movement is a requirement for case assignment, and the result is a trace (t) left behind. Unergative verbs theta-mark agents in D-structure and assign nominative case, therefore movement is not required (Thompson, 2003). This is illustrated in examples 2 and 3 below:

2. Unergative: The man AGENT laughs.
3. Unaccussative: The ice $_i$THEME melts t_i. (Thompson, 2003)

Although these two classes of intransitive verb have the same number of arguments, they are syntactically different. Critically, the difference resides in the argument types each class of verb takes, which affects syntactic derivation of sentences constructed around the two types of intransitive verbs.

In the following section, the rationale for choosing the distinction between unaccusative and unergative verbs to be the scope of this thesis is discussed. Second, the main linguistic concepts involved in the current study are introduced and discussed. This discussion is thought to be necessary to understanding the different aspects of the current research, including what linguistic structures are examined in the current empirical research, and why these particular linguistic constructions are chosen. I start this discussion with the 'why' part of the discussion, which examines the logic behind selecting these English verbs and their importance to answering the questions raised in the thesis. This is followed by the 'what' part, which includes introducing linguistic concepts such as: argument structure, intransitivity, unaccusativity, unergativity, causative, inchoative and passive.

4.2.1 The rationale of choosing the structure

The choice on investigating the two classes of intransitive verbs is based on the fact that the L2 English teaching of intransitivity is pedagogically oversimplified[2] in language teaching materials. In a classroom setting, for example, the intransitive verb is introduced paired with the transitive verb, with the distinction between the two being the (in)ability to take an object. A typical English language teaching experience does not differentiate between an unergative and an unaccusative verb. The L2 learner is only introduced to the concept of intransitive verbs that do not take objects, which might imply that what is in the subject position is the action doer. For example, in *Intermediate Language Practice* (Vince, 1998), the discussion of transitive and intransitive verbs is a part of the passive unit in the book. The unit starts with explaining that verbs can be divided into transitive and intransitive. Then examples are presented for each verb type. *Diane drinks milk*

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[2] See Appendix H for a list of grammar course books and webpages, which shows that intransitive verbs are pedagogically oversimplified.

every morning is given as an example of transitive verbs, which take objects. The unit gives *Diane walks to college* as an example of intransitive verbs which do not take objects. As can be seen form the latter example, only unergative verbs are presented in this book as intransitive verbs. There is no reference to unaccusative verbs and no examples given as intransitive verbs. The unit proceeds that only transitive verbs as in *Diane drinks milk every morning* can be made passive. Then it explains in further detail how the passives are formed and numerous examples are given to make the passive construction clear for the book user. A number of grammar textbook and webpages regarding transitive and intransitive verbs were analysed. All of these textbooks and webpages give unergative verbs as examples of intransitive verbs (see Appendix H for a list of these books).

What is missing in pedagogical practices is that the intransitive verbs' (i.e., unaccusative and unergative) arguments can have different semantic properties or characteristics. That is, it is not explicit to the L2 learner that the argument might be semantically an object and the sentence can still be grammatical. The current oversimplified rule can only be applied to the unergative class of intransitives, such as *the baby cries*, as the verb *cry* and all other unergative verbs do not take an object. Another important point is that what is in the subject position *the baby* is actually the subject or the action-doer. This is not the case, however, with the unaccusative class of intransitive verbs. For example, *the window broke* is an utterance that might be confusing to L2 English learner because what is in the subject position (*the window*) is not the action-doer, rather it is semantically an object. This means that *the window broke* might sound ungrammatical to the L2 learner, as it is semantically clear that the window is not the action doer. Current pedagogical practices do not make this distinction between unergative and unaccusative verbs' arguments when teaching intransitive verbs. What might add to the learner's confusion is their encounter in the input to sentences such as *the window is broken.* The passive structure is taught in the language classroom, where pedagogical rules are explicit about the movement of the object to the subject position and the requirement of functional morphology to mark the verb as passive. Again, this is not the case with unaccusative verbs, a structure that is not explicitly taught in the language classroom. Pedagogical rules are not explicit about syntactic and semantic properties of the unaccusative verb and its arguments. Learning English unaccusatives is especially challenging for L1 Arabic learners of L2 English, because Arabic assigns specific morphemes to mark unaccusativity (this will be discussed in greater detail in section 4.2.6). Thus, Arabic L2 learners of English have to unlearn that unaccusative verbs are morphologically marked when learning English.

With that being said, it would not be an exaggeration to assume that the theoretical notion of unaccusative verbs does not exist in the language classroom

curriculum. Thus, the assumption is that developing the right syntactic representation(s) for unaccusative structure would happen naturalistically; triggered purely by the grasp of the meanings and concepts related to the unaccusative verb that might have triggered the instantiation of the syntactic representation for unaccusative structure. Encountering and accurately processing more instances of unaccusative verbs in the English input would strengthen the newly built syntactic representation(s). It should be noted, however, that I do not intend to suggest that learners never come to consciously analyse or realise properties of unaccusative verbs. However, whatever grammatical rules they come to be aware of about unaccusative verbs sure will be qualitatively and quantitatively different from those explicitly-instructed rules about unergative verbs they encounter in the classroom and in English language teaching materials.

The development of mental representation(s) for unergative structure might take one of two routes. It would be likely that the knowledge of unergative verbs would start as conceptual representation(s) for the metalinguistic knowledge encountered in the classroom. This type of knowledge would start as declarative in early stages of language development and would become procedural and maybe automatised in later stages of development, where L2 language processing would become more fluent and effortless. The second route would be the development of syntactic representation, which is implicitly developed through the processing of unergative instances that might trigger the instantiation of the syntactic representation(s). Within Modular Cognitive Framework (MCF) views, both routes can develop at different stages of L2 development, the selection of either syntactic or automatised conceptual representation(s) to handle the current input of unergative verbs would depend on which type of orientation(s) (i.e. Syntactic Structure [SS] or Conceptual Structure [CS]) would have proved useful and more readily available to be selected in past processing. It should be noted, however, that I do not intend to suggest that learners never come to consciously analyse or realise properties of unaccusative verbs. However, whatever grammatical rules they come to be aware of about unaccusative verbs sure will be qualitatively and quantitatively different from those explicitly-instructed rules about unergative verbs they encounter in the classroom and in English language teaching materials. This is discussed in further detail in Chapter 5 and 7.

This would allow the neatest comparison available between modular and extra-modular types of language knowledge, their growth and their interactions, if at all. This is explored through experimental data from Najdi Arabic L2 learners of English within different stages of L2 development.

4.2.2 Argument structure

Argument structure refers to "the system of structural relations holding between heads (nuclie) and arguments linked to them in the roster of syntactic properties listed for

individual items in the lexicon" (Hale & Keyser, 1999, p. 50). Certain categories (i.e. verbs) have lexical entries which not only have a semantic (dictionary) meaning, but also structural aspects of meaning or description related to the participants (i.e. arguments) involved in the event those categories (i.e. verbs) are describing (White, 2003). Verbs are divided into: monadic, dyadic and triadic according to the number of arguments they can take. Monadic refers to the verbs that can take one argument, such as *the bird appeared*. The noun phrase *the bird* is the argument of the verb *appeared*. Dyadic refers to the verbs that can take two arguments, such as *Eric wrote a letter*. Both Eric and a letter represent two different arguments in relation to the verb (*Eric* did the action/*a letter* was affected by the event of writing). Triadic refers to verbs that take three arguments such as, *Eric showed the letter to his mother*. All the three noun phrases *Eric, the letter* and *his mother* are related to the verb *showed*.

Universal Grammar (UG) made available a fixed number of participant roles that arguments can assume. These are referred to as thematic roles (theta-roles). These roles include: agent (the participant doing an event), theme (the participant affected by an event), experiencer (a human participant experiencing a change as a result of an event) and goal (the target of an event) (Hawkins, 2001, p. 178). The majority of arguments are obligatory, for example:

4. a) Mary put the book on the table
    b) Mary put the book.
    c) Mary put on the table.
    d) Mary put the book on the table at 3 pm. (from White, 2003, p. 205)

As can be seen from the examples above, the verb *put* must have three obligatory arguments: the subject *Mary* (or the agent) which is an external argument, the object *the book* (or the theme) which is an internal argument, and the prepositional phrase *on the table* (or the location) which is another internal argument. The absence of any of these arguments results in ungrammaticality, as in b) and c). But, having more optional adjuncts as in d) (at 3 pm) is grammatical.

There seems to be a canonical or default mapping between thematic roles and syntactic functions, that is between roles such as agent and theme and functions such as subject and direct object … etc. (Baker, 1997; Perlmutter & Postal, 1984). Consider the following example:

5. Eric wrote a letter.
    <subject> <direct object> (syntactic function)
    <agent> <theme> (thematic role)

as can be shown from example 5, agent is projected to the *external argument Eric*, syntactically represented as the *subject*, whereas theme is projected to the *internal argument a letter*, which is syntactically known as the *direct object*.

Phenomena related to the research of argument structure such as the dative alternation, the locative alternation, and the causative-inchoative alternation are briefly discussed in the following section due to their relevance to the scope of this thesis. Consider the following example, showing the three types of alternations mentioned earlier:

6. Dative alternation:
   Eric gave John a pen.
   Eric gave a pen to John.
7. Locative alternation:
   Eric loaded the burrito with rice.
   Eric loaded rice in the burrito.
8. Causative-inchoative alternation:
   Eric broke the window.
   The window broke.

Much of the second-language research done in this area has focused on the acquisition of these constructions, and whether L2 learners have knowledge to distinguish alternating verbs from non-alternating ones (e.g. *break* is alternating, but *arrive* is not), and whether they come to learn the distinct constructional meaning related to each argument structure in those verbs. For example, learning the fact that *Eric broke the window* means Eric caused the window to break is different from *the window broke*, which means the window became broke as a result of some (either known or unknown) events.

4.2.3 Intransitivity

An intransitive verb is a verb that have a single argument; its subject. As mentioned earlier, intransitive verbs are divided into two classes, namely unaccusative and unergative verbs as suggested by the unaccusative hypothesis by Perlmutter (1978). This division between the two classes of verbs is made on the basis of semantics, and also encoded in syntax.

Unaccusative verbs as a class of intransitive verbs can further be sub-divided into categories of alternating and non-alternating (Levin & Rappaport Hovav, 1995). Table 4.1 demonstrates examples of English intransitive verbs; their classes (unaccusatives and unergatives) and sub-classes (alternating and non-alternating).

Table 4.1 Classes and sub-classes of intransitive verbs in English

Intransitive Verbs		
Unaccusatives		*Unergatives*
Alternating	*Non-alternating*	
e.g. *freeze, dry, bend, melt, break, close, die*	e.g. *arrive, enter, appear, happen, disappear*	e.g. *study, work, dance, swim, cry, smile, talk, laugh*

4.2.4 Unaccusativity vs. unergativity

Unaccusative verbs refer to the intransitive verbs that denote non-volitional or unwilled acts, whereas unergative verbs refer to the intransitives entailing willed or volitional acts. Unergative verbs have agentive subjects, while unaccusative verbs have non-agentive subjects; subjects that are semantically similar to those in the position of a direct objects in a transitive verb, or to those in the position of the subject of a verb in the passive voice. Consider the following example:

> *9. Eric cried when Tom died.*

The initial noun phrase of example 9 (*Eric cried*) seems to have identical representations, in terms of syntactic function, to the second noun phrase (*John died*), that is, both have subject NPs and VPs that have intransitive verbs, as illustrated in example 10:

> 10. *Eric* cried, when (Unergative)
> a) <Subject> (Syntactic function)
> *Tom* died. (Unaccusative)
> b) <Subject> (Syntactic function)

But there seems to be significant difference between sentences like 10a and sentences like 10b. Under the current syntactic analyses, unergative and unaccusative verbs are associated with different D-structure configurations. An unaccusative verb takes a *D-structure object* and no subject, while an unergative verb takes a *D-structure subject* and no object (Levin & Rappaport Hovav, 1995). *Tom* in 10b is base-generated in the position of direct object complementing the verb *died*, and the subject position is empty, and the sentence in 10b has the meaning of **died John*. But, unaccusative verbs are unable to assign accusative case to the internal theme argument in the direct object position. In this particular regard, unaccusative verbs behave like passives, as the latter are unable to assign accusative case. Therefore, *John* in 10b has to move due to case requirements; that is, the internal argument has to move to the subject position to satisfy Case Filter[3], and to receive a nominative case. The result is that sentences like 10b have two distinct D- and S-structures. Looking at 10a, the subject (*Eric*) of the verb (*cried*) is the agent and occupies the subject position, resulting in the sentence having almost identical D- and S-structures.

Another important difference between the two sentence types in 10a and 10b is related to argument structure and theta-role. In terms of argument structure, the verb in *John died* has a direct internal argument, but no external argument, whereas the verb in *Eric cried* has an external argument but no direct internal argument (Levin & Rappaport Hovav, 1995). In terms of theta-roles of arguments, the only argument of an unaccusative verb is a theme, or a participant affected by the event (e.g. dying happened to John), but

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[3] Case Filter is a UG principle stating that all overt NPs must have case.

the argument of an unergative verb is an agent (Eric did the crying). This is illustrated in example 11 as a simplification:

11. a) *Eric* cried, when … (Unergative)
    <agent> (Thematic function)
    b) *John* died. (Unaccusative)
    < theme > (Thematic function)

According to the thematic hierarchy, agent is mapped to the subject position, whereas theme is mapped to the direct object position. Thematic hierarchy was proposed (Jackendoff, 1972; Larson, 1988) to determine "the order in which arguments are assigned to syntactic positions" (Hawkins, 2001, p. 180). One can argue that unaccusative verbs present a mismatch between syntactic function and thematic role; *John* in 11b has a theme thematic role, even though it functions as the subject. This apparent mismatch in the unaccusative verbs, however, can be discussed under two principles of UG, namely, the Uniformity of Theta Assignment Hypothesis (UTAH) (Baker, 1988) and the Case Filter (Vergnaud, 1977). Baker (1988) asserts that "[i]dentical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure" (p. 46).

According to UTAH, thematic roles are always mapped to the same syntactic position depending, on how high in the hierarchy those roles are. The theme, therefore, always originates in the direct object position at the D-structure. With regard to unaccusatives, the internal argument (theme) moves to the subject position, in which it receives a nominative case to meet Case Filter requirements.

The distinction between unaccusativity and unergativity can be seen in all languages, with differences among languages in the way they exhibit morpho-syntactic reflexes in marking unaccusatives and unergatives.

4.2.5 Alternating vs. non-alternating

English unaccusative verbs can be classified, in terms of their transitivity alternation into two sub-classes: alternating verbs (i.e. grammatical in both transitive/causative forms and intransitive forms), non-alternating verbs (i.e. only grammatical in intransitive form, with no transitive/causative counterpart). English unergatives are different from unaccusatives in this respect, that is, they are only non-alternating. Consider the following examples:

12. Alternating unaccusative verbs
    a) *The window broke.*
    b) *Eric broke the window.*
13. Non-alternating unaccusative verbs
    a) *An accident happened*.
    b) **Eric happened an accident (cf. caused an accident to happen).*
14. Unergative verbs
    a) *The baby smiled.*
    b) **The mother smiled the baby* (cf. *the mother made the baby smile*).

The sentences in 13b *Eric happened an accident* and 14b *The mother smiled the baby* are ungrammatical in English because the verbs *happen* and *smile* are non-alternating. This type of verb expresses causative meaning through the so-called *syntactic causation* or *periphrastic causation*, for example, in English, verbs like *make* or *cause* are used to express such meaning. This is different from *lexical* or *morphological causation* as in 12b *Eric broke the window*.

However, this is not the case in all languages, as those vary in how they exhibit unaccusative and unergative structures. In Arabic, most of the English verbs classified as non-alternating (whether unaccusative or unergative) are classified as alternating verbs through assigning overt morphology. This is illustrated in 12 and 13 below (examples are from El-Nabih, 2010)

15. a) ḥadaṯa ḥadiṯ-un[4].
   happened an accident-NOM
   'an accident happened'
   b) a- ḥdaṯa Eric-u ḥadiṯ-an
   CAUS- happened Eric-NOM accident- ACC
   '*Eric happened an accident' (Eric caused an accident to happen).
16. a) ḍaḥika at-tifl-u
   laughed the- baby- NOM
   'the baby laughed'
   b) a- Dhaka-t al-'um-u at-tifl-a
   CAUS- laughed- FEM the- mother- NOM the- baby- ACC
   '*the mother laughed the baby'. (the mother made the child laugh).

4.2.6 Causative, inchoative and passive

The current thesis deals with the concepts of causative, inchoative and passive structures, which are used in the empirical test items either as grammatical or ungrammatical forms of certain verbs, or are expected to be provided by participants as alternative items to ungrammatical ones in some of the empirical tasks. This also helps in explaining how Arabic morphologically and syntactically encodes the English verbs used in the current tests. Thus, it is thought important to draw attention to the distinction between the causative, inchoative and passive structures. However, it is vital to recall that the main scope for the current thesis in terms of linguistic structures are unaccusative and unergative verbs.

4.2.6.1 Causative vs. inchoative

The *causative-inchoative* alternation refers to verbs that occur in transitive as well as intransitive forms. These forms are typically referred to as *causatives* in case they occur in transitive structure, and *inchoatives* when occurring in intransitive structure. According

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[4] The transliteration scheme I use throughout is that of the Journal of Semitics Studies, as it uses a single letter to represent a single sound in Arabic, which is thought to be simpler and clearer for the reader.

to Parsons (1990), *causatives* explain the 'cause' of something with both the agent and the theme present (e.g. *Eric broke the window* meaning *Eric caused the window to break*). Inchoatives can be paraphrased as 'become' and an adjective (e.g. *the window broke* meaning *the window became broken*). Therefore, a causative-inchoative pair of verbs "express the same basic situation… and differ only in that the causative verb meaning includes an agent participant who causes the situation, whereas the inchoative verb meaning excludes a causing agent and present the situation as occurring spontaneously" (Haspelmath, 1993, p. 90). In other words, the subject of the inchoative form and the direct object of the causative form bear the same semantic relation to the verb. Inchoative verbs have a thematic role, whereas their causative counterpart have both theme and agent thematic roles.

As noted earlier, the causative-inchoative alternation is a universal phenomenon, occurring in all languages, but languages vary in the way they encode these forms (Levin & Rappaport Hovav, 1995). Haspelmath (1993) surveys 31 pairs of alternating verbs in 21 languages, and Haspelmath found different patterns for morphologically marking causative and inchoative verbs. These morphological patterns can be referred to as *anti-causative, causative,* and *non-directed*, which can further be sub-classified into *labile, equipollent,* and *suppletive* forms.

In the case of *anti-causative alternations*, an affix, a causative auxiliary or stem modification is added (to the inchoative form) to derive inchoative verbs from their causative counterpart. In the case of *causative patterns*, causative forms are derived from their inchoative counterpart by adding an affix, a causative auxiliary or stem modification (to the causative form). In the case of *non-directional alternations*, neither verb is derived from the other. Rather, in *equipollent pattern*, both forms come from a common stem, while in *labile pattern*, both forms have the same form, and in *suppletive alternations*, forms have totally different roots – not morphologically related.

The labile pattern of the alternation is the one predominantly used in English as reported by Haspelmath's (1993) survey, for example:

17. a) The girl *boiled* the water. (Causative)
    b) The water *boiled*. (Inchoative)
18. a) The girl *opened* the door. (Causative)
    b) The door *opened*. (Inchoative)

In sentences 17 and 18, both the causative and inchoative verb forms are identical (*opened* and *boiled*). But, not all English verbs alternate in this pattern (*labile* or zero-morphology): some verbs favour the suppletive alternation, such as *teach-learn, drop-fall, kill-die*. The pair of sentences below illustrate the suppletive pattern in English:

19. a) The girl *dropped* the pencil.
    b) The pencil *fell*.

On the other hand, Arabic shows a significant difference from English with regard to the inchoative- causative alternation.[5] The following examples[6] illustrate this difference.

> 20. a) *ġala-t* al-bint-u al-mā'-a. (Causative)
> boiled-FEM the-girl-NOM the-water-ACC
> 'The girl boiled the water'.
> b) *ġala* al-mā'-u. (Inchoative)
> boiled the-water-NOM
> 'The water boiled'

In the example above, both the causative and the inchoative form of the verb are identical *(ġala)* with the morpheme *t* inflected to the verb in 20a to mark femininity. In this particular sentence, Arabic follows the labile pattern, but it is rare in Arabic.

> 21. a) *qatala* al-asad-u al- ġazal-a (Causative)
> killed the- lion-NOM the-gazelle-ACC
> 'The lion killed the gazelle'
> b) *mata* al- ġazal-u. (Inchoative)
> died the-gazelle-NOM.
> 'The gazelle died'

As can be seen in example 21, two different roots are used to mark the alternation (*qatala* 'killed' and *mata* 'died'), which are examples of the suppletive patterns in Arabic. This pattern, however, is not very common in Arabic. What is predominant in Arabic is that overt morphology is inflected to the causative form of the verb (which is termed the anti-causative pattern) or to the inchoative form (which is referred to as causative pattern). Examples of these predominant forms of the alternation in Arabic are presented below; c) is an ungrammatical example to illustrate that overt morphology is necessary.

> 22. a) *fataḥa-t* al-bint-u al-bab-a. (Causative)
> opened-FEM the-girl-NOM the-door-ACC.
> 'The girl opened the door'.
> b) *in-fataḥa* al-bab-u. (Inchoative)
> ANTICAUS-opened the-door-NOM
> 'The door opened'
> c) **fataḥa* al-bab-u. (Ungrammatical Inchoative)
> opened the-door-NOM
> 'The door opened'

As shown above, there are two forms of the verb: a) is the causative or unmarked form (*fataḥa)*; the second is the derived form with the prefix *in* (*in-fataḥa*) inflected to the causative form to derive its inchoative counterpart. This overt morpheme is obligatory, and the absence of it results in an ungrammatical unaccusative sentence, as the one shown in c). Of all patterns of alternation, anti-causative patterns are the predominant in Arabic. Another common, but less dominant, pattern in Arabic is the causative pattern, also involving overt morphology, as shown below.

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[5] Unaccusative verbs are referred to as *Mut āwiʕ ~ 'a* in Arabic.

[6] Examples here are in Modern Standard Arabic, as these sentences are also used in Najdi Arabic with the slight difference of losing case marking in Najdi.

23. a) *daba* ad-dalj-u (Inchoative)
     melted the-ice-NOM
     'The ice melted'
     b) *a-daba*-t an-nar-u ad- dalj-a. (Causative)
     CAUS-melted-FEM the-fire-NOM the-ice-ACC
     'the fire melted the ice'
     c) **daba*-t an-nar-u ad- dalj-a
     melted-FEM the-fire-NOM the-ice-ACC
     'The fire melted the ice' (Ungrammatical Causative)

comparing 23 to 22, both verbs require overt morphology for the alternation, but in the causative alternation pattern, the unmarked inchoative form of the verb (*daba)* is inflected with an affix (*a-*) to derive the marked causative alternant (*a-daba*). Thus, the causative pattern requires the opposite directionality of derivation compared to the anti-causative pattern. This morpheme (*a-*) is obligatory to mark the causative variant, without which the form of the verb is not licensed, as in c).

Another crucial difference between the two languages relating to the unaccusative and unergative verb is that some the non-alternating unaccusative and non-alternating unergatives in English, including the verbs used in the current empirical tests, do participate in the alternation in Arabic, as previously shown in examples 15 and 16, which are repeated in 24 and 25 here for convenience.

24. a) ḥadata ḥadit-un.
     happened an accident-NOM
     'an accident happened'
     b) a- ḥdata Eric-u ḥadit-an
     CAUS- happened Eric-NOM accident- ACC
     '*Eric happened an accident' (Eric caused an accident to happen).
25. a) ḍaḥika at-tifl-u
     laughed the- baby- NOM
     'the baby laughed'
     b) a- Dhaka-t al-'um-u at-tifl-a
     CAUS- laughed- FEM the- mother- NOM the- baby- ACC
     '*the mother laughed the baby'. (the mother made the child laugh).

4.2.6.2 Passive vs. unaccusative

The common feature between unaccusatives and passives is their inability to assign accusative case. Therefore, the D-structure object, which is a theme argument originated in object position, has to move to the subject position to receive nominative case to satisfy the Case Filter. The crucial difference between passives and unaccusatives is that passive structure has an external argument or a linguistically implied agent, but the unaccusative structure does not possess this linguistic component, and the event (conveyed by an unaccusative verb) is conceived as happening spontaneously. This variation in agentivity between the two structure is more apparent if one examines the expressions each structure licences. Passives (but not unaccusatives), for example, licence agent-oriented adverbs and (*by-*) phrases, but unaccusatives (but not passives) allow non-agentive adverbs, such as *by its own, by itself* and *spontaneously* (Levin &

Rappaport Hovav, 1995). Arabic passives and unaccusatives show the same properties discussed here for English passives and unaccusatives. The examples (26–28) below are illustrative. Examples a) and b) are grammatical, while c) and d) are not.

26. a) The window was broken by the girl.
    b) Kusira-t an-nafiḏat-u biwāṣiṭat al-bint-i
    Broke-FEM the-window-NOM by-means-of the-girl-GEN
    'The window was broken by the girl'.
    c) *The window broke by the girl.
    d) * in-kasara-t an-nafidat-u biwāsitat al-bint-i
    ANTICAUS-broke-FEM the-window-NOM by-means-of the-girl-GEN
    'The window broke by the girl'
27. a)The window was broken on purpose.
    b) Kusira-t an-nafiḏat-u ʕ ~ 'mdan.
    Broke-FEM the-window-NOM on-purpose.
    'The window was broken on purpose'.
    c) *The window broke on purpose.
    d) *in-kasara-t an-nafiḏat-u ʕ ~ 'mdan.
    ANTICUS-broke the-window-NOM on-purpose.
    'The window broke on purpose'.
28. a) The window broke by itself.
    b) in-kasara-t an-nafiḏat-u binafsiha.
    ANTICUS-broke-FEM the-window-NOM by-itself.
    'The window broke by itself'.
    c) *The cup was broken by itself.
    d) Kusira-t an-nafiḏat-u binafsiha.
    Broke-FEM the-window-NOM by-itself.
    'The window was broken by itself'.

4.2.7 Conclusion

From the discussion above, it appears that there are some cross-linguistic differences between Arabic and English in the way unaccusatives, unergatives, passives and inchoative-causative alternation are morphologically marked. English favours the labile pattern, without requiring overt morphology to mark either form of the alternation, while Arabic predominantly employs overt morphology to be inflected either on the inchoative or causative form of the verb. Another important difference is that some of the non-alternating verbs in English do alternate in Arabic.

In the following section, I review previous empirical studies on the SLA of unaccusative-unergative verbs.

4.3 Empirical work on the second-language acquisition of unaccusative and unergative verbs

In this section, I review empirical studies that investigated SLA of intransitive verbs; and studies that focused on the distinction between L2 learning of unaccusative vs. unergative verbs.

The distinction between unaccusative and unergative verbs is thought to be the ideal structure to explore the research questions of the current study. This is because of

the fine syntactic difference between the two classes of the verbs as discussed above, the important difference in the external input between the second-language learning of unaccusative verbs as opposed to the L2 learning of unergative verbs, and the deviation between the English and Arabic realisation of the two structures. These conditions provide the most appropriate stage for exploring the notions of input and development of modular implicit L2 knowledge and extra-modular implicit or explicit L2 knowledge in the production and comprehension of Najdi Arabic L2 learners of English.

It should be noted that the studies reviewed here are mainly theoretically concerned with generative-driven questions, which slightly deviate from the main scope of the current thesis. Their relevance to the current study lies in the notion of the similarity between previous studies' empirical tasks to point out the distinction between the two classes of intransitives and the empirical tasks used for the investigation of the current research questions. For this reason, I review some of the key work conducted on the two classes of intransitives. First, I review Zobl (1989) who pioneered the work on the learnability problem with unaccusative construction. Second, I review Montrul (2000) as it is concerned with L1 influence on the development of unaccusative construction, which is also explored within the current empirical data in Chapter 6 and 7. Finally, I review Hirakawa's (2013) which is concerned with the positive effects of instruction on the development of English L2 unaccusative/unergative distinction, which is relevant to the current research question exploring the difference between instructed unergatives as opposed to uninstructed unaccusatives.

4.3.1   Zobl (1989)

The data for this study was based on a corpus of written English collected from 114 university students in different universities in the United States and Canada. These students had various L1 backgrounds: 90 Japanese, 10 Spanish, 10 Arabic, one Chinese, one Turkish, one Thai and one Indonesian. Zobl stated that the participants were advanced enough to be able to mark English tense distinctions. Zobl classified the proficiency levels of his participants as ranging from high to low-intermediate. However, he noticed that some speakers produced ungrammatical verb-subject word orders with unaccusatives, as in example 29, and they were overgeneralising passive morphology to unaccusative verbs, as in example 30:

> 29. a) *I was just patient until dried my clothes.
>   b) *Sometimes comes a good regular wave.
> 30. a) *My mother was died when I was just a baby.
>   b) *The most incredible experience of my life was happened 15 years ago.
> (examples from Zobl, 1989, p. 204)

In example 29, L2 speakers failed to move the theme argument to subject position to assign nominative case, while in example 30 L2 speakers moved the theme argument

into the subject position, but ungrammatically inserted passive morphology (*be+ past participle* in English).

Zobl extensively investigated the corpus to examine whether these over-generalisations correlated with unaccusative verbs, or whether they were random. Zobl found 13 cases of unaccusative verbs in verb-subject order within 80 tokens of unaccusative verbs. Other cases of such word order (verb-subject) were not found with any other verb type. Ten out of the 13 utterances were produced by L1 Japanese. These findings could not be attributed to L1 Japanese because Japanese is verb-final word order, which led Zobl to reject the view of the influence from L1. Furthermore, in English, unaccusative verbs are not marked to be distinguished from unergatives. The argument that the unaccusative required falls within the subject position, which indicates the lack of evidence in the English L2 input from which L1 Japanese speakers might have drawn their verb-subject word order. Hawkins (2001) noted, however, that utterances in verb phrase (VP) order in the production of L1 Japanese can be accounted for by Case Assignment in Japanese, where arguments of unaccusative verbs receive case in the verb phrase itself, without the need to move. Thus, this transferred property from L1, interacting with the L2 property of English verbs preceding their complements, resulting in the verb-subject word order (Hawkins, 2001, p. 186).

Zobl argued that those errors can be explained with the unaccusative hypothesis (Perlmutter, 1978), which distinguishes between two classes of intransitive verbs; unaccusatives and unergatives. Zobl interpreted the results as supporting the unaccusative-unergative distinction; that is, they had unconscious knowledge of the distinction, despite the lack of surface evidence in the L2 input. Hawkins (2001) suggested that this indicated that the representations constructed to represent unaccusative were distinct from those constructed to represent unergative verbs.

With the passive morphology, Zobl found ungrammatical use of passive construction with unaccusative verbs such as those in the examples above, and with unergative verbs such as *I was cried*. However, the ungrammatical use of passive morphology with unaccusatives was higher than that with unergative verbs. There were 25 ungrammatical uses of passive morphology with unaccusatives out of a total of 110 unaccusative tokens (a ratio of around 1 to 4.5), whereas there were 11 ungrammatical passive instances of unergatives (a ratio of about 1 to 16). Again, the conclusion that was drawn is that unaccusative verbs are represented differently to unergatives in the mental grammar.

Zobl's work has pioneered the investigation into what has become known as the learnability problem of unaccusative verbs, which inspired a great deal of research into this question (e.g. Balcom, 1997, among others). Most (if not all) of this body of research continues to investigate the operations of specific principles of UG, with little or no

concern about what type of second-language knowledge is being tested, nor for what in L2 input might have caused this difference between such close classes of intransitive verbs. Within the generative research, it is constantly assumed that it is modular implicit L2 knowledge within the language faculty that is being called upon, disregarding the fact that extra-modular L2 knowledge might develop to be procedural (i.e. effortless and fluent). This extra-modular L2 knowledge is more likely to develop in the case of unergative verbs than in unaccusative verbs. This particular topic is further explored in Chapter 7 and 8, where findings from the current study are discussed.

4.3.2   Montrul (2000)

Montrul (2000) investigated SLA of causative/inchoative alternation (e.g. *Tom broke the window vs. The window broke*) by Spanish and Turkish learners of English and the possible L1 influence on the development of this alternation. The current empirical study is also concerned with L1 cross-linguistic influence on the development of unaccusative and unergative verbs. For this reason, this particular study is thought to be relevant to the current discussion. The task was a picture judgement task, with 83 pictures each accompanied by two sentences to be judged by grammaticality and meaning in the context of the picture. Montrul discussed the syntactic properties of the alternation and reduced the analysis to the level of morphology and the level of argument structure. For example, the alternation in Spanish is as follows:

> 31. a) María rompió los vasos.
> María broke the glasses
> 'María broke the glasses'.
> b) Los vasos se rompieron.
> the glasses REFL broke
> 'The glasses broke'. (Examples are from Whong-Barr, 2006, p.192)

The question was whether the L2 learner will transfer the functional morphology or the argument structure or even both when learning a second language. For Montrul, the Spanish learner will transfer the argument structure in the causative form, and the functional morphology in the inchoative form, as it requires the reflexive *se* in the L1 Spanish. In Turkish, it is the causative form that is marked with most verbs, as in (32a), while a subset of inchoative verbs are overtly marked with the passive morpheme *-ıl* as in (33b)

> 32. a) *Düşman gemi-yi bat-ir-miş* (Causative)
> Enemy ship-ACC sink-CAUS-PAST
> 'The enemy sank the ship/ made the ship sink'
> b) *Gemi bat-miş*
> (Inchoative) ship sink-PAST
> 'The enemy sank the ship/ made the ship sink'. (Montrul, 1997, p. 45)
> 33. a) *Hırsız pencere-yi kır-dı* (Causative)
> thief window-ACC break-PAST
> 'The thief broke the window'
> b) Pencere kır-ıl-dı. (Inchoative)

Window break-PASS-PAST
'The window broke'.
c) *Pencere kır-dı
window break-PAST (Montrul, 1997, p. 46)

For Montrul, the prediction is different with Turkish learners of L2 English. L1 transfer will be reflected on the level of argument structure in the inchoative forms, and on the level of morphology in the causative forms, as this is how the alternation is mostly realised in Turkish. On the other hand, the subset of a few verbs that have the opposite morphological pattern (i.e. inchoative alternant is morphologically marked) will have the opposite L1 transfer effects.

Montrul found that L2 learners made their judgements on the English causative/inchoative sentences based on their L1; that is, based on whether each sentence has equal morphological shape to that of their L1. This led Montrul to conclude that there are L1 transfer effects on the morphological level, but not on the level of argument structure, which supports her claim for a 'modular' view of L1 transfer, which is against an unrestricted formulation of full transfer. She concluded that "UG and L1 knowledge may not affect all linguistic domains in the same way at a given stage of development" (Montrul, 2000, p. 229). Turkish and Spanish learners also had the issue of over-generalisation of the causative/inchoative alternation, as they allow forms that are ungrammatical in their L1. However, Whong-Barr (2005; 2006) argued that Montrul's (2000) findings can be interpreted in terms of interlanguage development; that is, can be viewed as a stage of development beyond the initial state, which is considerably affected by the transfer of L1 properties, rather than as evidence against the transfer of argument structure. Montrul's findings can also be explained by the view of L2 cross-linguistic influence adopted in the current thesis. It views L1 as the starting point of L2, and that when certain L2 grammatical structure still have L1 value, such structure would need to be processed frequently enough to get higher activation levels and to reach the threshold to be 'the value' for this grammatical structure. This could be supported by data from different proficiency levels, where performance advances towards the L2 value as the proficiency level goes up, which could be attributed to the frequency of processing. This can be further explored in one of the current research questions concerning the effects of L1 on the development of unaccusatives and unergatives in data by different proficiency levels of Najdi Arabic L2 learners of English. We return to this issue in Chapter 7.

4.3.3 Hirakawa (2013)

Hirakawa conducted an empirical experiment to investigate the question of the effect of L2 input English learners receive on the acquisition of unaccusative constructions. Specifically, Hirakawa investigated the effect of negative L2 instruction on L2 learners who make over-passivisation errors regarding unaccusative verbs as in *the accident was*

happened – in other words, whether or not explicit negative instruction would help L2 learners overcome their over-passivisation errors and make them reject ungrammatical passive unaccusatives. The experiment included the explicit teaching that it is ungrammatical to use passive morphology with unaccusative construction. The experiment took place in a university in Japan, with teaching sessions lasting for 15 minutes for each class, for a period of four weeks. The teaching session included doing exercises with unaccusative and unergative verbs. The participants constituted three groups: i) the experimental instructed group, which consisted of 13 Japanese learners of English; ii) the control non-instructed group, which consisted of 14 Japanese learners, who received regular English lessons with no specific emphasis put on unaccusative verbs; and iii) a group of 12 native speakers of English.

Both groups had the same grammaticality judgement task as a pre-test and a post-test, with five weeks in between. The experimental group received explicit teaching that unaccusative verbs are ungrammatical with passive morphology. They were also exposed to grammatical intransitive constructions throughout the sessions. The control group had their normal English lessons. Both groups are university students in Japan. The native group were students in the same university. They took the same grammaticality judgement task once.

