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| RESEARCH ARTICLE

A bottom-up approach to the Feature Reassembly Hypothesis: Acquisition of the present perfect by Arabic learners of English

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| ABSTRACT
Data from prior research has provided evidence for the L1 Arabic influence on the acquisition of L2 English present perfect (PP). However, little is known about what exactly is being transferred from L1 Arabic grammar to facilitate or hinder the acquisition of the English PP by Arabic speakers of English. This paper adopts a bottom-up approach to the Feature Reassembly Hypothesis (FRH) (Lardiere 2012) to empirically compare PP feature mapping in English and Arabic, resulting in precise L1 Arabic transfer predictions for feature reassembly, which we then tested in an L2 acquisition study. The results revealed that Arabic L2 users of English (L2ers) made form-meaning associations based on the lexical aspect (telicity) and semantic interpretations of English PP contexts, which revealed new insights into L1-L2 feature reassembly in English PP acquisition that other approaches did not.

| KEYWORDS
bottom-up approach; Feature Reassembly Hypothesis; Arabic learners of English

| ARTICLE INFORMATION
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1. Introduction

The acquisition of tense and aspect has been intensively investigated in second language acquisition (SLA) research (e.g., Slabakova 2000). This interest is unsurprising because temporal distinctions are fundamental to communication, and the functional marking of tense and aspect differs substantially from language to language. The second language (L2) acquisition of English temporal and aspectual distinctions, such as the distinction between the present perfect (PP) and preterite (simple past), is notably challenging for L2 users (L2ers) of English. Numerous studies have demonstrated a low accuracy rate in the use of English PP by L2ers from diverse first languages (L1) (Slabakova 2000; Bulut 2011; Teran 2014; Uno 2014). L2 acquisition of the PP in English has been investigated in L1 speakers of many languages (e.g., Japanese: Yoshimura et al. 2014; Turkish: Bulut 2011; Korean: Han & Hong 2015; Spanish: Terán 2014). In these studies, the acquisition of the PP was tested by different methods, such as forced-choice, fill-in-the-blank and translation tasks. The L2ers in these studies generally misused the simple past form of the verb in the PP context in their L2 English production, argued to be due to L1 negative transfer.

PP acquisition by Arabic speakers of L2 English is challenging, even at advanced levels of L2 English proficiency (Mazyad 1999; Alruwaili 2014; Abu Jarad 2017). Alruwaili (2014) investigated L2 acquisition of tense and aspect (TA) by Saudi Arabic learners of English using an acceptability judgement and a gap-filling assignment task. The results of Alruwaili 's investigation revealed that the Arabic learners of English were unable to establish the temporal distinction between the preterite and the PP in L2 English. Similarly, Abu Jarad (2017) concluded in a study of English PP acquisition by L1 Arabic learners of English that the participants tended to use the simple present or the simple past in contexts in which they were supposed to use the English PP. This difficulty has been attributed to L1 influence and morphological–semantic differences between the two languages (O'Brien 2003).

On the other hand, Farina (2017) investigated the L2 acquisition of the English PP among Arabic and Chinese learners of L2 English via two critical features of the English PP, namely boundedness and current relevance. Offline rating and online self-

paced reading tasks were conducted in Farina's investigation. Farina (2017) concluded that the Arabic group showed some indication of beneficial L1 transfer compared to the Chinese learner group. The results revealed that the Arabic learners of English performed better than the Chinese learners in using the English PP; however, Farina also stated that it was unclear what exactly was being transferred from L1 Arabic. Farina (2017) assumed that the Arabic perfect and past continuous were functionally mapped onto the English bounded present perfect and non-bounded present perfect, respectively. However, to date, there is no clear evidence of how the features of the English PP are lexically encoded onto morphemes in Arabic. The investigation in the present paper addresses this gap by studying Arabic speakers' acquisition of the English PP. This paper reports a study which addresses the challenge Arabic speakers of L2 English encounter in their acquisition of L2 English PP due to the lack of a direct counterpart of the English PP in L1 Arabic.

The paper is structured with a literature review in section (1) followed by experimental sections (3) and (4) For each study, we present the methods used to create the experiments, the findings and a discussion of the collected data from these conducted experiments is presented in section (5). After that, we summarise these results and discuss their implications for SLA research in section (6).

2. Literature review

2.1 The English PP and its lack of a direct counterpart in Arabic

The English PP is a backwards-looking present tense form that expresses the actualisation of an event relevant to speech time (Verkuyl 2022). In English, the two interpretive features mapped onto the PP, which make it completely different from the simple past, are [temporal boundedness] (TB) and [current relevance] (CR) (Davydova 2011). CR is the central feature of PP. This concept was introduced by McCord (1978:19), who explained the PP as "an identification of prior events with the extended now".

CR can be instantiated through the following four semantic features or interpretations: resultative (a state resulting from the event still persists), experiential (the event might reoccur), continuative (the event still continues to the present time) and recent past (the event was recent) (Depraetere 1998) (see Table 1). These interpretations are derived through conventional implicatures (Davydova 2011).

Table 1: *The four current relevance interpretations of the English present perfect*

Current relevance	**Example**	**Implicature**
Resultative	Susan has watered the plants this morning.	→ They don't need more water.
Continuative	Ahmad has lived in Leeds since 1990.	→ He still lives in Leeds.
Experiential	The army has attacked the city five times already.	→ They might attack again.
Recent past	Mary has bought a table from IKEA just now.	→ This happened very recently.

The English PP occurs in temporally unbounded contexts, which are typically identified by indefinite adverbs such as *already, recently, just now, or since 2016*. PP is incompatible with definite adverbial phrases such as *yesterday* or *last week* because it always denotes a definite time span (Bardovi-Harlig 2002).

The contrast in example (1) shows that English grammaticalises the current relevance of a past state or event (Davydova 2011): The continuation "and he still lives there now" is only compatible with the PP (b) and not with the simple past (a). Adverbials expressing a definite period are compatible with the simple past but not with the PP (which requires indefinite adverbials).

(1) a. John lived in Leeds (in 2009) (*and he still lives there now).
b. John has lived in Leeds (*in 2009) (and he still lives there now).

Arabic lacks a counterpart for the English PP. The difficulty of identifying precise transfer predictions for the acquisition of the PP by Arabic learners of English (Farina 2017) is further complicated by a theoretical controversy as to whether Arabic features a temporal or an aspectual distinction of inflected verbs. Some argue that Arabic features a temporal distinction (past vs present; ElSadek 2016), while others argue that it features an aspectual distinction (perfect vs imperfect; Ryding 2005). In this paper, we will remain agnostic as to whether the distinction is temporal or aspectual and use combined labels for each form: "past/perfect" vs "present/imperfect".

There is no clear evidence of how interpretations of the English PP are mapped onto morphemes in L1 Arabic. There is still a controversial debate regarding the lexical encoding of the features associated with English present perfect in L1 Arabic. Some Arabic linguists argue that the relevant properties of the PP could be expressed in Arabic by different means, such as past/perfective, present/imperfective and *qad/laqad,* (Mazyad 1999; Alsalmi, 2013), as in the examples below. The sentence in (2) features an inflected verb form that can be translated into English as either simple past or present perfect (Mazyad 1999:108).

(2) katab-at risaala.
wrote-PERF-3fsg letter-ACC
"She wrote a letter." / "She has written a letter."

The present/imperfective in Arabic, , can be used to express habitual actions; however, it can also express aspectual relations similar to the present perfect (Mazyad, 1999: 120), as in the following example:

(3) arifahu mundu sanawaat
know-IMP-3.M.Sg-he since years
"*I know him for years." / "I have known him for years."

Al-Saleemi (1987), Adel (2019), O'Brien (2003) and Mudhsh (2021) proposed that current relevance can be expressed in Arabic by the particle *qad* preceding past forms of the verb. The Arabic particle *qad* can convey completion with current relevance when used with past forms (O'Brien 2003). *Qad* can be replaced by a more emphatic form, *laqad* (O'Brien, 2003). Al-Saleemi (1987) stated that when the particle *qad* in Arabic is followed by the perfective form of the verb, it indicates an action that has just been completed at the moment of speech, as in the following example (4):

(4) qad atā
qad came-PERF-3.M.Sg-he
"He has (just) come." (Adel, 2019: 52)

2.2 L1 Arabic transfer predictions

Given the lack of consensus in the literature regarding the L1 transfer predictions for the acquisition of the PP by Arabic learners of English, we chose in this study to adopt a bottom-up (i.e., inductive) approach to the feature reassembly hypothesis (FRH) to empirically determine how the features associated with the English PP differs from the feature mapping in L1 Arabic. According to the FRH (Lardiere, 2009;2012), L2 learners must create new mappings of formal features (interpretation) onto forms (morphemes) and identify the conditioning environments in which these morphemes can appear. Mapping differences between L1 and L2 predicts what will be transferred and what will be challenging to re-map.

