Verb Derivation Patterns among Moroccan Arabic Heritage Speakers in France: Pedagogical Implications

Amal El Haimeur
University of Kansas

Abstract
This study investigates the acquisition of verb derivation patterns by 15 Moroccan Arabic heritage speakers in France. The patterns studied were the basic, causative, medio-passive, and reciprocal. The data were gathered through a production experiment. The main finding was that a semantic distinction realized by pattern alternation was neutralized in the heritage language. The basic pattern and periphrastic constructions were used predominantly in medio-passive and reciprocal target data. The basic pattern was acquired by all participants, while only 40% acquired the causative, although the phonological form of the causative pattern was modified in the heritage language. The medio-passive and reciprocal patterns were not acquired. There were significant differences between the four patterns. Less marked and more common morphological structures characterized the heritage language.

Neutralization in verb patterns showed that participants spoke a variety of Arabic in which certain morphosyntactic forms were reanalyzed.

Keywords: Moroccan Arabic; heritage speaker; heritage language; verbal morphology; non-concatenative morphology

1. Introduction

Heritage speakers have been examined by theoretical linguists, educationalists, and sociolinguists, with grammar being a common area of debate (Aalberse & Muysken, 2013). Linguistic research shows that the end state of heritage speaker grammar is typically different from that of monolingual speakers (Benmamoun et al., 2013a; Montrul, 2008, 2016; Polinsky, 2008). As such, heritage speaker grammar is often described as incomplete (Montrul, 2016) or simply different from monolingual speakers, which does not imply incompleteness (Kuppisch & Rothman, 2016). Given the complexity of heritage language acquisition—affected by numerous social, cultural, and linguistic factors (see Albirini, 2014; Montrul, 2016)—it is expected that heritage speaker language will be different from monolingual speakers because of the different variables influencing monolingual and heritage speakers' experiences in their language development (Pascual y Cabo & Rothman, 2012).

Monolingualism was formerly considered the benchmark of being a native speaker (Rothman & Treffers-Daller, 2014). However, multilingualism has increasingly been viewed as the default state as over 50% of the world's population lives in a bilingual context (Kupisch & Rothman, 2016). Research on heritage speakers has thus shifted to a different type of native speaker whose linguistic outcomes result from the interaction of multiple factors, such as setting of acquisition and quantity and quality of input. Heritage speakers present unique opportunities to study native speakers' grammar acquired under different social contexts. Montrul (2016) explained that what makes a language a heritage language is its local and social context and the conditions under which heritage languages are learned, such as within an immigrant population.

Heritage speakers are referred to as a subset of native speakers (Rothman & Treffers-Daller, 2014) based on the age of onset of acquisition and the naturalistic learning context. In other words, they acquire the language naturally in a family

setting at a young age (Aalberse & Muysken, 2013). Heritage speakers are also bilingual and native speakers of the majority language if the acquisition process takes place before or at 4–6 years of age (Rothman & Treffers-Daller, 2014). They have been described as often coming from an "immigrant and/or ethnic minority background" (Albirini, 2014, p. 731). This is because they speak a minority language, which is usually confined to home and community settings, and a majority language spoken in most other situations (Montrul, 2008, 2016 Polinsky, 2008). They also usually do not receive formal education in their heritage language (Pascual y Cabo & Rothman, 2012). Hence, heritage speakers are both native speakers and bilingual speakers and may be considered a natural resource for language acquisition studies.

Acquiring grammar is a gradual process "with a beginning followed by a period of development that spans several years"; as such, "the study of language acquisition is concerned with describing the typical courses of development of different aspects of vocabulary and grammar" (Montrul,

2016, p. 1). The study of acquiring a heritage language as a native language is also concerned with different linguistic components. This process has been described as disrupted by heritage speakers switching to the majority language once they start going to school (Albirini, 2014; Benmamoun et al., 2013). Since language acquisition does not end at the typical start of formal schooling (Albirini, 2014; Montrul, 2016), heritage speaker grammar is often described as incomplete as is not given sufficient time to more fully develop (Benmamoun et al., 2013), such as between ages 8 and 10, with many structures continuing to develop across one's lifespan (Montrul, 2008, p. 267). Furthermore, achieving adult proficiency requires about 13 to 14 years (Montrul, 2016).

There has been a great amount of research on heritage language in North America in the last two decades (Montrul, 2016) and ample research on Levantine Arabic as a heritage language in the U.S. (Albirini, 2014; Albirini & Benmamoun, 2014; Albirini et al., 2013; Albirini et al., 2011; Rouchdy, 2002; Saadah, 2011). Rouchdy (2002) claimed that the Arabic

spoken by Arab-Americans did not correspond to any specific dialect; their ethnic variety was understood only by members within the linguistic community in the U.S. and not by Arab immigrants outside the U.S. In contrast, research on immigrant varieties of Arabic in Europe has been scarce (Montrul, 2016). Turkish and Moroccan people represent two major immigrant groups in many European countries (Boumans & de Ruiter, 2002; Montrul, 2016). Hence, it would be interesting to study the linguistic outcomes of acquiring Arabic as a heritage language in Europe and to explore its characteristics in that setting.

This study focused on Moroccan Arabic (MA) as a heritage language in France in order to better understand the linguistic outcomes of acquiring Arabic as a heritage language in an immigrant context where the majority language is French. The study is the first to examine the acquisition of MA as a heritage language in a European immigrant context. The study also contributes to the geographical diversity of heritage language research. Additionally, it is the first study to

examine the acquisition of morphological structures by Moroccan-French heritage speakers.