The scaled grammaticality judgement test included non-alternating unaccusatives, alternating unaccusatives, unergatives and transitive verbs. Test items consisted of two sentences: one introduced the context and the second sentence was test item. For example:

34. a) Traffic is heavy at this crossing.
    A big accident happened last night.
    b) John went to meet his friend at the airport.
    The plane arrived very late.
35. a) Traffic is heavy at this crossing.
    *A big accident was happened last night.
    b) John went to meet his friend at the airport.
    *The plane was arrived very late. (examples are from Hirakawa, 2013, p. 127)

Hirakawa found that learners succeeded in accepting grammatical sentences, but they were less successful in rejecting ungrammatical utterances for both unaccusative and unergative verbs. The learners of this study had the most difficulty with these two types of verbs. Hirakawa noted that the instructed group developed their knowledge on the ungrammaticality of passive (non-alternating) unaccusative constructions and passive unergative constructions, while the non-instructed group improved their knowledge on alternating and non-alternating unaccusatives, which as suggested by Hirakawa indicated a general development in second-language proficiency. Hirakawa also noted, through individual analyses, that three out of the 13 in the instructed group scored perfectly in all test items, and two out of 14 of the non-instructed group provided correct

judgements to all test items. Hirakawa also noted that learners from both groups performed better on unaccusative sentences than on unergative sentences. Hirakawa interpreted the results (i.e. learners having the most difficulty with unaccusatives and unergatives) as a product of learners treating unergatives just like unaccusative and therefore grouping them together. Hirakawa concluded that the data lends partial support to the effectiveness of the instruction of the ungrammaticality of passive intransitives on the development of L2 English. Hirakawa claimed that despite the amount of teaching L2 learners received, some positive effects of instruction were still evident in overcoming over-passivisation. Furthermore, individual analyses, as suggested by Hirakawa, showed that few learners seemed to have acquired the distinction between unergative and unaccusative verbs, as they scored perfectly in all test items. This study is relevant to the current empirical study in its concern with the effect of instruction on the development of the two structures. Although the current study is not a class-intervention one, it raises the question of how instructed input would affect the development of unergative as opposed to uninstructed unaccusatives.

4.4   Summary and conclusion

There exist some cross-linguistic differences between Arabic and English in the way unaccusatives, unergatives, passives and inchoative-causative alternation are morphologically marked, and the way alternation is realised in English and Arabic. The choice to investigate the two classes of intransitive verbs is based on the fact that L2 English teaching of intransitivity is pedagogically oversimplified, and on the difference between the realisation of the two structures in the two languages. This would allow the neatest comparison possible between modular and extra-modular types of language knowledge; their growth and their interactions, if any. This is explored through experimental data from Najdi Arabic L2 learners of English within different stages of L2 development.

Previous research on unaccusative and unergative verbs, such as Zobl's, found ungrammatical use of passive construction with unaccusative verbs and with unergative verbs, but it was higher with unaccusative verbs than with unergative verbs. The issue with the approach most generative research takes towards L2 knowledge is that it is constantly assumed that it is the modular implicit L2 knowledge within the language faculty that is being tapped, disregarding the fact that extra-modular L2 knowledge might develop to be procedural (i.e. effortless and fluent). This highlights the significance of the scope of the current study, which seems to be overlooked in the field (discussed in full detail in Chapter 7).

Another empirical study reviewed is Montrul's (2000), which concluded that there are L1 transfer effects on the morphological level, but not on the level of argument

structure, which supports her claim for a 'modular' view of L1 transfer, which is against an unrestricted formulation of full transfer. However, Montrul's findings can also be explained by the view of L2 cross-linguistic influence adopted in the current thesis, which views the process of L2 development as constant change from the L1 value to the ultimate L2 value. This means that certain syntactic structure would require frequent enough processing to reach the threshold to be the value of the grammar. This can be supported by data from different proficiency groups, where performance advances towards the L2 value as the proficiency level improves. This notion is discussed in detail in the following chapter, where the present research question concerning the effect of L1 on the development of L2 knowledge of the two structures in different levels of proficiency is discussed.

The final empirical study reviewed, Hirakawa's (2013), focuses on the effect of formal instruction on the development of unaccusative and unergative verbs, as does one of the research question of the current study. Hirakawa concluded that some positive effects of instruction were still evident in overcoming over-passivisation. This will be examined further in the comparison between L2 learners' performance on the two structures and how instructed input would affect the development of unergative as opposed to uninstructed unaccusatives.

In the following chapter, I discuss the methodology and experimental design of the empirical tests conducted for the purposes of the current study.

Chapter 5   Experimental Design: Rationale and Method

5.1   Introduction

This chapter describes an experimental study which tests the second-language acquisition (SLA) of unaccusativity and unergativity by Najdi Arabic L2 learners of English. The experiment serves two main purposes: one is to investigate the difference between the L2 knowledge of uninstructed unaccusative verbs and instructed unergative verbs; the other is to relate that to what can be known about the learner's type of L2 knowledge (modular implicit or extra-modular explicit or implicit), representing each construction. The experiment also aims at exploring the question of L1 cross-linguistic influence on different stages of L2 development (i.e. proficiency levels). This is conducted taking into account the existence of modular and extra-modular types of L2 knowledge. Finally, the study investigates the effectiveness of explicit instruction on the development of modular or extra-modular knowledge of unergative verbs across different proficiency levels, with relation to the question of the durability of positive effects of instruction.

This chapter is mainly devoted to the methodology employed to test the research questions. First, core theoretical concerns are discussed. Second, research questions, hypotheses and predictions are presented. Next, a section on research participants is introduced, followed by a discussion of the research instruments used for data collection. The chapter concludes with a discussion of the statistical procedure followed to analyse the data obtained.

5.2   Core theoretical concerns

The first general concern is the distinction between modular L2 knowledge and extra-modular L2 knowledge of unaccusativity and unergativity at the level of production, and at the level of comprehension. It is useful to recall the assumption held in the current thesis, that developing the right syntactic representation(s) for unaccusative construction would happen naturalistically; triggered purely by the grasp of the meanings and concepts related to the unaccusative verb itself, which would also trigger the instantiation of the syntactic representation within the realm of modular linguistic knowledge. On the other hand, the development of mental representation(s) for unergative structure might take two routes. The first might be the development of syntactic representation, which is implicitly developed through the processing of unergative instances that might trigger the instantiation of syntactic representation(s), similar to that of unaccusative verbs. But, it would be more likely that knowledge of unergative verbs would start as conceptual representation(s) for the metalinguistic knowledge encountered in the classroom. This type of knowledge would start as declarative in the early stages of language development

and would become procedural and maybe automatised in later stages of development, where L2 language processing would become more fluent and effortless.

Would this metalinguistic knowledge of unergative verbs intervene during production? And would it intervene the same way during comprehension? According to Competing System Hypothesis (CSH) the 'learned knowledge', as referred to by Rothman (2008), should intervene during L2 production, but not comprehension. The intervention of such metalinguistic knowledge would differ depending on the nature of that knowledge. For example, the metalinguistic knowledge of unergative verbs in beginner L2 learners would be declarative knowledge that involves heavy and slow processing if retrieved from memory. In case of production for example, this metalinguistic knowledge about unergative verbs could be retrieved to help learners manipulate their production if they have extra time to do so (e.g. in open time and maybe test-like context). Yet, in comprehension, say in the L2 learner's attempt to comprehend a talk or a lecture in L2, the learner is very likely to attend to the meanings and ideas of what is being heard, rather than retrieving metalinguistic knowledge of each grammatical structure used in the language of that stream of speech. In fact, reflecting on metalinguistic rules and regularities in such contexts would not be a scenario that is logically available, as conceptual and perceptual modules are overwhelmed with a stream of information to be processed/understood. Bear in mind that such conceptual and perceptual activities require consciousness. According to Baars's theory of consciousness (1988), a piece of information becomes conscious through the routing system which shares this piece of information across different modules of the mind. During (L2) comprehension, the shared information would be meanings and concepts of what being comprehended, that is; the routing system would be overwhelmed with sharing those meanings and concepts, rather than sharing unnecessary information of how certain structures work in a certain language (i.e., metalinguistic knowledge). Thus, the learned knowledge would not be likely to intervene during comprehension. What might be operating during comprehension are more likely to be syntactic processes which go beyond the reach of conscious introspection. The question of whether explicit extra-modular L2 knowledge would intervene at the level of production or comprehension can be best explored by incorporating experimental tasks that involve production and comprehension within the same set of participants. This will facilitate an understanding of the difference between the workings of modular and extra-modular types of L2 knowledge from different angles. This is what the current empirical study is based on.

The second general concern relates to the difference between uninstructed unaccusative verbs and instructed unergative verbs in terms of stages of L2 development. One of the core concerns of the current study is to establish what L2 development is in terms of mental language systems. For example, what does it mean

to label a learner as a beginner or an advanced in terms of the nature of their (modular or extra-modular) L2 knowledge. This is done through investigating what is the difference in production and comprehension between unaccusative verbs, which learners are assumed to come to know naturalistically, and unergative verbs, which are learned in an explicit manner.

Prior to introducing the research questions and the experimental design, I briefly revise stages of L2 development based on the theoretical assumptions discussed earlier in chapters 2, 3 and 4 in order to make clear the rationale of the study and the relationship between theoretical assumption and experimental design.

5.2.1 Stages of the development of unaccusatives and unergatives

Based on the mental architecture proposed by Modular Cognitive Framework (MCF), cognitive stages of development of unaccusative and unergative verbs can be explored as follows (these stages are not, of course, as clear cut as presented. They are presented this way for clarification purposes).

5.2.1.1 Beginning learners: introducing initial instantiation

In the case of unaccusative verbs, beginner L2 learners will encounter instances of unaccusative verbs in the external input (e.g. *the ice cream melted*). This means that L2 learners are now introduced to the concepts and meanings related to the verb *melt*. Learners are likely to develop a conscious perceptual/visual representation of an ice cream melting, perhaps a perceptual representation of the taste of melted ice cream, and maybe a conscious conceptual knowledge of the meaning of *melt*, with the ability to report and explain this concept. Note that no conscious conceptual knowledge of syntactic structure is involved here. L2 learners are focused on concepts and meanings of language instances, rather than form. In this stage of acquisition, the verb *melt* has probably low resting levels as it has not been frequently processed yet. *Melt* needs to be processed (comprehended/produced) several times before it can be said that it has high activation levels and can be processed fluently.

In the case of unergative verbs, beginner L2 learners will encounter instances of unergative verbs (*e.g. the children laughed*) in the external input. Learners are introduced to concepts and meanings related to *laugh* and also introduced to pedagogical instruction-based rules about the usage of the verb *laugh*, e.g. that laugh is an intransitive verb that cannot take an object in English. It is likely that L2 learners will start developing visual representations of children laughing, perhaps acoustic/auditory representations of sounds of laughter, and conscious conceptual representation of the meaning of *laugh* and conscious conceptual representations of the syntactic (and perhaps phonological) structure of *laugh*.

Within Acquisition by Processing theory, it is maintained that teaching the rule does not result in the rule being learned; rather, frequent processing of instances of language where that rule is integrated does. This is held true for unergative and unaccusative verbs. However, in the case of unergative verbs, L2 learners are likely to start forming this declarative knowledge on how unergative verbs work, which might or might not be extended to unaccusative verbs. That is, L2 learners might employ meta-pattern matching on unaccusative construction as well, based on the declarative knowledge on unergatives they formed during classroom experience. This might instantiate (inaccurate) conscious conceptual representations of syntactic structure of unaccusative verbs. L2 learners might treat unaccusative verbs just like unergatives. They might also confuse them with passive construction, given the fact that both passive and unaccusative have a semantic object in the subject position (e.g., *the window was broken* and *the window broke*). This is because unaccusative verbs are not explicitly instructed, and most Arabic L2 learners of English are unlikely to encounter explicit rule-focused instruction on unaccusative verbs.

5.2.1.2 Intermediate learners: connecting mental representations and raising resting levels

In the case of unaccusative verbs, Arabic L2 learners of English will develop the ability to perceive *melt* as they have already confronted instances of *melt* several times in the external input (e.g. *the ice cream melted, the snowflake melted as it touched the ground…* and so on). This means that Arabic L2 learners of English now can perceive concepts and meanings related to the verb *melt*. In terms of cognitive stages of acquisition, conscious perceptual (visual, auditory, sensory, etc.), conscious conceptual, and maybe unconscious syntactic and phonological representations have higher activation levels and are more readily available to be selected during processing than they were in the previous stage of acquisition. The learner here is experiencing a conscious state of this piece of information, which indicates that the corresponding mental representation is made globally available to adjacent systems of the mind. For example, *melt* can be made active in the visual system by activating the visual representation of an ice cream melting. It can also be activated in the auditory system by activating the auditory representation of the pronunciation. The learner here is experiencing a conscious state of *melt*. The learner's mind can then hold *melt* because it has brought it to the workspace that maintains it independent of the time and place in which the learner first perceived it. After the stimulation is gone, it is very likely that *melt* is stored in long-term memory (LTM) in the conceptual system, to use and reuse in the future. This is likely to assist future processing to trigger unconscious syntactic processing.

L2 learners, in this stage, have been taught that there are two types of verbs: transitive and intransitive. It is also very likely that learners are going to assume that the verb *melt* belongs to the unergative rule. That is, *melt* is an intransitive verb that does not have an object, which is true for both classes of the verb (unergatives and unaccusatives). However, what learners are not taught in the case of unaccusative verbs is that what is in the subject position is not the action-doer, as is explicitly made clear to L2 learners in the case of passive structure. For example, L2 learners, independent of teachers, textbooks or any other information source, have to learn that *the window broke* is perfectly grammatical in English and has a different meaning to *the window is broken*. This might not be a very straightforward process – especially for Arabic speakers, for whom such verbs in Arabic are morphologically marked for unaccusativity. This is the evident difference between unergative and unaccusative verbs that can be observed on the surface by the L2 learner.

Syntactically, unaccusative and unergative verbs have distinct D-structure configurations: an unaccusative verb takes a D-structure object and no subject, whereas an unergative verb takes a D-structure subject and no object (Levin & Rappaport Hovav, 1995). Thus, unaccusative verbs represent a mismatch between thematic role and syntactic function: although what is in the subject position functions as a subject, it has a *theme (not agent)* thematic role. Unaccusative and unergative verbs having distinct configurations would come with the implication that these two classes of verbs would be represented distinctly in the language module. This is, of course, a strong claim that is very difficult to be empirically tested, but is the logical outcome of the theoretical assumptions held in the current study. Raising concerns and queries is what keeps the wheels of the science going forward.

Unaccusative and unergative verbs having such differences implies that the success achieved in the performance of unaccusative verbs (e.g. *the ice cream melted* vs. *the ice cream was melted*) is likely to be attributed to the syntactic and phonological modules working unconsciously with the internal input available in conceptual and perceptual modules. It is highly unlikely that learners' ability to successfully process (or produce) *the ice cream melted* is due to their conscious conceptual manipulation of the syntactic principles governing such verbs, as pedagogical tools and materials do not stimulate raising conscious conceptual awareness of syntactic properties of this class of intransitive verbs.

Connections between representations from different mental systems are starting to form through frequent processing of the verb *melt*. These connected or co-indexed representations form a chain of representations that get activated during processing. They are then selected, among a vast array of representations crisscrossing the mind, due to their relevance to the current input (this is the case of desirable processing;

however irrelevant representations can also be selected and the result is inaccurate comprehension/production). With even more frequent processing, these connections strengthen and the result is that co-indexed representations of *melt* become more readily available for future processing. This process is referred to as raising resting levels of the index of the verb *melt* via means of frequent processing.

With unergative verbs, cognitive stages of acquisition are assumed to differ slightly in route as intentional, explicit, conscious conceptual manipulation of learning comes into play. After being exposed to explicit pedagogical-based instruction, learners confront instances of *laugh* several times in the input. This means that learners can now easily perceive concepts and meanings related to *the children laugh*, along with awareness of syntactic rules governing this verb. In terms of mental representations, this means that conscious visual, auditory and conceptual representations are established. As a result of frequent processing of sentences containing the verb *laugh* in the external input, those representations (i.e. perceptual, conceptual and maybe affective) are co-indexed (i.e. connected) to form and index, containing a chain of representations. These representations get selected, among some many other representations, due to their relevance to the current input. These connections between representations of *laugh* strengthen through frequent processing, and the result is higher resting levels of activation of the index; in other words, mental representations of *laugh* become more readily available for future processing.

It is crucial to note that during earlier stages of acquisition, it is unlikely that syntactic representation of *laugh* is part of its index, as learning the grammatical rule does not mean establishing a syntactic representation of that rule. Instead, learning contributes to the establishment of a conscious conceptual knowledge about the syntactic principles governing *laugh*. At this stage, L2 learners may or may not have unconsciously established syntactic representations for the unaccusative *(melt)* and the unergative *(laugh)*, and this depends on whether or not the learner has processed those two verbs in a desirable way frequently enough.

The difference between establishing *unconscious* syntactic representations and establishing conscious conceptual representations of syntactic principles governing the rule is that the latter would place heavy demands on working memory (WM), as it might still be declarative knowledge at this stage of language development. It is likely that L2 learners will assume that both classes (unaccusative and unergative) have the exact same structure, which might result in processing difficulties (of unaccusative verbs) in the stage of language development that depends on conceptual representations of syntactic structure of the verb; that is, the stage where the unconscious encapsulated specialist systems (syntactic and phonological structures [SS and PS]) have not yet come into play. For example: in '*the accident happened'*, the verb in this sentence does

not take an object, but the meaning of the subject might create confusion to the L2 learner in the stage of conscious conceptual manipulation of the SS. '*The accident'* is clearly not the action-doer, and an L2 learner might confuse this structure with another structure they have been explicitly taught, namely passive structure. Another example is '*the window broke'*: the subject *'the window'* in this sentence is likely to cause even more confusion to the L2 learner, as not only does the meaning not correspond with what L2 learners have been taught in the classroom about intransitive verbs, but also external input providing sentences like 'the window was broken' might add to the misperception.

It is very important to note that once the unaccusative structure has been processed frequently enough (that is, a sufficient number of unaccusative verbs have been encountered in the external input), it is very likely that the 'right' syntactic representation will be triggered unconsciously, causing the unaccusative structure to be perceived or produced in the desirable way. L2 learners might be more proficient in processing unergatives than unaccusatives in the stages where syntactic representations have not been instantiated (beginner and maybe intermediate). But, once syntactic representations are unconsciously triggered, would the conceptual metalinguistic knowledge (i.e. learned knowledge) of properties of unergative verbs still intervene at the level of production, and at the level of comprehension? I discuss this question, along with the findings from the current study, in Chapter 7.

5.2.1.3 Advanced learners: established robust combined representations (indexes)

In the case of unaccusative verbs, it is assumed that an index of *melt* is well established. Having been processed frequently, the index of the verb *melt* is now robust and has high resting levels. Once the external input triggers the retrieval of *melt*, the visual, auditory, sensory and conceptual representations will become consciously available in the global workspace, be selected and then connected to one another. This repeated process will result in a well-established index of *melt*. Since L2 learners came to unconsciously develop universals and primitives of unaccusative verbs, it is likely that learners lack conceptual conscious knowledge of those principles. The growth of a syntactic representation of universals related to unaccusative verbs is triggered by the interfaces between the syntactic and the conceptual modules and/or between the auditory and phonological modules. Syntactic knowledge of unaccusative verbs is processed in a domain-specific module.

In the case of the development of unergative verbs among advanced-proficiency learners, it would be difficult to claim that the type of knowledge is either modular or extra-modular. This is because extra-modular L2 knowledge that started as declarative in the early stages of L2 development would be proceduralised or even automatised in advanced learners, which would place no processing limitations on the learner, as their knowledge of pedagogical rules and regularities would be held in LTM, and therefore

would not interrupt processing or cause performance to slow (Criado, 2016), since both modular and extra-modular L2 knowledge develop through processing.

5.3 Specific research questions and hypotheses

The following specific research questions and hypotheses are put forward to investigate the more general research questions based on the assumption of the distinction between the two types of L2 knowledge (modular and extra-modular) represented for unaccusative and unergative constructions. It also relates the research questions to the experimental tasks used in this thesis, which are (1) a reaction-time reading comprehension task and (2) an error-correction and rule-verbalisation task.

5.3.1 Research question 1 (RQ1): extra-modular L2 knowledge intervention at the level of production

Is there a difference between the ability to correct ungrammatical utterances of unergative structure compared to the ability to correct ungrammatical utterances of unaccusative structure in the production of Najdi Arabic L2 learners of English?

It is hypothesised here that extra-modular explicit knowledge would intervene during production (Rothman, 2008), especially in an offline test-like scenario where L2 learners have enough time to reflect on their conceptual knowledge of grammatical rules of unergative construction, away from the demanding nature of spontaneous communication (e.g., R. Ellis, 2005a; Norris & Ortega, 2000). This will show positive effects of classroom instruction of unergative verbs over unaccusative verbs. This means that Najdi Arabic L2 learners of English will show higher accuracy rates with regard to unergative construction than with unaccusative construction. This question is addressed through an offline task that put no limit on the time Arabic L2 learners are given to complete it. The aim of the task was to compare participants' ability to correct ungrammatical sentences containing unergative verbs with their ability to correct ungrammatical sentences with unaccusative verbs. The responses required providing alternative grammatical sentences with an unergative or unaccusative verb. For example, if the Arabic L2 learner was provided with the sentence *'*the accident was happened'*, the grammatical alternative will be '*the accident happened'*. The prediction is that the difference between the two sub-classes of the verbs will be evident, as participants have time to retrieve and benefit from their conceptual knowledge of grammatical rules of unergative verbs they once explicitly encountered in a classroom context. The difference between unaccusative and unergative constructions will even be more evident across lower-proficiency learners, where accuracy rates are predicted to be higher with correcting ungrammatical unergative verbs than with correcting unaccusative verbs.

5.3.2 Research question 2 (RQ2): extra-modular L2 knowledge intervention at the level of comprehension

Is there a difference in the reading pace of Najdi Arabic L2 English learners between sentences with unaccusative constructions and unergative constructions?

It is hypothesised here that extra-modular explicit knowledge of L2 would not intervene at the level of comprehension (Rothman, 2008).[7] This means that although Najdi Arabic L2 learners of English have been instructed on the use of unergative verbs, this metalinguistic knowledge would not benefit learners during real-time comprehension. This question is addressed through a reaction-time reading comprehension task, which compares the mean reaction times of reading experimental sentences consisting of unaccusative verbs (e.g. *the accident happened*) as test items against the mean reaction time of reading sentences with unergative verbs (e.g. *the baby cried*) within the same proficiency group. For example, the results from the beginner group will not be compared to the results from the intermediate or advanced groups; rather, the mean reaction time spent to read sentences with unaccusative verbs by the beginner group will be compared to the mean reaction time taken to read experimental sentences with unergative verbs by the same beginner group. This procedure will be repeated in all groups. This question investigates whether there is a difference between the unaccusative construction, which is assumed to be instantiated/established at the syntactic level, and the unergative verb, which is assumed to be instantiated/established at the conceptual level, and whether this conceptual knowledge of syntactic properties might play a role at the level of comprehension. If extra-modular knowledge of unergative construction intervenes during comprehension, this would be reflected in the amount of time Najdi Arabic L2 learners take to read sentences with unergative verbs, which would be different from reading times of sentences with unaccusative verbs, an uninstructed construction. Reading times of both constructions would be similar if extra-modular knowledge did not intervene at the level of comprehension (as suggested by CSH [Rothman, 2008]).

5.3.3 Research question 3 (RQ3): L1 cross-linguistic influence by proficiency

Is there a difference between lower-proficiency learners and higher-proficiency learners with regard to their L2 knowledge of unaccusative and unergative construction?

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[7] This question was not initially intended to support the claim that learned knowledge 'would not' intervene at the level of comprehension. Instead, it was formed after obtaining the current findings, which seem to be consistent with the claims of CSH.

L2 learners are hypothesised to start with L1 values dominating the system, then as their proficiency levels advance, L2 values start to appear more frequently (Sharwood Smith & Truscott, 2006). This hypothesis is addressed offline using an error-correction task that aims at comparing lower-proficiency L2 learners' abilities to correct ungrammatical unaccusative and unergative sentences with higher-proficiency L2 learners. The hypothesis is also addressed online, using a reaction-time reading comprehension task which measures the reaction-time scores of reading unaccusative and unergative sentences, comparing lower-proficiency learners with higher-proficiency learners' reaction-time scores.

In the error-correction task, it is predicted that there will be a difference between lower and higher-proficiency Najdi Arabic learners with both unaccusative and unergative constructions, with an increase in accuracy rates as the proficiency level advances. Similarly, in the reaction-time reading comprehension task, it is predicted that higher-proficiency learners will score shorter reaction times than lower-proficiency learners with all verb types.

5.3.4   Research question 4 (RQ4): Metalinguistic knowledge

Is there a difference between the ability of Arabic L2 learners to verbalise instruction-based rules about the use of unaccusative verbs compared to the ability to verbalise violated rules about the use of unergative verbs?

This question is addressed through a rule-verbalising task, where Arabic L2 learners are given an ungrammatical sentence with either an unergative or unaccusative verb, then asked to state in terms of pedagogical rules why the sentence is ungrammatical. Mean scores of verbalising rules relating to ungrammatical unergative verbs will be compared to mean scores of ungrammatical unaccusative verbs. It is predicted that L2 learners will show higher accuracy rates in verbalising rules regarding unergative verbs than in verbalising rules concerning unaccusative verbs. It is also predicted that lower-proficiency groups will have the tendency to perform better in verbalising pedagogical instruction-based rules in unergative verbs than those at higher-proficiency levels, based on the theoretical assumption that extra-modular L2 knowledge starts as declarative knowledge (Criado, 2016; Dekeyser, 2010; 2017). This means that this type of knowledge is more accessible for self-reflection than proceduralised or automatised conceptual knowledge, or even the encapsulated syntactic knowledge of higher-proficiency learners.

5.4   Participants

To investigate the questions above, an experimental study was conducted. Testing was done in different cities in two countries: the United Kingdom (Leeds and York) and Saudi Arabia (Buraydah). In all, 127 individuals from two different groups were tested, all

satisfying the requirements of being adult L2 learners (i.e. started learning English after puberty) with Najdi Arabic native language. Experimental participants constituted two groups: (1) undergraduates majoring in English Language and Translation in Saudi Arabia and (2) undergraduates and postgraduates who at the time of testing were enrolled in different programmes in universities in the UK. In addition, a group of British English native speakers were tested as a control group. In the following section, these groups are discussed in more detail.

5.4.1 Experimental groups

The first group of undergraduate students at Qassim University formed the majority of the participants in the current study. They were a total of 88 Saudi undergraduates students majoring in English Languages and Translation at different levels (i.e. juniors, seniors) in the academic year 2016/17.

Qassim University is located in the Qassim Province of Saudi Arabia. The university was established in 2004 by joining King Saud University Campus and Imam Muhammad ibn Saud Islamic University Campus in Qassim Province. Qassim University has different campuses across the region covering a large number of faculties. Colleges of Qassim University, like in all Saudi Arabian universities, are unfortunately gender-segregated. It was only possible to reach a female college; the College of Arabic Language and Social Studies, where the department of English Language and Translation is located.

Students in the department are required to study eight levels: two levels a year. They are required to enroll in modules that aim to develop English-language skills during their first four levels, such as reading, writing, listening and grammar. During their last four terms, they enroll in specialised modules in different areas of Translation Studies. Lectures in the department are delivered by Saudi lecturers and teaching assistants who hold MA or PhD degrees in Teaching English as a Second Language (TESOL), Linguistics, Applied Linguistics, Literary Translation, Legal Translation, Scientific Translation and Islamic Translation. Most of the staff in the department obtained their degrees in the United States, the UK, and Canada.

The Saudi students have not travelled widely outside the country, and have limited contact with English native speakers. However, they were nominated by their tutors to participate in the experimental study because they showed a good level of English skills in communication and writing. Participants reported taking advantage of TV and media to engage in an English environment. Their average age was 20 and a half. Two of the participants of this group were categorised as advanced learners – the rest were distributed in the beginner and the intermediate groups. Both of the advanced learners in this group reported enrolling in an English summer school in the US to

improve their English communication skills. Only two participants in this group reported knowledge of a third language (Korean, Turkish).

A formal permission was obtained from the head of department to have access to undergraduate students' classes in the university. The rationale for selecting Saudi undergraduates taking an English Translation major was because the tasks were rather long and thought to require relatively good English proficiency, particularly reading skills. In addition, the fact that participants in this group received English grammar instruction is also important to the current study. This sample was one of convenience and necessity.

The second group of Najdi Arabic learners included 39 undergraduates and postgraduates from the University of Leeds, Leeds Beckett University and the University of York, majoring in Psychology, Communication Studies, Audiology, Business Management, Engineering, Medical Imaging, History and Philosophy of Science and Politics, and Human Physiology in relation to Medicine. Participants started learning English in a formal (classroom) setting, and at the time of testing the participants were using English in normal everyday activities in the university and outside. Participants in this group were contacted through social media platforms whose audience were mostly Saudi Arabic students in the UK. Participation was voluntary, and participants were given the chance to withdraw at any time. The administration of the test tasks was on a one-to-one basis (discussed in greater detail in section 5.5). Meetings between the researcher and the participants was scheduled via Doodle during October and November 2016 in Leeds and York. Only three of this group fell in the intermediate proficiency group of the current study, and the rest were categorised as advanced learners. Participants' ages ranged from 19 to 36, with an average age of around 27.

The total number of participants of the UK and Saudi Arabia was 127, 111 of whom were female and 16 of whom were males. At the time of testing, participants had been exposed to English for an average of 12 years. Participants in both groups were categorised in three proficiency levels according to the results of their cloze tests, which will be discussed in section 5.5.2.

A total of 31 participants were excluded for different reasons (and are not included in the number of participants presented above). Responses to multiple choices of the reading comprehension questions that measure attention to the task led to the exclusion of 23 participants, since their accuracy rates fell below 50 per cent. Excluding those participants from analysis seemed necessary for the results to be as reliable as possible. This is because participants might have been distracted from reading the sentences that appeared on the screen, and therefore, the recorded reading time did not represent the actual time they spent reading the test sentences. Another participant was excluded because she did not provide any responses for the cloze test, which makes it

difficult to accurately categorise her into a specific proficiency group. Seven participants skipped more than 75 per cent of the error-correction task test items. This seemed an to be an act of fatigue, distraction, or loss of interest, and therefore was thought not to be sufficiently accurate data for reliable analysis. The actual number of participants' responses that were deemed as useful to be statistically analysed was 127.

5.4.2 Control group

In addition to the 127 experimental participants, 32 British native speakers of English participated in the current study forming the control group. They were postgraduate and undergraduate students from the University of Leeds (but not studying Linguistics). Twenty-four of the participants were males and eight were females, with their ages ranging from 18 to 29. The languages the control group had knowledge of were: French, Spanish, Polish, Punjabi, Chinese, Korean and Romanian. The native control group were approached on campus through personal communication with the researcher, during the Autumn term of the academic year 2016/17.

The total number of participants was 159: 127 of whom were experimental and 32 of whom were controls. Table 5.1 below gives a summary of participants in all groups:

Table 5.1 Participants by group, age range and gender

Participants	Age range	Female	Male	Total
Experimental group	18–36	111	16	127
Control group	18–29	8	24	32

5.4.3 Ethics and confidentiality

Throughout the study, there was adherence to the University of Leeds Research Ethics Policy.[8] The data gathered in this research was not sensitive in nature, and the procedures followed to collect and analyse data did not involve any issues of confidentiality and deception. Ethical approval was obtained from the PVAC & Arts Joint-Faculty Research Ethics Committee in the University of Leeds on 23 November 2015.[9] Formal written permission was also obtained from the department of English Language and Translation in Qassim University in Saudi Arabia.[10] At the time they were approached, participants were given verbal and written information about the nature of the study: general enough not to cause bias in their responses, but at the same time not deceptive. Participants had to give consent to take part. It was made clear to participants that they had the right to withdraw at any time, for whatever reason.

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[8] Details of University of Leeds Research Ethics Policy can be found at http://ris.leeds.ac.uk/info/73/policies_guidelines_and_other_information

[9] See appendix F for ethical approval document.

[10] See appendix G for Qassim University approval.

5.5　Methodology

For the purposes of data collection, four research instruments were used: i) a demographic information questionnaire; ii) a cloze test to evaluate the English proficiency level of participants; iii) a computer-based reaction-time reading comprehension task to examine Najdi Arabic learners' knowledge of English unaccusative and unergative verbs; and iv) an error-correction and rule-verbalisation task to examine participants' abilities to produce alternative, grammatical sentences using unaccusative and unergative construction, and to reflect upon their linguistic knowledge through their ability to verbalise grammatical rules of English unaccusative and unergative constructions. The error-correction and rule-verbalisation tasks were left to the end of the trial to ensure that metalinguistic knowledge of unaccusative and unergative verbs was not retrieved during performing the reaction-time reading comprehension task. At the beginning of each trial, participants were provided with an explanation of the voluntary nature of participation, and the guaranteed anonymity of their responses. At the end of each trial, participants were provided with an explanation of the purpose of the study. This was delayed to ensure responses were not biased by participants' awareness of the purpose behind the tasks.

All four tests were presented in the same session. The tasks took the experimental group 30 to 45 minutes and the control group 20 to 30 minutes. Participants were given the chance to have a break in between tests. To eliminate test anxiety, the tests were done in an informal atmosphere, where participants could interrupt and ask questions at any time (except while doing the reaction-time reading comprehension task). No time limits were assigned.

5.5.1　Demographic information questionnaire

The information provided by L2 learners included name, age, gender, highest degree obtained, major field of study, length of stay in English-speaking countries (in years and months), and finally languages participants might know other than English and Arabic. Names of participants were transformed into codes to ensure confidentiality. Information obtained from this questionnaire is discussed in section 5.4.

5.5.2　Assessment of proficiency levels

The study was designed to include a range of different levels of English proficiency. This is for the purpose of following the stages of development of unaccusative and unergative verbs. Thus, participants were expected to differ in terms of English proficiency, which was examined as an independent factor that might have influenced the results obtained from the tasks of the current study. The main tasks for this study were rather demanding and time-consuming. For this reason, it was decided that a quick but effective

independent measure that could allow for the division of participants into groups according to their proficiency levels in English. A cloze test was used for this purpose.

In cloze test procedure, words are deleted at regular intervals (fixed ratio or nth word). A considerable body of research has supported cloze tests as reliable and valid measure of language knowledge at grammatical, lexical and textual levels. Research also shows high correlations between results from cloze tests and scores from established language-proficiency measures (e.g. Abraham & Chapelle, 1992; Chapelle & Abraham,1990; Brown, 1993; Oller & Perkins, 1980; Yamashita, 2003).

Cloze tests can be scored either by using the exact-answer method or the acceptable-answer method. The exact-answer method counts correct responses which correspond exactly to the words deleted from the original passage, whereas the acceptable-answer method counts as correct any grammatically and contextually appropriate word. The acceptable-answer method is more time-consuming, but is believed to yield more accurate assessment of language proficiency than the exact-answer method, as it does not underestimate language knowledge (Abraham & Chapelle, 1992; Hinofotis, 1980; Lange & Clausing, 1981).

To examine the acceptable-response scoring procedure, Hinofotis (1980) administered a cloze test to 107 foreign students studying English as a second language (ESL) at the Centre of English as a Second Language (CESL) at Southern Illinois University. Both scoring methods were used to score the cloze test. Hinofotis used two proficiency tests (Test of English as a Foreign Language [TOEFL] and the CESL placement battery) as criterion measures, against which cloze test scoring evaluated. Results supported the conclusion that the cloze test procedure is a viable proficiency testing tool, and that the exact-response method "does not discriminate among levels to the extent the acceptable-answer method does" (Hinofotis, 1980, p. 127).

The cloze test used in this project was devised as a baseline of proficiency in a number of L2 English studies (Al-Thubaiti, 2009; Avery & Radisic, 2007; Chen, 1996; Marsden et al., 2017; Montrul, 1997; 2000; Slabakova, 2001). This cloze test was adapted by Chen (1996) from a text passage in *American Kernel Lessons: Advanced Student Book* (O'Niell & Cornelius Jr, 1991). The test followed the every-seventh-word method (i.e. every seventh word was omitted from the text), but no words were deleted from the first sentence to provide contextual information. There were 40 blanks in the text, and the participants had to fill each blank with one word; participants had to generate these words themselves, because no word choices were given.

5.5.3 Reaction-time reading comprehension task

In order to investigate participants' knowledge of English unaccusatives and unergative verbs, a reaction-time reading comprehension task was administered to Arabic L2 learners of English and British English speakers. The task was computer-based. Arabic

L2 learners of English had to read 36 mini-stories, each containing from two to four sentences; either one or two opening contextual sentence/s and a test sentence with either an unaccusative or unergative verb. Participants also had to read nine 'distractor' mini-stories, each containing contextual sentence/s and a distractor sentence with a transitive verb. Nine distractor sentences were thought to be sufficient, because of the demanding nature of the experiment, which might cause fatigue and therefore affect the reliability of the results. It was also unlikely that participants would figure out the structure under investigation as each test sentence would appear after a contextual sentence, which might also distract participants from guessing the pattern in a way that might affect the results.