The FRH predictions were determined inductively in two comparative studies. Study 1 (feature mapping in L1 English) aims to empirically confirm the role of [temporal unboundedness] and [current relevance] in native speakers' use of the English PP. Second: Study 2 (feature mapping in L1 Arabic) was conducted in L1 Arabic to determine the extent to which *qad* is associated with [current relevance] in Arabic. Moreover, given the tense versus aspect controversy highlighted above, Study 2 aims to empirically determine whether verbal morphology is associated with [temporal boundedness] in Arabic. The results of these two comparative studies inform our bottom-up approach to deriving the FRH predictions about which form–feature mappings; L1 Arabic learners of L2 English can exploit to acquire the English PP. The present investigation aims to test these predictions on L2 data in Study 3 (feature reassembly in L2 English).

Temporal boundedness (TB) is operationalised in our study as the definiteness of an adverb (indefinite vs definite). The adverbial modifiers can trigger the use of the PP vs preterite (Binnick 1991; Bardovi-Harlig 2002). Definite adverbs indicate a definite timespan by specifying a specific reference time in the discourse, such as *yesterday, last week, or in 2020,* and are incompatible with the PP (Davydova 2011). In contrast, indefinite adverbs are adverbs that indicate an indefinite time span, where they concentrate on specifying a feature of an event rather than a reference time, such as *already, recently, or for three days,* and they license the PP (Bardovi-Harlig 2002).

Therefore, we used adverbial modifiers to create obligatory or blocking contexts (+PP vs –PP) for the use of the PP. As can be seen in Table 3, the inducing adverbials in the first column collocate with the English PP with its four semantic interpretations (resultative, continuative, experiential and recent past completion), and contexts where these adverbials are used (+PP) trigger the use of the target PP. In contrast, blocking adverbials in the second column block the use of PP, and they collocate with the preterite. Thus, the PP is not expected to be used in (–PP) contexts with blocking adverbials (McCoard 1978; Davydova 2011).

Table 3: *The inducing and blocking adverbial phrases*

Current relevance	**Inducing adverbs (+PP)**	**Blocking adverbs (–PP)**
Resultative	This [time]: e.g. *this morning* Recently	Long ago [*N* time unit] ago: e.g. *three years ago, two hours ago* Once Yesterday Last *(night, week)* In [year]: e.g. *in 1900, in 2003* At [time]: e.g. at 3:00 pm.
Continuative	Since [time]: e.g. *since 2009, since birth* For [duration]: e.g. *for two weeks.*	
Experiential	[*N* unit times]: e.g. s*everal times* Every [time] so far: e.g. *every single day so far* Never Ever	
Recent past	Lately Just (now) Recently This very instant Already	

Table 3 also illustrates how different types of temporal adverbials are used in the four types of current relevance (resultative, experiential, continuative and recent past) (Depraetere 1998). The recent past perfect can be modified by recency adverbs, indicating an eventuality that has just happened, such as *just (now), recently, already or lately*. The continuative perfect can be modified by durative adverbs, which refer to a past situation that continues to the present moment, such as *since, for, yet, or to date*. The experiential perfect allows indefinite time adverbials of frequency, such as *often, or* quantity, *such as ever, never*, or *twice,* which indicate the possibility of future occurrence. The resultative perfect allows the adverbs of recency, such as *this time x or recently*, that imply the direct or indirect result of a past event (Depraetere 1998).

We consider the telicity of the predicate, which concerns whether or not the predicate has an inherent endpoint (Bardovi-Harlig 2000; Slabakova 2000) as one of the critical features which will be tested in the present investigation to examine whether telicity is a relevant feature in the contexts which favour the use of the PP. Telicity differentiates two types of events: telic events and atelic activities. A telic predicate describes an occurrence that progresses for some time before reaching its inherent endpoint, at which point it ends. An atelic predicate describes an event that lacks an inherent endpoint and thus continues indefinitely. In the Aspect Hypothesis (AH), Andersen & Shirai (1995) proposed that L2 learners are strongly affected by the semantics of the predicates in their acquisition of tense-aspect markers, which means that according to this hypothesis, it can be predicted that the telicity of the predicates can influence the use of tense and aspect among both L1 and L2 speakers. The AH proposes that past perfective marking emerges with telic predicates (achievements and accomplishments) as a prototypical structure and that progressive markings are strongly associated with atelic predicates as a prototypical structure. Although the influence of telicity has been extensively demonstrated in studies of L2 learners using morphological markers such as simple past, simple present, and progressive marking (Andersen and Shirai, 1995), relatively few studies have examined the acquisition of the L2 English PP in relation to the inherent semantic properties of predicates (telicity) (Terán, 2014). Although these few studies have shown a slight effect of the telicity of the predicate on the use of the PP, more research is needed to draw clear conclusions regarding the use of the English PP in relation to the telicity of the predicate. Therefore, it is significant to take telicity into consideration in this investigation to test whether the semantic feature [±telic] of the predicate is a relevant feature in the contexts which favour the use of the PP. The aspectual behaviour of the Arabic verbs behaves in the same way as their English counterparts. The aspectual verb classes (achievement, accomplishment, state, activity) are also found in Arabic, with possible meanings of similar sets of predicates falling into each class (Mazyad, 1999).

2.3 Research questions

Our research questions are summarised as follows:

- **RQ 1**. Do [temporal unboundedness] and [current relevance] predict English native speakers' use of the PP?

- **RQ 2**. How are [temporal unboundedness] and [current relevance] grammaticalised in Arabic? To what extent is *qad* associated with [current relevance] in Arabic?
- **RQ 3**. Are the form-meaning mappings transferred from Arabic to English, as predicted by the FRH (Lardiere,2012)? Is the telicity of the predicate a relevant feature in the obligatory contexts for the use of the PP by Arabic L2ers of English?
- **RQ 4**. Is the influence of L1 Arabic transfer progressively overcome as English proficiency increases?

3. Two comparative studies

Two comparative studies were conducted among native speakers of L1 English and Arabic. Study 1 which is the first experiment conducted in this investigation among English native speakers to establish the features determining the choice of PP versus the simple past in L1 English. Study 2 is an equivalent study to Study 1, in Arabic, which seeks to empirically determine how PP feature mapping in English compares to feature mapping in Arabic. Establishing the differences between Arabic and English guides us in identifying precise predictions for the FRH regarding the acquisition of second language (L2) English present perfect by Arabic L2ers of English

3.1 Methodology

We conducted Contextualised Multiple-Choice (MC) tasks, each of which required the participants to choose a suitable verb form (among four choices, as will be explained below) to fill a gap in a sentence; the gap was always followed by an adverbial phrase, and the sentence containing the verb was followed by an additional contextual sentence. The adverb and the second sentence were designed to either induce or block the use of the PP, as in Table 4. All the critical items and the distractors in these tasks were formulated in the same structure, as follows: [proper noun subject] [verb (with complement or locative adjunct)] [adverbial] + follow-up sentence. For the distractors, the contexts were created to induce present, future or hypothetical use.

Table 4: *Examples of context manipulation and multiple-choice design*

PP-inducing context: (+PP)	**PP-blocking context: (–PP)**
Amal -------- her skills in English **since she came to the UK. She will soon be able to pass her exam.**	Amal ------ her skills in English **last year. She was able to pass her exam.**
• has improved • will improve • improved • improves	• improves • has improved • will improve • improved

The material from Study 1 was translated into Arabic to test the Arabic native speakers in Study 2, with one necessary difference; in the response options, we replaced the PP form of the verb with (*qad* + past/perfective).

The choice of the verb form in the MC task was examined according to the following variables:

- The type of current relevance (CR) supported by the context (continuative experiential, resultative, or recent past completion)
- Telicity of the predicate (telic or atelic).
- Temporal boundedness (indefinite or definite), operationalised as adverb definiteness.

Table 5: *The number of experimental items, including manipulation*

	Atelic	Atelic	Atelic Total	Telic	Telic	Telic Total	Base items	Total with manipulation
CR type of the context	**Activity**	**State**		**Accomplishment**	**Achievement**			
Continuative	6	6	**12**	6	6	**12**	24	**48**
Experiential	6	6	**12**	6	6	**12**	24	**48**
Recent past	6	6	**12**	6	6	**12**	24	**48**
Resultative	6	6	**12**	6	6	**12**	24	**48**
Grand Total	**24**	**24**	**48**	**24**	**24**	**48**	**96**	**196**

In a 4 × 2 × 2 design, we fully crossed the type of current relevance supported by the context x 4 (resultative, experiential, continuative, recent past) and the telicity of the predicate x 2 (telic vs atelic), yielding eight lexical conditions. We included 12 items per lexical condition, i.e. a total of 96 "base sentences". Each telicity category included an equal number of Aktionsart subtypes, as clarified in Table 5 (i.e. six states, six activities for atelic predicates and six achievements, six accomplishments for telic predicates).