Each test sentence was grouped into four-word phrases to control sentence length, which might affect the reaction time participants take to read each phrase. Participants were instructed to press the spacebar once they had finished reading each phrase. The software used (*PsychoPy*) recorded the time participants took to read each sentence. Participants had to answer a comprehension question about the story they had just read; that is, they had to answer one comprehension question immediately after reading each story. The comprehension questions were presented in a pen-and-paper form to minimise the effect of practice in reading the test sentences, which might affect recorded reaction times.

To help ensure that the participants understood the procedure, they were provided with extensive oral instructions and were asked to read the instructions carefully. Participants were also provided with the chance to practice doing the test with three mini-story samples to ensure they were confident and ready to start the experiment.

Language acquisition research has used different online tasks such as reaction-time reading comprehension, sentence repletion and story retelling as a measure for grammatical processing and processing demands in language learners (e.g. Clahsen & Felser, 2006; Dekydtspotter & Seo, 2017, Hopp, 2016; 2017; 2019 among others). The choice of an online comprehension task is based on the notion that online processing methods tap the participant's unconscious knowledge (Blom & Unsworth, 2010).

The purpose of the task was to examine whether there is a difference in pace of reading between unaccusative and unergative construction. This is then linked to theoretical concern of the current study of whether extra-modular explicit L2 knowledge would intervene at the level of comprehension, which is compared to extra-modular L2 knowledge intervention at the level of production. It is important to recall here that Najdi Arabic L2 learners of English are assumed to have this extra-modular explicit or implicit L2 knowledge of unergative verbs, but not unaccusative verbs. Najdi Arabic L2 learners of English are assumed to have developed modular L2 knowledge of unaccusative construction, because they were not exposed to the right type of pedagogical instruction

to fully understand unaccusative structure. The task operates under the assumption that the shorter the time Arabic L2 learners of English take to read sentences containing unaccusative and unergative verbs, the more likely they are to have developed modular implicit L2 knowledge or even extra-modular implicit L2 knowledge of those verbs. The longer participants take to read test sentences, the more likely they are to have conceptual knowledge of grammatical rules that place heavy burdens on processing and cause their reading to slow down.

Four different verb types were considered in the reaction-time reading comprehension task. The four experimental types of unaccusative and unergative verbs were chosen and categorised according to the patterns of their Arabic equivalents. Each verb type included three verb tokens, each of which included three test items. The total number of test items was 36, which were designed to target the linguistic phenomenon under investigation. Increasing the number of verb tokens could increase the statistical robustness, yet would also increase the chance of participants experiencing boredom and fatigue, which would affect the reliability of the data. Intending to balance these factors, it was thought that three tokens per type would be sufficient for the current study. Three transitive verbs were also included in the task to serve as distractors, which makes a total number of nine test items. In the following section, verbs types and tokens are discussed.

5.5.3.1 Verb types and tokens

Existing research on unaccusative and unergative verbs (e.g. El-Nabih, 2010; Yip, 1994; Zobl, 1989) provided a basis for helping to decide which verbs to choose and what sentences and contexts might be effective. The total verbs tested in this task are 12 English intransitive verbs (each with three tokens), classified as follows:

5.5.3.1.1 Type 1: non-alternating unaccusatives:

This verb type includes *arrive, appear* and *happen* as English unaccusatives that do not alternate. For example, *the magician appeared the rabbit* is ungrammatical, and the correct form would be *the magician made the rabbit appear*. The Arabic equivalents of these verbs have a causative pattern, and participate in the alternation. An affix is required to derive the causative form from its corresponding inchoative. In the following example, the story is provided with the Arabic equivalent of the underlined test item.

1. Bill was having a nice picnic when he heard a noise in the bushes. <u>Suddenly, a rabbit *appeared*</u>.
ẓahara arnab-u fj'a-tan
appeared a rabbit -NOM suddenly-ACC (causative pattern)
'Suddenly, a rabbit appeared'

5.5.3.1.2 Type 2: unergatives

This type includes the verbs *swim, cry,* and *laugh*. These verbs do not participate in the alternation in English, however, their Arabic equivalents do alternate by adding an affix to the intransitive form to derive its causative counterpart. For example:

> 2. The swimming teacher was an expert.
>   The children *swam* skilfully.
>   ta-sabbaḥa al-aṭfal-u biḥyrafiyah
>   CAUS-swam the children-NOM expertly. (causative pattern)
>   'The children swan expertly.'

5.5.3.1.3 Type 3: alternating unaccusatives

This verb type includes the verbs *break, open* and *close* as English unaccusatives whose Arabic equivalents have an anti-causative pattern; that is, the inchoative form is derived from its causative counterpart through adding overt morphology. For example:

> 3. Stefani stayed at a modern hotel.
>   When she walked towards the gates, the doors *opened* automatically.
>   In-fataḥat al-abwab-u telqa'y-an
>   ANTICAUS- opened the doors-NOM automatically. (inchoative pattern)
>   'The doors opened automatically.'

5.5.3.1.4 Type 4: alternating unaccusatives

This verb type has *sink, freeze* and *melt* as the type of English unaccusatives whose Arabic counterparts have a causative pattern; that is, the causative form is derived from its inchoative counterpart through adding overt morphology. For example:

> 4. We had a cold winter last year.
>   The river froze solid.
>   ta- jammada an-nahr-u
>   ANTICAUS- froze the river- NOM. (Inchoative Pattern)
>   'The river froze.'

5.5.3.1.5 Type 5: transitive as distractors

This verb type includes *buy, eat* and *get* as English transitive. These verbs do not participate in the causative/inchoative alternation in English. Arabic equivalents have a causative pattern; that is, the inchoative form is derived from its causative form through an affix added to the verb. For example:

> 5. The chief is an expert at making burger. He makes burgers every day.
>   His family eat burgers every Friday.

Table 5.2 below exhibits the tested verb types used in the reaction-time reading comprehension task.

Table 5.2 Verbs included in the reaction-time reading comprehension task

English verbs	Pattern of Arabic equivalent	Verb type
happen | arrive | appear	causative	Type 1: non-alternating unaccusatives
laugh | cry | swim	causative	Type 2: non-alternating unergatives
break | open | close	anti-causative	Type 3: alternating unaccusatives
freeze | melt | sink	causative	Type 4: alternating unaccusatives

5.5.3.2 Comprehension questions

Comprehension questions were designed to ensure that participants are reading the test items, and that the reaction-time calculated represent the actual time participants took to read each sentence. Scores from comprehension questions were not analysed, as those scores are not themselves an outcome measure, but rather a tool to ensure the accuracy of reaction-time scores. Questions were presented in a pen-and-paper form, and each was provided with four multiple-choice answers from which participants had to choose the correct answer. Participants were instructed to do one comprehension question on paper immediately after reading the corresponding story on the computer. The story did not appear in the paper along with question, as participants would have the chance to read the test sentence again, which might affect the reliability of the results from the recorded reaction time. The multiple choices were designed to reveal if participants were reading thoroughly or were distracted from the test sentences. This was accomplished through the inclusion of a totally irrelevant choice. If the irrelevant choice was chosen for 50 per cent or more of the answers across the whole task by any participant, all the scores of the reaction-time task for this participant were excluded from the analysis, as they might not be representative due to the participant's distraction.

The multiple choices included two relevant answers, one of which might be correct. It also included a 'none of the above' choice, which also might be correct. One choice that should have been included is "I cannot remember", as few participants chose "none of the above" then wrote that they could not remember the story.

The story below is provided as a matter of convenience for the reader, however it was not provided to the participants of the study along with the question. Stories only appeared on the screen, and were not available for participants while they were answering the comprehension question.

6. The swimming teacher was an expert.
   The children swam skilfully.
   Corresponding question: what is the result of the teacher being an expert?
   a) The children were satisfied.

    b) The children swam skilfully.
    c) The pupils learned to read very quickly.
    d) None of the above.

5.5.3.3 Presentation of the reaction-time reading comprehension task

As discussed earlier, every story was divided into sentences to control the effect of sentence length on the recorded reaction time. Each story contained two sentences: the first served as a contextual sentence, familiarising the reader with the topic of the story; the second contained the actual test sentence, of which a reaction time was recorded. The story appeared as shown in Figure 5.1 below. The rectangles exemplify the computer screen.

The swimming teacher was an expert.	The children swam skilfully.
…	We had a cold winter last year.
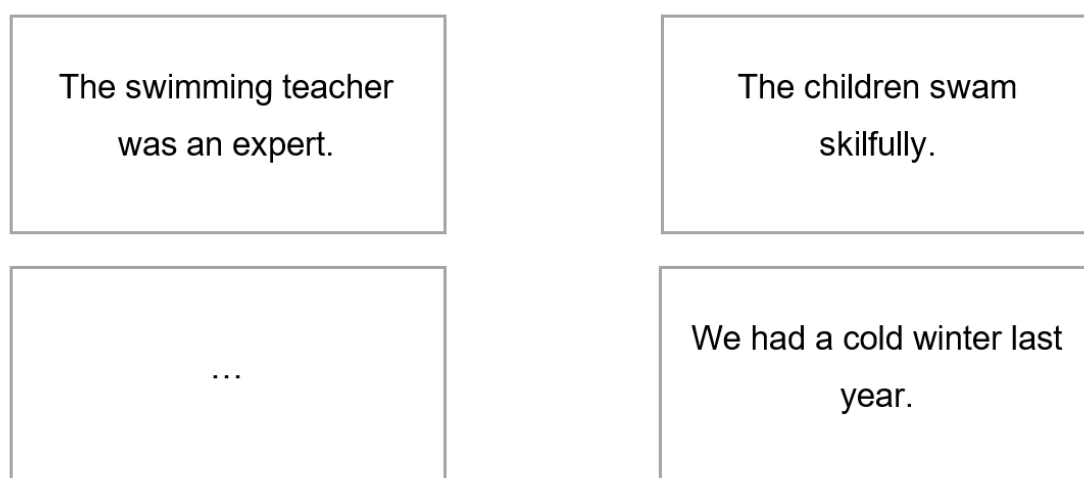
Figure 5.1 Presentation of the experiment

Participants were instructed to pause and answer the comprehension question once the three dots appeared on the screen. All comprehension questions were provided in one booklet in the same order to correspond to the order of the stories appearing on the screen. Participants had to read a total of 36 test stories and answer 36 comprehension questions. There were nine distractor stories along with nine corresponding comprehension questions.

5.5.4 Error-correction and rule-verbalisation task

To investigate the participants' extra-modular explicit L2 knowledge of unaccusative and unergative verbs, an error-correction and rule-verbalisation task was administered to all participants. This task was presented in a pen-and-paper form. Participants had to read 30 items, each containing two sentences: an introductory contextual sentence and a test sentence with either an unaccusative or unergative verb. The second sentence was a continuation of the first (introductory) sentence and contained an ungrammatical part. Participants were instructed to supply a correction and to verbalise the grammatical rule violated. Participants were instructed to leave the space blank if they were unable to supply any response. The 30 test items were presented in random order, where no two verbs from the same verb type appeared successively. To ensure that participants

understood the instructions, they were asked to read the instruction section very carefully and were supplied with intensive oral instruction.

The task was designed to assess Najdi Arabic learners' extra-modular L2 knowledge of unergative verbs and its intervention at the level of production. Najdi Arabic L2 learners of English are assumed to have richer extra-modular L2 knowledge of unergatives, and therefore are expected to perform better at correcting ungrammatical unergative construction when they are given open time. This task was also designed to investigate the effects of formal instruction on the development of second-language knowledge by comparing the instructed unergative structure with the uninstructed unaccusative construction. This tasks also investigates the L1 cross-linguistic effects on earlier stages of language development in Najdi Arabic L2 learners of English compared to more advanced stages of language development.

The task operates under the assumption that extra-modular explicit L2 knowledge, or explicit knowledge of language as articulated by (Ellis, 2004) can potentially be reported by learners (Ellis, 2004). Learners' ability to verbalise rules depends on their metalinguistic knowledge, as well as their ability to analyse linguistic structure using non-technical terms (James & Garrett, 1992). In her study, Butler (2002) found that adult Japanese learners of English had the ability to provide some kind of metalinguistic explanation to the choices they provided in a cloze task examining their knowledge of English articles.

In designing this task, three criteria were considered to examine L2 learners' explicit knowledge of unaccusative and unergative verbs. These criteria were first suggested by R. Ellis (2005b), and discussed below:

1. *Degree of awareness*. This criterion refers to the degree to which learners are aware of their language knowledge. This can be measured through learners' responses to the questions asking them to verbalise the rules violated in experimental sentences, as in the current experimental task. It can also be measured through requiring learners to self-report their experience by stating whether they relied on 'feel' or 'rule' when responding to a certain task (R. Ellis, 2005b).

2. *Time available*. This criterion refers to whether learners are restricted to perform a task within certain time limit or perform the task with no time restriction, that is; they have the chance to plan their answers more carefully. Extra-modular knowledge of a second-language can be measured by excluding any element of time pressure while performing the task.

3. *Focus of attention*. This criterion refers to the extent to which the task emphasises fluency or accuracy. Fluency directs attention to meaning by conveying a certain message or information (as in the previous task),

whereas accuracy directs attention to the construction of the linguistic form (as with the error-correction and rule-verbalisation task).

Some of the verb types used in the reaction-time task were used again in the error-correction task, as the purpose of this study is to measure two different types of second-language knowledge of the same linguistic phenomenon. Measuring different verb types in the error-correction and rule-verbalisation task would yield less precise results, especially when comparing the intervention of extra-modular L2 knowledge at the level of comprehension and its intervention at the level of production (the latter is tested through the error-correction task, and the former through the reaction-time reading comprehension task).

Two different verb types were considered in the error-correction and rule-verbalisation task. Each verb type included three verb tokens, each of which included five test items. The experimental tokens appeared in two different conditions/scenarios, which were designed to target the linguistic phenomenon under investigation. Both scenarios in which ungrammatical English unergative and unaccusative constructions appeared have grammatical Arabic equivalents. This is to test different stages of L2 development in Najdi Arabic L2 learners of English and their shift towards L2 English values.

In the following section, the basis for ungrammaticality in the test items is discussed, then verb types and tokens are reviewed, followed by a section on the conditions and scenarios in which the test verbs appeared. All intransitive verbs included in this task were non-alternating. This is because including any English alternating unaccusative verbs would be confusing, and any ungrammaticality would not be attributed to the verb itself, but rather to the context in which the verb appears, as English alternating unaccusative verbs can grammatically be passive and causative (the two ungrammatical structures used in this task).

5.5.4.1 The basis for ungrammaticality in the test items

Several structural patterns and phenomena have been noticed in second-language learners' performance of various L1 backgrounds in unaccusative and unergative verbs[11]: overpassivisation, avoidance of inchoatives (and use of the passive instead); use of post-verbal NP structures; and causativisation (transitivisation), For example:

a) *The most memorable experience of my life was happened 15 years ago. (Arabic L1 in Zobl, 1989, p. 204)
b) <u>Judgement task</u>: My car has broken down. <u>Learner's correction</u>: was broken down. (Chinese L1 in Yip, 1994, p.129)
c) *Sometimes comes a good regular wave. (Japanese L1 in Zobl, 1989, p. 204)

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[11] This is referred to in the literature as the causative-inchoative alternation. The current task only investigates non-alternating unaccusative verbs.

d) *The shortage of fuels occurred the need for economic engine. (in Rutherford, 1987, p. 89)

The non-target performance instances exemplified in a) and d) (that is, overpassivisation and causativisation) above formed the basis for providing ungrammatical test items in this task. The Arabic unaccusative and unergative equivalents of the ungrammatical test items are in fact grammatical. The following section focuses on verb types and tokens.

5.5.4.2 Verb types and tokens

The total number verbs tested in this task was six English intransitive verbs (each with five tokens [a total of 30 test items]), incorporating the same verbs in verb type 1 and verb type 2 in the reaction-time reading comprehension task. This includes type 1: non-alternating unaccusatives (*arrive, appear* and *happen*) and type 2: unergatives. However, the tested verbs were presented in two different conditions, which are discussed in the following section.

5.5.4.3 Item scenario

In the following section, I discuss the two conditions under which the ungrammatical English unaccusative and unergative utterances appeared in the task.

5.5.4.3.1 Context encourages use of passive and the structure is passive

In this scenario, the contextual sentences imply agentivity, that is; an implied agent is promoted as the entity responsible for the action expressed by the tested verb. The test verb is expressed in a passive form, and is therefore ungrammatical, because non-alternating unaccusative and unergative verbs do not allow passivisation. Take the following example from the current error-correction and rule-verbalisation task:

6. The mother was telling a funny story to the child.
   *So, the child was laughed.

The underlined part in the example above is ungrammatical, because the verb *laugh* was supplied in a passive form, which is not permissible in English. The mistaken part can be corrected by replacing the passive form of the verb with a periphrastic causative (e.g. *the mother made the child laugh/ she made her laugh*), an intransitive form of the verb (e.g., *the child laughed*) or a passive form of a different passivisable verb (*e.g., the child was amused or cheered up*).

5.5.4.3.2 Context encourages use of causative and the structure is causative

In this scenario, the contextual sentence includes an explicit agent causing the event denoted by the test verb. Non-alternating unaccusative and unergative verbs do not allow transitivity, therefore the underlined part is ungrammatical. Take the following example from the task:

7. The magician performed several tricks.
   *In one of the tricks, he appeared a bird from an empty box.

The underlined part in the example above is ungrammatical because the verb *appear* was supplied in a causative structure, which is not permissible in English. This part can be corrected by either using the intransitive structure of the verb (e.g. *a bird appeared*), a periphrastic causative verb (e.g. *he made a bird appear*) or maybe using a different verb allowing transitivity (e.g. *he suddenly showed a bird*).

5.5.4.3.3 Verb tense and subject-verb agreement errors as distractors

In this task, no specific verb type is used as a distractor; rather, different types of grammatical errors were incorporated within different verbs. Verb tense errors and subject-verb agreement errors were included throughout the task. For example:

10. Amelia travels around the world for her work.
    *She loves it, but <u>she always suffer</u> from jetlag. (subject-verb agreement)
11. Yesterday, the boat hit a big rock.
    *<u>The boat sink</u> gradually. (verb tense error)

5.6 Scoring

The cloze test had 40 blanks in the text, and the participants had to fill each blank with one word; participants had to generate these words themselves, because no word choices were given. Minor spelling mistakes and the confusion of upper and lower case were tolerated; however, grammatical errors in terms of tense and number were not. One point was given to each acceptable answer. The maximum score was 40. This forms the basis for dividing participants into different proficiency groups (discussed in more detail in section 6.6.2. In the following section, the scoring criteria for both tasks are discussed. First, I discuss the criteria for the reaction-time reading comprehension task. Second, the criteria for the error-correction and rule-verbalisation task is considered.

5.6.1 Reaction-time reading comprehension task

The software used (*PsychoPy*) recorded the time participants took to read each sentence. Each test item generated a score, representing the time spent to read the test sentences in milliseconds. Those scores were then manually entered into an *Excel* spreadsheet, organising scores according to verb types and tokens for each participant. The file included a reaction-time score for each test item for each participant. Each participant of the 159 had 36 scores of the recorded reaction time for each test sentence. The final file had a total number of 5,724 scores of the recorded reaction time.

Participants had to answer a comprehension question about the story they had just read; that is, they had to answer one comprehension question immediately after reading each story. This question formed the basis for the decision of whether to include the corresponding test item reaction time score in the final analysis, as discussed in section 5.4. Participants scoring below 50 per cent were excluded from analysis. This is because it is important that the reaction-time score should represent the actual time participants took to read each sentence.

5.6.2 Error-correction and rule-verbalisation task

The scoring of the error-correction and rule-verbalisation task was based on the correspondence between the participants' responses and the predetermined expected answers to the 30 items of the task. The task contained two parts: error-correction and rule-verbalisation. The maximum score was 30 for each part, but that was not analysed as one task, rather the task was divided into four parts corresponding to verb types and scenarios for each part. Each task was divided into four categories, corresponding to verb types and scenarios. The categories were:

1. Non-alternating unaccusative in passive construction
2. Non-alternating unaccusative in causative construction
3. Unergative in passive construction
4. Unergative in causative construction.

Spelling mistakes were tolerated throughout the task.

For the error-correction task, the answers for each participant were checked, and their responses were categorised based on the following criteria:

1. A response was counted correct and given a point if the participant supplied a relevant and acceptable correction, for example:
   The teacher was an expert. Fortunately, <u>the teacher swam the children skilfully</u>.
   Correct form: <u>The teacher was teaching the children how to swim skilfully</u>. (participant #AL2017)
   Correct form: <u>The teacher taught the children swimming.</u> (participant #AL2126)
   Correct form: <u>The teacher gave swimming lessons to the children. She was an expert.</u> (participant #AL2038)
2. A response was counted incorrect, and no point was given if: a) the participants left the space blank or b) the participant provided an irrelevant correction, for example:
   The new driver had little experience. His car slipped out of the wet road, and <u>a collision was happened</u>.
   Correct form: *<u>and the collision was happened.</u> (participant #AL2017)

The verb in sentence 2 is incorrectly passivised (NP BE V-en pattern), but participant #AL2017 failed to provide a relevant acceptable correction, and seemed distracted by the article instead. Therefore, participant #AL2017 scored zero points for this test item.

For the rule-verbalisation task, responses were categories based on the following criteria:

3. A point was added to the whole score of the task if participants supplied a relevant instruction-based grammar rule, explaining why a certain sentence is ungrammatical. For example, the test item below had different responses from different participants:
   Mary was sad, and her friends wanted to help. To make her feel better, <u>Mary was laughed</u>.
   Grammar rule: <u>you cannot use passive in this sentence</u>. (by participant #AL2126)

> Grammar rule: <u>it does not make sense; shouldn't the friends be the ones mentioned instead of Mary? Ex. Her friends made her laugh</u>. (by participant #AL2038)

Participant #AL2126 seemed aware of the fact that the verb *laugh* was incorrectly used in passive voice, and that it was ungrammatical. Having referred to 'passive structure', the participant seemed to be able to identify the error and reflect upon their own knowledge of the verb. However, the participant did not refer to intransitive verbs, but awareness that such a sentence is ungrammatical in passive structure was sufficient. Not many participants in the current study had grammar instruction-based explanations of ungrammatical sentences. This type of response was found in very few participants. Most participants failed to provide clear instruction-based rule explanations/justifications for their responses. It should be noted that both parts of the task were presented simultaneously alongside the test item (i.e. the ungrammatical instance of an intransitive verb), and most participants provided or attempted to provide grammatical alternative sentences, but the majority of participants left the rule-verbalisation part blank, or provided answers like the one provided by participant #AL2038 in sentence 3. Participant #AL2038 (and many other participants in the study) seemed to lack conscious knowledge of why the given sentence sounded ungrammatical, as they referred to the agents (*Mary* and *friends*) in the sentence and thought that they need to be repositioned. This clearly shows knowledge of the intransitivity of the verb *laugh*; a type of knowledge that the participant could not consciously reach to reflect upon.

5.6.3 Statistical procedure

To test the research questions of the current study, several statistical tests were conducted on the scores obtained from participants in the cloze test, the reaction-time reading comprehension task and the error-correction and rule-verbalisation task.

As noted earlier, the cloze test scores helped to group the experimental Najdi Arabic participants into three proficiency levels (beginner, intermediate and advanced). The British native group was classified as the control group. The classification was supported by statistical analyses. T-tests were conducted with each two successive groups to examine whether the mean scores of the cloze test for each group were significantly different (discussed in greater detail in Chapter 6).

Scores from the reaction-time reading comprehension task were statistically tested by verb type, as well as by proficiency. In both cases, an analysis of variance (ANOVA) test was used to compare mean reaction times across different verb types, as well as to compare mean reaction times across proficiency levels for each verb type.

Scores from the error-correction-tasks were statistically tested by comparing results from unaccusative verbs and results from unergative verbs within each test condition (ungrammatical passive vs. ungrammatical causative) within each proficiency

group. For example, results from the ungrammatically passivised unaccusative verbs were compared with ungrammatically passivised unergative verbs within the beginner group. Results were also statistically tested across groups within either unaccusative verbs or unergative verbs to investigate L1 cross-linguistic effects.

5.7 Summary

This study adopted an experimental as well as conceptual approach to investigate the difference between modular implicit L2 knowledge and extra-modular explicit and implicit L2 knowledge. It is challenging to tease these two types of L2 knowledge apart in empirical terms, yet setting experimental tasks that might expose these types of L2 knowledge from different angles might advance research into the nature and development of these two types of L2 knowledge. The current thesis aims to shed more light on the nature of intervention of extra-modular L2 knowledge at the level of production compared to its intervention at the level of comprehension. The current study also aimed to explore the difference between stages of L2 development between instructed unergative verbs and uninstructed unaccusative verbs, and the role L1 cross-linguistic influence might have on early stages of L2 development.

This difference was analysed through integrating the two classes of intransitive verbs into the tasks designed to address the current inquiry. A total of 127 participants were selected to perform the tasks. Participants were second-language speakers of English with Najdi Arabic L1 in different stages of acquisition. Additionally, 32 British English native speakers participated in the study as the control group. A demographic information questionnaire was administered to obtain background information on the participants. The participants' English proficiency levels were identified based on their scores on a cloze test. To empirically investigate questions of the current study, a reaction-time reading comprehension task, and an error-correction and rule-verbalisation task were administered. The outcome data was analysed using different statistical tools including *Excel* and *R*. The following chapter focuses on the results of the data analysis of the main two tasks conducted to investigate the research questions.

Chapter 6   Results

6.1   Introduction

The present study is an investigation into the L2 knowledge of unaccusative construction and unergative construction of Najdi Arabic L2 learners of English. For the purpose of data collection, four instruments were used: (i) a demographic information questionnaire; (ii) a cloze test to classify participants into proficiency groups; (iii) a reaction-time reading comprehension task; and (iv) an error-correction and rule-verbalisation task. Data from the demographic information questionnaire was presented in the previous chapter as background information for participants. This chapter is largely devoted to the presentation of results obtained through the analysis of the cloze test, the reaction-time reading comprehension task, and the error-correction and rule-verbalisation task. First, the results from the cloze test analysis are presented. Then, the chapter is organised according to the central research questions. The different parts of the experimental tasks are analysed separately to answer each research question. The discussion covers each research question, in the same order that they appeared in the previous chapter.

6.2   Cloze test

As noted earlier, two methods of scoring cloze tests can be administered, that is, the exact-answer or the acceptable-answer method. The acceptable-answer method is thought to yield more accurate results regarding language proficiency levels than the exact-answer approach, as it does not underestimate language knowledge (Chapelle and Abraham, 1990; Abraham & Chapelle; 1992; Hinofotis, 1980; Lange & Clausing, 1981; Oller & Perkins, 1980). The acceptable-answer criterion was employed for scoring the cloze passage used in the current study. Minor spelling mistakes and the confusion of upper and lower case were tolerated; however, grammatical errors in terms of tense and number were not. One point was given to each acceptable answer. The maximum score was 40.

The cloze test scores of the control group (32 participants) were high, as expected; most of the participants scored 40/40, with a few outliers ranging from 35 to 39. The mean score for native speakers was 39.66, the median was 40 and the minimum score was 35/40. Data from native controls was not normally distributed. The native speakers group are referred to as the control group throughout this chapter. The scores from the Arabic learners of English varied from 2/40 to 38/40. Based on scores from the cloze tests, participants were grouped into three different proficiency levels. The cut-off points between levels were decided by equally dividing the whole set into three groups. Then overlaps were avoided, taking into consideration maximising the internal coherence of each group, while maintaining semi equal number of participants in each group. The advanced-level group (38 participants) scores ranged from 29/40 to 38/40.

The mean score for the advanced group was 33.11, the median was 33 and the minimum score was 29. The intermediate-level group (45 participants) scores ranged from 20/40 to 28/40. The mean score for the intermediate level was 24.04, the median was 24 and the minimum was 20. The low-level group (44 participants) scores ranged from 2/40 to 19/40. The mean score for the low-level group was 13.05, the median was 15, and the minimum was two. Scores from the cloze test are presented in Figure 6.1.
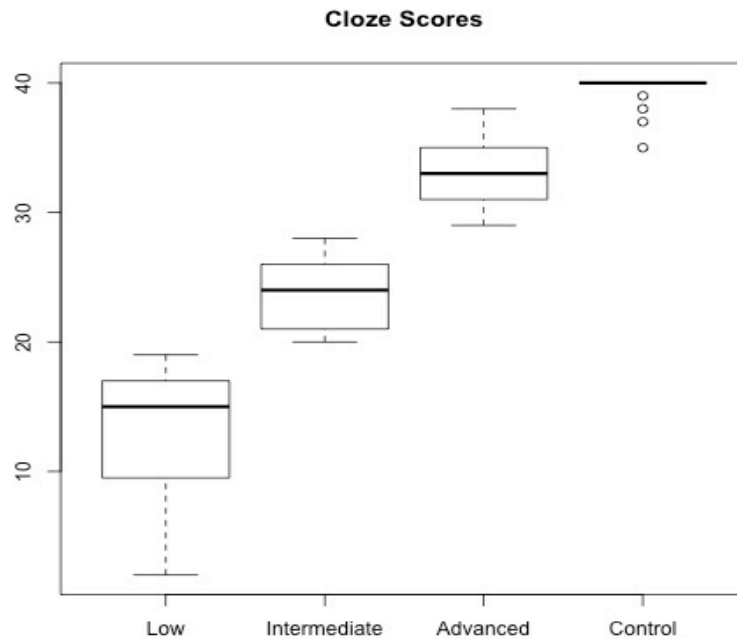
Figure 6.1 Scores from cloze test

Data from the experimental group was normally distributed, whereas data from native controls was not. Figure 6.2 shows the distributions of scores in the experimental groups and the control group. As can be seen from this figure, the distributions of cloze tests were different for each group, none of which, however, is overly kurtotic (i.e. clustered around a particular point). That is not the case with the control group, who had a distribution skewering to the right.
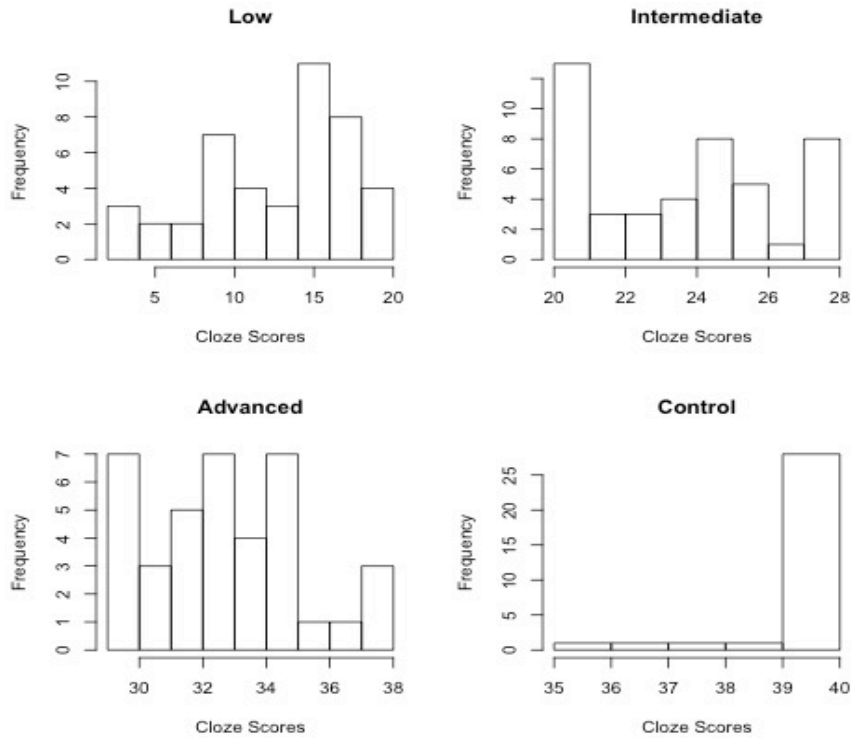
Figure 6.2 Distribution of cloze scores

The classification was supported by statistical analyses. T-tests were conducted with every two successive groups to examine whether the mean scores of the cloze test for each of the two groups were significantly different. As noted above, the cloze scores from the control group were not normally distributed, so a non-parametric test (Wilcoxon test) was conducted to examine the statistical difference between the control and the advanced groups. The results indicated that there was a statistically significant difference between the low and the intermediate group (p <0.5). There was also a significant difference between the intermediate and the advanced group (p <0.5). A significant difference was also found between the control group and the advanced group (p <0.5). The standard deviation and mean of the three groups and the control group are presented in Table 6.1 below.

Table 6.1 Mean and standard deviation for the cloze test

Group	Mean	Standard deviation
Beginner (n= 44)	13.04	4.75
Intermediate (n=45)	24.04	2.68
Advanced	33.10	2.54
Control (n=32)	39.65	1.06

## 6.3 Research question 1 (RQ1)

Is there a difference between the ability to correct ungrammatical utterances of unergative structure compared to the ability to correct ungrammatical utterances of unaccusative structure in the production of Najdi Arabic L2 learners of English?

This question is addressed through the off-line error-correction task. There were no time limits for the completion of the task. The aim of the task is to compare the ability of the participants to correct ungrammatical sentences containing unergative verbs with their ability to correct ungrammatical sentences with unaccusative verbs. The response required the participants to provide an alternative grammatical sentence with unergative or unaccusative verb. For example, if the Arabic L2 learner were provided with the sentence '*the accident was happened', the grammatical alternative would be 'the accident happened'. The prediction was that there would be a difference between the two sub-classes of intransitive verbs, as participants would have time to retrieve and benefit from the conceptual knowledge of grammatical rules of unergative verbs that they had once explicitly encountered in a classroom context. The difference between unaccusative and unergative constructions would be even more evident across lower proficiency learners, where accuracy rates were predicted to be higher with correcting ungrammatical unergative verbs than with correcting unaccusative verbs.

Two different verb types were considered in the error-correction task. Each verb type (unaccusative and unergative) included three verbs; *appear, arrive, happen* for the unaccusatives and *laugh, swim, cry* for the unergatives, and each verb included five test items. The total number of the test items were 30 which appeared in two different conditions/scenarios; either ungrammatically formed in a passive pattern or ungrammatically formed in a causative pattern. Both conditions in which ungrammatical English unergative and unaccusative constructions appeared have grammatical Arabic equivalents.

In the ungrammatical passive condition, results from a two-paired t-test showed that Najdi Arabic L2 learners of English performed statistically significantly better at correcting errors and supplying accurate alternatives to ungrammatically passivised unergative verbs than unaccusative verbs in the performance of both the beginner group df(66.29)= -4.41, $p < 0.05$ and the intermediate group df(65.63)= -4.18, $p < 0.05$. The advanced group, however, performed statistically significantly better at correcting and supplying accurate alternatives to ungrammatically passivised unaccusative verbs than unergative verbs df(87.03)= 2.42, $p < 0.05$. In the ungrammatical causative condition, there was no statistical difference between correcting errors in unaccusative and unergative verbs in the performance of the beginner and the intermediate group. The advanced group, however, performed statistically significantly better at correcting errors in unaccusative verbs than in unergative verbs df (78.751)= 3.68, $p < 0.05$. The advanced group's performance presented a different pattern from that of the beginner and intermediate groups.
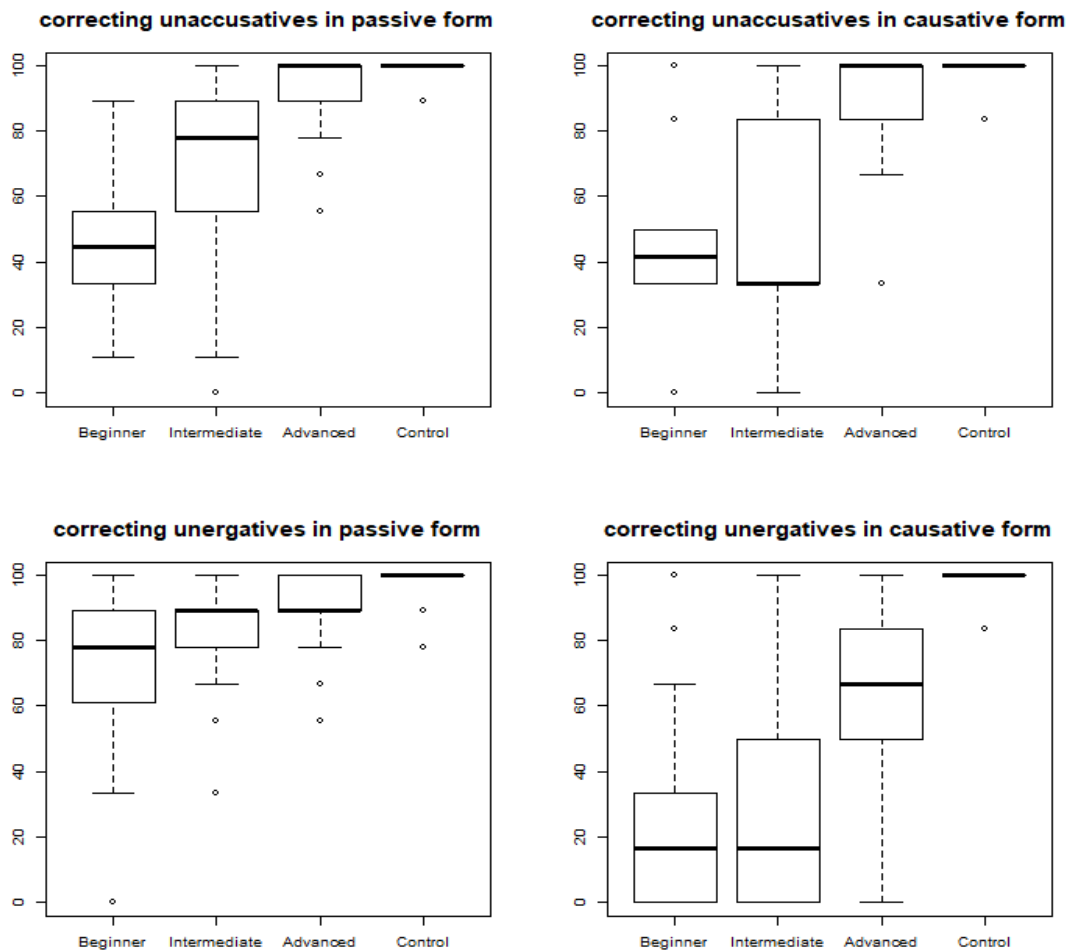
Figure 6.3 Performance in percentage in experimental and control groups in the error-correction task in all test conditions

Figure 6.3 above presents the results from the three experimental groups and the control group performance in unaccusative and unergative verbs in both conditions. The top left graph represents results from unaccusative verbs in the ungrammatical passive condition. As can be seen from this graph, accuracy rates increase as the proficiency level advances. The beginner group had the lowest score of correct responses (a mean of 46 per cent) with a high level of variation among the group from just below 20 per cent to just above 80 per cent. The intermediate group had a lower mean score than the advanced group and a higher one than the beginner group (a mean of 63 per cent accuracy), with large variance as well. The advanced group seemed the most proficient at using unaccusative verbs among all the experimental group (a mean of 92 per cent accuracy rates), with the least variation among the groups, from around 90 per cent to 100 per cent. The advanced group were highly proficient and consistent in correcting errors and supplying accurate alternatives to ungrammatically passivised unaccusative verbs in the passive condition.