The base sentences were manipulated by the adverbial modifiers and the follow-up sentence, which induce or block the use of the present perfect x 2 (definite vs indefinite adverbial) as in Table 6. This manipulation resulted in 16 experimental conditions, with 192 critical items in total. The total number of critical items used in this experiment is 192, and 48 distractors.

Table 6: *Example of Temporal boundedness and follow-up context manipulation.*

[– temporally bounded] (+PP)	**[+ temporally bounded] (–PP)**
Sarah and Mike ------ (adopt) **several little kittens already. Now they want to adopt a dog too.**	Sarah and Mike ----- (adopt) several little kittens **last summer. Nevertheless, the kittens ran away.**

The distractors required choosing between present and future tense and modality. The total number of distractors was 48 items, with 16 present, 16 future and 16 hypothetical sentences. The goal of forming the distractors in this way was not to show precisely the tense–aspect distinction, which we aimed to investigate for the participants. The adverbial modifiers used in the filler sentences could induce the use of present, simple, future or hypothetical, as in Table 7.

Table 7: *The contexts used to create the distractors*

The context	The expected verb form	Example
Habitual context	Present	John-----(listen) to the news daily. He likes to know what happens around the world.
Future context	Future	Sara ------ (visit) her friends next week. She has a lot of work to complete this week.
Hypothetical	Conditional form of the verb	Mary ------- (pass) her exams this year if she studied hard. But she will do her best.

We avoided the PP form altogether in the responses for the distractors. The position of each type of response was systematically altered between items. These responses were presented in a randomised order for all the experimental and filler items. To reduce the length of the experiment and avoid fatigue/learning effects, the Latin square method was used to distribute the 192 experimental items into the four lists so that each participant was presented with 96 items: 48 test items and 48 distractors; the identical distractors were used across lists, as illustrated in Table 8.

Table 8: *An example of how the critical items ordered by list, then telicity, then condition, then aktionsart, and how they distributed across the four lists.*

item numb	base-ser	lexical interpreta	telicity	aktionsa	conditi	List
1	1	Continuative	T	Acc	+PP	1
2	1	Continuative	T	Acc	-PP	2
3	2	Continuative	T	Ach	+PP	1
4	2	Continuative	T	Ach	-PP	2
5	3	Continuative	A	St	+PP	1
6	3	Continuative	A	St	-PP	2
7	4	Continuative	A	Act	+PP	3
8	4	Continuative	A	Act	-PP	4
9	5	Continuative	T	Acc	+PP	3
10	5	Continuative	T	Acc	-PP	4
11	6	Continuative	T	Ach	+PP	3
12	6	Continuative	T	Ach	-PP	4
13	7	Continuative	A	St	+PP	2
14	7	Continuative	A	St	-PP	1
15	8	Continuative	A	Act	+PP	2
16	8	Continuative	A	Act	-PP	1
17	9	Continuative	T	Acc	+PP	2
18	9	Continuative	T	Acc	-PP	1
19	10	Continuative	T	Ach	+PP	4
20	10	Continuative	T	Ach	-PP	3
21	11	Continuative	A	St	+PP	4
22	11	Continuative	A	St	-PP	3
23	12	Continuative	A	Act	+PP	4
24	12	Continuative	A	Act	-PP	3

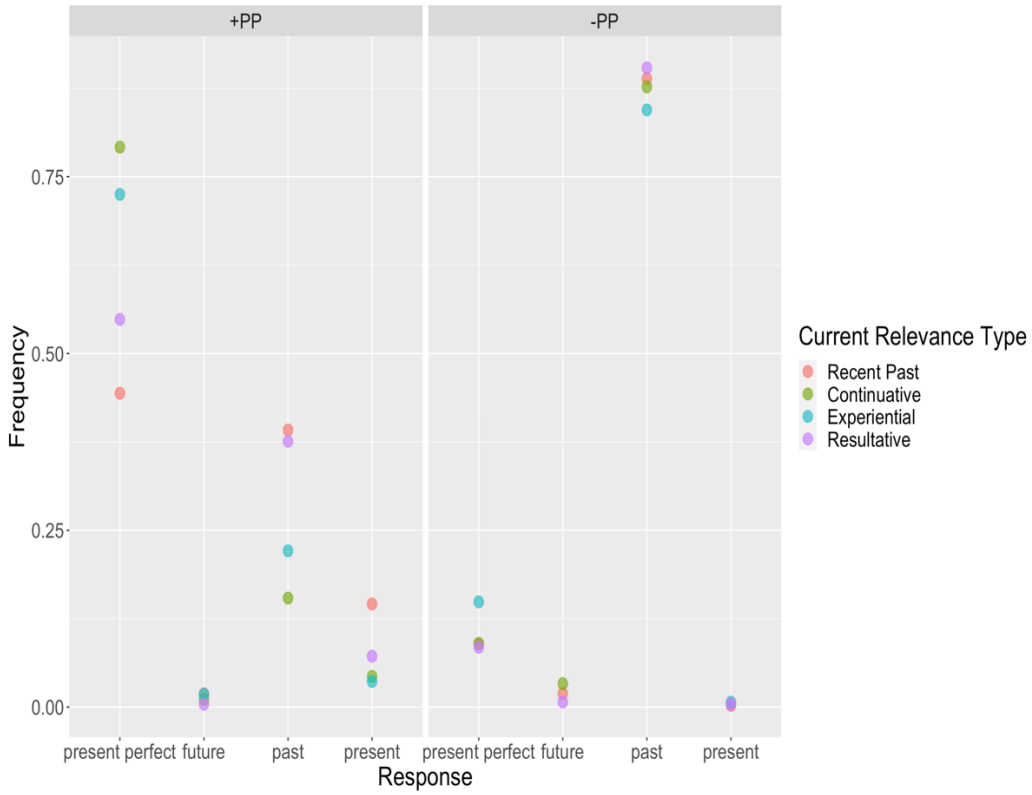
3.2 Study 1 (feature mapping in L1 English)

3.2.1 Summary of the data analysis and results

Study 1 was conducted among British native speakers of English to confirm the predictions from the theoretical literature regarding the role of [current relevance] and [temporal boundedness] in the licensing of the English PP to answer RQ 1.

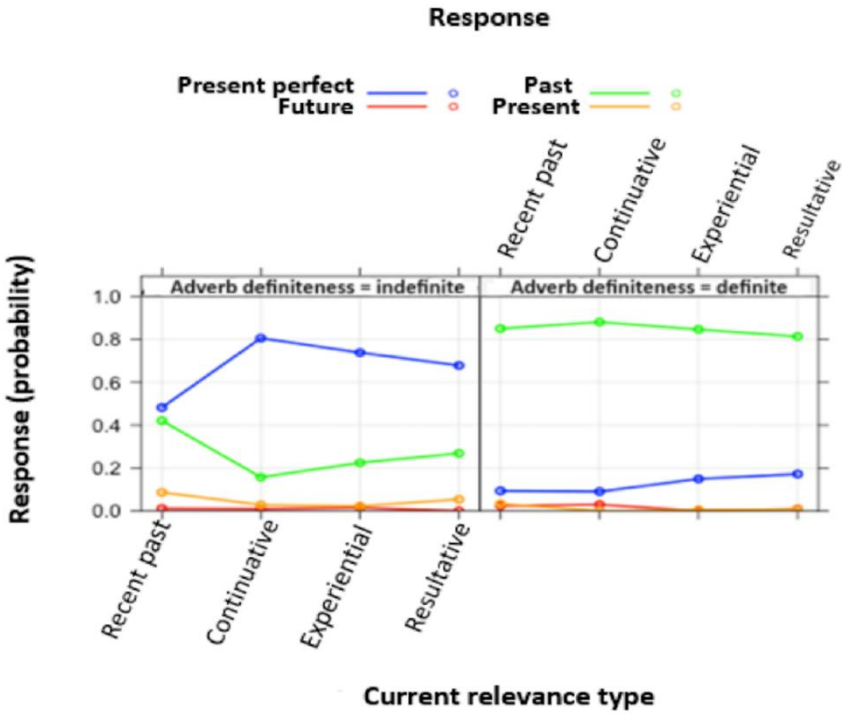
Figure 1 shows the mean distribution of the native English speakers' responses in PP-inducing (+PP) versus PP-blocking (–PP) contexts. The responses in Figure 1 shows that our design was on the right track, and the +PP versus –PP manipulation was successful.

Figure 1: *The distribution of the native English speakers' responses in PP-inducing vs PP-blocking contexts in Study 1*



The statistical data analysis was conducted in R (3.6.1) using generalised linear mixed models. The models were built bottom-up, starting from a null hypothesis model including only random effects for participants and items. Predictors were only retained if they improved the model fit (estimated by likelihood ratio tests). The present perfect is used as the reference level of the response variable in the analysis of the English participants' data. In the optimal model, the response variable was predicted by the interaction between (adverb definiteness and current relevance type) by telicity and telicity of the predicate (telic vs atelic) ended up not being significant and hence was not included in the optimal model. To plot all the interactions of interest, the optimal model was refitted using multinomial regression analysis.