The beginner and the intermediate groups had similar accuracy rates in the causative condition. The beginner group had a mean of 37 per cent and the intermediate group had a mean of 40 per cent, as shown in the top right graph in Figure 6.3 above.

Both the beginner and the intermediate groups had large variations, ranging from 0 per cent to 100 per cent. The advanced group, however, had the highest score of correct responses among the other two groups (a mean of 86 per cent). The advanced group was not only more highly proficient but also more consistent than the beginner and the intermediate groups, with the least variation among the group, ranging from just above 80 per cent to 100 per cent.

The bottom left graph presents results from the unergative verbs in the passive condition. As can be seen from this graph, all experimental groups preformed similarly to the beginner group scoring slightly lower than the intermediate and the advanced ones. The beginner group also had the largest variation among the group, ranging from 0 per cent to 100 per cent. The beginner group had a mean of 70 per cent of correct responses. The intermediate group had a score of 84 per cent of correct responses. The advanced group had a mean of 86 per cent of correct responses. This is a very similar score to the intermediate group, and statistically significantly lower than the advanced group's score in unaccusative verbs (a mean of 92 per cent).

The bottom right graph presents results from unergative verbs in the causative condition. The beginner and the intermediate group performed very similarly, with a mean of 25 per cent and 26 per cent of correct responses respectively. The advanced group performed statistically significantly better than the intermediate group in this condition (a mean of 66 per cent of correct responses).

In the following section, I review those results in more detail presenting statistical tests and procedures for each proficiency group. First, results from the control group are presented. Then, findings from the beginner, intermediate and advanced groups are presented in a similar manner. Data are presented this way to correspond to the order in which the results are discussed in the following chapter (Chapter Seven).

6.3.1   The control group performance in the error-correction task

The control group performed equally well with the ungrammatically passivised unaccusative verbs and ungrammatically passivised unergative verbs. A two-paired t-test was conducted which revealed no statistically significant difference in the performance of the control group between unergative and unaccusative verbs. Table 6.2 shows that the control group performed perfectly to most of the test items to both verb types.

Table 6.2 Control group accuracy scores on ungrammatical passive items (%)

Verb type	Mean	SD	Range
Unaccusatives	98	0.3	12
Unergatives	98	0.2	17

The control group exhibited a similar pattern of performance with regard to correcting ungrammatical unaccusatives and unergatives in the causative conditions as they performed equally to both verb types. A two-paired t-test was conducted which revealed no statistically significant difference in the performance of the control group between unergative and unaccusative verbs ungrammatically presented in a causative form. Table 6.3 below shows that the control group performed perfectly to most of the test items to both verb types.

Table 6.3 Control group accuracy scores on ungrammatical causative items (%)

Verb type	Mean	SD	Range
Unaccusatives	98	0.2	17
Unergatives	98	0.2	17

6.3.2 The beginner group performance in the error-correction task in terms of verb type

Data from the beginner group is presented in terms of the difference between the ability to correct and provide grammatical alternative sentences to ungrammatical unaccusative or unergative test items both in (i) the passive condition and in (ii) the causative condition.

6.3.2.1 Ungrammatical unaccusatives and unergatives in the passive condition

As we have just seen, the beginner group performed better at correcting and providing grammatical alternatives to the ungrammatical unergative test items than the unaccusative test items. They were more proficient at spotting the ungrammaticality in the sentence when it contained ungrammatically passivised unergatives than ungrammatically passivised unaccusatives. Table 6.4 below provides a summary of descriptive statistics of the beginner group's results in the difference between correcting ungrammatically passivised unaccusatives and ungrammatically passivised unergatives. The table presents minimum, first quarter, median, mean, third quarter and maximum accuracy scores to allow some degree of comparison of the group and individual data from the two types of verbs.

Table 6.4 Beginner group accuracy scores on ungrammatical passive items (%)

Verb type	Mean	SD	Range
Unaccusatives	46	4.72	77
Unergatives	70	2.39	48

Table 6.4 above indicates that the beginner group supplied the correct unergative form of the verb in 70 per cent of the ungrammatically passivised unergatives. Some of the participants in the beginner group performed perfectly to ungrammatically passivised unergative verbs, as the summary statistics show that the maximum number of correct responses was 100 per cent. Looking at results from passivised unaccusative verbs, the beginner group accurately corrected only 46 per cent of the experimental sentences.

Some participants in the beginner group responded correctly to 88 per cent of the ungrammatically passivised unaccusative verbs, which indicates that some of the beginner group had a relatively high level of proficiency with regard to unaccusative verbs. Nevertheless, the beginner participants as a group were significantly more proficient at using unergative verbs than in using unaccusative verbs.

A two-paired t-test was considered to investigate whether there is a statistically significant difference between the beginner group's ability to correct ungrammatically passivised unergative verbs and the ability to correct ungrammatically passivised unaccusative verbs. The following R code was used to perform the test:

```
t.test (beginner $ML.unc.p, beginner $ML.uner.p)
```

and the following output was obtained:

```
Welch Two Sample t-test
    data: beginner $ ML.unc.p and beginner $ ML.uner.p
    t= -4.4177, df= 66.29, p-value= 3.777e-05
    alternative hypothesis: true difference in means is not equal to 0
    95 percent confidence interval:
    -34.68458 -13.09320
    sample estimate:
    mean of x mean of
    46.11111 70.00000
```

Results from the t-test revealed a statistically significant difference between the ability to correct unergative verbs and the ability to correct unaccusative verbs ($p < 0.05$).

6.3.2.2   Ungrammatical unaccusatives and unergatives in the causative condition

With regard to correcting ungrammatical unaccusatives and unergatives in a causative structure, the beginner group showed slightly more accuracy rates with regard to correcting ungrammatical unaccusatives than ungrammatical unergative test items. Table 6.5 below provides descriptive statistics of data from correcting ungrammatical unaccusative verbs and unergative verbs in causative form by the beginner group.

Table 6.5 Beginner group accuracy scores on ungrammatical causative items (%)

Verb type	Mean	SD	Range
Unaccusatives	37	3.61	100
Unergatives	25	4.36	100

Table 6.5 above indicates that the beginner group supplied accurate alternative corrections to 37 per cent of the experimental sentences containing unaccusative verbs. Some participants in the beginner group performed perfectly in correcting ungrammatical unaccusative verbs, as the summary statistics in Table 6.5 show that they responded correctly to 100 per cent of the experimental sentences. The beginner group responded accurately to 25 per cent of the ungrammatical unergative verbs. Some participants in the beginner group also supplied accurate alternative corrections to 100 per cent of the experimental sentences containing unergative forms. Table 6.5 indicates higher scores

in means and medians in correcting unaccusatives than in correcting unergatives. However, there was no statistically significant difference between the two types of verbs.

A two-paired t-test was considered to investigate whether there is a statistically significant difference between the beginner group's ability to correct ungrammatical unergative verbs and the ability to correct ungrammatical unaccusative verbs in causative structure. The following R code was used to perform the test:

```
t.test (beginner $ML.unc.c, beginner $ML.uner.c)
```

and the following output was obtained:

```
 Welch Two Sample t-test
data: beginner $ ML.unc.c and beginner $ ML.uner.c
t= 1.9219, df= 77.693, p-value= 0.05829
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
-0.4193742 23.7527076
sample estimate:
mean of x mean of
37.08333 25.41667
```

Results from the t-test indicate that it cannot be concluded that there is a significant difference between the beginners' ability to correct unaccusatives and their ability to correct unergatives in the causative structure condition ($p > 0.5$).

6.3.3 The intermediate group performance in the error-correction task in terms of verb type

In this section, data from the intermediate group is reported in the same way as previously done with the beginner group; that is, in terms of the difference between accuracy rates in correcting ungrammatical unaccusative and accuracy rates in correcting unergative test items both in (i) the passive condition and in (ii) the causative condition.

6.3.3.1 Ungrammatical unaccusatives and unergatives in the passive condition

The intermediate group performed better at correcting ungrammatically passivised unergatives than at correcting ungrammatically passivised unaccusatives. Table 6.6 compares data from the intermediate group's accuracy scores in correcting ungrammatically passivised unaccusative verbs and ungrammatically passivised unergative verbs.

Table 6.6 Intermediate group accuracy scores on ungrammatical passive items (%)

Verb type	Mean	SD	Range
Unaccusatives	63	2.72	100
Unergatives	84	1.45	67

Table 6.6 shows that some of the intermediate group had a relatively high level of proficiency with regard to unaccusative verbs as well as unergative verbs, as the summary statistics show that the maximum number of correct responses was 100 per cent for both verb types. Nevertheless, the intermediate group seem to be more proficient at using unergative verbs than at using unaccusative verbs as indicated by their minimum, first quarter, median, mean and third quarter scores.

A two-paired t-test was considered to investigate whether there is a statistically significant difference between the intermediate group's accuracy rates in correcting ungrammatically passivised unergative verbs and ungrammatically passivised unaccusative verbs. The following R code was used to perform the test:

```
t.test (intermediate $ML.unc.p, intermediate $ML.uner.p)
```

and the following output was obtained:

```
Welch Two Sample t-test
data: intermediate $ ML.unc.p and intermediate $ ML.uner.p
t= -4.1879, df= 65.635, p-value= 8.57e-05
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
-30.81651 -10.91791
sample estimate:
mean of x mean of
63.68564 84.55285
```

Results from the t-test revealed a statistically significant difference between the scores in correcting unergative verbs and unaccusative verbs, with $df(65.63)= -4.18$, $p < 0.05$.

6.3.3.2   Ungrammatical unaccusatives and unergatives in the causative condition

With regard to correcting unergatives and unaccusatives from an ungrammatical causative structure, the intermediate group seemed to perform slightly better at supplying a grammatical unaccusative alternative. Table 6.7 below provides descriptive statistics of data from the intermediate group in correcting ungrammatical unaccusative verbs and ungrammatical unergative verbs in causative form.

Table 6.7 Intermediate group accuracy scores on ungrammatical causative items (%)

Verb type	Mean	SD	Range
Unaccusatives	40	3.13	100
Unergatives	26	4.04	100

Table 6.7 above indicates that the intermediate group supplied accurate corrections to 40 per cent of the experimental sentences containing unaccusative verbs. Some participants in the intermediate group performed perfectly in correcting ungrammatical unaccusative verbs in causative forms, as the summary statistics in Table 6.7 show that

the maximum accurate score was 100 per cent. The intermediate group responded accurately to 26 per cent of the ungrammatical unergative verbs in the causative form. Individual participants in the intermediate group supplied accurate alternative corrections to 100 per cent of the experimental sentences containing unergative forms. Table 6.7 indicates higher scores in minimum, first quarter, median, mean and third quarter in correcting unaccusatives than in correcting unergatives.

However, this difference does not seem to be statistically significant as indicated by the two-paired t-test that was performed to investigate whether there is a statistically significant difference between the intermediate group's accuracy rates in correcting ungrammatical unaccusatives and ungrammatical unergatives. The following R code was used to perform the test:

```
t.test (intermediate $ML.unc.c, intermediate $ML.uner.c)
```

and the following output was obtained:

```
Welch Two Sample t-test
data: intermediate $ ML.unc.c and intermediate $ ML.uner.c
t= 1.957, df= 79.535, p-value= 0.05385
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
40.65041 26.42276
sample estimate:
mean of x mean of
40.65041 26.42276
```

As can be seen from the output above, it cannot be concluded that there is a significant difference between accuracy scores in correcting ungrammatical unaccusative test items and ungrammatical unergative test items in the causative condition by the intermediate group ($p > 0.5$).

6.3.4 The advanced group performance in the error-correction task in terms of verb type

Data from the advanced group is presented in the same way as previously done with the intermediate and the beginner groups. The advanced group's performance on unaccusatives is compared with their performance on unergatives in both test conditions: (i) the passive condition and (ii) the causative condition.

6.3.4.1 Ungrammatical unaccusatives and unergatives in the passive condition

The advanced group participants exhibited a different pattern of performance to those in the beginner and intermediate group. The advanced group were better at correcting utterances when they contained an ungrammatically passivised unaccusative construction than when they had an ungrammatically passivised unergative construction. The advanced group were more proficient at providing grammatical alternatives to the ungrammatical unaccusatives than to the ungrammatical unergatives. Table 6.8 provides

correcting ungrammatical unaccusative verbs compared to their performance on correcting ungrammatical unergative verbs in causative form.

Table 6.9 Advanced group accuracy scores on ungrammatical causative items (%)

Verb type	Mean	SD	Range
Unaccusatives	86	0.69	67
Unergatives	66	1.82	100

As can be seen from Table 6.9, participants in the advanced group showed a generally higher tendency to perform better with regard to correcting ungrammatical unaccusatives in causative form than in correcting ungrammatical unergative verbs (a mean of 86 per cent v. a mean of 66 per cent). Some participants of the advanced group performed perfectly to both verb types as indicated by the maximum of 100 per cent. However, some participants failed to score any correct responses with regard to ungrammatical unergatives as indicated by a minimum of 0 per cent, which is lower than the minimum score of correcting ungrammatical unaccusatives (33 per cent).

A two-paired t-test was considered to support results from Table 6.9, and to investigate whether there is a statistically significant difference between the advanced group's ability to correct ungrammatical unaccusative verbs in a causative form and their ability to correct ungrammatical unergative verbs in a causative form. The following R code was used to perform the test:

```
t.test (advanced $ML.unc.c, advanced $ML.uner.c)
```

and the following output was obtained:

```
Welch Two Sample t-test
data: advanced $ ML.unc.c and advanced $ ML.uner.c
t= 3.6821, df= 78.751, p-value= 0.0004221
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
9.017936 30.241323
sample estimate:
mean of x mean of
86.29630 66.66667
```

Results from the t-test indicate that there is a statistically significant difference between the advanced group's ability to correct unaccusatives and their ability to correct unergatives in the causative structure condition (p < 0.05).

6.3.5 Summary of RQ1 results

To sum up, results from the error correction task, in the ungrammatical passive condition, showed that, Najdi Arabic L2 learners of English performed statistically significantly better at correcting errors and supplying accurate alternatives to ungrammatically passivised unergative verbs than unaccusative verbs in the performance of both the beginner group and the intermediate group. The advanced group, however, performed statistically significantly better at correcting and supplying accurate alternatives to ungrammatically passivised unaccusative verbs than unergative verbs. In the

ungrammatical causative condition, there was no statistical difference between correcting errors in unaccusative and unergative verbs in the performance of the beginner and the intermediate group. The advanced group, however, performed statistically significantly better at correcting errors in unaccusative verbs than in unergative verbs.

In the following section, results obtained for the second research question (RQ2) are presented.

6.4   Research question 2 (RQ2)

Is there a difference in the reading pace of Najdi Arabic L2 English learners between sentences with unaccusative constructions and unergative constructions?

This question is addressed through a reaction-time reading comprehension task, which compares the mean reaction-time of reading experimental sentences consisting of unaccusative verbs (e.g. *the accident happened*) against the mean reaction-time of reading sentences with unergative verbs (e.g. *the baby cried*) within the same proficiency group. For this particular research question, the results from the beginner group will not be compared to the results from the intermediate or advanced group. Rather, the mean reaction-time spent by beginner group to read sentences with unaccusative verbs will be compared to the mean reaction-time taken to read experimental sentences with unergative verbs by the same beginner group. This procedure will be repeated in all groups. Four different verb types were considered in the reaction-time reading comprehension task. The four experimental types of unaccusative and unergative verbs were chosen and categorised according to the patterns of their Arabic equivalents. Verb type 1 includes *arrive, appear* and *happen* as English unaccusatives that do not alternate. Verb type 2 includes the verbs *swim, cry,* and *laugh* as English unergatives. Verb type 3 includes the verbs *break, open* and *close* as English unaccusatives. Type 4 has *sink, freeze* and *melt* as English unaccusatives. The total number of tokens tested in this task is 36. Figure 6.4 below gives a visual representation of participants' reaction-time scores from all groups.
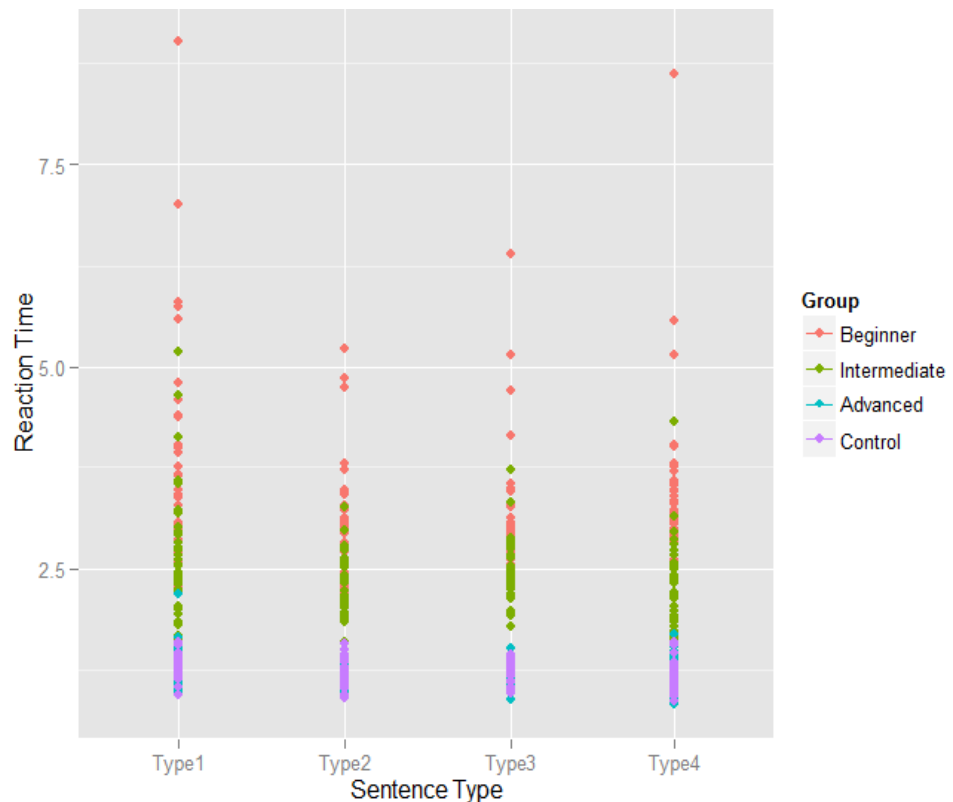
Figure 6.4 Reaction time scores for each verb type across proficiency groups

As can be seen from Figure 6.4 above, there is no effect of verb type among all experimental groups. That is, the advanced group had similar reaction-times regardless of verb types. The intermediate group also performed similarly in all experimental sentences containing different verb types. This is also the same for the beginner group, but with more variations and more outliers. Data from this task revealed no statistically significant difference between all four verb types within equal proficiency levels. Experimental groups within the same proficiency level had similar reaction-time scores reading sentences with unaccusative and unergative constructions. However, there seems to be a clear proficiency effect on the time participants took to read experimental sentences which will be presented in research question 3 (RQ3) in section 6.5 when the groups' performance from different proficiency levels are compared.

In the following section, data from the reaction-time reading comprehension task comparing performance between different verb types is presented in more detail along with statistical tests and procedures. First, results from the beginner group are presented along with the statistical procedure performed. Then, findings from the intermediate and advanced groups are presented in a similar manner.

6.4.1 The beginner group performance on the reaction-time reading comprehension task

In order to determine whether there is any difference among the four verb types in the performance of the beginner group, reaction-time scores of the four verb types within the beginner group were statistically analysed and compared.

A new data frame was constructed to extract one score for each participant, representing the reaction-time score for reading type 1 sentences, which contain the verbs *happen, appear*, and *arrive* as non-alternating unaccusative verbs. The average used could either be the mean or the median. The median could be used and this would be robust against outliers; however, the mean was chosen as the average, because there were no real outliers. Through a quick analysis, using excel (using minimum. and maximum. functions), it can be seen that the only outlier was one reaction-time of 51.088 (51 seconds and 088 milliseconds). However, this participant was placed in the beginner group and obtained a very low cloze score of 6, so the large reaction-time seems plausible. From this quick analysis, the mean seems the most appropriate average to use, as all nine reaction-times will have an equal effect on the final aggregated reaction-time for non-alternating unaccusatives (type 1). To calculate the mean reaction-time of the sentences containing verb type 1 non-alternating unaccusatives, the nine relevant scores representing type 1 were extracted, and a new data frame was formed. The same procedure was undertaken for the rest of the three verb types: type 2 (*swim, cry,* and *laugh),* type 3 *(break, open* and *close)* and type 4 *(sink, freeze* and *melt)* for all proficiency groups.

Figure **6.5** below suggests that the beginner group had similar reaction-time scores in all test sentences in the four verb types. Participants in the beginner group seem to be slightly faster at reading sentences with verb type 2 (unergatives; *swim, cry,* and *laugh*) and sentences containing verb type 3 (alternating unaccusatives; *break, open* and *close*) than sentences with verb type 1 and verb type 4.
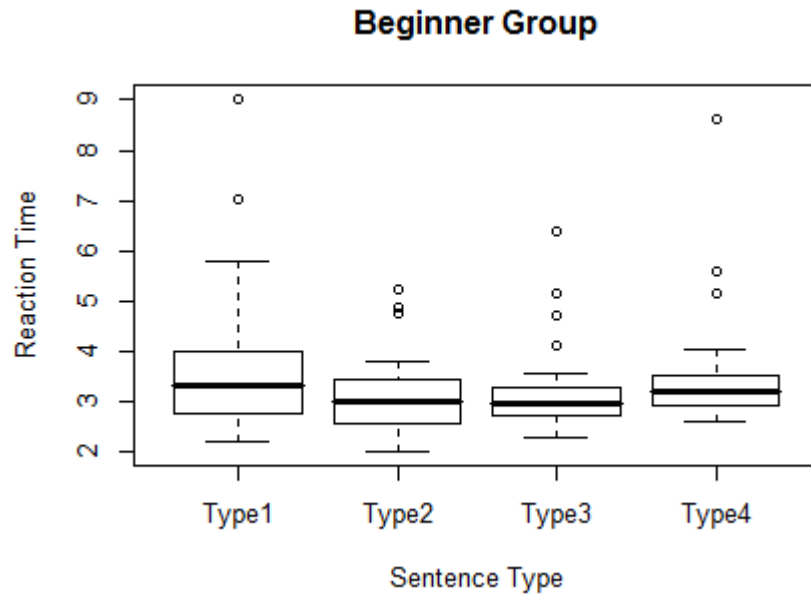
Beginner Group

Figure 6.5 Beginner group reaction-time scores across verb types

As can be seen from Figure **6.5** above, the mean reaction-time scores of the participants in the beginner group are similar for each of the four verb types, which suggests that there is no statistical difference. Inferential statistics were performed using analysis of variance (ANOVA) to examine whether there is a significant difference in mean reaction-time between each verb type. The following R code was used to perform ANOVA model to compare the four verb types:

```
BegAnov <- Finaldf[which(Finaldf$Group=="C"),c(5,6,7,8)]
BegAnov <- stack(BegAnov )
AnovBeg <- aov(values~ind,data = BegAnov)
summary(AnovBeg)
AnovBeg$coefficients
```

Initially, results from the ANOVA test suggest that it cannot be concluded that there is no significant difference between each of the four verb types. Results from the ANOVA test revealed a significant difference ($p < 0.05$) with regard to the beginner group performance on the four verb types, with $F(3,156)= 2.873$, $p < 0.05$.

However, having the descriptive statistics showing similar means among the four verb types, while the ANOVA test showed a significant difference, further analysis of the results from the ANOVA was considered. The R code presented below shows further analysis of the results from the ANOVA model. It shows 95 per cent confidence intervals for the difference in means between each of the verb types. This is presented in Table **6.10** below:

```
TukeyHSD(anovBeg)
Tukey multiple comparisons of means
95 family- wise confidence level
Fit: aov(formula= values ~ ind, data = BegAnov)
$ind
```

Table 6.10 Beginner group difference in mean between verb types

Verb type	Difference in mean	lwr	upr	p adj
Type 1–Type 2	-0.56	-1.16	0.02	0.06
Type 3–Type 1	-0.54	-0.13	0.04	0.08
Type 4–Type 1	-0.22	-0.81	0.36	0.75
Type 3–Type 2	0.02	-0.57	0.61	0.99
Type 4–Type 2	0.34	-0.24	0.93	0.43
Type 4–Type 3	0.32	-0.27	0.91	0.49

Despite the ANOVA model appearing significant, it can be concluded from Table **6.10** above that there is no significant difference between any of the reaction-time scores of the four verb types tested.

6.4.2 The intermediate group performance on the reaction-time reading comprehension task

In order to determine whether there is statistical difference among the four verb types in the performance of the intermediate group, reaction-time scores of the four verb types within the intermediate group were statistically analysed and compared. The same data frame for verb types was used in this procedure; that is, a single score was extracted to represent the reaction-time for reading type 1 (*happen, appear,* and *arrive*), type 2 (*swim, cry,* and *laugh),* type 3 *(break, open* and *close)* and type 4 *(sink, freeze* and *melt).* Then, the mean scores for each verb type were analysed within the intermediate group.

Table 6.11 below gives summary statistics of the reaction-time in seconds and milliseconds, for each verb type within the intermediate group:

Table 6.11 Intermediate group statistical summary across verb types

Verb type	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.	var
Type 1	1.39	2.01	2.42	2.58	2.94	5.18	0.63
Type 2	1.26	2.01	2.16	2.26	2.58	3.26	0.20
Type 3	1.07	2.18	2.40	2.39	2.52	3.71	0.19
Type 4	1.61	1.90	2.20	2.27	2.52	4.31	0.26

As can be seen from the summary Table 6.11 above, the mean reaction-time of the participants in the intermediate group is very similar for each of the four verb types. The table also gives a glimpse into individual performance for each verb type. Data from Table 6.11 suggests no statistical difference between verb types within the intermediate group.

Inferential statistics were performed using ANOVA to provide support to the results obtained from the descriptive statistics presented in Table 6.11. The following R code was used to perform ANOVA model to compare the four verb types:

```
IntAnov <- Finaldf[which(Finaldf$Group=="C"),c(5,6,7,8)]
```

```
IntAnov <- stack(IntAnov )
AnovInt <- aov(values~ind,data = IntAnov)
summary(AnovInt)
Anov2Int$coefficients
```

Results from the ANOVA test suggest that it cannot be concluded that there is no statistically significant difference between each of the four verb types. Results from the ANOVA test revealed a significant difference ($p < 0.05$) with regard to the intermediate group performance on the four verb types, with $F(3,160)= 2.872$, $p < 0.05$. Figure **6.6** below presents a visualisation of these results.
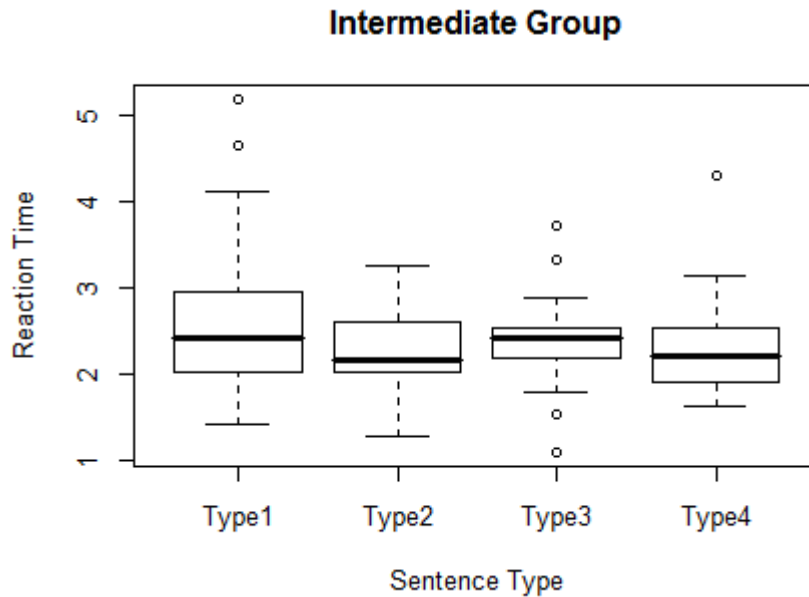
Figure 6.6 Intermediate group reaction-time scores across verb types.

Figure **6.6** above suggests that there is more variation in verb type 1 non-alternating unaccusatives, with few outliers. The intermediate group seemed to be slightly faster in reading sentences with verb type 2 (unergatives; *swim, cry,* and *laugh*) and sentences containing verb type 4 (alternating unaccusatives; *sink, freeze* and *melt*) than sentences with verb type 1 (*happen, appear,* and *arrive*) and type 3 *(break, open* and *close)*.

However, having the descriptive statistics showing similar means, while the ANOVA test showed a statistical difference, further analysis of the results obtained from the ANOVA test was considered essential. The R code presented below shows further analysis of the results from the ANOVA model. It shows 95 per cent confidence intervals for the difference in means between each of the verb types. This is presented in Table 6.12 below:

```
TukeyHSD(anovInt)
Tukey multiple comparisons of means
95% family- wise confidence level
Fit: aov(formula= values ~ ind, data = IntAnov)
$ind
```

Table 6.12 Intermediate group difference in mean between verb types

Verb Type	Difference in mean	lwr	upr	p adj
Type 1–Type 2	-0.32	-0.65	0.00	0.05
Type 3–Type 1	-0.19	-0.52	0.13	0.40
Type 4–Type 1	-0.31	-0.64	0.01	0.06
Type 3–Type 2	0.12	0.20	0.45	0.74
Type 4–Type 2	0.00	0.31	0.33	0.99
Type 4–Type 3	-0.11	-0.44	0.20	0.77

Despite the ANOVA model appearing significant, it can be concluded from Table 6.12 above that there is no statistically significant difference between any of the reaction-time scores of the four verb types tested within the intermediate group.

6.4.3 The advanced group performance on the reaction-time reading comprehension task

In order to determine whether there is statistical difference between verb types in the performance of the advanced group, mean reaction-time scores of the four verb types within the advanced group were statistically analysed and compared, using the same data frame used with the beginner and the intermediate group.

Table 6.13 below gives statistics of the reaction-time scores for each verb type within the advanced group:

Table 6.13 Advanced group statistical summary across verb types

Verb type	Min.	Mean	var
Type 1	0.96	1.24	0.04
Type 2	0.94	1.20	0.01
Type 3	0.87	1.21	0.01
Type 4	0.86	1.14	0.03

As can be seen from the summary Table 6.13 above, the mean reaction-time of the participants in the advanced group is similar for each of the four verb types. Individual reaction-time scores also show very similar values across different verb types.

Inferential statistics were performed using ANOVA to provide support to the results obtained from the descriptive statistics presented in Table 6.13; that is, whether there is a significant difference in mean reaction-time between each verb time within the advanced group. The following R code was used to perform ANOVA model to compare scores from the four verb types:

```
AdvAnov <- Finaldf[which(Finaldf$Group=="C"),c(5,6,7,8)]
AdvAnov <- stack(AdvAnov )
AnovAdv <- aov(values~ind,data = AdvAnov)
summary(AnovAdv)
Anov3Adv$coefficients
```

Results from the ANOVA test revealed a non-significant difference (p > 0.05) with regard to the advanced group performance on the four verb types, with $F(3,180)= 2.073$, $p > 0.05$. This is visualised in Figure **6.7** below:
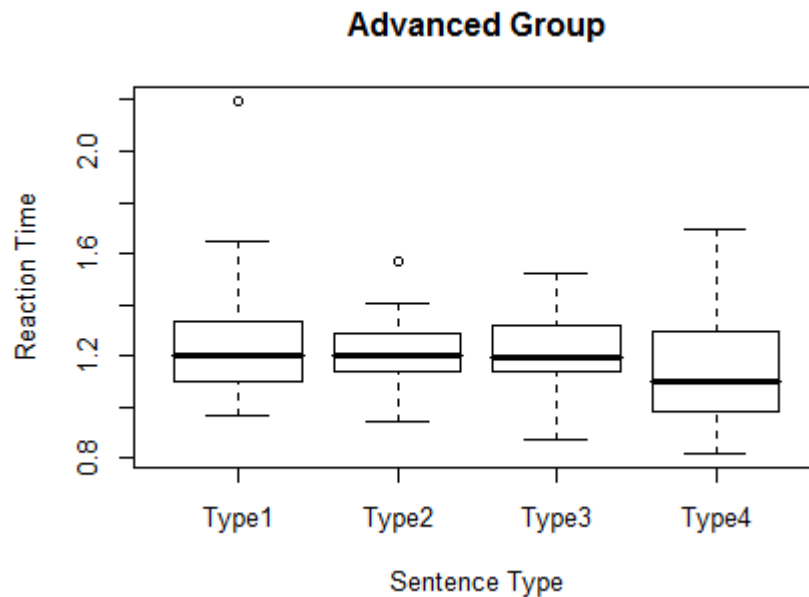
Advanced Group

Figure 6.7 Advanced group reaction-time scores across verb types

6.4.4 Summary of RQ2 results

As can be seen from data reviewed for research question 2, the conclusion is that there does not seem to be any statistically significant difference between the reading pace of sentences with unaccusative construction, both alternating and non-alternating, and the reading pace of sentences with unergative construction within equal proficiency levels.

In the following section, data obtained for research question 3 are presented.

6.5 Research question 3 (RQ3)

Is there a difference between lower proficiency learners and higher proficiency learners with regard to their accuracy rates in the error-correction task and their reaction-time scores in the reaction-time reading comprehension task?

The hypothesis is that there is a difference between Najdi Arabic lower proficiency learners and higher proficiency learners in their English L2 knowledge of both unaccusative and unergative constructions.

For the investigation of this research question, data from the reaction-time reading comprehension task is presented, but this time focusing on the proficiency effect on the reading pace of test sentences containing unaccusative and unergative constructions, comparing lower proficiency learners' with higher proficiency learners' reaction-time scores.

Data from the error-correction task is also presented for the current research question. Lower proficiency L2 learners' ability to correct ungrammatical unaccusative

and unergative sentences is compared with higher proficiency L2 learners' ability, rather than comparing accuracy rates between unaccusatives and unergatives with the same proficiency level (as in research question 1).

In the following section, results from the reaction-time reading comprehension task are presented, comparing proficiency groups within each verb type tested in this task. This section will be followed by results from the error-correction task comparing proficiency groups as well.

6.5.1 Data from the reaction-time reading comprehension task in terms of proficiency

Data from the reaction-time reading comprehension task shows a clear effect of proficiency in the performance of all experimental groups. In other words, the advanced group had the shortest reaction-time scores in reading sentences of the four tested verb types. The intermediate group had shorter reaction-time scores than the beginner group in reading sentences containing the four verb types tested. And the beginner group had the longest scores among all three groups. This indicates that data from this task lends support to RQ3 that there is a statistically significant difference between lower proficiency learners and higher proficiency learners with regard to their reaction-time scores in the reaction-time reading comprehension ($p < 0.05$ for type 1, type 2, type 3, and type 4, respectively).