Figure 2: *English native speakers' likelihood of choosing a particular verb form in Study 1, as predicted by the interaction between (CR type and adverb definiteness) in (A) and the main effect of telicity in (B).*



(A)

(B)

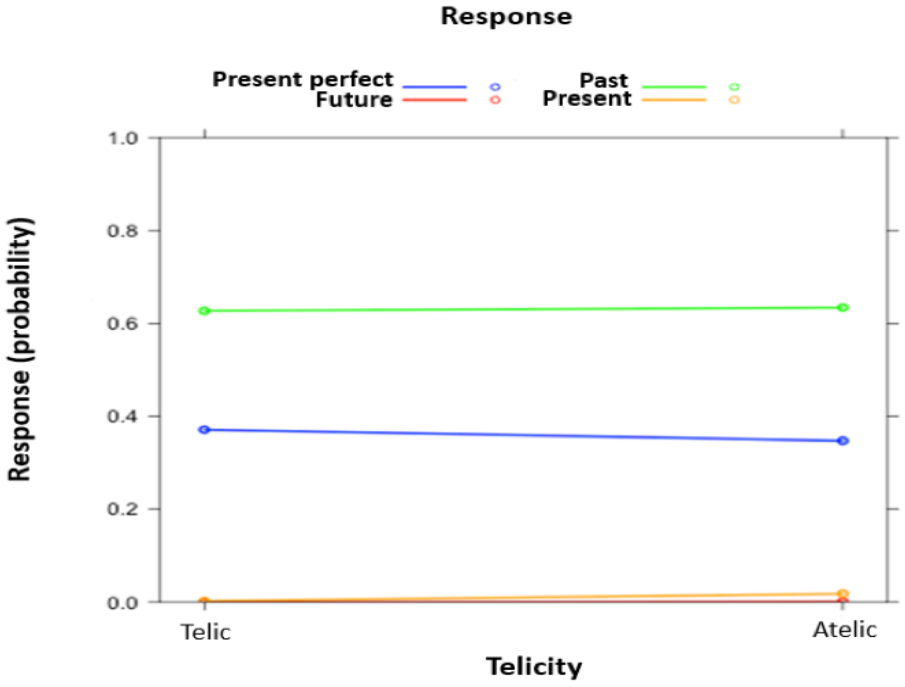
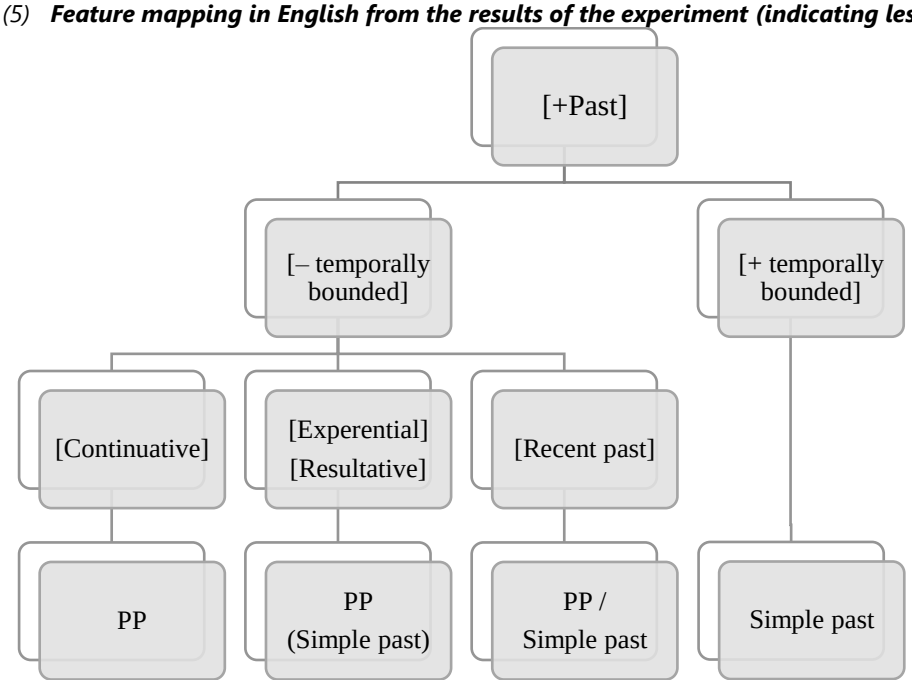


Figure 2 (A)1 shows that PP was preferred in [– temporally bounded] contexts (featuring indefinite adverbials), while the simple past was preferred in [+ temporally bounded] contexts (featuring definite adverbials). However, there was no preference between PP and simple past in [– temporally bounded] with [+ recent past] contexts. Figure 2(B) shows that the telicity did not significantly impact response choice in the L1 English data.

The results show that (i) contexts suggesting a continuative or an experiential interpretation of current relevance favour the choice of the PP, and the continuative interpretation is the most favourable context for the choice of the PP. The PP is not significantly more likely to be chosen in resultative contexts than in recent past contexts. (ii) the feature of temporal boundedness has a significant impact on the responses of the English native speakers, where contexts featuring a definite adverbial are significantly less favourable to the PP than those featuring an indefinite adverbial. (iii) The telicity of the predicate has no significant impact on whether PP or another response is chosen. We conclude from Study 1 that the features determining the choice of the PP versus preterite in English are as follows:

(5) ***Feature mapping in English from the results of the experiment (indicating less likely forms in parentheses).***



3.3 Study 2 (feature mapping in L1 Arabic)

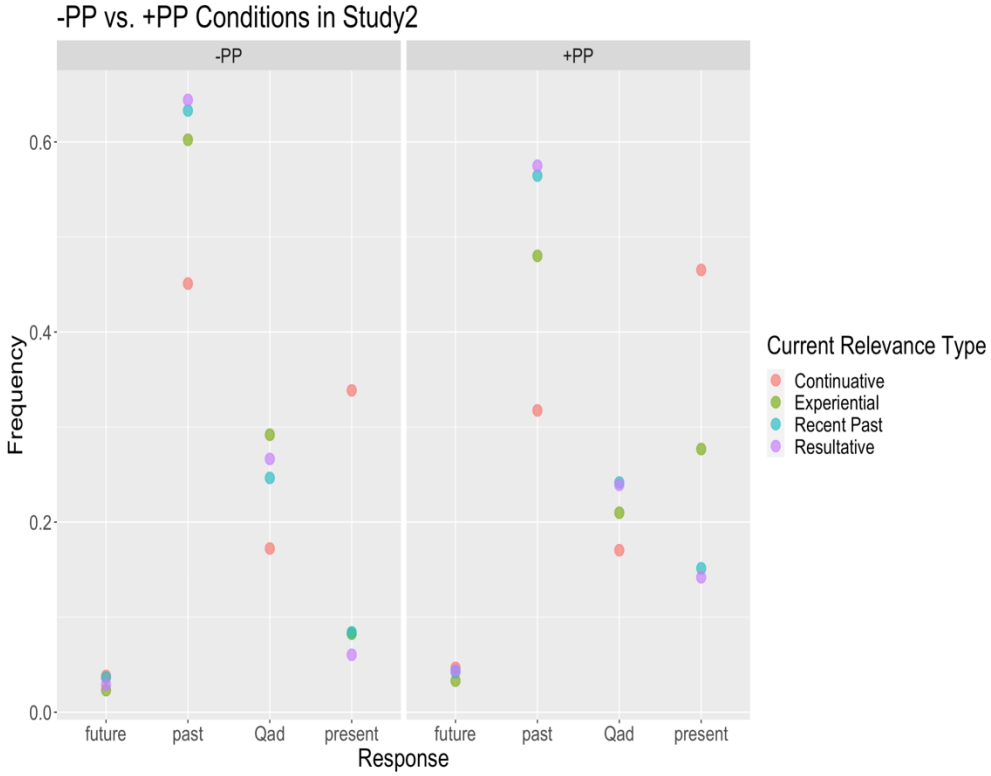
3.3.1 Summary of the data analysis and results

Study 2 is the Arabic counterpart of Study 1. It aimed to empirically determine the mapping between verb forms, the features associated with the English PP to answer RQ 2.

Figure 3 shows the mean distribution of the Arabic native speakers' responses in PP-inducing (+PP) vs PP-blocking (–PP) contexts, interacting with the CR type (continuative, experiential, resultative and recent past).

[1] Figures 2a and 2b were generated by refitting the model using multinomial regression (yielding the same patterns of significance as the mixed-effect model) to make it possible to plot the modelled response choices.

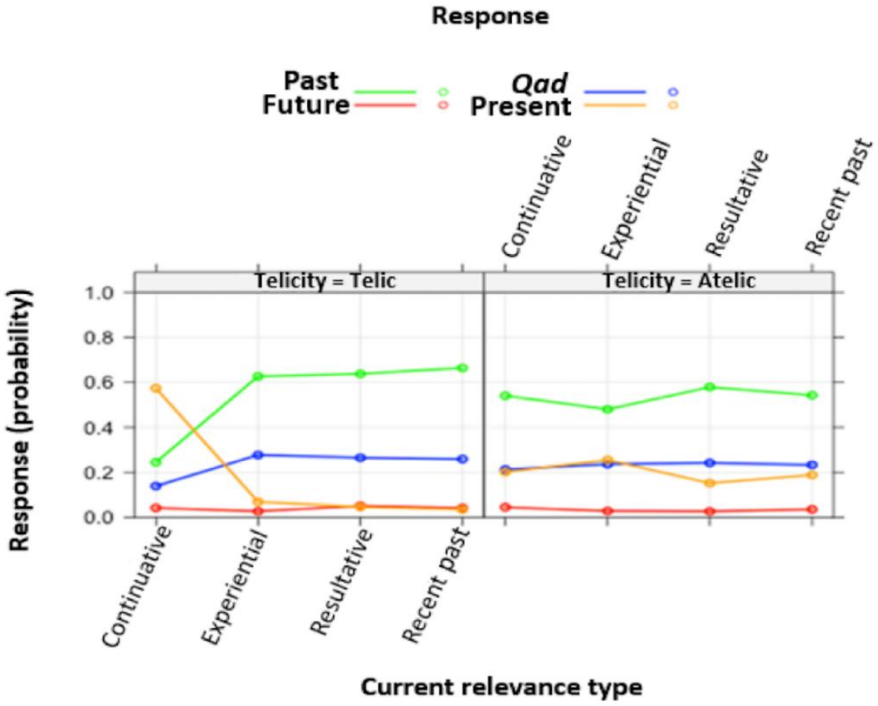
Figure 3: *The distribution of the Arabic native speaker responses in PP-inducing vs PP-blocking contexts.*



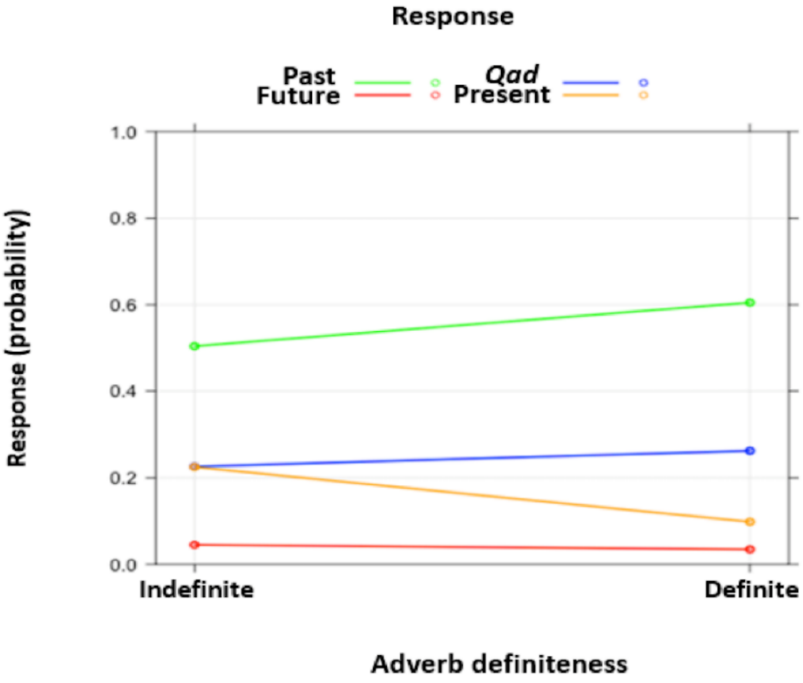
The same model-fitting procedures were adopted as per Study 1. There was no improvement in the model fit if (adverb definiteness interacted with CR type) or (telicity interacted with adverb definiteness). In the optimal model, the optimal model was predicted by the interaction between (telicity and CR type) by adverb definiteness. We refitted the model using multinomial regression analysis to generate Figures 4a and b to get the full picture.

Figure 4: *Native Arabic speakers' likelihood of choosing a particular verb form in Study 2, as predicted by (the interaction between relevance type and telicity) in (A) and the main effect of adverb definiteness in (B)*

(A)



(B)

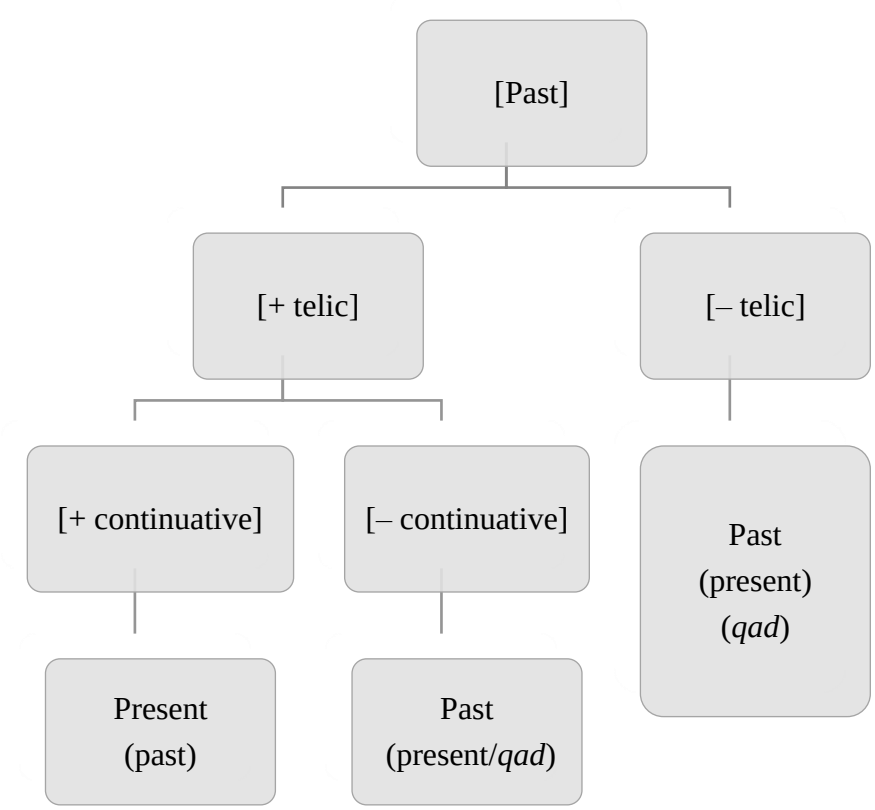


Therefore, we can interpret the results as follows. As shown in Figure 4a, there was a different configuration of predictors from the one observed in Study 1 (i) The Arabic data show a significant interaction between the CR type and the telicity of the predicate. The majority of the native Arabic speakers tended to use the past/perfective form of the verb in all contexts except for the continuative context, where the present/imperfective was preferred. (ii) Contexts favouring a continuative interpretation of

current relevance favour the choice of the present/imperfective with telic predicate. (iii) Adverb definiteness does not significantly impact the choice of verb forms. (iv) Native Arabic speakers choose *qad* about 25% of the time across all the conditions (experiential, resultative and recent past perfect), except for continuative, which is even less used. *Qad* and the present/imperfective are equally likely to be chosen in the [– temporally bounded] contexts.

A summary of the relevant feature-form mapping in Arabic is shown in (6).

(6) ***Feature mapping in Arabic from the results of the experiment (indicating less likely forms in parentheses)***



4. Study 3 (feature reassembly in L2 English)

Study 3 is an L2 acquisition study of Arabic L2ers of English from different L2 English proficiency levels and aims to test the predictions of the FRH that were empirically derived from Studies 1 and 2 to answer RQs 3, 4.Based on the feature mapping configurations identified in Studies 1 and 2 for English and Arabic, as in Table 9, we are now in a position to lay out the predictions of the FRH for the acquisition of the PP by L2ers of English.