Figure **6.8** is given again here for convenience to highlight the difference in the reading pace between lower and higher proficiency groups. Figure **6.8** below shows that among the four groups, the beginner group spent the longest time reading the experimental sentences. They also had the largest variations, as their scores are scattered along a large scale (from just over 2.5 seconds to over 7.5 seconds). In contrast, the advanced group had the smallest variations and were consistent in their performance, with their scores being distributed around a specific area (scores only below 2.5 seconds). The advanced group had similar scores to those of the control group. The intermediate group spent a longer time reading than the advanced group, but they were faster in reading experimental sentences when compared to the beginner group. The intermediate group had larger variations than those of the advanced group, but again they had smaller variations if compared to the beginner group.
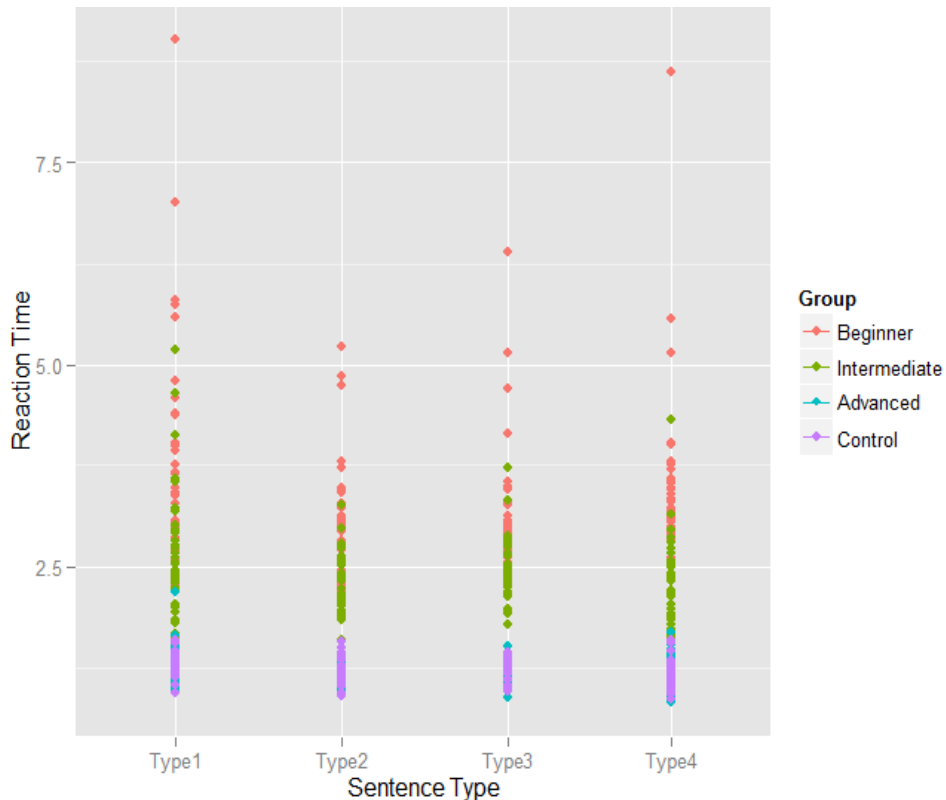
Figure 6.8 Reaction time scores for each verb type across proficiency groups

In the following section, the results are presented, along with statistical tests and procedures, from each verb type (type 1 non-alternating unaccusatives, type 2 unergatives, type 3 alternating unaccusatives, type 4 alternating unaccusatives) to compare different proficiency groups' performance on each verb type tested in this task.

6.5.1.1   Performance on type 1 non-alternating unaccusatives

Verb type 1 includes three unaccusative verbs (*happen, appear,* and *arrive*), appearing in nine different mini stories. In order to examine whether there is a proficiency effect in the reading time scores of non-alternating unaccusative verbs tested in the current experiment, the reaction-time scores were analysed separately for each group. Within this verb type, there were three verbs and three tokens for each verb. This means that each participant has a total of nine reaction-time reading scores for this type.

The data from the experimental groups and the control group were normally distributed, except for data from the beginner group, who had a distribution clustered to the left. Figure **6.9** below shows the distribution of reaction-time scores from the experimental and the control groups.
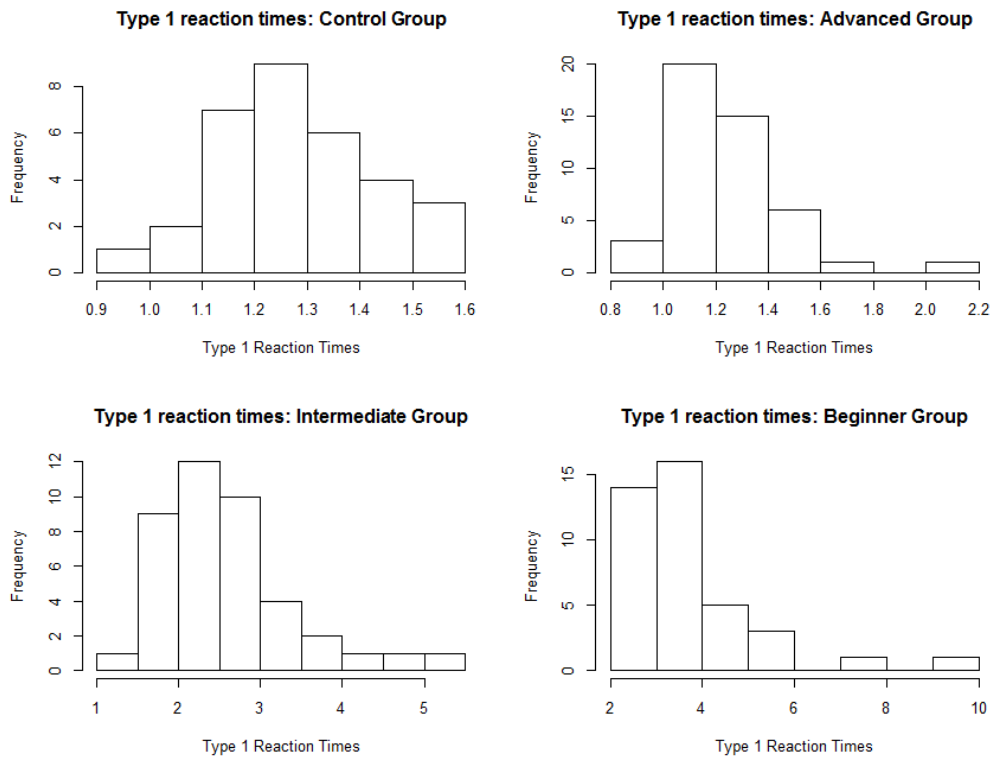
Figure 6.9 Type 1 distribution of reaction-time scores across proficiency groups

Data from the four groups (beginners, intermediate, advanced and control) were statistically analysed to examine any effects of proficiency on the reaction-time scores on reading sentences containing the non-alternating unaccusative verbs tested. A statistical summary for verb type 1 is presented in Table **6.14** below:

Table 6.14 Type 1 statistical summary across proficiency groups

Group	Min.	Mean	var
Control	0.93	1.28	0.02
Advanced	0.96	1.24	0.04
Intermediate	1.39	2.58	0.63
Beginners	2.18	3.66	1.90

Table **6.14** above shows that there is a statistically significant difference between groups in term of performance on this subclass of verbs (i.e. non-alternating unaccusatives). Comparing the mean scores of all groups, it can be clearly seen that the beginner group had the longest reading time scores. The intermediate group scored shorter reading times than the beginner group. The advanced and the control group scored the shortest reading times. It can be seen from Table **6.14** that the results obtained from the advanced and the control groups are very similar. Table **6.14** also shows that there is a larger variance within the beginner group (var = 1.90), and the variance decreases as the proficiency level advances.

Inferential statistics were performed using ANOVA to provide support to the results obtained from the descriptive statistics presented in Table **6.14**. Results from the ANOVA

test revealed a significant difference (p < 0.05) between groups with regard to their performance on non-alternating verbs (*happen, appear, arrive*), with $F(3,155)= 81.46$, *p* < 0.05. This is can be visualised in Figure **6.10** below:
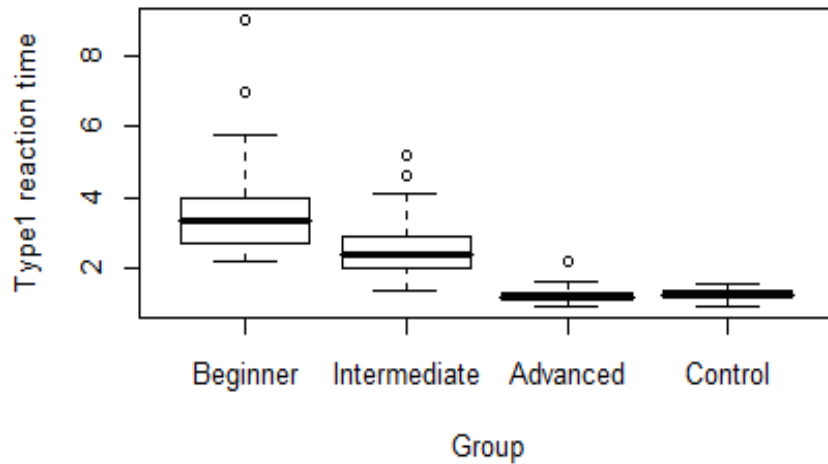
Figure 6.10 Type 1 reaction-time scores across proficiency groups

Hence, there is statistical evidence to conclude that there is a significant difference between groups. Using R command below, confidence intervals for the difference in means between each group can be obtained.

```
TukeyHSD(anovType1)
Tukey multiple comparisons of means
95% family- wise confidence level
Fit: aov(formula= Type1 ~ Group, data = Finaldf)
```

Table 6.15 Type 1 difference in mean between proficiency groups

Group	Difference in mean	lwr	upr	p adj
Intermediate–Beginner	-1.07	-1.54	-0.6086005	0.00
Advanced–Beginner	-2.42	-2.88	-1.96	0.00
Control–Beginner	-2.38	-2.88	-1.88	0.00
Advanced–Intermediate	-1.34	-1.80	-0.89	0.00
Control–Intermediate	-1.30	-1.80	-0.80	0.00
Control–Advanced	0.04	-0.44	0.52	0.99

From the confidence intervals presented in Table 6.15 above, it can be concluded that there is a statistical difference between all groups, except for the advanced group and the control group, where the confidence interval for the difference in means contains zero (0.04136166). Data from verb type 1 supports hypothesis 3 that there is a statistical difference between Najdi Arabic lower proficiency learners and higher proficiency learners with regard to their L2 English knowledge of unaccusative verbs.

In the following section, results from verb type 2 are presented from the experimental groups and the control group.

6.5.1.2   Performance on type 2 unergatives

This type includes the verbs *swim, cry,* and *laugh*. These verbs do not participate in the alternation in English; however, their Arabic equivalents do alternate by adding an affix to the intransitive form to derive its causative counterpart. The same statistical procedure was undertaken as the previous verb type to investigate whether there is a proficiency effect in reaction-time scores of unergative verbs tested in the current experiment (*swim, cry,* and *laugh*). Within this verb type, there were three verbs and three tokens for each verb. This means that each participant has a total of nine reaction-time reading scores for this type.

        In terms of distribution, data from the control and experimental groups were assumed to be normally distributed as the thumbnail for assuming a normal distribution of a sample is over 30 observations. Each group tested in the current experiment exceeded 40 observations. Figure **6.11** shows the distribution of data from each group. As can be seen from this figure, data from the control, intermediate and advanced groups is normally distributed. This does not apply to data from the beginner group, whose data seem to be clustered to the left.
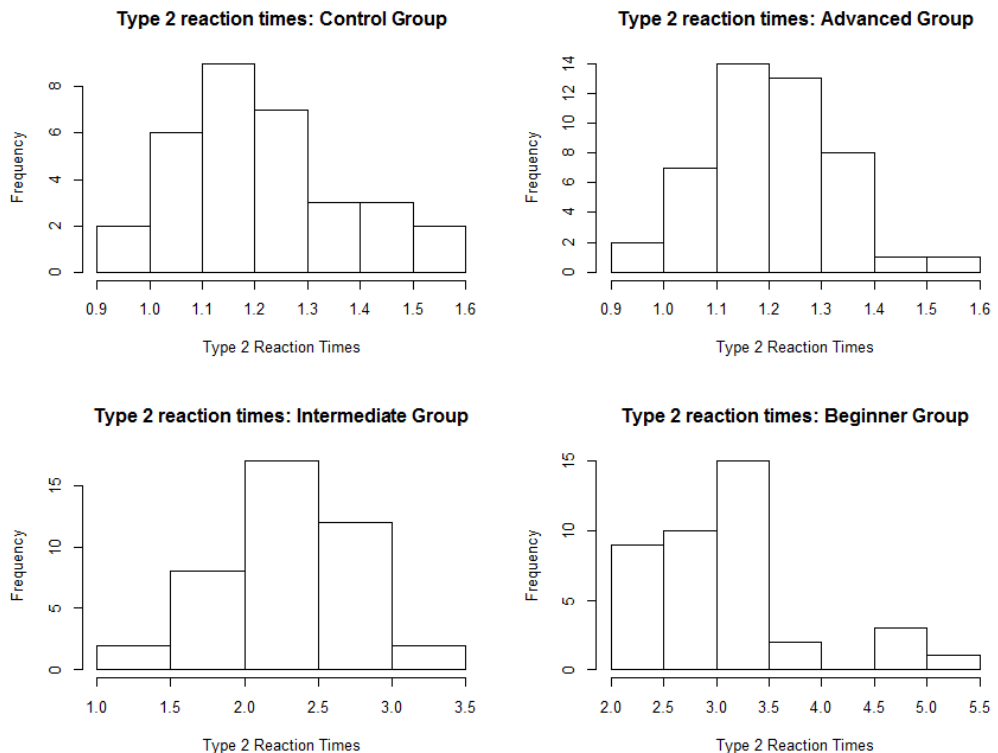
Figure 6.11 Type 2 distribution of reaction-time scores across proficiency groups

Data from the four groups (beginners, intermediate, advanced and control) were statistically analysed to examine any effects of proficiency on the reaction-time scores on reading sentences containing the unergative verbs tested. A statistical summary for verb type 2 is presented as in Table **6.16** below:

data from type 3 alternating unaccusatives exhibits similar patterns to the two verb types discussed earlier. As can be seen from Figure **6.13**, data from the control, intermediate and advanced groups are normally distributed. However, this does not apply to data from the beginner group, which seems to be clustered to the left.
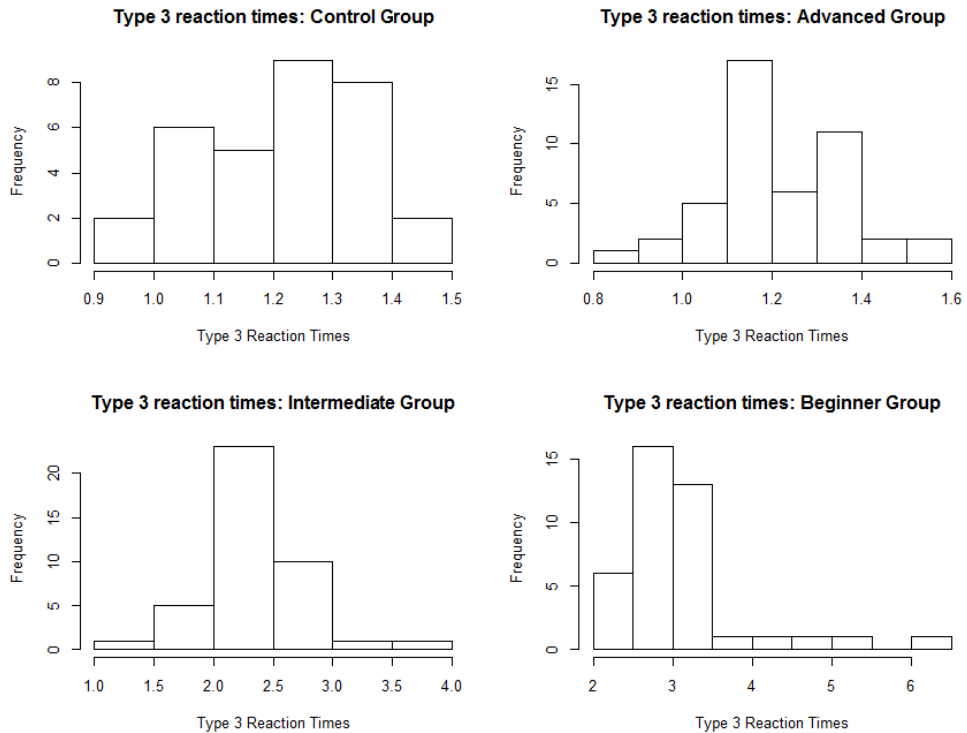
Figure 6.13 Type 3 distribution of reaction-time scores across proficiency groups

Data from the four groups was statistically analysed to examine any effects of proficiency on the reaction-time scores on reading sentences containing the alternating unaccusative verbs tested. A statistical summary for verb type 3 is presented as in Table **6.17** below.

Table 6.17 Type 3 statistical summary across proficiency groups

Group	Min.	Mean	var
Control	0.9541	1.2120	0.01972481
Advanced	0.8736	1.2180	0.01967814
Intermediate	1.077	2.393	0.1933215
Beginners	2.285	3.119	0.621194

The descriptive statistics presented in Table **6.17** above show that performance on the type 3 alternating unaccusative is similar to that of non-alternating unaccusatives and unergatives. That is, regardless of the verb type under investigation, Najdi Arabic L2 English learners in the beginner group seemed to have the longest reaction-time scores (a mean of 3.11 seconds), whereas the advanced group seemed to have the shortest reading time score (a mean of 1.21 seconds). The intermediate group, in all three verb

types, is placed between the two experimental groups. This can be seen in Figure **6.14** below.
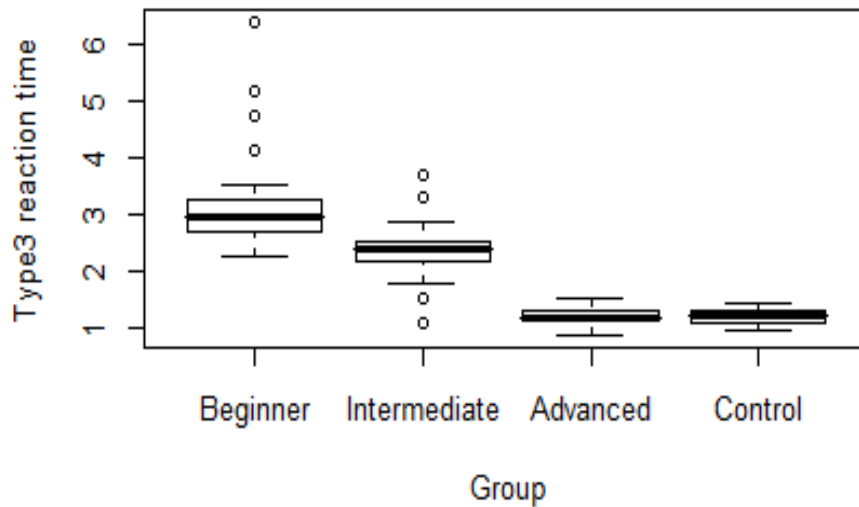
Figure 6.14 Type 3 reaction time scores across proficiency groups

Inferential statistics were obtained using ANOVA to provide support to the results from the descriptive statistics presented in Table **6.17** above. Results from the ANOVA test revealed a significant difference ($p < 0.05$) between the groups with regard to their performance on type 3 alternating unaccusative verbs, with $F(3,155)= 161,2$, $p < 0.05$, which confirms conclusions from type 1 and type 2 that there is a clear proficiency effect on the Najdi Arabic L2 English learners' performance on unaccusative and unergative constructions.

6.5.1.4   Performance on type 4 alternating unaccusatives

This verb type has *sink, freeze* and *melt* as the type of English unaccusatives whose Arabic counterparts have a causative pattern; that is, the causative form is derived from its inchoative counterpart through adding overt morphology. Within this verb type, there were three verbs and three tokens for each verb. Data from this verb type were different from other verb types in terms of distribution, which is shown in Figure **6.15** below. Data from the control group, the advanced group, and the intermediate group can be said to be positively skewed, as most of the values clustered towards the left of the x-axis. Data from the beginner group were mainly clustered to the left. Data from the control and experimental groups was assumed to be normally distributed. Each group tested in the current experiment exceeded 40 observations (the threshold for assuming normal distribution).
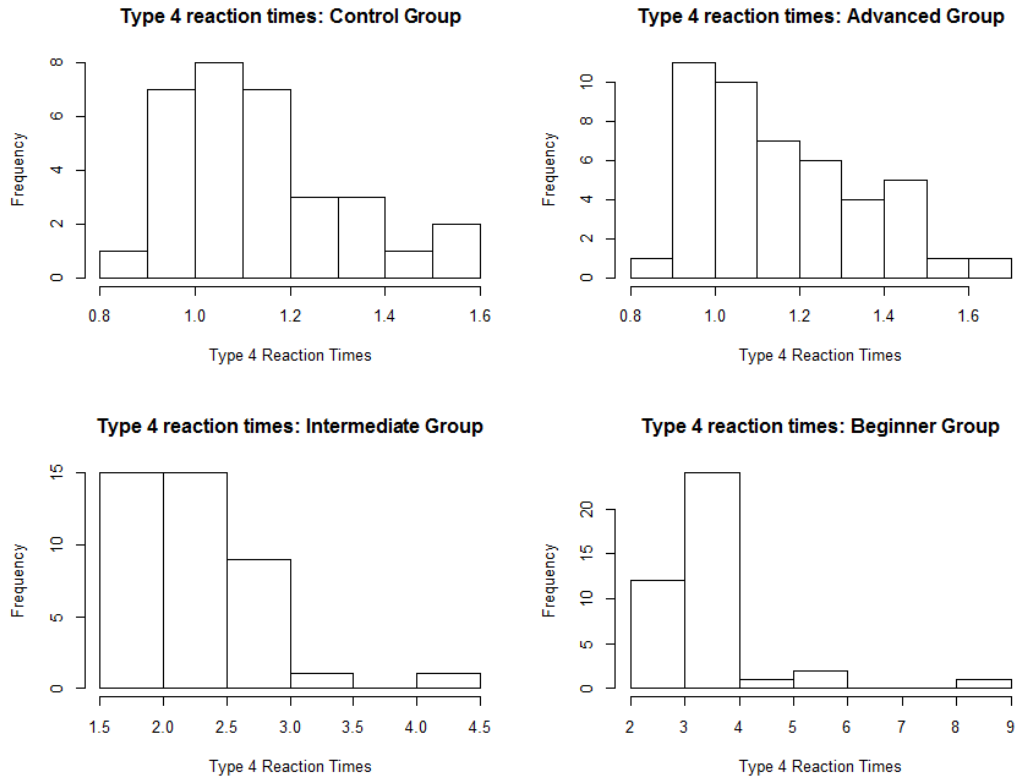
Figure 6.15 Type 4 distribution of reaction-time scores across proficiency groups

Data from the four groups was statistically analysed using the same statistical procedure to examine effects of proficiency on the reaction-time scores on reading sentences containing the alternating unaccusative verbs tested (*sink, freeze* and *melt*). The statistical summary for verb type 4 is presented in Table **6.18** below.

Table 6.18 Type 4 statistical summary across proficiency groups

Group	Min.	Mean	var
Control	0.86	1.14	0.03
Advanced	0.81	1.15	0.37
Intermediate	1.61	2.57	0.26
Beginners	2.58	3.44	1.06

The descriptive statistics presented in Table **6.18** above suggest similar patterns in this verb type as the other three verb types. Proficiency effects seem to be clear as the beginner group scored the longest reading time scores (a mean of 3.44 seconds), and the advanced and the control group had the shortest reading times (a mean of 1.15 and 1.14 seconds, respectively). As in all four verb types tested in the current task, the intermediate group had a score in the middle; shorter than the beginner group, and longer than the advanced one. The pattern of the results can easily be identified through Figure **6.16** below.
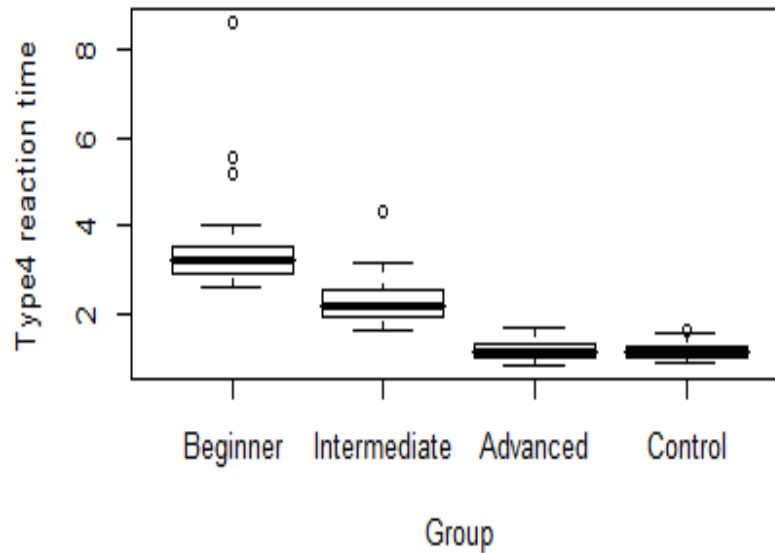
Figure 6.16 Type 4 reaction time scores across proficiency groups

Inferential statistics were performed using ANOVA to provide support to the results obtained from data presented in Figure **6.16** above. Results from the ANOVA test revealed a significant difference ($p < 0.05$) between groups with regard to their performance on type 4 alternating unaccusative verbs (*sink, freeze* and *melt*), with $F(3,155)= 134.1$, $p < 0.05$. This confirms conclusions drawn from types 1, 2 and 3 that there is a difference between lower proficiency Najdi Arabic L2 English learners and higher proficiency learners with regard to their knowledge of unaccusative and unergative verbs.

Results from all four verb types support the current hypothesis that there is clear proficiency effects on the Najdi Arabic L2 English learners' reading pace of sentences with both unaccusatives and unergative constructions.

6.5.2   Data from the error-correction task in terms of proficiency

Data from the error-correction task lends partial support to RQ3. It is important to recall that this task has two verb types (unaccusatives and unergatives) each in two different conditions: presented either in ungrammatical passive form or ungrammatical causative form. Data from the ANOVA test in the unaccusative test items in the passive condition suggests that there is a statistically significant difference between each successive group, with *df(3.154)= 189.55, p <0.0.5*. However, further statistical analysis from a post-hoc test using Tukey's HSD shows that the statistical difference occurs between all groups except for the advanced and the control group ($p > 0.05$), which is expected given the advanced proficiency level of the experimental group. Data from unaccusative test items in the causative condition suggests that there is a statistically significant difference between the advanced group and other experimental groups *df(3.154)= 121.35, p <0.0.5*, but it cannot be concluded that there is a statistical difference between the

beginner and the intermediate group (p > 0.05) as shown by the post-hoc test. Data from unergative test items in the passive condition suggests that there is a statistically significant difference between the beginner group and other experimental groups *df(3.154)= 38.27, p <0.0.5*, but it cannot be concluded that there is a statistically significant difference between the intermediate group and the advanced group (p > 0.05). Data from unergative test items in the causative condition suggests that there is a statistically significant difference between the advanced group and other experimental groups *df(3.154)= 154.75, p <0.0.5*, but it cannot be concluded that there is a statistical difference between the beginner and the intermediate group (p > 0.05). This is presented in Figure **6.17** below:
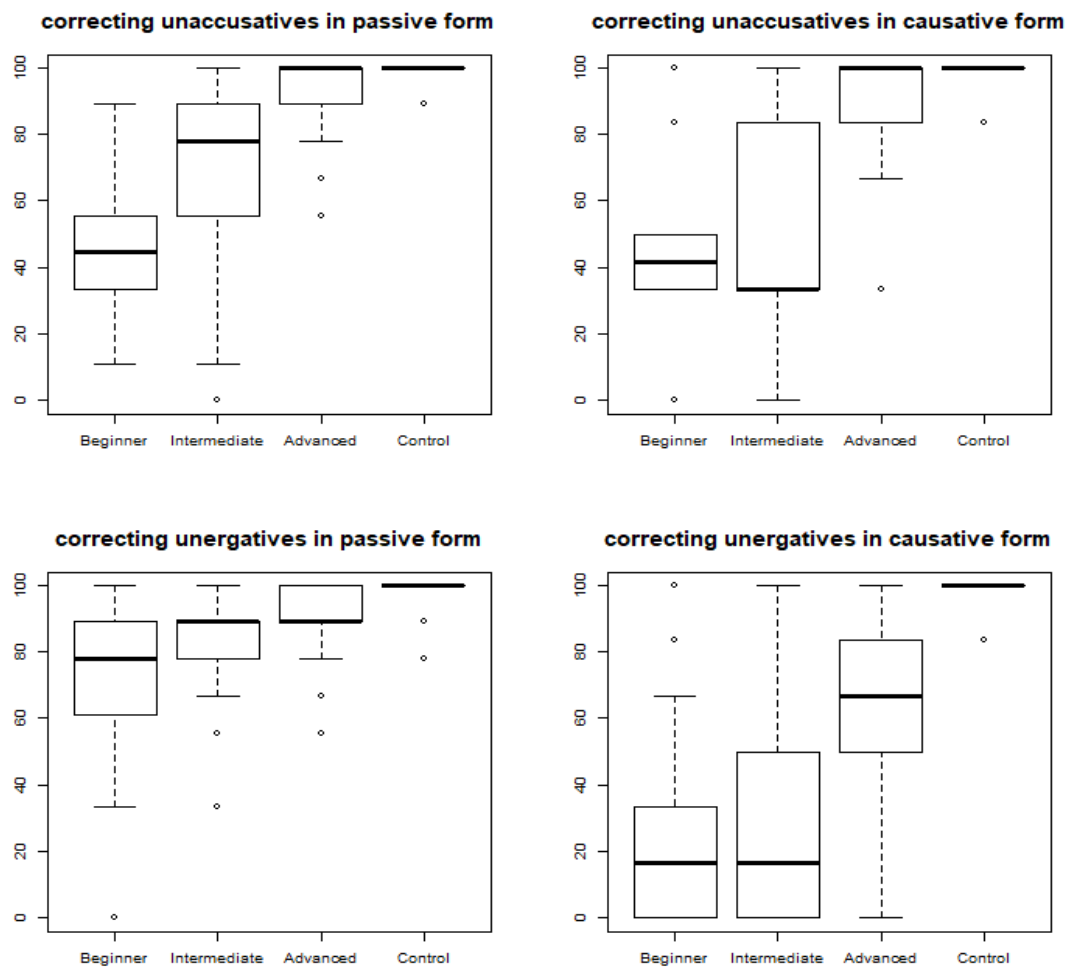
Figure 6.17 Accuracy scores on the error-correction task across proficiency groups (%)

In Figure **6.17** above, the top left graph represents results from unaccusative verbs in the passive condition. As can be seen from this graph, the score of correct responses increases as the proficiency level advances. The beginner group had the lowest score of correct responses (a mean of 46 per cent) with a high level of variation from just below 20 per cent to just above 80 per cent. The intermediate group had a lower score than the advanced group and a higher one than the beginner group (a mean of 63 per cent), with

large variance as well. The advanced group had the highest accuracy rates in using unaccusative verbs among all the experimental groups (a mean of 92 per cent), with the least variation among the groups, from around 90 per cent to 100 per cent.

The effect of proficiency on supplying accurate responses to ungrammatical unaccusative test items seems less evident in the causative condition, as the beginner and the intermediate group had similar scores of correct responses. The beginner group had a mean of 37 per cent and the intermediate group had a mean of 40 per cent, as shown in Figure **6.17**7 above in the top right graph. Both the beginner and the intermediate groups had large variations, ranging from 0 per cent to 100 per cent. The advanced group, however, had the highest scores of correct responses among the other two groups (a mean of 86 per cent), with the least variation, ranging from just over 80 per cent to 100 per cent.

The bottom left graph in Figure **6.17** presents results from the unergative verbs in the passive condition. As can be seen from this graph, the beginner group scored lower than the intermediate and the advanced groups. The beginner group also had the largest variation among the groups, ranging from 0 per cent to 100 per cent. The beginner group had a mean of 70 per cent of correct responses. The intermediate group had a score of 84 per cent of correct responses. The advanced group had a mean of 86 per cent of correct responses, which is a very similar score to that of the intermediate group, and lower than the advanced group's score in unaccusative verbs (a mean of 92 per cent).

The bottom right graph in Figure **6.17** presents results from unergative verbs in the causative condition. As can be seen from the graph, the beginner and the intermediate groups performed very similarly, with a mean of 25 per cent and 26 per cent of correct responses respectively. The advanced group performed significantly better than the intermediate group in this condition (a mean of 66 per cent of correct responses).

6.5.3   Summary of RQ3 results

To sum up, data from the reaction-time reading comprehension task provides support to the current hypothesis that there is a statistically significant difference between each successive group in their reading scores of sentences containing unaccusative and unergative verbs. Data from the error-correction task provides partial support to the current hypothesis. With correcting ungrammatical passivised unaccusative verbs, there was a statistically significant difference between all experimental groups. But with correcting ungrammatical passivised unergatives, there was a statistically significant difference only between the beginner group and other proficiency groups. In other words, there was not a statistically significant difference between the advanced and the intermediate group.

6.6 Research question 4 (RQ4)

The fourth research question addressed in the current thesis is: *Is there a difference between the ability of Arabic L2 learners to verbalise instruction-based rules about the use of unaccusative verbs compared to the ability to verbalise violated rules about the use of unergative verbs?*

The question is addressed through a rule-verbalisation task, where Arabic L2 learners are given an ungrammatical sentence with either an unergative or an unaccusative verb, then asked to state in terms of pedagogical rules why the sentence is ungrammatical. Mean scores of verbalising rules relating to ungrammatical unergative verbs are compared to mean scores of ungrammatical unaccusative verbs. It was predicted that L2 learners would show higher accuracy rates in verbalising rules regarding unergative verbs than in verbalising rules concerning unaccusative verbs, based on the assumption that the former is explicitly taught while the latter is not taught in a formal setting.

This task was presented to the participants along with the error-correction task, as discussed earlier in Chapter 5. That is, participants were presented with an ungrammatical sentence and then asked to 1) supply a grammatical alternative sentence and 2) explain why that sentence is ungrammatical in terms of instruction-based rules. However, the rule-verbalisation part of the task did not seem to yield very informative results, as most of the participants left this part blank, which resulted in many zero values in the data. Figure **6.18** presents results from the experimental group and the control group in verbalising rules relating to errors in structure of either unaccusative or unergative verbs.
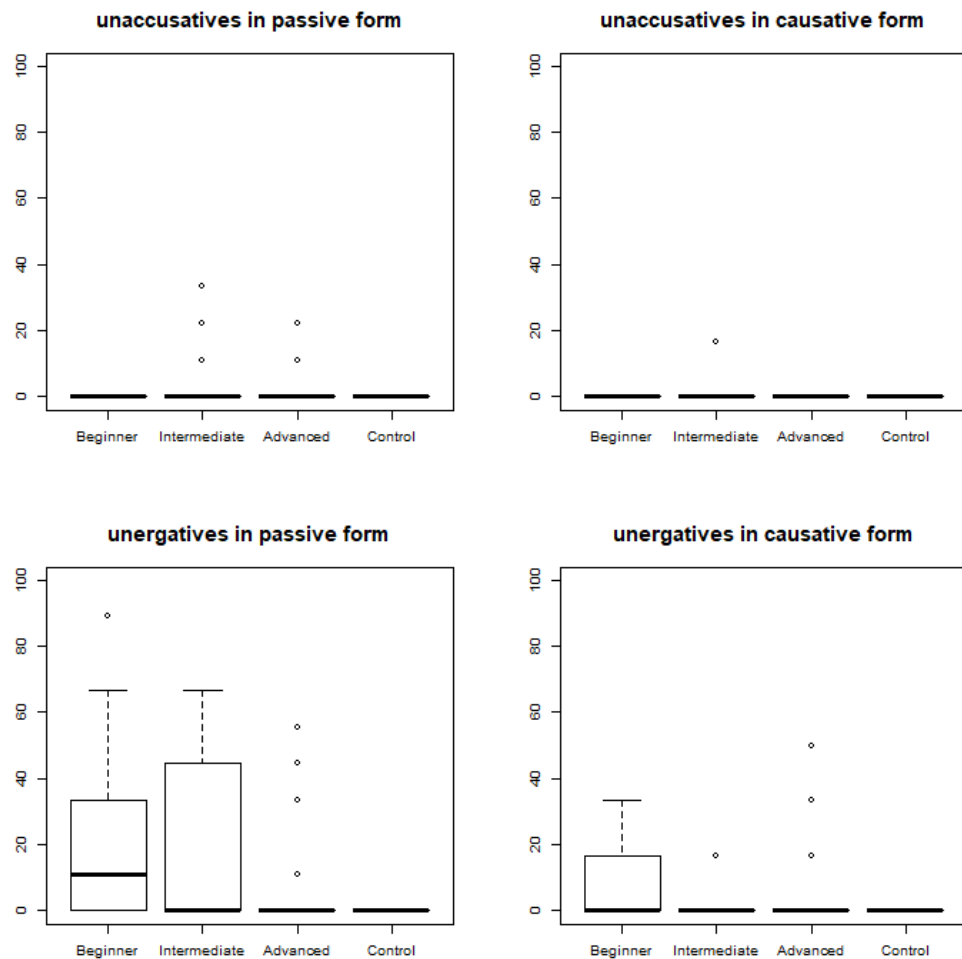
Figure 6.18 Accuracy scores on the rule-verbalisation task across proficiency groups (%)

The top left and right graphs represent the ability to verbalise rules in unaccusative verbs in the passive and causative conditions respectively. As can be seen from the graphs, almost none of the participants were able to supply instruction-based grammatical rules, with very few outliers in the intermediate and the advanced groups. The bottom left and right graphs present results from the unergative verbs in the passive and causative conditions respectively. Although very few participants provided an accurate response, there seemed to be a tendency for lower proficiency groups to perform better. There also seemed to be a tendency for better performance with regard to unergative verbs than unaccusatives, as the graphs show that the beginner group performed better with unergative verbs than with unaccusative verbs in both conditions, and the intermediate group performed better with unergative verbs than unaccusative verbs in the passive condition. It is very difficult, however, to draw conclusions on the Najdi Arabic L2 English learners' metalinguistic knowledge based on such a small sample, as most of the participants did not provide explanations as to why test items were ungrammatical.