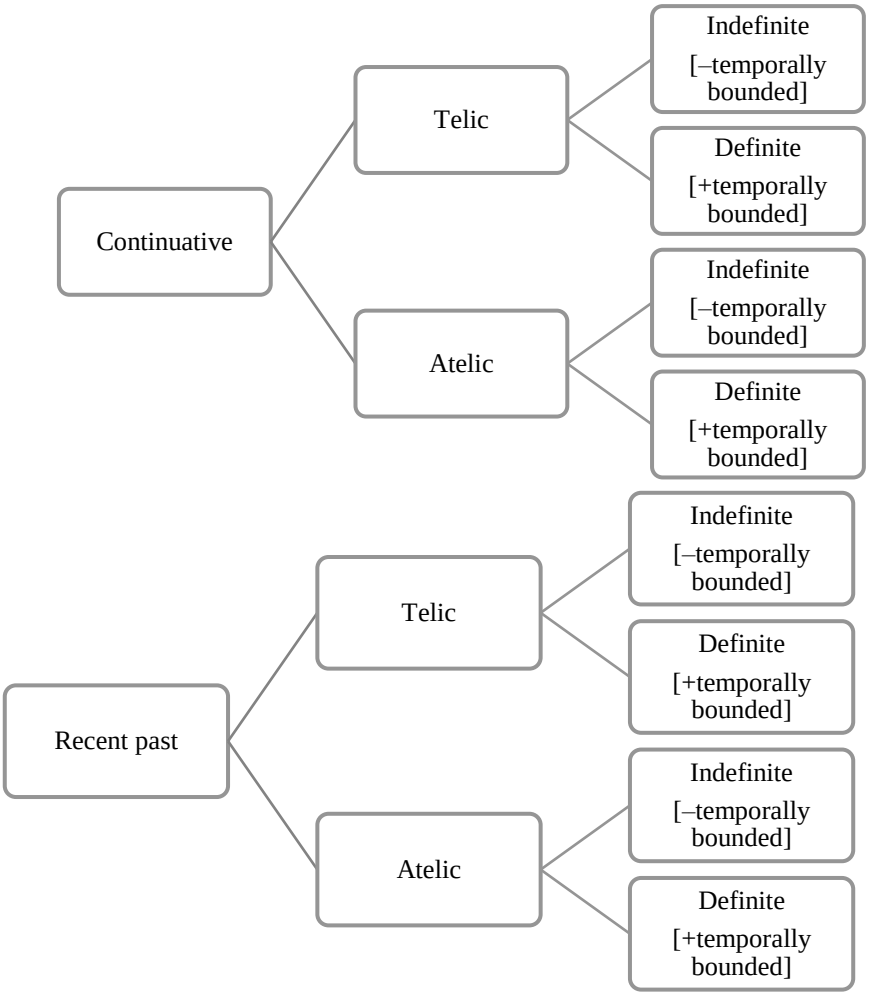
Table 9: *Feature mapping configurations in L1 English and Arabic*

Feature-mapping in L1 English	**Feature-mapping in L1 Arabic**
[+past] [+ temporally bounded] → past	[+past] [-telic] → past (/present) (/qad+past)
[+past] [- temporally bounded] [continuative] → present perfect	[+past] [+telic] [+continuative] → present (/ past)
[+past] [- temporally bounded] [+ recent] →present perfect /past	[+past] [-telic] [continuative]→ past (/present) (/qad+past)

4.1 Design of the Experiment

In Study 3, we simplified the design of Study 1 to concentrate on two types of the current relevance of the English PP, which are continuative and recent past, since we explored a significant difference between the response form used in these two contexts in both the English and Arabic data in Studies 1 and 2. The design of Study 3 included a comparison between two interpretations of the English PP, namely the continuative and the recent past. The test items were manipulated according to (i) the CR of the context (continuative vs recent past), (ii) temporal boundedness (indefinite vs definite) and (iii) telicity (telic vs atelic). There were 12 items per condition (eight conditions), as illustrated in (7), and 50% distractors (identical to Study 1). An independent measure of English proficiency was administered to categorise the participants according to their proficiency level. This was determined based on an MC task at the beginning of the experiment consisting of a subset of the Standardized Oxford proficiency test (as per Slabakova & Garcia Mayo 2015 and Jensen 2016).

(7) The eight conditions of the experimental items, including manipulation in Study 3



4.2 Predictions:

For L2ers at initial stages of acquisition,

- Arabic users of L2 English will generally transfer L1 features to associate perfective aspect with past tense.
- Telicity is expected to impact on feature mapping. In [+continuative], [+telic] contexts, features will generally transfer to present tense marking with some optionality between past and present marking in [–telic] contexts.
- [Temporal boundedness] is not predicted to have an impact on feature mapping at this level.

For L2ers at advanced stages of acquisition,

- Arabic users of L2 English may be able to distinguish perfective aspect from past tense, remapping features marking temporal unboundedness and continuative CR to PP forms.

- In view of the optionality for PP marking found in the L1 English group in recent past contexts, where there is no preference between PP and past marking in recent past contexts Arabic users may show similar optionality.

- Telicity is not expected to impact on feature mapping.

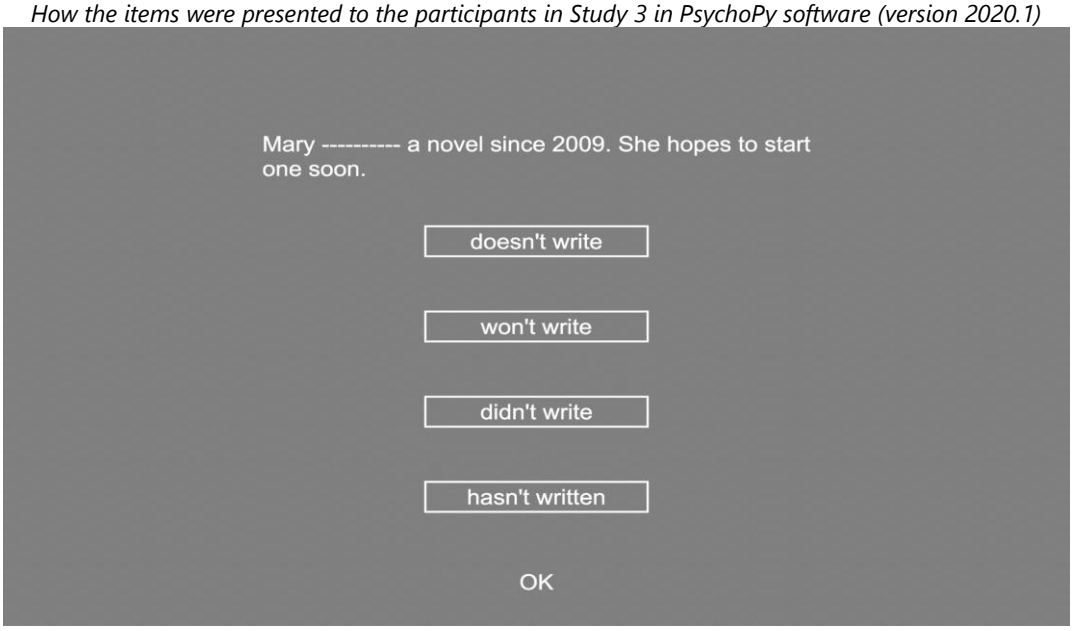
4.3 Participants & Procedures

In this experiment, 202 Arabic learners of English were invited to participate (184 female). They were all between the ages of 18 and 55. The participants were recruited via email (through convenience sampling) and social media. The participants were either L2ers from different levels at the English department (from the 1st level to the 8th level) or MA or PhD candidates in different specialisations .

They were tested for their English proficiency and asked to complete a brief questionnaire about their language background and the Language Experience and Proficiency Questionnaire (LEAP-Q; Marian, Blumenfeld & Kaushanskaya 2007). Both were administered via the Jisc online platform. Afterwards, each participant performed a contextualised multiple-choice task spread over two sessions. The MC task was designed in Psychopy (version 2020.1) and administered via the Pavlovia platform, as shown in Figure 6.

Figure 6

How the items were presented to the participants in Study 3 in PsychoPy software (version 2020.1)

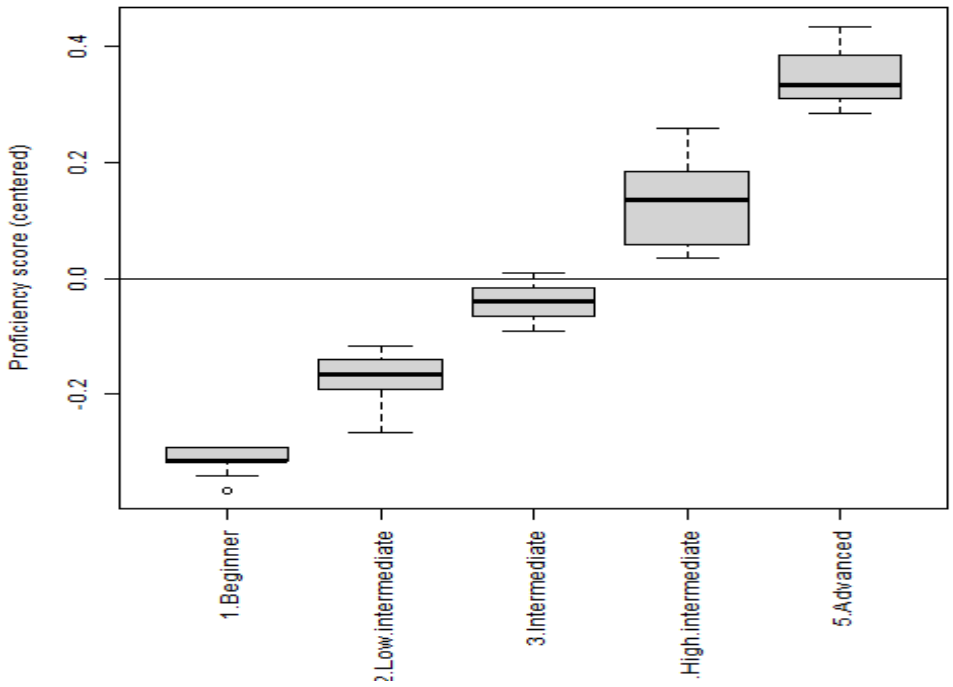


I.

4.4 Data analysis and results

The participants' proficiency level was based on their score in the MC task, and the maximum possible score was 40 (one point per correct answer). The following five levels were determined: beginner (n=16 participants) (a score lower than 10), low intermediate (n=75) (a score between 11 and 17), intermediate (n=45) (a score between 18 and 22), high intermediate (n=51) (a score between 23 and 32) and advanced (n=15) (a score of 33 or more). Figure 5 shows the distribution across proficiency levels. The L2 English proficiency measure was centred on this analysis.

Figure 5: *Proficiency scores, by proficiency group*



4.4.1 Statistical analysis

The data was analysed with generalised linear mixed model using tidyverse package in R Studio (Version 3.6.1). The same procedure was used as in Studies 1 and 2. The response variable in the optimal model[2] was predicted by the interactions between (adverb definiteness and Proficiency.c), (adverb definiteness and Relevance.type), (telicity and Proficiency.c) and (Relevance type and Proficiency.c.) The interaction between telicity and Relevance type did not improve the model fit. The model included random intercepts for the item and base sentence and random slopes for adverb definiteness by participants. Multinomial regression analysis followed the mixed-effect model, as shown in Figure 7, which displays the same patterns of significance as the mixed-effect model. In Figure 7, the x-axis represents proficiency. L2ers of the lowest proficiency group preferred to choose the present in [– temporally bounded] contexts, while PP (designated as *Pr.p.only* in this Figure) was the preferred choice for the intermediate and advanced English learners' groups in these contexts. Simple past was preferred by intermediate proficiency levels and upwards in [+ temporally bounded] contexts.

[2] The formula for the optimal model was:glmerbest <- glmer(Resp.new ~ (1+Adv.definiteness|Id) + (1|Item.number) + (1|Base.sentence)+ Adv.definiteness * Proficiency.c + Adv.definiteness : Relevance.type + Telicity : Proficiency.c + Relevance.type : Proficiency.c, data= dat, family=binomial(link="logit"),
control=glmerControl(optimizer="bobyqa"))
summary(dat.glmerbest)

Figure 7: Study 3: *Feature reassembly in L2 English (interaction between relevance. type and telicity) in [– temporally bounded] and [+ temporally bounded] contexts.*

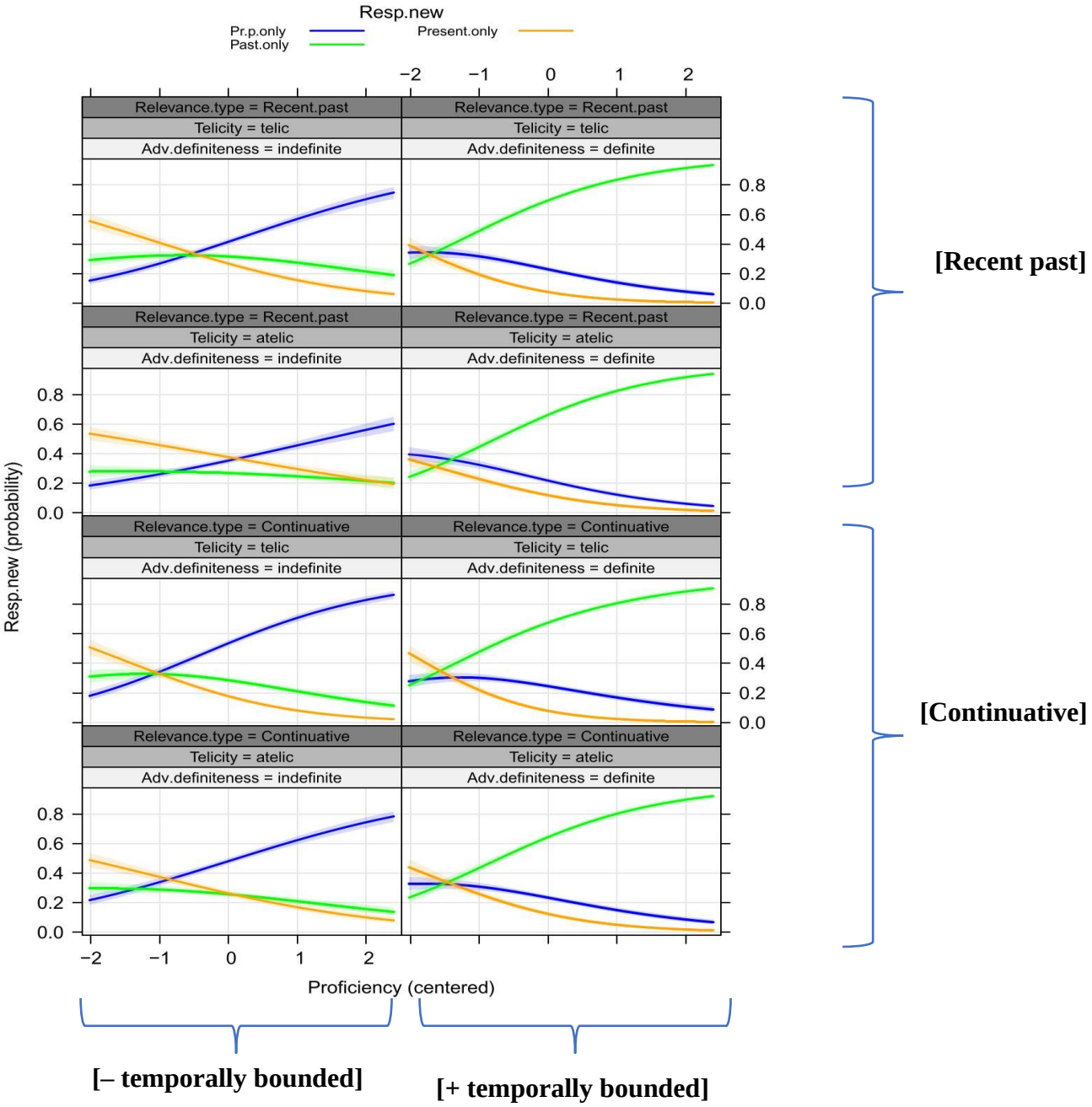


Table 10: *Coefficients for a mixed-effect model for the choice of present perfect vs other forms interacting with the other variables (reference levels: telicity: atelic; Current relevance type: recent past; Adverb definiteness: indefinite; proficiency.c).*

Fixed effects	Estimate	Std.Error	z value	P-value
(Intercept)	0.8439	0.1103	7.648	2.05e-14 ***
Adv.definiteness definite	0.8381	0.1443	5.809	6.28e-09 ***
Proficiency.c	-3.0333	0.4757	-6.377	1.81e-10 ***
Adv.definiteness definite: Proficiency.c	6.2101	0.5709	10.877	< 2e-16 ***
Adv.definiteness indefinite: Relevance.type Continuative	-0.5642	0.1142	-4.942	7.74e-07 ***
Adv.definiteness definite: Relevance.type Continuative	-0.1160	0.1178	-0.985	0.324770
Proficiency.c: Telicity telic	-0.9252	0.2371	-3.903	9.51e-05 ***
Proficiency.c: Relevance.type Continuative	-0.8102	0.2386	-3.396	0.000684 ***

The response variables included Pr.p.only (present perfect), Past.only (past), Present.Only (present) and Other. Other included the possibility for multiple responses. We chose the Pr.p.only response as a refence level for the response variable.

The negative coefficients indicated a greater likelihood of choosing the PP. The positive coefficients indicated a greater likelihood of choosing another response form (Past.only, Present.Only or Other) than the PP. As shown in Table 10, learners were sensitive to adverb definiteness; they used the PP significantly less in temporally bounded contexts with definite adverbials (as a main effect) (Estimate:0.8381, z:5.809, p: <0.001), and this trend increased with proficiency (Estimate:6.2101, z:10.877, p: <0.001). The likelihood of choosing the PP increased with proficiency (as a main effect). As L2 English proficiency increased, the L2ers are less likely to use a different verb form (present, past, or other) than the target present perfect in the [-temporally bounded] [+current relevance] contexts (Estimate: -3.0333, z: -6.377, p: <0.001). The likelihood of choosing the PP by the L2ers of a high level of proficiency significantly increased when the predicate is telic (Estimate: -.9252, z: -3.903, p: <0.001). and in the continuative contexts (Estimate: -0.8102, z: -3.396, p: <0.001).

II. 5. Discussion

In this study, we adopted a bottom-up approach to the FRH (Lardiere 2012) to empirically determine how the features associated with the English PP are mapped in Arabic and hence derive predictions as to how Arabic users of English would map or reassemble these features into new formal configurations in their L2 acquisition of the English PP. Three studies informed this.