6.7   Summary

Data obtained from the reaction-time reading comprehension task, error-correction task, and rule-verbalisation task were examined, and the tasks were analysed either by

research question, making distinctions between verb types or proficiency levels as appropriate. Descriptive and inferential statistical analyses were performed, and the results revealed partial support to the hypotheses addressed by the central research questions. These results are discussed following the same classification (i.e., by research question) in the following chapter.

Chapter 7   Discussion

7.1   Introduction

This chapter proceeds as follows. First, findings are discussed in relation to the research questions presented in Chapter 5. The core theoretical concerns of the current study are reconsidered based on different insights from different experimental tasks performed by Najdi L2 English learners of different proficiency levels. Finally, the chapter concludes with a summary of the significant findings of the current data.

7.2   Major findings

In the current study, a conceptual and empirical approach was followed to investigate modular implicit L2 knowledge and extra-modular implicit or explicit L2 knowledge in Najdi Arabic learners of L2 English. In this section, the major findings derived from the reaction-time reading comprehension task and the error-correction and rule-verbalisation task are discussed with reference to the central research questions and core theoretical concerns discussed in Chapter 5. The aim of integrating online and offline tasks to investigate L2 knowledge of intransitivity is to capture such knowledge from different angles, which adds depth to the discussion of the nature of modular and extra-modular knowledge and their development and perhaps their indirect interfaces. In each section, I first discuss results from the empirical research question, then I relate that to the corresponding theoretical interpretation of the data using Modular Cognitive Framework (MCF) framework as a tool to arrive at the most detailed and precise explanation possible for the current data.

7.2.1   Extra-modular L2 knowledge intervention at the level of production

The first theoretical question is whether or not extra-modular L2 knowledge intervenes at the level of production, which was put forward for deeper investigation through the first empirical research question (RQ1) (*i.e. is there a difference between the ability to correct ungrammatical utterances of unergative structure compared to the ability to correct ungrammatical utterances of unaccusative structure in the production of Najdi Arabic L2 learners of English?*)

The assumption held in the current study is that treatment of intransitive verbs is oversimplified by pedagogical practices. Specifically, while properties of unergative construction are covered in formal settings under the intransitive topic in English grammar classrooms, grammatical properties of unaccusative constructions are not fully covered. This means that Najdi Arabic L2 learners of English have to arrive at the knowledge of English unaccusatives for themselves. It seems more likely that they would develop a modular implicit knowledge of unaccusative verbs, since conceptual introspection of syntactic properties of unaccusatives is not encountered in the formal

setting. The hypothesis is that Najdi Arabic L2 English learners' extra-modular (explicit or implicit) knowledge of unergative verbs would intervene at the level of production, but not at the level of comprehension (discussed in section 7.2.2). This is predicted to result in higher accuracy rates with regard to unergative test items than unaccusative test items, as a result of the positive effects of instruction. The difference between L2 knowledge of unergatives and of unaccusatives is predicted to decrease as modular L2 knowledge of unaccusative verbs increases in higher-proficiency participants, resulting in similar accuracy rates between the two classes of verbs.

This was tested through analysing the performance of Najdi Arabic L2 learners of English in the error-correction task, where they were required to produce a grammatical alternative sentence to the ungrammatical test item either in unaccusative construction or unergative construction. In the following section, results from the task are discussed.

7.2.1.1 Insights from the error-correction task

In this section, L2 knowledge of unaccusative structure is compared to L2 knowledge of unergative structure from Najdi Arabic learners of equal proficiency (i.e. comparison runs in terms of verb type, rather than proficiency level). Data from each proficiency group is presented separately, within which the results from the two classes of verbs are discussed and compared. First, results from the beginner group are discussed, followed by the intermediate, advanced and finally the native controls. MCF is adopted to enrich the discussion of the different types of L2 knowledge of the two classes of intransitive verbs in relation to different levels of proficiency.

7.2.1.1.1 The beginner group

Results from the beginner group in the error-correction task only partially support the first hypothesis. The prediction with the beginner group, is that extra-modular L2 knowledge of instructed unergative verbs will be evident at the level of production, and will result in the Najdi beginner group scoring higher with regard to producing grammatical alternatives to the ungrammatical unergatives than the unaccusative test items. The beginner group's data was examined in two different conditions. In the first, unergative and unaccusative test items were ungrammatically passivised. The results from a two-paired t-test revealed a statistically significant difference in the beginner's group performance between the unergative verbs and unaccusative verbs df(66,29)= -4.4177, $p < 0.05$, with higher accuracy rates in correcting ungrammatical unergative verbs (a mean score of 70 per cent) than in correcting unaccusative verbs (a mean score of 46 per cent). In the second condition, the two classes of intransitive verbs were presented in causative forms, which is ungrammatical in English. However, the results from a two-paired t-test revealed a non-significant difference between data from the two classes of

intransitive verbs (*df* (77.69)= 1.9219, *p* > 0.05). The hypothesis that L2 extra-modular knowledge of unergative verbs would intervene at the level of production is partially supported by the first condition; where test items are presented in a passive construction, but not when they are presented in a causative form.

With unaccusative verbs, the beginner group accurately scored a mean of 46 per cent of the unaccusative verbs. This indicates that just above half of the time, Najdi Arabic L2 learners of English accepted sentences like, *the accident was happened, *the boy was arrived at school, *the rabbit was appeared* – even though it was clear in the task instructions that there is something ungrammatical in each sentence, learners inaccurately corrected other grammatical elements instead. The direct translations of these verbs in Arabic are licensed in passive structure because they do alternate in Arabic. Assuming L1 cross-linguistic influence, as we do, Najdi Arabic L2 learners of English have to unlearn that these verbs alternate and have to unlearn that they require overt morphology to mark unaccusatives. Najdi Arabic L2 English learners' modular implicit knowledge of unaccusativity would not easily map onto English instances of unaccusative verbs, because of the divergence between Arabic and English morpho-syntactic properties in realising unaccusative verbs. Given that the beginner group only accurately scored a mean of 46 per cent of the ungrammatical unaccusative test items, this could be interpreted as L2 values not being fully acquired.

The case is different with regard to the beginner group performance in unergative verbs. The beginner group accurately corrected 70 per cent of the ungrammatical unergative verbs. This indicates that 70 per cent of the time, the beginner group were able to produce grammatical alternative instances of unergative verbs in English. They had knowledge that utterances like *the boy was swam, *the mother was laughed* and *the baby was cried* were ungrammatical in English. Interestingly, the exact translations of these verbs, just as in the case of unaccusative verbs, also alternate in Arabic and are licensed in passive construction. Mapping modular implicit knowledge of unergativity onto English instances of unergative verbs should be equally challenging, but apparently this L1/L2 divergence caused less difficulty in unergative verbs than in unaccusative verbs. The actual range of deviation demonstrated by individual learners in the beginner group was from 0 per cent to 100 per cent. These high accuracy rates with regard to unergative verbs in some beginner learners might be attributed to formal instruction Najdi Arabic L2 learners of English once had on unergative verbs, but not in unaccusative verbs. While it is very difficult to cognitively explore what type of L2 knowledge is guiding the beginner group's production of unergative verbs, in theoretical terms this could be interpreted as the beginner group having formed extra-modular knowledge of unergative verbs through classroom input, and as what assisted them to tackle the current task.

Factors that might cause this statistically significant difference in performance between unergative and unaccusative verbs in the beginner group can be discussed in terms of i) the positive effects of explicit formal instruction, ii) the frequency of occurrence of the tested verbs in the external input, and finally iii) the intervention of extra-modular L2 knowledge of unergative verbs at the level of production.

In terms of the effect of explicit instruction, since Norris & Ortega (2000), it has become widely accepted that L2 instruction can result in target-oriented benefits. In their comprehensive meta-analysis of the effectiveness of instruction, Norris & Ortega (2000) showed that instructional treatments that are form-focused or meaning-focused are far more effective than those that only rely on L2 simple exposure with no emphasis placed on direct L2 learners' attention to certain linguistic features neither through focusing on form nor meaning. In other words, L2 learners performed better when provided with focused instruction than with non-focused L2 exposure. Throughout the literature, explicit treatments are associated with greater L2 development than implicit treatments, yet caution should be taken when making conclusions with regard to the durability of explicit instruction gains. It should be noted that Norris and Ortega's conclusions about the effectiveness of explicit instruction have been called into question, which might be a result of possible over-interpretation of the results of their meta-analysis (Truscott, 2004). In fact, a number of studies have reported equal effects of explicit and implicit instruction (e.g., Soleimani, Jahangiri & Gohar 2015; Marzieh, 2015). This will be discussed later in the results of higher-proficiency groups (see sections 7.2.1.1.2 and 7.2.1.1.3).

The Najdi Arabic beginner group is assumed to have been instructed about grammatical rules regarding intransitive construction and that an intransitive verb does not take an object. While this is true for unergative verbs, it is pedagogically oversimplified for unaccusative verbs. That is, not all syntactic and semantic properties of the verb and its argument are covered in a formal setting context. This seems to have significantly boosted beginners' accuracy rates in unergative verbs in a manner different from their performance with regard to unaccusative verbs. The type of input that the beginner group received for unergativity (which is explicitly instructed) is different from the type of unfocused, uninstructed input for unaccusative verbs, which resulted in significantly different accuracy rates and might suggest two different types of L2 knowledge for each class of intransitive verb in the beginner group.

Another factor that might have contributed to the statistical difference between the beginner group's performance is the frequency of occurrence in the external input of the tested unaccusative and unergative verbs. Contrary to the beginner group's higher accuracy rates in unergative verbs, it is interesting to note, based on the British National

Corpus, that the tested unergative verbs are in fact less frequent in the external input as shown in Table 7.1.

Table 7.1 Frequency of occurrence of the tested verbs

Verb	Frequency
Swim (unergative)	1,374
Cry (unergative)	3,053
Laugh (unergative)	3,546
Happen (unaccusative)	8,404
Appear (unaccusative)	10,597
Arrive (unaccusative)	2,802

This lack of correlation between frequency of occurrence of verbs and their level of development is very much compatible with the MCF perspective of external and internal frequency. Frequency of instances of input might provide a rough prediction of how frequently the learner might encounter a certain entity, but does not guarantee that the equivalent perceptual or conceptual representation has been instantiated or activated to form internal input to trigger syntactic processing in the syntactic module, as seen in the beginner learners' performing better with unergatives than unaccusatives even though the unergative verbs tested appear less frequently than the unaccusative verbs. It only shows that it is naïve to assume a direct correlation between the frequency of instances in the external input and L2 development. The beginner group's higher performance in unergatives cannot be explained by frequency of occurrence in the external input, but perhaps by conceptual knowledge of unergative grammatical rules, boosted through formal instruction.

Although L1 Arabic and L2 English realisation of unaccusativity and unergativity diverge in the same way, the beginner group scored higher accuracy rates in the error-correction task with unergative verbs than with unaccusative verbs in the passivised condition. Indeed, unergative verbs appeared less frequently in these tasks than unaccusative verbs in external input. Given unergative verbs' lower frequency rates, one would predict corresponding lower accuracy rates, as L2 learners might have encountered them less in the external input, but this is not the case here. This leads the discussion to what type of linguistic knowledge might be guiding the beginner group's production of unergative verbs and unaccusative verbs. This is especially important when considering the difference in the learning context and nature of input between how the Najd Arabic beginner group came to learn these two classes of intransitive verbs.

In this task, there were no limitations or measurements on the time Najdi Arabic L2 English learners took to complete the task, which was intended to allow L2 learners to retrieve their learned knowledge of unergative verbs and perhaps unaccusative verbs. Data shows that there is a significant difference within the beginner group between their performance on the instructed unergatives and uninstructed unaccusatives. Theoretically, this could be interpreted as a result of two types of L2 knowledge guiding

the production of each type of verb class. It would be plausible to assume that a large part of the beginner groups' performance in correcting unergative verbs was guided by their learned knowledge of intransitive verbs as taught in the classroom. In MCF terms, this learned knowledge of unergative verbs is extra-modular L2 knowledge, which is stored in the conceptual structure (CS) and available for conscious introspection. Such interpretations of the results can give insights into why the beginner group had a high level of accuracy in correcting ungrammatical unergatives but not unaccusatives. This might be because the beginner group had explicit instruction on unergative verbs, which assisted them in initiating some kind of active conceptual knowledge of unergative verbs at an early stage of their development. This kind of knowledge of unergatives can be seen to reside in the conceptual module, which is available for reflection from the learner's part, as this knowledge has been recently introduced/processed. In the case of the knowledge of unaccusative verbs, responses from the beginner group might be guided by modular knowledge of unaccusative individual verbs, which would not be fully developed (as illustrated by lower accuracy responses in unaccusative verbs in the beginner group). Within the MCF view, modular knowledge of unaccusative verbs is represented in the encapsulated syntactic structure (SS), which means Najdi Arabic L2 English learners would not have conscious control over such knowledge. Lower accuracy rates with unaccusative test items also suggest that the Najdi Arabic learners lacked conceptual knowledge (or learned knowledge) of syntactic and semantic properties of unaccusative verbs as result of a different learning contexts.

In both verb classes, the L2 value of the feature is divergent from the L1 value. And, it is natural for the L1 values to dominate the system in earlier stages of development, as in case of the beginner's group production of unaccusative verbs, because the L1 use has assigned it a higher resting level of activation. However, it seems that Arabic L1 values are more evident in unaccusative verbs than in unergative verbs in the error-correction task. This could only be interpreted as that the knowledge of individual unergative verbs is boosted through the extra resources of extra-modular L2 knowledge that is mentally represented in the CS, which might be not as fluent as modular implicit L2 knowledge, but could show itself/intervene at the level of production when provided with sufficient time. In the language module, it might be the case that both classes have reached the same (low) level of activation, but what might cause the difference is the previously learned L2 knowledge of unergative verbs, that that learners can make use of to tackle the task at hand.

In spite of the many factors that could have been attributed to similar results in the beginner group's responses with unergative and unaccusative verbs, Najdi Arabic L2 English learners had significantly higher accuracy rates in unergative verbs. This lends support to Competing Systems Hypothesis (CSH), which is tested in the current

study through the error-correction task. That is, extra-modular L2 knowledge of unergative verbs intervened at the level of production, resulting, in this case, in higher accuracy rates in unergative verbs than in unaccusative verbs. Data from the reaction-time reading comprehension task was statistically analysed to test whether learned knowledge of unergative verbs would intervene in the same way at the level of comprehension and would result in faster reading time scores in sentences with unergative verbs than in sentences with unaccusative verbs, which will be discussed in section 7.2.2.

In the following section, I discuss data from the error-correction task from the intermediate group.

7.2.1.1.2 The intermediate group

It is plausible to assume that conceptual knowledge of unergative verbs might have been processed frequently enough to reach higher activation levels in the intermediate group than in the beginner group. Representations gain higher resting levels of activation as a result of frequent processing, which is expected in the type of knowledge the intermediate group possessed, as shown by their cloze test scores. Like with the beginner group (only showing a higher-proficiency level), results from the intermediate group in the error-correction task only partially supports the first hypothesis. The prediction is that extra-modular L2 knowledge of taught unergative verbs will intervene at the level of production, resulting in the intermediate group achieving higher accuracy rates with regard to supplying alternative grammatical sentences to ungrammatical unergative than unaccusative test items. The intermediate group's data was investigated in two different test conditions. The first condition ungrammatically passivised unergative and unaccusative test items. The results from a two-paired t-test revealed a statistically significant difference in the intermediate groups' performance between the unergative verbs and unaccusative verbs df (65.63)= -4.18, $p < 0.05$, with higher accuracy rates in correcting ungrammatical unergative verbs (a mean score of 84 per cent) than in correcting unaccusative verbs (a mean score of 63 per cent). In the second condition, the two classes of intransitive verbs were presented in causative forms. However, the results from a two-paired t-test revealed a non-significant difference between data from the two classes of intransitive verbs df (79.535)= 1.957, $p > 0.05$. Similar to findings from the beginner group, the hypothesis that L2 extra-modular knowledge of unergative verbs would intervene at the level of production is partially supported by the first condition, where test items are ungrammatically passivised.

This seems to confirm results from the beginner group. Responses from Najdi Arabic L2 learners of English in the intermediate group in the current task seem to have benefited from the formal instruction participants once had on unergative verbs. The actual range of deviation demonstrated by individual learners in the intermediate group

in unergative verbs was from 33 per cent to 100 per cent. This high accuracy rate could only be interpreted as the positive effects of formal instruction. This could not have been either L1 cross-linguistic influence as it is the same in both unergative and unaccusative verbs, nor could it be the effect of external frequency as the tested unergative verbs are less frequent than the unaccusative verbs.

Similar to the beginner group's results, despite all these factors being identical, the statistically significant difference is still evident between the two classes of intransitives, which points to a possible difference in the type of L2 knowledge of unaccusatives and the type of L2 knowledge of unergatives, which might be triggered by the different input experience between the two verb classes (instructed vs. uninstructed). In theoretical terms, this difference could be interpreted as a result of the intermediate group's performance being guided by the learned knowledge of intransitive verbs as encountered in the classroom. Given their higher-proficiency level, this type of extra-modular conceptual knowledge of unergative verbs could either be implicit or explicit, depending on activation levels of representations in the conceptual memory store. Higher activation levels would correspond to a more procedural or implicit type of knowledge, while lower activation levels would correspond to a more declarative or explicit conceptual knowledge of unergative verbs. Whether this type of L2 knowledge is extra-modular implicit or explicit, time was open in the task to enable L2 learners to reflect on their own knowledge of the tested items.

In the case of knowledge unaccusative verbs, responses from the intermediate group might have been guided by modular knowledge of unaccusative individual verbs which would not yet be fully developed as illustrated by lower accuracy responses in unaccusative verbs than in unergative verbs in the intermediate group. Lower accuracy rates with unaccusative test items might suggest that Najdi Arabic learners lacked conceptual knowledge (or learned knowledge) of syntactic and semantic properties of unaccusative verbs, as a result of a different learning context. This conceptual knowledge of unaccusative verbs could have served as an extra resource to rely on in case modular L2 knowledge proved short, especially in the error-correction task, where no time restriction was applied. Knowledge of unaccusative verbs in the intermediate group does not seem have benefited from formal instruction, which might suggest that internal processes might have taken place through comprehensible communication, which in turn triggers the knowledge of unaccusatives to be instantiated and slightly strengthened through processing. Lexical learning seems to have triggered syntactic configuration of grammar for the learner; understanding of meanings and concepts related to unaccusative verbs by the intermediate group triggers the development of unaccusative verbs in the syntactic module.

Despite the many factors that could have been attributed to similar results in the intermediate group's scores with unergative and unaccusative verbs, Najdi Arabic L2 English learners had significantly higher accuracy rates in unergative verbs. This could shed light on the type of L2 knowledge guiding each construction, as a result of different input experience. This also seems to lend partial support (found only in passivity condition) to CSH, resulting, in the case of beginner and intermediate groups, in higher accuracy rates in unergative verbs than in unaccusative verbs.

The intervention of learned knowledge, however, seems to result in lower accuracy rates with regard to unergative verbs than unaccusative verbs in the performance of the advanced group. In the following section, I discuss data from the error-correction task from the advanced group, where speculations are made on possible reasons why the advanced groups showed higher proficiency on unaccusative verbs than unergative verbs, contrary to other proficiency groups.

7.2.1.1.3 The advanced group

Results from the advanced group in the error-correction task had a slightly different pattern from that of the intermediate and beginner groups. Findings from the advanced group seem to support the hypothesis that extra-modular L2 knowledge of unergative verbs intervenes at the level of production. But, contrary to other groups, the advanced group performed higher in correcting ungrammatical unaccusatives than unergatives, as modular L2 knowledge of unaccusatives seems to be robust enough at this stage of L2 development for the advanced learners to achieve high rates of accuracy. The results from a two-paired t-test revealed a statistically significant difference in the advanced groups' performance between the unergative verbs and unaccusative verbs df (87.03)= 2.42, $p < 0.05$, with higher accuracy rates in correcting ungrammatical unaccusative verbs (a mean score of 92 per cent) than in correcting unergative verbs (a mean score of 86 per cent) in the first condition. In the second condition, a two-paired t-test also revealed a significant difference between data from the two classes of intransitive verbs df (78.751)= 3.6821, $p < 0.05$, with higher accuracy rates in correcting ungrammatical utterances with unaccusative verbs (a mean score of 86 per cent) than in correcting ungrammatical use of unergative verbs (a mean score of 66 per cent). Unlike findings from the beginner and intermediate groups, the hypothesis that L2 extra-modular knowledge of unergative verbs would intervene at the level of production is fully supported by the first condition; where test items are ungrammatically passivised *(*the accident was happened)*, and the second condition; where the test items are presented ungrammatically in causative condition (*She happened an accident*).

It is interesting to find a difference between two very similar constructions in the performance of the advanced group, whose L2 has developed to a relatively high level. Initially, it was not predicted to find such an interesting pattern in the advanced group's

data, rather it was predicted that at this stage of L2 development, the advanced learners would have similar accuracy rates in both unaccusative and unergative test items.

In the section to follow, I discuss why such differences appeared in the advanced learners' performance. Factors that might cause this statistically significant difference in performance can be discussed in terms of the effects of input they received; the frequency of occurrence of the tested verbs in the external input; and finally what this might tell us about the two types of second-language knowledge and the intervention of extra-modular L2 knowledge of unergative verbs at the level of production.

It is important to recall the core assumption of the study about the difference between the two constructions in terms of the type of input L2 learners receive for each one of them; properties of unergatives being covered in a language classroom, while syntactic and semantic properties of unaccusative verbs are overlooked in a formal instruction context. However, formal instruction of unergative verbs does not seem to positively affect the advanced learners' accuracy rates with regard to unergative verbs, which sheds light on how durable the effects of formal instruction are in later stages of L2 development.

Responses from Najdi Arabic L2 learners of English in the advanced group seem not to have benefited from the formal instruction participants once had on unergative verbs. The advanced group accurately corrected 86 per cent of the ungrammatical unergative verbs (e.g. *the child was laughed*), which is significantly lower than their accuracy rates with regard to correcting ungrammatical utterances of unaccusative verbs (a mean score of 92 per cent). The advanced learners also scored lower in correcting ungrammatical use of unergative verbs (a mean score of 66 per cent) than in correcting ungrammatical instances of unaccusative verbs (a mean score of 86 per cent), where the tested verbs were presented in a causative condition.

Unlike Najdi Arabic learners in the beginner and the intermediate groups, advanced learners achieved significantly more with unaccusative verbs. These findings are consistent with data from Rothman (2008), where untutored naturalistic L2 learners outperformed tutored learners. While this is not to claim that learners in the advanced group are naturalistic, it is important to take into consideration that learners seem to come to know unaccusative construction incidentally through input encounter. It is also important to take into account that they were immersed in the second language as they lived in an English-speaking country (UK) at the time of testing in this group.[12] Furthermore, although they had once been taught English in a language classroom, they were no longer learning English in a classroom context at the time of testing, which might suggest that the positive effects of instruction on unergative verbs might have faded.

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[12] Only two participants from the advanced group lived in Saudi Arabia at the time of testing.

From an MCF point of view, it might be the case that learners in the advanced group developed syntactic representations for unaccusative verbs, different from conceptual representations for unergative verbs that were once driven by classroom input, through explicit information about different properties of intransitive verbs. While Najdi Arabic learners in the beginner and intermediate groups might have benefited from such formal instruction as shown by their higher accuracy rates in unergative verbs, the advanced learners seem to show the reverse effects. Thus, caution should be taken when making conclusions with regard to how durable the positive effects of instruction are.

As pointed out earlier, it is cognitively very difficult to identify what type of L2 knowledge is guiding the production of both unaccusatives and unergatives. However, exploring those two types of L2 knowledge might push forward the development of neurologically-oriented experimental methods that might give more precise explanations of what is happening in the learner's mind, how different stimuli are being processed, and why. Until then, all we have are theoretical explanations that would give us an in-depth discussion of the possible types of L2 knowledge that might have guided the production of unaccusative and unergative verbs by Najdi Arabic L2 English learners in the advanced group. The advanced group's performance on unergative verbs could be guided by the learned knowledge of intransitive verbs as encountered in the classroom. Within MCF, this knowledge is referred to as extra-modular knowledge of a second language that is stored outside in the CS. This knowledge could be available for conscious reflection, depending on the resting levels of activation of the representation of each piece of information. Such interpretations of the results can give an in-depth explanation as to why the advanced group had a lower level of accuracy in correcting ungrammatical unergatives than in correcting unaccusatives. This might be because the advanced group received explicit instruction on unergative verbs, which triggered the development of some kind of conceptual knowledge of unergative verbs at the early stage of their development. This kind of knowledge of unergatives seems to reside in the conceptual module, which would mean that it is a non-specialist type of L2 knowledge, which might explain why Najdi Arabic learners in the advanced group scored lower in unergatives than in unaccusatives. This might have led to the development of non-specialist type of L2 knowledge during different stages of L2 development. It might also suggest limits to how 'good' this knowledge can be. It might be the case that this conceptual knowledge has been fossilised as a result of automatization of non-target forms. The advanced group consisted of participants who had already completed their English classroom experience and were doing different degrees at English speaking universities (except for two participants who were in Saudi Arabia at the time of testing). Their knowledge of unergative verbs is very much likely to have started at a classroom setting where a teacher created few opportunities to systematically incorporate the use

of unergative verbs in L2 production, along with grammatical explanations about the verb and its arguments. This type of conceptual knowledge of unergative verbs might have developed and remained as conceptual. And this empirical piece of evidence from the advanced group can be interpreted as this type of conceptual knowledge (specifically the conceptual knowledge of metalinguistic and grammatical rules) having limitations and constraints to how far it can develop and reach a 'syntactic-like' L2 knowledge. On the other hand, the advanced learners' knowledge of unaccusative verbs might have developed as unconscious syntactic knowledge triggered purely by the conceptual representations of meanings related to unaccusative verbs as they encountered quality input frequent enough to trigger and strengthen this syntactic knowledge. This interpretation of the findings might also imply that developing modular implicit L2 knowledge in adults might not be prone to fossilisation, and this might only apply to extra-modular implicit or explicit L2 knowledge.

In the case of the knowledge of unaccusative verbs, responses from the advanced group with regard to unaccusative test items might be guided by modular knowledge of unaccusative individual verbs which may be able to develop to higher levels than conceptual knowledge, as illustrated by the more accurate responses on unaccusative verbs than on unergative verbs (a mean score of 92 per cent). With MCF in mind, modular knowledge of unaccusative verbs is represented in the encapsulated SS, which might suggest that Najdi Arabic L2 English learners would not have conscious control over such knowledge, as it would only be implicit. The development of this L2 knowledge in a specialist system might be driven by a different learning context from that of the unergative verbs (i.e. naturalistic context in learning unaccusative verbs, rather than a classroom context). Najdi Arabic learners in the advanced group seem to have developed a robust L2 knowledge of unaccusatives, presumably through comprehensible communication, which in turn triggers the knowledge of unaccusatives to be instantiated and may be strengthened through processing. Given the frequency of occurrence and L1/L2 realisation of the tested verbs that might have contributed to similar findings within the advanced group in both constructions, there is a significant difference between the two classes of intransitive verbs. This difference supports the notion that lexical learning seem to have triggered syntactic configuration of grammar for the learner; understanding of meanings and concepts related to unaccusative verbs by the intermediate group triggers the development of unaccusative verbs in the syntactic module, rather than providing pedagogical rules about the use of unergative verbs, which proves less effective than natural encounter, as shown in the findings from the advanced group. This might also suggest that there might be limits to the development of the conceptual knowledge, whereas encapsulated modular knowledge of language might be less prone to the effects of fossilisation, as shown by a higher mean score of 92 per cent

of accurate responses in unaccusative verbs than in unergative verbs (86 per cent) in the performance of the advanced group.

Although advanced learners were the least expected to perform differently with regard to the two tested structures, they had significantly higher accuracy rates in unaccusative verbs than in unergative verbs. This seems to shed light on the type of L2 knowledge guiding each construction, as a result of different input experiences. This also seems to lend support to CSH, tested through the error-correction task.

Part of the claim of CSH is that extra-modular knowledge would not intervene at the level of comprehension. While this was not the initial research question, the results obtained from the data seem to be compatible with what CSH seems to suggest: that effects (positive or otherwise) of consciously learned knowledge would not show themselves during comprehension of instances of the second language. Effects of learned knowledge would only be evident during production – a claim that is also supported by data from the error-correction task. In the following section, I discuss the second research question (RQ2) of whether extra-modular L2 knowledge of unergatives would intervene in the same way at the level of comprehension, exploring data from the reaction-time reading comprehension task across the three proficiency groups.

7.2.2 Extra-modular L2 knowledge intervention at the level of comprehension

Initially, the reaction-time reading comprehension task was based on the prediction that there will be a difference between the two classes of intransitive verbs, in the same way as data from the error-correction task. The task was set to measure the difference between reading times of unaccusative and unergative verbs, and whether participants experienced more difficulty with one class over the other. As the previously-discussed error-correction task is an offline measurement, it was thought that it would be more explanatory to add an online measurement task to further examine the more implicit side of second-language development in the same group of Najdi Arabic L2 learners of English, and what that might reveal regarding the type of L2 knowledge they might have about unaccusative and unergative verbs.

However, results from the reaction-time reading comprehension task show that there is no statistically significant difference between unaccusative and unergative verbs within each proficiency group, which inspires the formation of the second theoretical research question (RQ2). On the contrary, data from the error-correction task revealed a statistically significant difference between unaccusatives and unergatives in the L2 production of Najdi Arabic L2 learners of English. In the following section, attempts are made to make sense of these seemingly contradictory results.

This was tested through analysing reaction-time scores from the Najdi Arabic L2 learners of English in the reaction-time reading comprehension task, where they were required to read a four-word-length phrase as fast as they could. The software (*PsychoPy*) recorded the time they took to read the phrases, which was statistically analysed. In the following section, results from this task are discussed in more detail.

7.2.2.1   Insights from the reaction-time reading comprehension task

In this section, the reading pace for sentences containing unaccusative verbs are compared to the reading pace for sentences containing unergative verbs from Najdi Arabic L2 learners of English (results from the current task exploring proficiency effects on reaction-time scores are discussed in section 7.2.4). MCF is adopted to discuss the different types of L2 knowledge of the two classes of intransitive verbs in relation to different stages of proficiency levels.

Results from all proficiency groups (beginner, intermediate and advanced) showed that there is no statistically significant difference between reaction-time scores reading sentences with unaccusative verbs as opposed to reading sentences containing unergative verbs. Najdi Arabic L2 learners did not appear to have shorter reaction-time scores in reading sentences with one verb type over the other. Learners in all groups scored very similar reaction-time scores for unaccusative verbs (alternating and non-alternating) and unergative verbs. This seems to suggest that Najdi Arabic L2 learners of English do not experience greater difficulty with one verb type over the other.

The mean reading times for the beginner group was just above 3 seconds for both unaccusative and unergative verbs. The intermediate group spent an average of around 2 seconds reading test sentences containing unaccusative and unergative verbs alike. The intermediate and beginner groups did not seem to be faster or slower at one verb type than the other. The advanced group did not seem to have any variation in their pace of reading sentences containing unaccusative and unergative verbs. In all verb types, they spent a mean of just over 1 second to read the sentence, which is very similar to the results from the control group, who also spent a mean of just over 1 second reading each test sentence.

At first, this strong and consistent pattern in the data from all three proficiency groups was a disappointment. The initial prediction was that there would be a difference in reading pace, especially at earlier stages of L2 development (i.e. the beginner and intermediate groups), showing maybe some kind of processing difficulties Najdi Arabic L2 learners would have on one type of tested verb. It is true that such a clear pattern in the data means that the null hypothesis could not be rejected, but our exploration should not stop at this point. There must be an underlying effect causing this pattern to appear so evidently in the data from all proficiency groups – a pattern that is the exact opposite of the one found in the error-correction task from the same participants. Our exploration

will again lead us to Rothman's (2008) CSH, which I will develop, in terms of detail and clarity, using MCF mental architecture.

Looking at data from the reaction-time reading comprehension task and the error-correction task, it is interesting to obtain seemingly contradicting results from the same set of participants on the same linguistic structures. It is important to note that the nature of the two tasks is different: the error-correction task, being offline, offered participants all the time they needed to reflect upon their knowledge and complete the task; and the reaction-time reading comprehension task, being online, required participants to read the sentences as fast as they could, attempting to prevent use of problem-solving techniques or learning strategies recalled during reading. Such findings from the two tasks only highlights the importance of testing a phenomenon from different perspectives before drawing conclusions about the development of certain linguistic structures in certain L2 learners of different proficiency levels. This is exactly why it was important for this thesis to test such phenomena using different experimental methods to arrive at an-in-depth, rather than superficial, explanations of the two types of L2 knowledge of English and how these might be represented in the learner's mind.

The purpose of the reaction-time reading comprehension task was to test whether or not Najdi Arabic L2 learners of English have more difficulty processing one construction over another, exemplified by longer reading times. The task was set to tap into the learner's spontaneous reaction, with no extra time allowed to reflect upon linguistic structure. The task was designed very carefully to be as close as possible to natural real-time comprehension to accurately measure the time Najdi Arabic learners took to comprehend the test sentences and whether one construction poses more processing difficulty. To eliminate confounding factors from intervening in the results, test sentences were controlled for length and questions measuring attention to the task were administered. For both tasks, the same sets of participants were consulted using the same linguistic constructions.

7.2.2.1.1 Insights into the two types of L2 knowledge

Comparing results from the two tasks within each group, especially at earlier stages of development, can shed light on the types of L2 knowledge that might be representing each linguistic construction in the mind. The beginner group, as mentioned earlier, spent similar amounts of time reading sentences with unaccusative and unergative verbs in the reaction-time reading comprehension task. This is different from their results in the error-correction task, where they performed significantly better with unergative verbs than with unaccusative verbs. Data from the intermediate group exhibited the same pattern in both tasks. The positive effects of formal instruction, which boosted learners' knowledge on unergative verbs in the error-correction task, seems to be absent in the reaction-time reading comprehension task, resulting in similar reaction-time scores in

reading sentences with both unaccusative and unergative verbs. This indicates that when L2 learners are under time pressure, which might be similar to everyday-life communication, their language performance differs. While this is a very well-known observation in L2 learners (especially at earlier stages of L2 development) learners tend to perform better when given time than in a more spontaneous context. There seems to be a lack of a processing-oriented detailed explanation to what might be causing such phenomena to occur in relation to the two mental linguistic systems.

The challenge of teasing apart the two types of L2 knowledge lies in the fact that the superficial performance of L2 learners is similar, be it modular or non-modular. It is difficult to be certain of what cognitive processes are operating to handle certain tasks at a specific point. However, incorporating different experimental methods to capture the learner's performance from different perspectives, as well as adopting a detailed mental framework to theoretically explain what might be causing different patterns of performance, could provide the most explanatory discussion of the two types of L2 knowledge of unaccusatives and unergatives in the Najdi Arabic L2 learners of English. From an MCF point of view, this can be explained in relation to the type of representations handling the current language experience. When reading the test sentences, the conceptual representations are triggered to deal with the current input – understanding the meanings and concepts conveyed by the test sentences with unaccusative and unergative verbs. According to MCF, one key aspect of the mental architecture is its interconnectedness through its interface systems, which suggests that representations activated in one module of the mind might trigger the instantiation or activation of another representation in another module of the mind, such as how the activation of an auditory representation might trigger the activation of a phonological representation, and in this case a conceptual representation might trigger the activation of a syntactic representation. This, in turn, implies that the activation of conceptual representations of unergative and unaccusative verbs might trigger the activation of syntactic representations of those verbs (modular knowledge of L2). In other words, lexical learning triggers syntactic configuration of grammar. It is important to bear in mind that extra-modular L2 knowledge occurs as conceptual representations, which do not carry any syntactically-coded information. Instead, they carry meanings and concepts of the use of unergative verbs, which might be simply represented as 'CRY/LAUGH/SWIM DOES NOT TAKE AN OBJECT'. Within this view, modular knowledge of L2 in the modular linguistic system would be the mental system that is guiding learners' performance in the reaction-time reading comprehension task.

Due to the nature of the reaction-time reading comprehension task, it is unlikely that extra-modular L2 knowledge (more specifically, learned knowledge or metalinguistic knowledge of grammar) of unaccusatives or unergatives is triggered during reading test

sentences. This is because, at earlier stages of L2 development (the beginner and the intermediate groups), extra-modular knowledge of the L2 would still be declarative in nature, and therefore would not contribute to such a demanding task, which requires a more spontaneous reaction. This seems to be the case with the beginner and intermediate groups, as they took equal times reading sentences with unaccusative and unergative constructions, but scored statistically significantly differently in the error-correction task, in which participants were allowed as much time as they needed. Moreover, extra-modular knowledge of L2 grammatical rules of unaccusative and unergative constructions would not be necessary in comprehending what is being read in the task.

Within MCF, this would theoretically imply that modular knowledge of unaccusative and unergative construction might be implicitly processed during the reaction-time reading comprehension task, which would explain why the beginner learners were better at unergative verbs when they have time in the error-correction task, but performed similarly when no extra time was offered to reflect upon one's conscious conceptual knowledge of linguistic structure. Extra time means that Najdi Arabic learners experienced another sequential event which in this case is the awareness of conceptual representations about the use of the unergative verbs in the error-correction task. This additional sequential event of activating an additional follow-up conceptual representation of metalinguistic knowledge of unergative verbs made the beginner group perform significantly better on unergative verbs than in unaccusative verbs on the error-correction task. Such conceptual representations about the metalinguistic use of unaccusative verbs might not be fully available in the extra-modular system due to the pedagogical practices discussed earlier, which resulted in the beginner group performing significantly lower in the error-correction task because of their lack of extra-modular L2 knowledge and the weakness of their modular L2 knowledge of the English individual unaccusative verbs tested.

7.2.2.1.2 Evidence for the Competing Systems Hypothesis

Findings from this thesis are compatible with Rothman's (2008) CSH, which suggests that there are two separate mental linguistic systems within L2 learners, including learners with high proficiency levels. Those mental systems compete to contribute to the final product of L2 performance. The competition in the mind occurs between the underlying grammatical competence or the modular implicit L2 knowledge as referred to here, and learned metalinguistic knowledge, or extra-modular L2 knowledge, which is guiding second-language production and comprehension. Within CSH, grammatical competence is assumed to have developed through the interaction between L2 data and universal principles (which is compatible with the view held here), while the learned system is assumed to have developed through classroom declarative knowledge about

how the L2 works. According to CSH, those two systems offer two filters for linguistic performance. CSH predicts that the learned system would intercede only at the level of production, not at the level of comprehension.

As discussed earlier in the findings from the error-correction task, extra-modular knowledge of intransitive verbs seems to have intervened at the level of production, resulting in higher accuracy scores in unergative verbs than in unaccusative verbs in the beginner and intermediate groups. This is because modular implicit knowledge of individual unaccusative verbs would not be very highly developed in the beginner and intermediate levels of proficiency. This would explain why their learned knowledge of unergative verbs, which was once developed through obtaining declarative knowledge in the classroom, outperformed their modular implicit knowledge which seems not to be highly developed, especially at these levels of proficiency. Thus, extra-modular L2 knowledge of unergatives, having a boost from formal instruction, outperformed the modular implicit knowledge of unaccusatives, which has developed through interaction between linguistic data and universals.

However, the intervention of the extra-modular L2 knowledge resulted in lower accuracy rates in unergative verbs than in unaccusative verbs in the error-correction task in the advanced group. This would again suggest that the production of English unaccusative verbs was guided by modular implicit L2 knowledge, while the production of unergative verbs was intervened by the filter of extra-modular L2 knowledge of unergative. This knowledge was once obtained through formal classroom experience, resulting in lower accuracy rates, as predicted by CSH, in learners with the highest levels of proficiency. This would be because at the advanced level of proficiency, modular implicit knowledge would be likely to have increased. Not filtered by learned knowledge, modular L2 knowledge of unaccusative verbs in the advanced level outperformed extra-modular L2 knowledge of unergatives in the Najdi Arabic L2 English learners in the error-correction task. This is because modular implicit L2 knowledge is a specialist system, and would naturally outperform extra-modular L2 knowledge; a non-specialist source of a second language.

In the findings from the reaction-time reading comprehension task, it seems that only modular implicit knowledge of unaccusativity and unergativity guides the comprehension of the test sentences by the Najdi Arabic L2 learners of English, as all Najdi Arabic L2 learners of English performed equally. This interpretation of the findings seems to be supported by the superficially contradictory findings from the two tasks, where the extra-modular knowledge of English unergativity seemed to intervene at the level of production (the error-correction task), but not at the level of comprehension (the reaction-time reading comprehension task). The intervention of extra-modular L2 knowledge results in statistically significant differences within each of the proficiency

groups between their production of unaccusative and unergative constructions in the error-correction task. This statistically significant difference manifests itself in higher accuracy rates in unergative test items than in unaccusative test items in the beginner and intermediate groups, but higher accuracy rates in unaccusative items than in unergative test items in the advanced group. Comparing such findings to the data from the reaction-time reading comprehension task, where there was no statistically significant difference in the reading pace of sentences containing unaccusative verbs and sentences containing unergative verbs, could support the interpretation that modular implicit knowledge of the L2 English could be guiding the comprehension of both unaccusative and unergative test items. This is because the beginner and intermediate higher accuracy rates in unergative constructions in the error-correction task do not seem to apply in the reaction-time reading comprehension task, where their reading pace did not appear to be faster in sentences with unergative construction. This could suggest that the performance (production and comprehension) on the two tasks could be guided by two different types of L2 knowledge. This would also suggest that extra-modular L2 knowledge could contribute to L2 performance during production, but not comprehension.

However, CSH does not say much about how learned knowledge intervenes during production and comprehension, and why. In the following section, I discuss CSH and suggest that it could be developed to benefit from MCF's detailed mental architecture.

7.2.3 Competing Systems Hypothesis revisited

Although CSH, as acknowledged by Long & Rothman (2013), is a hypothesis seeking to explain certain L2 performance (rather than to comment on the process of development), it can benefit from the detailed mental architecture offered by MCF to add clarity and explain key concepts in CSH. In this section, I present a brief critique of the hypothesis and offer a more explanatory discussion of its main concepts, using MCF.

The core assumption in CSH is the existence of two mental systems that compete to contribute to second-language production. The first is referred to by CSH as underlying grammatical competence, corresponding to modular implicit L2 knowledge in this thesis, and the second is referred to as the learned system corresponding to extra-modular L2 knowledge. CSH assumes that the two systems develop separately and remain separate even in advanced L2 learners. CSH, however, does not comment on how those two systems develop. While CSH maintains a modular view of language development, it refers to the learned system as grammar, highlighting the comprehensive nature and the true mental status of the system of learned metalinguistic knowledge. CSH refers to this system as grammar (contrary to generative second-language acquisition [SLA] traditions) also because, in advanced L2 learners, such a system would no longer be

conscious or declarative in nature, but it would have been proceduralised within the mind (Long & Rothman, 2013).

This assumption is very much compatible with the views of MCF's mental architecture, particularly about the language and conceptual modules which can accommodate language-related information. Incorporating a mental framework can add depth to the discussion of the two systems competing to contribute to L2 output by CSH. This is because CSH seems to only lightly discuss those two mental systems with little detail about the nature and development of each system and how the two co-exist, which is in in itself problematic as it makes it difficult to comprehend its assumptions. Within MCF, the learned system can be seen in terms of the conceptual module instantiating representations to handle the experience of L2 explicit training in the form of specifically designed pedagogical explanations. This would result in the instantiation of conceptual representations about metalinguistic knowledge of certain linguistic structure(s). This type of metalinguistic knowledge would start as conscious conceptual knowledge that L2 learners would likely be able to reflect upon, but can also be implicit through frequent processing, which would result in high resting levels of activation. The development of such conceptual representations of metalinguistic knowledge does not in any way affect the development of syntactic representations in the language module. However, both modules develop in a similar way, through the activation of representations during processing. The difference is that syntactic representations in the language module would always be implicit – not being able to pass a certain threshold for consciousness, whereas metalinguistic representations in the conceptual module could be both implicit and explicit depending on the nature of the knowledge in the conceptual memory store, be it declarative or procedural, which is directly affected by frequent processing.

Another unclear assumption within CSH is related to the notion of the intervention of the learned system at the level of production as opposed to its intervention at the level of comprehension. While this assumption very much explains the findings obtained from the two tasks in this thesis, CSH does not explain the basis on which this assumption is made and why is it the case that learned knowledge does not interfere at the level of L2 comprehension. Herein, I focus on the second part of the assumption (the non-intervention of learned knowledge at the level of comprehension) as it carries more ambiguity within CSH as the hypothesis only hints on it in all papers that discuss CSH (Rothman, 2008; Long & Rothman, 2013).

The only discussion undertaken by CSH regarding the non-intervention of learned knowledge at the level of comprehension in L2 learners is shown in the following quote:

> These separate systems remain intact through advanced stages and essentially provide two filters for linguistic performance. This means that even when interlanguage reaches a steady-state in advanced learners that is

representationally native-like in particular domains, the learned knowledge system can intercede, especially in highly monitored output, resulting in systematic errors. The prediction, therefore, is that once grammatical properties have been acquired at the mental representation level this system can interfere with production, but not comprehension. (Rothman, 2008, pp. 85–86)

While this explains the current findings, it does not provide much insight into why learned knowledge would not intervene at the level of comprehension. In an MCF perspective, learned knowledge would be stored as conceptual representations in the conceptual module. The learned knowledge would not intervene at the level of comprehension because the conceptual system would be processing meaning and concepts related to what is being heard, rather than pedagogical-based explanations about the linguistic structure that carry those meanings and concepts. Comprehension also means being conscious of what is being comprehended, and according to Baars's theory of consciousness (Baars, 1988; McGovern & Baars, 2007), we can only be conscious of one specific mental representation that has been selected among many others that are crisscrossing the mind. This selected mental representation is made globally available to our high-level decision systems, because of its relevance to the current input. Considering language comprehension, it is more effective to be attentive to the meanings and concepts of what is being heard/read, rather than focusing one's attention on information of grammatical rules about linguistic structure. This is especially true during conversation or when listening to a talk or a lecture, where time pressure is put on the conceptual module to make sense of a stream of concepts.

Modular implicit knowledge, however, would intervene at the level of comprehension. This can be explained by the notion that is suggested in section (7.2.1.1) that lexical understanding might trigger syntactic configuration in the learner's grammar. In MCF terms, conceptual processing of relevant representations to handle what is being comprehended would trigger, through the interface system, the activation of the corresponding syntactic representation and likely other representations from other modules. This would create a chain of representations (an index) to handle the current input. This could explain why it is the case that modular implicit L2 knowledge guides L2 comprehension, and why extra-modular L2 knowledge might only interfere at the level of L2 production.

Although there were no statistical differences in reaction-time reading scores between sentences with unaccusative verbs and sentences with unergative verbs, there was a clear proficiency effect on the reaction-time reading scores. The beginner group had the longest mean reaction-time score, and the advanced group scored the shortest mean reaction-time score. In the following section, findings from the reaction-time reading comprehension task are discussed in relation to the question of L1 cross-linguistic influence. I discuss the effect of proficiency on the reading pace of sentences

with unaccusative verbs and sentences with unergative verbs by Najdi Arabic L2 learners of English, comparing learners' reaction-time scores across proficiency levels. I also discuss findings from the error-correction task in relation to L1 cross-linguistic influence, investigating proficiency effects on learners' accuracy rates across different proficiency levels.

7.2.4   L1 cross-linguistic influence

The third theoretical question is that whether or not L1 cross-linguistic influence would decrease at higher-proficiency levels. It is hypothesised that L2 learners at low proficiency levels would start with the L1 value dominating the system, then as their proficiency level advances, L2 values will start to appear more frequently (Sharwood Smith and Truscott, 2006).This hypothesis is put forward for investigation through the third empirical research question: *Is there a difference between lower-proficiency learners and higher-proficiency learners with regard to their accuracy rates in the error-correction task and their reaction-time scores in the reaction-time reading comprehension task?* The overall prediction would be that the native language influence, in this case Arabic, would be more evident in lower-proficiency levels, and would decrease as activation levels of the L2 values start to form strong competitors against the L1 values.

This was tested through analysing the performance of the same offline task used in the first research question; the error-correction task, but aiming this time at comparing the lower-proficiency L2 learners' with the higher-proficiency L2 learners' ability to correct ungrammatical unaccusative and unergative sentences. The hypothesis is also addressed through the online task used in the second research question; the reaction-time reading comprehension task, which measure the reaction-time scores of reading unaccusative and unergative sentences, but comparing this time lower-proficiency learners' with higher-proficiency learners' reaction-time scores. In the following sections, results from the two tasks are discussed.

7.2.4.1   Insights from the error-correction task

In the following section, I first discuss results from the unaccusative verbs across all the three proficiency groups. Then, results from the unergative verbs across the three proficiency groups are discussed.

7.2.4.1.1   Type 1: unaccusative verbs

In providing grammatical alternatives to the ungrammatical unaccusative test sentences, the beginner group accurately scored 44 per cent. This indicates that more than half of the time, Najdi Arabic L2 learners of English accepted sentences like, *the accident was happened, *the boy was arrived at school, *the rabbit was appeared* (even though it was clear in the task instructions that there is something ungrammatical in each sentence,

but learners corrected other grammatical elements). The intermediate group accurately corrected 63 per cent of the ungrammatical unaccusatives, which revealed a statistically significant difference in accuracy rates compared to the beginner group's scores, with the intermediate group scoring higher in supplying grammatical alternatives to the ungrammatical test items containing unaccusative construction. The advanced group accurately scored 92 per cent of the unaccusative test items, which was also higher than that of the intermediate (63 per cent) and beginner group (44 per cent). Data from analysis of variance (ANOVA) tests on the unaccusative test items in passive condition shows that there is a statistically significant difference between each successive group with 2e-16 p- value *df(3.154)= 189.55,p <0.0.5*. The statistical difference occurs between all groups except for the advanced and control groups with a p of 0.75, which is expected given the high proficiency level of the advanced group.

As noted earlier, the realisation of unaccusativity diverges in English and Arabic, and Najdi Arabic L2 learners of English have the task of acquiring how these verbs work in English. The direct translations of the test verbs (*happen, appear, arrive*) in Arabic are licensed in passive structure, because they alternate in Arabic. Najdi Arabic L2 learners of English have to unlearn that these verbs alternate, and have to unlearn that those verbs request overt morphology to mark unaccusativity. Findings from the error-correction task across the three proficiency groups, with regard to unaccusative construction presented above, support the third hypothesis of this thesis, that Najdi Arabic L2 learners of English seem to shift from Arabic L1 values to English L2 values as their proficiency advances (i.e. the beginner group 44 per cent, the intermediate group 63 per cent, and the advanced group 92 per cent).

Theoretically, such findings would mean that just over half of the time, in the production of the beginner group, the L1 value (which licenses unaccusative alternations) would win the competition for insertion of the representations constructed during processing. This might have resulted in the beginner group of Najdi Arabic L2 learners of English considering utterances like *the rabbit was appeared* as grammatical. Within MCF views of cross-linguistic influence, this would be because L1 values co-exist in the mental architecture with newly forming L2 values (as information in the stores), with L1 values having higher activation levels as a result of the L1 values crossing a threshold and being 'the value' for this particular feature in grammar. This might suggest that the beginner group at this stage needs time and frequent processing of the right input for the L2 values to reach a point where they would be strong enough to compete with L1 values and maybe, in later stages of development, would dominate.

According to findings from the intermediate group (63 per cent of accuracy rates), both L1 Arabic and L2 English values would appear in their production of unaccusative construction. Results from the intermediate and beginner groups would suggest that

there appears to be a gradual shift in frequency of occurrence from L1 values in early stages of grammar development towards the dominance of L2 values in later stages. The cross-linguistic influence from Arabic would still be evident in the performance of the intermediate group in unaccusative verbs, which is expected, within the adopted view of L1 cross-linguistic influence, as both L1 and L2 values co-exist and compete to get selected. The more frequently processed a representation in the system, the more robust it is, and the higher activation level it would get. The ultimate result would be reduced cross-linguistic influence from L1 values, as L2 values gain higher resting levels of activation and providing the learner with accurate internal input to handle the current situation as it is the case with Najdi Arabic L2 learners in the advanced group scoring the highest accuracy rates (92 per cent) compared to the intermediate and beginner groups.

Here, it is important to note that according to MCF, cross-linguistic influence is not a matter of 'transferred' L1 values into L2, rather it is the system with mental syntactic representations that are formed obeying the system's primitives (UG), which are activated according to the available current input. Encountering a new second language, therefore, might involve activating new primitives to form syntactic representations for the new language. In other words, L2 values are innately found in the syntactic processor, and are inserted to the syntactic store when needed (to handle certain input). Thus, processing would apparently start with L1 values and would change as processing continues, which causes small but lasting effects on the L2 values' resting levels, which gradually come to win the competition over time and with frequent internal register in the system. This interpretation seems to be supported by the current findings from the beginner, intermediate and advanced groups' accuracy rates on unaccusative verbs in the error-correction task.

7.2.4.1.2   Type 2: unergative verbs

In supplying grammatical alternatives to the ungrammatical test items with unergative verbs, the beginner group accurately corrected 70 per cent of the test items with ungrammatical unergative verbs. This means that only 30 per cent of the time Najdi Arabic learners in the beginner group accepted the L1 values exemplified in sentences like *the boy was swam, *the mother was laughed* and *the baby was cried*. The intermediate group accurately corrected 84 per cent of ungrammatical utterances with unergative verbs. This is a statistically significant difference in accuracy rates compared to the beginner group's scores, with the intermediate group scoring higher in supplying grammatical alternatives to the ungrammatical test items containing unergative construction (*df(3.154)= 38.27,p <0.0.5*). The advanced group accurately scored 86 per cent of the unaccusative test items. This is not a statistically significant difference compared to the scores from the intermediate group (84 per cent), which were similar to

those of the advanced group (86 per cent), with a p of 0.39. The pattern of performance with regard to unergative verbs across the three proficiency levels differs from that of performance with unaccusative verbs, where there were statistically significant difference between all successive proficiency levels (i.e. between beginner and intermediate groups, and between intermediate and advanced groups).

Similar to the divergence between Arabic and English unaccusativity, the realisation of unergativity diverges in the same way, and Najdi Arabic L2 learners of English would have to learn certain properties applying specifically to the English unergatives. The direct translations of unergative verbs used in the current task (*laugh, swim, cry*) in Arabic are licensed in passive structure, because they alternate in Arabic. Najdi Arabic L2 learners of English have to unlearn that these verbs alternate, and have to unlearn that those verbs request overt morphology to mark unergativity. Findings from the error-correction task across the three proficiency groups, with regard to unergative construction, seem to only partially support the third hypothesis that Najdi Arabic L2 learners of English seem to shift from Arabic L1 values to English L2 values as their proficiency level advances (i.e. the beginner group 70 per cent, the intermediate group 84 per cent). However, there does not seem to be a significant difference between accuracy rates in the intermediate group (84 per cent) and accuracy rates in the advanced group (86 per cent). This again leads us to the notion of fossilisation, which might limit the development of the CS, but not the modular specialist system.

In theoretical terms, the beginner groups' high accuracy rates, relative to their proficiency level, with unergative verbs (70 per cent of correct responses) is not anticipated. This would suggest that English L2 values would dominate more often over L1 Arabic values for insertion of the representations constructed during processing. Participants in the intermediate group also exhibited high accuracy rates with regard to correcting unergative verbs. Within MCF, this would suggest that that L2 value started to have a stronger setting, where it has reached a point at which it dominates the majority of the time. The L2 value does not seem to have a comparable activation level to that of its L1 rival, as indicated by the high accuracy rates in supplying grammatical sentences to the ungrammatical unergative test items. However, the advanced groups' performance (86 per cent accuracy rates) in correcting unergative verbs was similar to that of the intermediate group (84 per cent accuracy rates).

As discussed in the investigation of RQ1 and RQ2, the Najdi Arabic L2 English learners' performance on the error-correction task on the unergative verbs might have benefited from learners' extra-modular knowledge of unergative verbs, as their properties are covered in pedagogical practices on intransitive verbs. This might be the case considering the relatively unexpected high performance of the beginner group. There seems to be a boost in the lower-proficiency groups in their performance with

regard to unergative verbs, which only improves slightly at the advanced level. Thus, caution should be taken when drawing conclusions about whether this would be an effect of L2 values of unergative verbs dominating the SS or a case of rich conceptual knowledge of unergative verbs in the CS formed through declarative knowledge in a formal classroom setting.

In MCF terms, it might be that the difference in patterns in the data between unaccusative and unergative test items would be a result of two different types of developed/developing mental representations, as an indirect result of two different learning contexts (namely, uninstructed unaccusatives and instructed unergatives). In the case of the development of unergative verbs, Najdi Arabic L2 English learners in the beginner and intermediate group seem to have benefited from classroom practice, which helped Najdi Arabic L2 learners of English construct better CS representations of their input. These improved CS representations serve as enrichment to language-related knowledge in CS, and might indirectly help the development of syntactic representations, as processing in SS is influenced by active representations in the CS. Thus, beginner and intermediate participants' knowledge of unergative verbs seems to be facilitated by the encounter of Najdi Arabic L2 learners of English to instruction that might have assisted in the construction of the representations that accurately capture the information conveyed by unergative verbs, which could help in the development of the language module. It might also be the case that this type of linguistic knowledge of unergative verbs would, in fact, be extra-modular L2 knowledge. Again, the discussion of the beginner and intermediate group's performance on unergative verbs, and why they showed a different pattern to that of the unaccusatives, leads us to two different interpretations of which type of knowledge is guiding Najdi Arabic L2 learners of English: modular implicit or extra-modular L2 knowledge. As discussed earlier, it is cognitively very difficult to identify what type of L2 knowledge is guiding the production of either unaccusatives or unergatives. Nevertheless, it is important to explore both types of L2 knowledge theoretically for the purpose of drawing attention to this important distinction. This advances the development of new experimental methods that might give more precise explanations of what might be happening in the learner's mind and how different stimuli are being processed and why.

7.2.4.2 Insights from the reaction-time reading comprehension task

Data from the previous task (the error correction) only partially supported the current hypothesis, as the rich conceptual knowledge of unergatives seems to have intervened at the level of production. Findings from the current task (reaction-time reading comprehension) show a consistent and strong pattern that there is indeed a statistically significant difference between each successive group in their reaction-time scores in reading sentences containing unaccusative and unergative verbs. This is similar to error

correction data only from unaccusative test items. It is also important to recall the discussion from RQ2, in which no statistically significant difference was found between unaccusative and unergative verbs.

Najdi Arabic L2 English learners in the beginner group exhibited the longest reaction-time scores. They took a mean of 3.6 seconds in reading sentences with verb type 1, non-alternating unaccusatives (*happen, appear, arrive*); a mean of 3.9 seconds in reading sentences with verb type 2, unergatives (*swim, laugh, cry*),;a mean of 3.1 seconds in reading sentences with verb type 3, alternating unaccusatives (*break, open, close*); and a mean of 3.4 seconds in reading sentences with type 4 alternating unaccusatives (*sink, freeze, melt*). Najdi Arabic L2 English learners in the intermediate group scored statistically significantly shorter than the beginner group and longer than participants in the advanced group. Learners in the intermediate group took a mean of 2.5 seconds to read sentences with verb type 1; 2.2. seconds to read sentences with verb type 2; a mean of 2.3 seconds to read sentences with verb type 3; and a mean of 2.2 seconds to read sentences with verb type 4. Participants in the advanced group scored the shortest reaction times of all experimental groups, and the difference was statistically significant. Their reaction-time scores were not statistically different from those of the native controls. Participants in the advanced group took a mean of 1.2 seconds to read sentences with verb type 1; 1.2 seconds to read sentences with verb type 2; 1.2 seconds to read sentences with verb type 3; and a mean of 1.1 seconds to read sentences with verb type 4. ANOVA tests comparing reaction times across proficiency levels revealed a significant difference (*df (3,15)= 81.46, p<0.05, df (3,15)= 161.2, p<0.05, df (3,15)= 134.1, p<0.05*, for verb types 1, 2 and 3, respectively).

In the findings from the reaction-time reading comprehension task, data from unaccusative (alternating and non-alternating) and unergative constructions seems to follow the same pattern. The only effect that is evident is proficiency, that resulted in advanced learners scoring the shortest reaction-time scores. In this task, the effect of rich conceptual knowledge of unergative verbs does not seem to be evident in the Najdi Arabic L2 English learners' comprehension of the test sentences. Their knowledge of unergative and unaccusative verbs seems to be of equal development in this task. Theoretically, this seems to match what CSH suggests – that learned knowledge might not be able to intervene at the level of comprehension. This would mean that modular L2 knowledge seems to be guiding comprehension of both unergative and unaccusative verbs. This type of knowledge would always be implicit and unconscious, operating automatically, with no deliberate introspection. In MCF terms, this modular implicit L2 knowledge is triggered through representations in the interface system indirectly connecting the SS and the CS. The conceptual representations activated to make sense of meanings and concepts related to test sentences might trigger the activation of

syntactic representations regarding the syntactic properties of these sentences. Conceptual knowledge about the syntactic properties of these sentences is not likely to be part of comprehension because it is neither necessary to comprehend the sentences, nor possible given the nature of the task and its pressure on time. It would be possible if participants were given open time for the conceptual representations of metalinguistic information to be processed as follow-up representations. However, that was not the case in the reaction-time reading comprehension task, which could explain why rich conceptual knowledge of unergatives in the error-correction task seems to be absent in the reaction-time reading comprehension task.

In sum, reaction-time scores of reading sentences with unergative verbs does not seem to be shorter than those of the unaccusative verbs in the beginner and intermediate groups, parallel to their higher accuracy rates in the error-correction task with unergative verbs. In light of the mental framework adopted, this would mean that modular implicit L2 knowledge would be guiding comprehension (as in the reaction-time task) and extra-modular L2 knowledge might only intervene during production, especially when L2 learners are given time to reflect on their conceptual knowledge, as in the error-correction task.

Throughout the whole thesis, the aim has been to tease apart these two types of L2 knowledge in real-time performance. This is why it is thought informative to measure learners' ability to analyse and reflect upon their responses in terms of instruction-based explanations and grammatical rules. In other words, measuring Najdi Arabic L2 learners of English metalinguistic knowledge. This was conducted, as discussed in Chapter 5, by incorporating questions asking participants to comment on why they think a certain sentence is ungrammatical in the error-correction and rule-verbalisation task. This would add up to the depth of our understanding of the nature of modular and extra-modular types of L2 knowledge.

The original purpose of the rule-verbalisation task was to test whether there is a correlation between the ability to correct an ungrammatical utterance and the ability to explicitly explain in terms of grammatical-based instructions what is wrong with such utterance. It was intended that such empirical design might further enrich our knowledge on which mental system might have guided learners in their performance in the error correction task. Unfortunately, this could not be achieved due to the fact that most participants did not do this part (rule-verbalisation) of the task, which will be explained in detail in section (7.2.5.).

7.2.5 Metalinguistic knowledge of second language

Attempts to measure metalinguistic L2 knowledge were converted into a rule-verbalisation task to test what linguistic structures Najdi Arabic L2 learners are aware of and able to reflect upon, which leads us to the fourth research question: *Is there a*

difference between the ability of Arabic L2 learners to verbalise instruction-based rules about the use of unaccusative verbs compared to the ability to verbalise violated rules about the use of unergative verbs?

7.2.5.1   Insights from the rule-verbalisation task

The question is addressed through a rule-verbalisation task, where Arabic L2 learners are given an ungrammatical sentence with either an unergative or unaccusative verb, then asked to state in terms of pedagogical rules why the sentence is ungrammatical. Mean scores of verbalising rules relating to ungrammatical unergative verbs are compared to mean scores of ungrammatical unaccusative verbs. It is predicted that L2 learners will show higher accuracy rates in verbalising rules regarding unergative verbs more than in those concerning unaccusative verbs.

The overall prediction is that lower-proficiency groups will have the tendency to perform better in verbalising pedagogical instruction-based rules in unergative verbs than higher-proficiency groups, based on the theoretical assumption that extra-modular L2 knowledge starts as declarative knowledge which is stored in short-term memory. This means that this type of knowledge is more accessible for self-reflection than proceduralised or automatised conceptual knowledge or even the encapsulated syntactic knowledge of higher-proficiency learners (Criado, 2016; DeKeyser, 2017; DeKeyser, 2010). It is also predicted that learners will show higher accuracy rates in verbalising violated rules related to unergative structure than in verbalising violated rules related to unaccusative structure. In the following section, I discuss the data from all proficiency groups.

Originally, data from the rule-verbalisation task was thought to provide further insights of how to explain why Najdi Arabic L2 learners of English exhibit two different patterns of performance with regard to unaccusative verbs and unergative verbs in the error-correction task. The aim of this empirical task was to investigate whether or not Najdi Arabic L2 English learners are conscious of their linguistic knowledge of either unaccusative or unergative verbs, and whether they are able to reflect on it. Whether or not they are conscious of their knowledge of the two classes of intransitives would deepen our understanding of what type of linguistic knowledge Najdi Arabic L2 English learners might have on unaccusatives and unergatives; that is, whether it would be modular implicit L2 knowledge or extra-modular implicit or explicit L1 knowledge.

To the greatest of my disappointments, the majority of participants in all proficiency groups did not provide responses to this part of the task. The task was presented along with the error-correction task; that is, participants had to provide an alternative to the ungrammatical test sentence and then state in terms of instruction-based grammar rules why it is ungrammatical. Most of participants skipped completing this part of the task either because they could not, which two advanced participants wrote

explicitly, or because they did not attempt it. Either way, I was left with less data to discuss than predicted. In this case, individual qualitative analyses of data from the rule-verbalisation task might give further insights into Najdi Arabic L2 learners' of English knowledge on unaccusative and unergative structures. I start with the intermediate group because their results are the most informative, then I discuss results from the advanced group and the beginner group.

The intermediate group constituted a total of 45 participants, only six of whom were able, to some extent, to explain why the unaccusative test items were ungrammatical in the rule-verbalisation task. This made a total number of only 10 responses of correct grammatical explanations. Of those six intermediate participants, one achieved three correct grammatical-based explanations out of nine unaccusative test items; two participants provided accurate explanations to only two out of nine unaccusative test items; and three of the participants were able to provide explanations to only one of the nine unaccusative test items. The case is different with regard to verbalising rules of unergative verbs. Fifteen of the intermediate groups' participants were able to provide instruction-based explanations to the ungrammatical unergative verbs in the rule-verbalisation task. This made a total number of 47 responses from those 15 participants, explaining why ungrammatical unergative verbs are considered ungrammatical in English.

Although the sample is not large enough, the difference between the ability to verbalise grammatical rules related to unaccusatives is significantly different from that of unergatives (*df (4)= -4.26, p< 0.05.*), with significantly higher accuracy rates with articulating violated rules related to unergative verbs. Comparing the intermediate group's results to results from the error-correction task, where the intermediate group showed the same pattern; that is, performed better in correcting ungrammatical unergative verbs than unaccusative verbs, it seems apparent now that the development of unergative verbs is positively affected by explicit knowledge of L2 grammar and formal instruction, and that the latter seems to have equipped the Najdi Arabic L2 English learners with linguistic knowledge that boosted their performance in the error-correction task, as shown by their ability to reflect upon their knowledge of unergative verbs, more than their ability to reflect upon their knowledge of unaccusative verbs in the rule-verbalisation task. This was shown through their ability to provide instruction-based grammar rules explaining why unergative verbs were ungrammatical significantly more than their ability to explain why unaccusative verbs were ungrammatical in the rule-verbalisation part of the task. It does not seem likely that participants worked out their own rules, considering that, according to the British National Corpus, the tested unergative verbs are in fact less frequent in the external input (*swim* 1,374; *cry* 3,053; *laugh* 3,546) than unaccusative verbs (*happen* 8,404; *appear* 10,597; *arrive* 2,802).

Data from Najdi Arabic L2 learners in the advanced group showed a similar pattern; participants provided more instruction-based explanations for ungrammatical unergative test items than ungrammatical unaccusative test items, but the difference is the smallest compared to other proficiency groups. Only six participants in this group provided a total of nine correct responses to why unaccusative test items were considered ungrammatical in the given test items. A slightly greater total of 13 correct responses from four participants in this group explained the violated rules in the given ungrammatical unergative test items.

Data from Najdi Arabic L2 learners in the beginner group are even less informative than those of the intermediate, but still show a similar pattern. None of the participants provided instruction-based explanations for why unaccusative verbs were considered ungrammatical in English, while seven participants from the beginner group provided a total of 17 responses accurately explaining why unergative test items were considered ungrammatical in the test items. Learners' knowledge of unergatives in the beginner group seems to be more accessible to conscious introspection than their knowledge of unaccusatives. This is similar to the pattern found in the data from the error-correction task, where accuracy rates were significantly higher with regard to unergative verbs than unaccusative verbs. However, due to the small sample, caution should be taken when drawing conclusions about what this would mean in terms of the type of linguistic knowledge that might represent each construction.

7.3 Summary and conclusion

A conceptual and empirical approach was followed to investigate modular implicit L2 knowledge and extra-modular implicit or explicit L2 knowledge in Najdi Arabic learners of L2 English. Online and an offline tasks were incorporated to investigate the L2 knowledge of intransitivity to capture such knowledge from different angles, which adds depth to the discussion of the nature of modular and extra-modular knowledge and their development and, perhaps, interfaces. The MCF was adopted as a tool to arrive at the most detailed and precise explanation possible for the two types of linguistic knowledge investigated. The MCF mental architecture seems to push forward the possibility of teasing apart these two types of linguistic knowledge of a second language.

Findings from the research supported Rothman's (2008) CSH: that extra-modular L2 knowledge would intervene at the level of production but not at the level of comprehension, as shown by seemingly contradicting patterns of performance by Najdi Arabic L2 English learners in the error-correction task as opposed to the reaction-time reading comprehension task. CSH can be developed into a more explanatory hypothesis with the privilege of a detailed account of language processing and development offered by MCF mental architecture. Findings in the study also showed a proficiency effect

across all proficiency groups in both the error-correction task and the reaction-time reading comprehension task, which would support the interpretation that L1 cross-linguistic influence would decrease gradually as proficiency levels advance. Evidence also suggested that participants have a richer mass of metalinguistic knowledge on instructed unergative verbs as obtained by the rule-verbalisation task. The findings should be approached with caution as the sample was not big enough due to participants skipping this part of the task.

Chapter 8 Conclusion

8.1 Introduction

The widely accepted assumption in the field of second language acquisition (SLA) is that there exists two types of second-language knowledge contributing to the final product of L2 performance. The concern of this thesis is that there seems to be little attempt to empirically distinguish between the two types of L2 knowledge at different stages of development. This is because of the challenging nature of such research and the difficulty of differentiating between the two types of L2 knowledge as overt L2 performance would be similar, be it modular or extra-modular knowledge that dictates that performance. The majority of generative second language classroom studies[13] collectively assume that the type of L2 knowledge being tested is the modular language knowledge within language faculty, without further investigation of such an important query. The implication on the field of SLA has been that these two types of L2 knowledge are unexplored and under-theorised.

This thesis adopts a theoretical approach with an empirical attempt to establish a detailed account of the types of L2 knowledge involved in L2 production and comprehension, through investigating the types of L2 knowledge representing unaccusative verbs and unergative verbs in the mind. These types of L2 knowledge are referred to as: Modular Implicit L2 Knowledge, Extra-modular Implicit L2 Knowledge and Extra-modular Explicit L2 Knowledge. The thesis pioneers in studying the mental representations of unaccusativity and unergativity in the second language in different stages of development, benefiting from the detailed account of language development offered by the Modular Cognitive Framework (MCF) (Truscott & Sharwood Smith, 2004a; 2004b).

8.2 The study

The investigation of unaccusative and unergative verbs has long been focused around questions about access to UG, which was inspired by Zobl's (1989) work on what is now known as learnability problem of unaccusative verbs. Zobl pioneered the investigation of the learnability problem within the Unaccusative Hypothesis, assuming that L2 learners have access to UG because of their sensitivity to the unaccusative-unergative distinction. This work has inspired a great deal of research into this question. This SLA scope has soon created controversy among researchers of whether or not L1 effects are evident on L2 learners' production of unaccusative verbs, with Zobl (1989) and Balcom (1997), for example, concluding absence of L1 effects and Montrul (2000) suggesting evident L1

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[13] There exists a growing interest among SLA researchers in this regard (e.g. Marsden et al., 2018; Rothman, 2008).

effects to some extent. More recent questions on the learnability problem of unaccusative verbs include investigations onto the effects of formal instruction on the acquisition of unaccusative verbs (e.g. Hirakawa, 2013). Interesting and unexpected ungrammatical patterns have been investigated and analysed such as overpassivisation and overcausativisation. Overpassivisation is the use of unpassivisable verbs (e.g. intransitive verbs) in a passive (BE-V-en) structure, which was also observed in the current study with the Najdi Arabic L2 learners of English showing instances of this non-target-like performance in their acceptance of ungrammatical instances of unaccusative and unergative verbs in passive construction. Overcausativisation refers to the ungrammatical use of S-V-O pattern with intransitive verbs, which was also found in the production of Najdi Arabic L2 learners of English in the current study. However, most (if not all) of this body of research has continued to investigate these patterns in terms of their relation to the operations of specific principles of UG, with no concern about what type of L2 knowledge is being tested. Within generative research, it has been constantly assumed that it is modular L2 knowledge that is being called upon, disregarding the fact that extra-modular L2 knowledge might develop to be procedural.