Studies 1 and 2 empirically determined the mapping of the features associated with the English PP (i.e., [temporal unboundedness] and [current relevance]) onto verb forms in native speakers of English (Study 1) and native speakers of Arabic (Study 2).

Study 1 answered RQ1 and confirmed the predictions of the theoretical literature, namely that native speakers overwhelmingly associate [current relevance] and [temporal unboundedness] with the PP. The responses of the English native speakers showed that the PP was the preferred choice in [– temporally bounded] and [+ current relevance] contexts, while the preterite was

preferred in [+ temporally bounded] and [– current relevance] contexts. There was, however, no preference between the PP and simple past in [– temporally bounded] with [+ recent past] contexts; the results show that the continuative interpretation is the most favourable context for the choice of the PP. The continuative contexts have the most robust relation to current relevance, as they describe situations that began in the past and continue up to the moment of utterance. In contrast, in the perfect of the recent past, the current relevance was found to be weaker (Davydova 2011). Telicity of the predicate did not have a significant effect, suggesting that it isn't part of the feature matrix associated with the PP in English.

Study 2 answered RQ2 and revealed a different feature-mapping configuration in Arabic. In that language, temporal boundedness is not associated with a particular verb form: adverb definiteness did not significantly impact participants' choice of the verb form. However, a significant interaction was observed between the type of current relevance and the telicity of the predicate. The majority of the native Arabic speakers tended to use the past/perfective form of the verb in all contexts except in the continuative context, where the present/imperfective was preferred, especially with telic predicates. No robust association of *qad* with current relevance was observed in this study (contrary to Al-Saleemi (1987), Adel (2019), and Mudhsh (2021)): the form with *qad* was chosen about 25% of the time across all the experiential, resultative, and recent past perfect conditions, and even less in the continuative. This is the first empirical study to report how feature mapping in L1 Arabic differs from the present perfect feature mapping in L1 English. The findings of Study 2 make a valuable contribution to the ongoing debate regarding the lexical-syntactic representation of the features associated with the English PP tense in L1 Arabic.

Based on Studies 1 and 2, we identified FRH predictions (section 4.2) and tested them in Study 3, allowing us to answer research questions 3 and 5 as follows:

The results of Study 3 revealed that L2ers of the highest proficiency levels were able to recognise the distinction between the PP and simple past in English, remapping features associated with [temporal unboundedness] and [continuative] CR to its corresponding morphological forms in L2 English (PP form). However, as illustrated in Figure 7, although the most advanced learners correctly chose the target PP in the majority of [-temporally bounded] contexts, their accuracy in using the target PP is lower than using the target past form in the [+temporally bounded] contexts. This confirms previous literature showing that the PP is acquirable after the simple past by L2ers in L2 English grammar (Bardovi-Harlig,2000), but that the challenges of feature reassembly are not fully overcome even at advanced proficiency levels (Lardiere 2012). The results of the high-proficient L2ers in Study 3 meet our prediction that Arabic L2ers at later stages of acquisition will be able to distinguish perfective aspect from past tense by reassembling features denoting temporal unboundedness and continuative perfect to present perfect forms. In addition, they showed similar optionality to that found in the performance of L1 English native speakers in Study 1, where they allowed optionality between the use of the PP and simple past in the recent past situations. There is no interaction between CR type and telicity in the feature mapping of the advanced L2ers, as we expect that telicity should not affect the present perfect feature mapping by Arabic L2ers at advanced stages of language acquisition.

There is some empirical support from Study 3 for the FRH regarding the findings, which showed that telicity strongly predicts the choice of PP compared with other forms, albeit in interaction with the type of [current relevance]. However, at low proficiency levels, preference for the present extended beyond [+ continuative] and [+ telic] contexts. The overuse of present in [+ continuative] [+telic] context demonstrated that L1 Arabic had influenced Arabic speakers at low proficiency levels. The subjects assigned the non-target tense-aspect marker to the [+ continuative] [+telic] by choosing the present, which was a more frequent form in L1 Arabic in the results of Study 2 in the continuative perfect situation with telic verbs and comparatively less so with atelic predicates. For example, the participants favoured choosing the present verb (invests) to complete sentence (8) instead of the target PP (has invested).

(8) The company ---------- (invest) $30 million to date. Things are likely to get better.
[+ continuative] [Telic; achievement]

However, there was no preference for the past in [– temporally bounded] contexts at any proficiency level. The L2ers of the lowest proficiency overused the present in [– temporally bounded] contexts. The over use of the present in the PP contexts could be due to the imperfective value denoted in the PP. It has been argued in the literature that the English present perfect always characterises the present in some way or another (Declerck,2006). Terán (2014, p.107) argued, "If the situations denoted by the present perfect have both past and present validity, then we should claim that the prototypical canonical value of this tense-aspect (TA) form should be the imperfective". The CR feature of the present perfect, suggests that this perfective form can convey a present/imperfective meaning. Hence, it is reasonable to see in the results of Study 3 that the low-proficient L2ers overused the simple present form as a replacement for the present perfect in the [–temporally bounded] contexts with both continuative and recent past contexts.

Moving to temporal boundedness, low-proficient L2 speakers demonstrated no effect of temporal boundedness on mapping the PP features., as we predicted, compared to highly proficient L2ers. This feature does appear to be mapped onto the present (although without much certainty) at the lowest proficiency levels. On the other hand, among the participants from low-intermediate to advanced levels of L2 English proficiency, the past becomes the preferred option in temporally bounded contexts and the PP in temporally unbounded contexts. As proficiency level increases, there is gradual developmental acquisition of the English PP by L2ers. This conclusion indicates that high proficient L2ers have overcome their L1 influence and acquired the form meaning associations of the English PP. This shows evidence of feature reassembly, which meets our prediction for the higher-proficiency L2ers. However, it can be seen in Figure 7 that even some of the high intermediate and advanced L2ers occasionally made residual mistakes by using (past/present) in the temporally unbounded contexts where they were expected to use the PP form of the verb. These errors might be driven by perfectivity distinctions.

Regarding telicity, the finding of Study 3 (Table 10) revealed an association between the use of the PP (perfective marking) and telic predicates. As proficiency increases, PP choice in temporally unbounded contexts augment faster with telic predicates. This result is in line with the prediction of the prototype account which proposed that L2ers tend to associate perfective markers with telic predicates. In contrast, they tended to associate imperfective markers with atelic predicates as prototypical structures. Furthermore, (Table 10) shows that the continuative was the favourable context for the use of PP by L2ers of high proficiency level in line with the results of L1 English participants in Study 1.

6. Conclusion

This paper contributes to the current literature on second language acquisition (SLA) with implications for L1 transfer predictions in the acquisition of the English present perfect (PP) by Arabic L2ers of English within a feature reassembly approach (Lardiere, 2012). The findings contribute to a debate regarding the lexical encoding of the features associated with English present perfect in L1 Arabic.

We followed in this paper a bottom-up approach to deriving the FRH predictions from two preliminary studies for the acquisition of the PP. These predictions were tested in L2 acquisition study. This inductive approach has showed new insights for the feature reassembly between L1 and L2 in the acquisition of the English PP that other approaches did not. These predictions differ from those predictions made using the conventional such by (Fassi-Fehri, 2004 and Alruwaili, 2014) in their investigations of the acquisition of tense and aspect distinctions by Arabic learners of English. They assumed that there is an interpretable [perfect] feature that is not marked explicitly in Arabic and can convey the English PP and simple past meanings, which causes persistent difficulty for Arabic learners of English in their acquisition of the English PP.

On the other hand, the bottom-up approach used in this paper allows for defining the target as a range, which takes into account the variability in the English native speakers' performance in Study 1. This can be particularly useful when dealing with the PP features such as the optionality between PP and simple past in recent past contexts. Similarly, in L1 Arabic. the conventional approach assumes a monolithic target, suggesting that the [perfect] feature in L1 Arabic can convey the meanings of the PP and simple past, our approach allows for some level of variability in the target in the performance of L1 Arabic participants, where the choice of verb form varies according to semantic features such as the type of CR and telicity of the predicate.

The driven FRH predictions have been supported by part of the above data, where L2ers of low proficiency level transferred the present in [+ continuative] and [+ telic] contexts, and there was no preference for the past in [– temporally bounded] contexts at any proficiency level. The over use of the present in the contexts favouring the PP could be due to aspectual distinctions. L2ers could transferred the [imperfective] feature beyond the obligatory contexts for the use of the PP. This finding provides new insight for further research to test the re-assembling of [imperfective] value from L1 in the L2 acquisition of the English PP by L2ers.

The results revealed that no impact of the temporal boundedness among the low proficient L2ers, as we predicted compared to highly proficient L2ers. The results of this study show that [temporal unboundedness] and proficiency significantly induce the use of the PP by L2ers. Further investigation is required to understand more how the semantic features (telicity and relevance type) could induce the use of PP by L2ers depending on the context with no associative adverbial clue.

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