Adopting MCF, UG is necessarily embodied in the SS and the PS – more specifically in the processors that construct representations from the internal input. As asserted by Sharwood Smith & Truscott (2014) the question of whether L2 learners have access to UG or not is a question of whether these processors are still functioning as they were in the development of L1. The present thesis advances a developmental-based approach to understanding second language data, which seems to be often overlooked by the vast majority of research in the field of generative SLA. This approach gives consideration to what type of L2 knowledge is being tested. Assuming two types of L2 knowledge without putting empirical efforts to differentiate the two in L2 data might lead to inaccurate interpretations of the findings. A developmental-based approach, for example, might be able to explain contrary evidence to the notion of UG access; that is, findings supporting the no-access to UG view (Flynn, 1987; Bley-Vroman, 1988; 1990; Clahsen & Muysken, 1989; White, 1989; Zobl, 1990). These data might be explained in terms of limitations of the extra-modular system, rather than malfunctioning of primitives in the SS and PS processors for the second language in adulthood. Learning a second language within the modular system entails activating L2-related primitives to deal with the new L2 input. The function of the SS and PS processors are available to L1 and L2 in the same manner. The only difference is that the stores are already accommodating another fully developed language (L1) (Sharwood Smith & Truscott, 2014). Thus, the access metaphor, as beneficial as it was in inspiring a great deal of research, might be confusing as "[t]here is no container and there are no mechanisms that would look to one for guidance" (Sharwood Smith & Truscott, 2014, p. 230). In my point of view, a

developmental-based approach to understanding second language acquisition, and specifically syntactic derivations, is in fact a pre-requisite to the conventional property-based approach to understanding L2 knowledge. Such approach would be able to yield consistent and meaningful interpretations of empirical findings, and might assist in avoiding confusion in understanding contradictory L2 empirical data.

The thesis also puts emphasis on the effect of the type of input L2 learners encounter in the development of different types of mental representations. It also focuses on what type of mental representations, modular or extra-modular, might guide L2 production, and what type of mental representations might guide L2 comprehension. The study also highlights the influence of empirical design on the interpretation of the findings, as seen by the seemingly contradictory findings from the on- and offline tasks from the exact same sample. If the case was only to consider one task or the other, it would have yielded a different interpretation.

Findings from the current study seem to support what the Competing Systems Hypothesis (CSH) seems to suggest, which has been able to explain findings from both empirical tasks. The current thesis also benefited from the MCF and current theories in psychology (Baars, 1988; McGovern & Baars, 2007) to understand and develop the claims of CSH (Rothman 2008).

8.3   Limitations and directions for future research

The current thesis has shown that there might be a slightly more advanced approach in studying what is happening in the L2 learner's mind than the current property-based approach. One area of future research which would be interesting is to explore what this developmental-based approach can inform us about issues related to unaccusative and unergative verbs such as overpassivisation and overcausativisation. What would be more interesting is looking at different linguistic phenomena within such approach, such as the L2 acquisition of inflectional morphology which has puzzled the field for decades. Another area of future research might be designing a different way of looking at different linguistic phenomena, taking into consideration the two types of L2 knowledge when carrying out experimental designs. The online test of the current study yielded statistically insignificant results in terms of the difference between unaccusative and unergative verbs, unlike the off-line test. It might be informative to design a different way of investigating overpassivisation, for example, which would inform us about the role that extra-modular L2 knowledge might have played in the production of ungrammatically passivised unaccusative and unergative verbs. This might open a new way of understanding overpassivisation or any other linguistic phenomenon.

One of the most challenging parts of the current study was figuring out the experimental design. The design underwent many phases of piloting over two years to

arrive at its current form. Nevertheless, a few decisions could have been reconsidered and issues could have been avoided to enhance validity and generalisability of findings. The research described in this thesis is based on the assumption that unaccusative verbs are uninstructed and unergative verbs are instructed in the formal classroom. The current study benefited from the existing oversimplification practices in the language classroom in teaching intransitive verbs. The type of L2 input received by the participants who took part in the current study was not monitored or controlled. All participants of the current study started their English learning in a formal setting. The findings of the current thesis would have been more reliable if a group of naturalistic L2 learners was considered and compared to a group of classroom learners. This would ensure that they do not encounter classroom experiences encouraging them to develop their analytical skills in grammar.

However, such a sample was very difficult to find among Najdi Arabic speakers within the researcher's reach, where almost all Najdi Arabic speakers are taught English formally. Figures of Saudi immigrants in the UK are very low (less than a hundred in the past ten years according to a 2009 UK government report).[14] It would be informative to approach participants with a different L1, where naturalistic learning of an L2 can be more easily found. Another limitation with the sample is that it is small and represents a narrowly-defined population, which puts considerable limitations on the efficacy of generalising the findings. Thus, future research would benefit from a more random sample to reinforce the reliability of findings. Adding participants with different L1s would enhance the validity and generalisability of the research.

Incorporating classroom as well as naturalistic L2 learners of different L1 backgrounds would allow us to establish better understanding of the two types of L2 knowledge, how they develop, how they interact with L2 input and how properties of L1 affect their development. Such an approach would allow us to obtain more robust findings. This approach will be kept open for future research.

In addition, methodological design could have been improved to yield more reliable results. First, the sessions in which participants performed the tasks were rather long, which might have affected the data obtained. Sessions, which lasted from 30 to 45 minutes, seemed to cause fatigue in participants, who sometimes showed signs of boredom, and this resulted in a number of participants being excluded as they were not reading sentences in the reaction-time reading comprehension task, as indicated by their responses to questions measuring attention to the task and their short reaction time (RT). This also might have affected the error-correction and rule-verbalisation task, in which

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[14] The Saudi Arabian Muslim Community in England: Understanding Muslim Ethic Communities (www.communities.gov.uk).

the majority of participants skipped the part where they were asked to give some instruction-based explanations. At that point participants might have been too tired to explain why a certain utterance is ungrammatical in English and might have opted to only respond to the easier part of the task, where they were asked to give an alternative grammatical sentence. This could have been avoided by arranging the sessions over two different days, when participants could have benefited from a fresh start for each task.

Second, in the error-correction task, there were 30 test items which were initially thought sufficient, given the lengthy nature of the test sessions. Those tested verbs were presented in two different conditions: either in ungrammatical causative pattern (e.g. *she happened an accident*) or in ungrammatical passive pattern (e.g. *the accident was happened*). However, the total number of test items in the passive condition was 18, whereas the total number of test items in the causative condition was 12. This is because there were five tokens of each tested verb, and the decision was made that three out of the total five would be in the passive condition and two to be in the causative condition, resulting in unequal distribution of the conditions. This could have been avoided by adding one more token in the causative condition, but the focus, at that time, was put into constructing a reasonably measured task in terms of length. The low number of tokens in the causative condition might have affected findings, especially in the beginner and intermediate data, which did not yield any statistical value. Another limitation in the error-correction task is that the task as a final product seems rather repetitive. This could have been avoided by including more test verbs (i.e., five instead of three) and less tokens (i.e., two instead of five). This will ensure varieties of verbs, which will decrease the possibility that participants would figure out the pattern of the test. Such limitations in the methodological design will certainly be avoided in future research.

Finally, any project with an interest in investigating types of L2 knowledge in the mind would benefit from a more interdisciplinary approach, as neurology and psychology has a lot to offer. The design of the current thesis would have benefited from more psychometric measures, such as eye-tracking and techniques in neurology, such as fMRI (Functional Magnetic Resonance Imaging). In my point of view, making such measures and techniques accessible to SLA researchers, or even collaborating with fellow researchers in the field of psychology and neurology, would substantially educate us in a lot of unknown areas of language.

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Appendix A: Consent Form

Informed Consent Form for Experimental Participants
Please read the following information carefully. You can also request a copy for future reference.
Experiment: Reading Comprehension and Error Correction in English.
Experimenter: Maha Al Khalaf.

DESCRIPTION: You are invited to participate in a research study that investigates the processing of written text in English by Arabic L2 speakers and by native speakers of British English. The experiment consists of two tasks. In the first task, you will be presented with a set of mini-stories. You are required to read the sentences that appear on the screen carefully, and then answer comprehension questions about the stories you have read. In the second task, you will be presented with ungrammatical sentences in English. You are required to correct these ungrammatical sentences and explain why they are ungrammatical. This study explores how second language speakers process certain linguistic constructions.

RISKS AND BENEFITS: There are no known risks involved in this procedure. There are no benefits to participation.

TIME INVOLVEMENT: Your participation will take approximately 30 minutes.

SUBJECT'S RIGHTS: If you have read this form and have decided to participate in this experiment, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time. You have the right to refuse to answer particular questions. Your individual privacy will be maintained in all published and written data resulting from the study.

If you agree with the above-stated conditions and are willing to participate in the experiment, please sign below. By signing the form, you confirm that you meet the following conditions:

- You are a Najdi Arabic second language speaker of English or a native speaker of British English.
- You are at least 18 years old.
- You have read the above consent form, understood it and you agree to it.
- You want to participate in the above-mentioned experiment.

Name:
Date:
Signature:

Appendix B: Demographic Questionnaire

A. General Background Information

    1. Name (last, first, middle):

    2. Age:

    3. Gender:

    4. Email:

B. Educational Background:

    5. What is the last degree you obtained?

    6. Do you hold (or in the process of holding) a degree from a university where English is the primary language of instruction? Yes/ No

    7. If Yes, write the name of the university, the name of your degree, and the years of study (example: University of Leeds, MA, 2 years).

C. English Language Background (second language speakers of English only)

    8. How long have you been learning English? Years: Months:

    9. Have you ever lived in a country where English is the primary language of communication? Yes / No

If the answer to 9 is yes, please do 10 and 11. If the answer is no, please go to 12.

    10. Which country?

    11. How many years/months? Years: Months:

    12. Do you use or encounter English outside the classroom? Explain.

    13. Do you speak any other languages? Yes/ No

D. Language Background (Native speakers of English only)

    14. Do you know or speak any other languages? Yes/No

    15. If yes, please write which languages do you speak and rate them in a scale from 1 to 5, where 1 means you can barely communicate in that language

and 5 means you can communicate very well in the language (e.g., French1, Spanish3, Hebrew5).

Appendix C: Placement Test

Please fill in the blanks in the following passage. Each blank must have **one and only one word.**

Joe came home from work on Friday. It was payday, but he wasn't _____ excited about it. He knew that _____ he sat down and paid his _____ and set aside money for groceries, _____ for the car and a small _____ in his savings account, there wasn't _____ much left over for a good _____.

He thought about going out for _____ at his favourite restaurant, but he _____ wasn't in the mood. He wandered _____ his apartment and ate a sandwich. _____ a while, he couldn't stop himself _____ worrying about the money situation. Finally, _____ got into his car and started _____. He didn't have a destination in _____, but he knew that he wanted _____ be far away from the city _____ he lived.

He drove onto a quiet country _____. The country sights made him feel _____. His mind wandered as he drove _____ small farms and he began to _____ living on his own piece of _____ and becoming self-sufficient. It had always _____ a dream of his, but he _____ never done anything to make it _____ reality. Even as he was thinking, _____ logical side was scoffing at his _____ imaginings. He debated the advantages and _____ of living in the country and _____ his own food. He imagined his _____ equipped with a solar energy panel _____ the roof to heat the house _____ winter and power a water heater. _____ envisioned fields of vegetables for canning _____ preserving to last through the winter. _____ the crops had a good yield, _____ he could sell the surplus and _____ some farming equipment with extra _____.

Suddenly, Joe stopped thinking and laughed _____ loud, "I'm really going to go _____ with this!".

Appendix D: Reaction Time Comprehension Task[15]

Read the questions carefully and choose the correct answer according to stories you just read on the screen

---

The stand-up comedy was so funny. *Everybody laughed really hard*.

Who caused the laughing and who laughed?

1. The comedian laughed at the audience.
2. The comedian's jokes made everyone laugh.
3. The dog passing randomly by the stage made everybody laugh.
4. None of the above.

Natalia was so depressed that her friends wanted to help. To make her feel better, they started telling her funny jokes; *and finally, Natalia laughed*.

What happened after Natalia interacted with her friends?

1. She decided not to talk to them again.
2. She made them laugh.
3. They told her jokes to make her laugh.
4. None of the above.

The whole family had a sense of humour. However, Oliver was the funniest. *Everybody laughed so much* when he was around.

Which statement about the story is true?

1. Nobody wanted to talk to Oliver.
2. The family made Oliver laugh.
3. Oliver arrived late.
4. None of the above.

The mother took her daughter to the vaccination appointment. The nurse was so gentle with the injection, *but the little girl cried*.

---

[15] This document shows the materials used for the computer-based reaction time reading comprehension task. In the real experiment, the stories were presented randomly on the screen and they were not presented along with the comprehension questions measuring attention to the task.

What was the result of the little girl having the vaccine injection?

1. The little girl was scared.
2. The little girl was proud of her bravery.
3. The little girl cried.
4. None of the above.

Lisa returned home from work. After realising that she had left her wallet in the taxi, *Lisa cried so loudly*.

Which statement about the story is true?

1. The taxi driver made Lisa cry.
2. Lisa cried after realising she had lost her wallet.
3. Lisa went to the supermarket.
4. None of the above.

Holly's dad was seriously ill. When Holly arrived at the hospital, her dad was unconscious. *Sadly, Holly cried hysterically* because she was frightened that he was dead.

What happened in the hospital?

1. Holly visited her friend who had had an accident.
2. Holly had her monthly check.
3. Holly cried because of her dad's serious illness.
4. None of the above.

The swimming teacher was an expert. *The children swam skilfully*.

What was the result of the teacher being an expert?

a. The children were satisfied.
b. The children swam skilfully.
c. The pupils learned to read very quickly.
d. None of the above.

The dog fell into the river. However, the rescue team arrived just in time; *they swam very quickly* and saved the little dog.

Which statement about the story is true?

1. The dog was enjoying a swim in the river.
2. The rescue team did not do the job well.
3. The rescue team swam quickly to save the dog.
4. None of the above.

Toddlers should be introduced to swimming as early as possible. It is quite surprising how *toddlers swim so well*.

What is the benefit of introducing swimming to toddlers?

1. They will spend quality time with their parents.
2. They will have stronger bones.
3. They will be able to swim well.
4. None of the above.

Bill was having a nice picnic when he heard a noise in the bushes. *Suddenly, a rabbit appeared*.

What happened in the park?

1. Bill enjoyed his daily walk.
2. Bill chased a rabbit.
3. A rabbit appeared from the bushes.
4. None of the above.

The magician performed several tricks. During one of her tricks, she was holding an empty hat, and *a bird suddenly appeared* out of the hat.

Which statement about the story is true?

1. The magician was funny.
2. The magician pulled a bird out of the hat.
3. The show tickets were expensive.
4. None of the above.

In the morning, the fog gradually lifted. After half an hour, *the green fields appeared* from quite a distance.

What happened when the fog lifted?

1. The weather was sunny and warm.
2. Farmers went back to the green fields.
3. The green fields appeared from a distance.
4. None of the above.

Jim is an irresponsible driver. *An accident happened yesterday*, and I knew it was him when I heard a loud bang.

Which statement about the story is true?

1. Jim caused an accident.
2. Jim went to New York.
3. Jim gave up driving.
4. None of the above.

The police sent out a warning reporting that *unfortunately, several crimes happened* in the neighbourhood in the last few months. Locals were advised to check that their homes were well-secured against robbery.

What did the police announce?

1. Residents in the neighbourhood were advised to move.
2. A severe weather warning.
3. Several crimes happened in the neighbourhood.
4. None of the above.

The weather was foggy in the past few days. *Unfortunately, many accidents happened* on the motorway.

What was the consequence of the foggy weather?

1. Limited visibility.
2. Many accidents happened.
3. Less traffic on the roads.
4. None of the above.

The teacher emphasised punctuality. Yesterday, she was disappointed because *two students arrived late*.

Which statement about the story is true?

1. The teacher arrived late.
2. The meeting was cancelled.
3. The students arrived late.
4. None of the above.

Helen had a heart attack, and her friend called an ambulance. *It arrived on time*, and Helen was taken care of.

What happened when Helen had a heart attack?

1. Her friend took care of her at home.
2. Helen soon died.
3. An ambulance arrived just in time.
4. None of the above.

Steve had an exam yesterday; he went to the bus stop on time, but *the bus never arrived*, so Steve decided to take a taxi to the university.

What happened when Steve was waiting for the bus?

1. Steve met his friend.
2. The bus arrived on time.
3. Steve decided to walk to the university.
4. None of the above.

It was snowing yesterday. As a result of the freezing weather, *the window suddenly broke*.

Which statement about the story is true?

1. The boy broke the window with his ball.
2. The window was replaced with a new one.
3. The window broke by itself.
4. None of the above.

The old lady has a wonderful collection of old vases. One of the vases had been cracked. *Unfortunately, it broke yesterday*.

What happened to the old lady's vases?

1. The vases were taken to a museum.
2. A visitor carelessly broke one of the vases.

3. One of the vases broke by itself.

4. None of the above.

The little boy had a low-quality pencil. The boy had just started drawing but *the pencil shortly broke*.

What broke the pencil?

1. The boy broke the pencil.

2. The teacher gave the boy a star sticker.

3. The pencil broke because it was of low quality.

4. None of the above.

Yesterday's show was amazing. The dancer arrived on stage. *Then, the curtains opened* and the show started.

What happened when the dancer arrived?

1. The dancer fell off.

2. The dancer performed very well.

3. The curtains opened.

4. None of the above.

Sally went to the new library last week; she was trying to push the door open, when she realized that it was an automatic door and *it opened by itself*.

Which statement about the story is true?

1. The librarian opened the door.

2. Sally had some friends over for dinner.

3. The door opened by itself.

4. None of the above.

Stefani stayed at a modern hotel. When she walked towards the gates, the doors *opened automatically*.

Which statement about the story is true?

1. The door opened by itself as Stefani was approaching.

2. Stefani spent some time with her mum.

3. The hotel staff opened the door.

4. None of the above.

When the girl walked into the elevator, *the door closed automatically*.

Who closed the elevator door?

1. The gentleman who was standing outside the elevator.
2. The girl closed the door.
3. The elevator door closed by itself.
4. None of the above.

Sara heard an argument at the front door, but she could not make out the words. The talking stopped and *the door closed shut*.

Which statement about the story is true?

1. Sara closed the door.
2. The front door closed shut.
3. Sara was studying in the library.
4. None of the above.

Adam has the habit of leaving the house without closing the door. His housemate always checks the door after Adam leaves. Yesterday, he left the door wide open, but luckily it was windy. *So, the door closed*.

What happened when Adam left the house yesterday?

1. Adam went to the gym.
2. Adam's housemate closed the door.
3. The door closed by itself.
4. None of the above.

The ship was in a collision with a dredger on the Thames. *Then, the ship sank*.

Which statement about the story is true?

1. A group of pirates sank the ship.
2. The party started at 7 pm.
3. The ship sank after a collision.
4. None of the above.

A little boat hit a big rock, and then *the boat gradually sank*.

Which statement about the story is true?

1. A shark attacked the boat.
2. The girl moved home last week.
3. The boat sank when it hit a rock.
4. None of the above.

The ship was not well-equipped to sail, but nobody noticed this. *Unfortunately, the ship sank,* and only a few people were rescued.

Which statement about the story is true?

1. The rescue team arrived on time.
2. The cruise was fun.
3. The ship sank as it was not well-equipped.
4. None of the above.

We had a cold winter last year. *The river froze* solid.

Which statement about the story is true?

1. The weather was warm yesterday.
2. The river froze last year.
3. The friends went river skiing in France.
4. None of the above.

Nathan left the house for a month in the winter. He turned off the boiler before leaving. As a result, *the water completely froze* in one of the bathrooms.

What happened after Nathan left the house?

1. He had a cup of tea in the airport.
2. The water froze in one of the bathrooms.
3. The house was freezing cold.
4. None of the above.

Sara went to Sweden last winter. She started ice skating *when the lake froze*.

When did Sara start ice skating?

1. When she woke up in the morning
2. When the lake froze.
3. When she finished her exams.
4. None of the above.

Residents were being warned about flooding in the past few days. Sea levels were rising as *polar ice caps melted.*

What was the warning about?

1. Crime levels were rising in the city.
2. The polar ice caps melted, which caused floods.
3. Heavy rain was expected to cause floods.
4. None of the above.

It was snowing all week. The floors of the school yard were icy and slippery yesterday. *Finally, the snow melted* and it is safe for the children now.

Which statement about the story is true?

1. The children helped to melt the snow.
2. The snow melted and the floors are not slippery.
3. No dogs were allowed in the school yard.
4. None of the above.

Sara had a party last night. She prepared everything before her friends arrived. However, she left the ice-cream outside. *Unfortunately, the ice-cream melted*.

What happened after Sara prepared everything for the party?

1. None of her friends turned up.
2. She waited for her friends.
3. The ice-cream melted.
4. None of the above.

The chief is an expert at making burger. He makes burgers every day. *His family eat burgers every Friday*.

Which statement about the story is true?

1. The chief is specialized in Italian cuisine.
2. The new chief is attracting more and more customers.
3. The chief makes burgers for his family every Friday.
4. None of the above.

Since Erin started working in this bakery, she is putting on weight. *She eats all kinds of buttery pastries every day*.

Which statement about the story is true?

1. Erin is working in a new hotel.
2. Erin is following a new diet.
3. Erin eats pastries every day.
4. None of the above.

Tom is transitioning into veganism. He stopped consuming meat and dairy products. *He only eats yogurt* until he finds a plant-based alternative.

Which statement about the story is true?

1. Tom consumes meats and dairy product.
2. Tom eats yogurt.
3. Tom has just won a prize.
4. None of the above.

Jess and Eden are moving to London. *They bought a new house a few months ago.*

Which statement about the story is true?

1. Jess and Eden got married in London.
2. Jess and Eden opened a new business.
3. Jess and Eden bought a new house.
4. None of the above.

Amelia's car had broken down on the road many times. That is why *Amelia has just bought a brand new car*.

Which statement about the story is true?

1. Amelia started school.
2. Amelia had a rough day yesterday.
3. Amelia bought a new car.
4. None of the above.

The little girl loves puppies. On her birthday, *her mother bought her a puppy* as a birthday present.

Which statement about the story is true?

1. The mother loves cats.
2. The mother spends so much time at work.
3. The mother bought a puppy as a present.
4. None of the above.

Tylor's passport had expired and she had applied for a new one. *She got her new passport last week*.

Which statement about the story is true?

1. Tylor had a new job.
2. Tylor had her first driving license.
3. Tylor got a new passport.
4. None of the above.

The student had trouble finding a nice place to live near the university. *Fortunately, he got a permission* to live in the university accommodation.

Which statement about the story is true?

1. The student failed his exam.
2. The student got his permission to live in the university accommodation.
3. The student had a rough start this term.
4. None of the above.

The chief is a Belgian-chocolate professional. *He got his training in Belgium*.

Which statement about the story is true?

1. The chief got fired.
2. The chief got his training in Belgium.

3. The chief recruited new people.

4. None of the above.

Appendix E: Error Correction and Rule Verbalisation Task

INSTRUCTIONS

- Each of the following items has a pair of sentences. Please read both sentences carefully.
- Part of **the second sentence** is ungrammatical. Focus on it and do the following:

  1. Correct the ungrammatical sentence by supplying **a grammatical form** of it. Write down your answer in the space provided underneath each sentence.
  2. Explain what is wrong with the sentence in terms of **grammatical rules** that the sentence violates.

Examples

Example 1

My uncle likes fishing.

Yesterday, he catches a big fish.

Correct form: *he caught*

Grammar rule: *past tense verbs should be used because the sentence is in the past.*

Example 2

Mr. Ibrahim is an excellent teacher.

So, his students likes him.

Correct form: *students like*

Grammar rule: *the verb (likes) should only be used with singular pronouns. The subject here is plural. So, (like) should be used instead.*

Example 3

Last weekend, the weather was very hot.

Thus, many people go to the beach.

Correct form: *many people went*

Grammar rule: *the verb (go) should be used in the past tense because the first sentence indicated that the action happened in the past. Thus, (went) should be used here.*

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1. The teacher was an expert.

Fortunately, the teacher swam the children skilfully.

Correct form: ………………………………………………………………………….………

Grammar rule: ………………………………………………………………………..…………

2. The thief was arrested.

The following day, he was appeared in the news.

Correct form: ………………………………………………………………………………………

Grammar rule: ……………………………………………………………………..…………

3. Yesterday, the boat hit a big rock.
The boat sink gradually.

Correct form: ………………………………………………………………………….………

Grammar rule: ……………………………………………………………………..…………

4. There were many onions chopped for the meal yesterday.
Unfortunately, the onions cried the cook.

Correct form: ………………………………………………………………………………………

Grammar rule: ……………………………………………………………………..…………

5. Henry was driving his car carelessly.
Thus, he happened an accident.

Correct form: ………………………………………………………………………….………

Grammar rule: ……………………………………………………………………..…………

6. There was a festival in town last night.
All my friends come and we had a lovely night.

Correct form: ………………………………………………………………………….………

Grammar rule: ……………………………………………………………………..…………

7. The friends were camping in the forest, where smoking was prohibited because it is a fire hazard.
Nevertheless, the friends smoked and happened fire.

Correct form: ………………………………………………………………………………………

Grammar rule: ……………………………………………………………………..…………

8. The mother was upset and her children wanted to help.
So, the children laughed the mother.

Correct form: ………………………………………………………………………………………

Grammar rule: …………………………………………………………………………..…………

9. After spending many years in medicine school.
Ella graduates last week.

Correct form: …………………………………………………………………………….………

Grammar rule: ………………………………………………………………………..………….

10. Many people were badly injured last night.
But, within ten minutes, an ambulance was arrived.

Correct form: …………………………………………………………………………….………

Grammar rule: ………………………………………………………………………..…………

11. The mother was telling a funny story to the child.
So, the child was laughed.

Correct form: …………………………………………………………………………….………

Grammar rule: …………………………………………………………………………..…………

12. My friend had a bad cough last night.
So, I go to the drugstore to buy her a cough syrup.

Correct form: …………………………………………………………………………….………

Grammar rule: …………………………………………………………………………..…………

13. Yesterday, the weather was miserable.
          Many accidents were happened.

Correct form: …………………………………………………………………………….………

Grammar rule: …………………………………………………………………………..…………

14. The magician performed several tricks.
In one of the tricks, he appeared a bird from an empty box.

Correct form: …………………………………………………………………………….………

Grammar rule: …………………………………………………………………………..…………

15. The girl's laptop broke down yesterday.

She immediately takes it to a repair service.

Correct form: …………………………………………………………………………….……

Grammar rule: …………………………………………………………………………..…………

16. The fog went away gradually.
After half an hour, the house was appeared.

Correct form: …………………………………………………………………………….……

Grammar rule: …………………………………………………………………………..…………

17. John was training his puppy to swim, but the puppy was scared.
To encourage the puppy, she was swam very gently.

Correct form: …………………………………………………………………………….……

Grammar rule: …………………………………………………………………………..…………

18. It was very cold in Scotland last December.
The hotel's radiators was switched on 24/7.

Correct form: …………………………………………………………………………….……

Grammar rule: …………………………………………………………………………..…………

19. The new driver had little experience.
His car slipped out of the wet road and a collision was happened.

Correct form: …………………………………………………………………………….……

Grammar rule: …………………………………………………………………………..…………

20. Last Tuesday, George had an exam and decided to take a taxi.
The taxi arrived George on time.

Correct form: …………………………………………………………………………….……

Grammar rule: …………………………………………………………………………..…………

21. The kids enjoyed their trip to Disney land.
Many pictures were took during this trip.

Correct form: …………………………………………………………………………….……

Grammar rule: ……………………………………………………………………..…………

22. The house was on fire and fire fighters were called.
Within ten minutes, fire fighters were arrived at the house.

Correct form: …………………………………………………………………….……

Grammar rule: ……………………………………………………………………..………….

23. Hailey was taken to a beautiful resort last week.
She was swam in the swimming pool with her friends.

Correct form: …………………………………………………………………….……

Grammar rule: ……………………………………………………………………..…………

24. Amelia travels around the world for her work
She loves it, but she always suffer from jetlag.

Correct form: …………………………………………………………………….……

Grammar rule: ……………………………………………………………………..…………

25. Last night, the train was so late and Erin could not make it to her friend's wedding.
 She was cried in the train station.

Correct form: …………………………………………………………………….……

Grammar rule: ……………………………………………………………………..…………

26. The magician was very talented.
After shuffling all the cards together, he appeared the exact card that I chose.
Correct form: …………………………………………………………………….……

Grammar rule: ……………………………………………………………………..…………

27. The children were very hungry after a few hours in the pool.
The sandwiches was all gone in few minutes.

Correct form: …………………………………………………………………….……

Grammar rule: ……………………………………………………………………..…………

28. It was not safe to let children go to school by themselves.

Many children were arrived in their parents' cars yesterday.

Correct form: ……………………………………………………………………….……

Grammar rule: ……………………………………………………………………..…………

29. Mary was very depressed, and her friends wanted to help.
To make her feel better, Mary was laughed.

Correct form: ……………………………………………………………………….……

Grammar rule: ……………………………………………………………………..…………

30. The hot air balloon experience was very much needed.
All family members feels happy and uplifted.

Correct form: ……………………………………………………………………….……

Grammar rule: ……………………………………………………………………..…………

31. Sara was teaching her younger sister how to swim, but the swimming pool was
    full of people.
To avoid them, Sara swam her sister in the children's swimming pool.

Correct form: ……………………………………………………………………….……

Grammar rule: ……………………………………………………………………..…………

32. Last week, the test was too challenging for Kate to pass.
After she was shown her results, Kate was cried.

Correct form: ……………………………………………………………………….……

Grammar rule: ……………………………………………………………………..…………

33. The teacher has a sense of humour.
Yesterday, she told the students a funny joke, and all the students were laughed.

Correct form: ……………………………………………………………………….……

Grammar rule: ……………………………………………………………………..…………

34. Nowadays, chronic diseases are increasing.
People's own diet are the reason.

Correct form: ……………………………………………………………………….……

Grammar rule: ……………………………………………………………...…………

35. Last July, Johanna's aunt, who lives in a coastal area, invited Johanna to stay for two weeks.

Johanna's aunt took her to the beach, and Johanna was swam in the beautiful ocean.

Correct form: …………………………………………………………………….……

Grammar rule: ……………………………………………………………...…………

36. Last Monday, the school bus was late.

So, the bus arrived the children to school 15 minutes after the morning session had started.

Correct form: …………………………………………………………………….……

Grammar rule: ……………………………………………………………...…………

37. The teacher shouted at the noisy child.

Sadly, the teacher cried the child.

Correct form: …………………………………………………………………….……

Grammar rule: ……………………………………………………………...…………

38. The water was left running in the apartment for days.

So, a flood was happened.

Correct form: …………………………………………………………………….……

Grammar rule: ……………………………………………………………...…………

39. Adam does not like museums.

But he occasionally go to accompany his dad.

Correct form: …………………………………………………………………….……

Grammar rule: ……………………………………………………………...…………

40. Many children went to the circus to see the famous clown.

As expected, the clown laughed the children.

Correct form: …………………………………………………………………….……

Grammar rule: ………………………………………………………………………..…………

41. The doctor was not gentle enough with the little baby.
The baby was cried.

Correct form: ……………………………………………………………………….………

Grammar rule: ………………………………………………………………………..…………

42. The criminal was arrested.
The following day, he was appeared in the court.

Correct form: ……………………………………………………………………….………

Grammar rule: ………………………………………………………………………..…………

Thank you very much for your time and effort!
Researcher: Maha Alkhalaf

Appendix F: Ethical Approval

Performance, Governance and Operations

Research & Innovation Service

Charles Thackrah Building

101 Clarendon Road

Leeds LS2 9LJ Tel: 0113 343 4873

Email: ResearchEthics@leeds.ac.uk

UNIVERSITY OF LEEDS

Maha Alkhalaf

Linguistics and Phonetics

Room B01, Michael Sadler Building

University of Leeds

Leeds, LS2 9JT

PVAC & Arts joint Faculty Research Ethics Committee

University of Leeds

28 May 2019

Dear Maha

Title of study	**The nature of modular and non-modular implicit knowledge of language, with regard to deliberately versus. incidentally learned linguistic structures**
Ethics reference	**PVAR 15-009**

I am pleased to inform you that the above research application has been reviewed by the Arts and PVAC (PVAR) Faculty Research Ethics Committee and following receipt of your response to the Committee's initial comments, I can confirm a favourable ethical opinion as of the date of this letter. The following documentation was considered:

Document	Version	Date
PVAR 15-009 09 final Ethical_Review_Form_V3.doc	2	13 /10/15
PVAR 15-009 20150720consent form MW Comment.docx	1	10 /09/15
PVAR 15-009 form.fieldwork-assessment-form-medium-risk-2013 (1).doc	1	10 /09/15

Please notify the committee if you intend to make any amendments to the original research as submitted at date of this approval as all changes must receive ethical approval prior to implementation. The amendment form is available at http://ris.leeds.ac.uk/EthicsAmendment.

Please note: You are expected to keep a record of all your approved documentation, as well as documents such as sample consent forms, and other documents relating to the study. This should be kept in your study file, which should be readily available for audit purposes. You will be given a two week notice period if your project is to be audited. There is a checklist listing examples of documents to be kept which is available at http://ris.leeds.ac.uk/EthicsAudits.

We welcome feedback on your experience of the ethical review process and suggestions for improvement. Please email any comments to ResearchEthics@leeds.ac.uk.

Yours sincerely

Jennifer Blaikie
Senior Research Ethics Administrator, Research & Innovation Service
On behalf of Dr Kevin Macnish, Chair, PVAR FREC
CC: Student's supervisor(s)

Appendix G: Qassim Approval Letter

Kingdom of Saudi Arabia
Ministry of Higher Education
Qassim University
College of Arabic Language & Social Studies
Department of English Language & Translation

المملكة العربية السعودية
وزارة التعليم العالي
جامعة القصيم
كلية اللغة العربية والدراسات الاجتماعية
قسم اللغة الإنجليزية والترجمة

التاريخ : / / ١٤٣ هـ   الرقـم :

الموضوع :   المرفقات :

Date: 10 November 2016

Dear Sir/Madam,

This is to certify that Ms. Maha A. Alkhalaf has requested our permission to visit the Department of English and Translation, Qassim University for data collection purposes. Herein, we confirm our approval to her request without any other responsibilities concerning this study or the consents of the subjects. This approval covers the period from 1st December 2016 and on.

We look forward to working with her and seeing her study results.

Dr. Abdulrahman A. Althowab

Head of the Department of English and Translation, Qassim University

P.O.Box: 6611 - Buraidah: - Tel:(06) 3220271 - Fax:(06) 3220112   ص.ب: ٦٦١١ – بريدة: – هاتف: ٣٢٢٠٢٧١ (٠٦) – فاكس: ٣٢٢٠١١٢ (٠٦)

Appendix H: List of English Grammar Books and Webpages

Anon. [no date]. The intransitive verb. [Online]. [Accessed 15 August 2017]. Available from: http://www.chompchomp.com/terms/intransitiveverb.htm

Fogarty, M. 2014. Transitive and intransitive verbs. [Online]. [Accessed 15 August 2017]. Available from: https://www.quickanddirtytips.com/education/grammar/transitive-and-intransitive-verbs

Foley, M. and Hall, D. 2012. My grammar lab intermediate B1/B2. London: Pearson Longman.

Ginger Software. [no date]. Action verbs. [Online]. [Accessed 15 August 2017]. Available from: https://www.gingersoftware.com/content/grammar-rules/verbs/action-verbs/

Murphy, R. 2003. English grammar in use with answers: a self-study reference and practice book for intermediate students: with answers. Cambridge: Cambridge University Press.

Murphy, R. 2015. Essential grammar in use with answers: a self-study reference and practice book for elementary learners of English. 4th edition. Cambridge: Cambridge University Press.

Oxford Dictionaries. [no date]. Transitive and intransitive verbs. [Online]. [Accessed 15 August 2017]. Available from: https://en.oxforddictionaries.com/grammar/transitive-and-intransitive-verbs

Paterson, K. and Wedge, R. 2013. Oxford grammar for EAP: English grammar and practice for academic purposes. Oxford: Oxford University Press.

Swan, M. 2016. Practical English usage. Oxford: Oxford University Press.

Swan, M. and Walter, C. 1997. How English works: a grammar practice book: with answers. Oxford: Oxford University Press.

Traffis, C. [no date]. Transitive and intransitive verbs — what's the difference? [Online]. [Accessed 15 August 2017]. Available from: https://www.grammarly.com/blog/transitive-and-intransitive-verbs/

Vince, M. 2008. Macmillan English grammar in context. Intermediate with key. London: Macmillan Publishers Limited.

Vince, M. 2010. Intermediate language practice: English grammar and vocabulary. London: Macmillan Publishers Limited.

Walden University. [no date]. Grammar: transitive and intransitive verbs. [Online]. [Accessed 15 August 2017]. Available from: https://academicguides.waldenu.edu/writingcenter/grammar/verbs

Woodward English. [no date]. Transitive and intransitive verbs. [Online]. [Accessed 15

August 2017]. Available from: http://www.grammar.cl/english/transitive-intransitive-verbs.htm

Your Dictionary. [no date]. Intransitive verbs. [Online]. [Accessed 15 August 2017]. Available from: http://grammar.yourdictionary.com/parts-of-speech/verbs/intransitive-verbs.html