More specifically, this study investigated the acquisition of MA verb derivation patterns. These processes highlight the use of non-concatenative morphology and how semantic notions such as causativeness and reciprocity are lexicalized within the MA verb-pattern system. Verb patterns are derived from the interaction of morpho-semantic components. Consequently, the acquisition of verb pattern alternation is a multi-faceted task. The researcher expected that heritage speaker non-concatenative morphology would be modified, so this study aimed to understand the linguistic changes that heritage speaker adopted and the different linguistic outcomes of acquiring their heritage language.

2. Verb Patterns in Moroccan Arabic

Verbs in Semitic languages are characterized by a root-and-pattern system (Ayalew, 2011; Berman, 1985, 1999; Danks, 2011). The root is typically composed of three consonants and conveys the semantic core of a word. The "patterns" refer to different ways a root can be altered to modify that core meaning (Berman, 1985). A verb root might be modified through patterns, for example, to indicate semantic notions such as causativeness, reciprocity, and passive voice.

Modern Standard Arabic technically has 15 verb patterns (McCarthy, 1979), but only nine (Glanville, 2018) or 10 (Badry, 2005) are used frequently. Of these, MA has seven patterns (Badry, 2005), only four of which are represented by a large number of verbs (Harrell, 1962). Pattern 1 (P1) is the most frequent and is referred to as the basic or agentive pattern (Badry, 1982). McCarthy and Prince (1990) hypothesized that other patterns in Arabic were generated from P1. The P1 root can be represented with a CCeC struc-

-ture , can be transitive or intransitive, and has several syntactic and semantic functions (Badry, 1982). Additionally, it might be the first pattern analyzed by children and productively derived from the root (Badry, 1982). It is also very frequent and easy for children to understand (Badry, 1982; Berman, 1985) and therefore should be the earliest for them to acquire. Formally, it is the simplest pattern as just one vowel is added to the C-C-C root, as in /xrɐʒ/ "went out." Pattern 2 (P2) follows a CeCCeC structure and is used for causatives, as in /xerrɐʒ/ "cause to leave." Pattern 5 (P5) has a tCeCCeC structure for medio-passive, as in /t-herres/ "to be broken." Finally, Pattern 6 (P6) follows a t-CaCeC structure to express reciprocity and derive reciprocal verbs, as in /t-ʕaneq t-ʕanqu/ "they hug each other." Of these, P1 is the most frequent, followed by P2, P5, and P6 (Danks, 2011).

2.1 The Acquisition of Verb Derivation Patterns in Semitic Languages

Badry (2005, 2009) examined the acquisition of verb patterns among 2.5- to 9.9-year-old children acquiring MA. P1 was the most productive and frequent in child language, as children at all studied ages were able to use it productively. The rate of use differed among the other three patterns. After mastering P1, the causative P2 was the next to be used productively, stabilizing by age 3.5. This was followed by the reciprocal P6 and then the medio-passive P5, as in /tkeffeH/ "it got spilled." Badry (2005) studied MA verb derivation among children from various ages based on previous findings that Arabic and Hebrew speaking children started using derivational morphology productively around age 3 and continued their native language acquisition by reorganizing their mental lexicon after preschool age.

Examining another Semitic language, Berman (1982) studied pattern alternation in Hebrew speaking children. Similar to Arabic, the basic pattern (P1) was the most frequent in the 2–4 age group as a given verb root was used largely in one pattern. The oldest children, aged 5–6, were able to use most of the studied patterns, including causative forms. However, they did not master the passive and inchoative, as in /hishxir/ "blacken," which in English normally take an auxiliary verb such as "get" but are lexicalized in Hebrew. The findings suggested that children would not master these two patterns in Hebrew until a later stage in grade school, as those in the study avoided using these patterns. Instead, they expressed the target meanings, passive and inchoative, through "suitable, non-immature paraphrases" (p. 183).

Berman (1982) suggested that the critical age for acquiring Hebrew passives was generally between 7 and 9 and depended on complex interactions between growing cognitive maturity and linguistic competence. This type of knowledge depends on literacy as well and thus was not mastered until puberty. Berman highlighted the importance of input in determining what children conceived of as a basic form. Moreover, Berman (1985) discussed two types of errors that children made when encoding semantic notions in the verb pattern system: neutralization of semantic distinction and pattern substitution (replacing one pattern with another). When a specified pattern is not used, the semantic distinction it represents is neutralized.

Previous studies of Arabic and Hebrew verbs have shown that pattern acquisition needs to be established past age 5. Also, children need to acquire a specific morphological pattern and simultaneously conceptualize the semantic function associated with a pattern. Because verb pattern alternation involves complex forms, I maintain that such forms are acquired later. It has been claimed that morphological complexity is a predictor of age of acquisition (Albirini & Benmamoun, 2014).

2.2 Research Questions and Hypotheses

This study addresses the following research questions:

1. What are the acquired patterns in MA heritage speaker verb derivation processes?
2. How do MA heritage speakers compensate for patterns that are possibly not acquired?
3. What are the characteristics of MA heritage speaker verb derivation processes?

The study made the following hypotheses:

1. P1 will be acquired and used productively in the heritage language.

2. Heritage speakers will use P2 productively to derive causative forms. However, the phonological form will be modified. This hypothesis would be supported if participants used P2 in at least 70% of the target cases and had constraints against geminate consonants in applying P2.

3. Morpho-semantic distinctions will be neutralized in the heritage language, as the semantic distinction (medio-passive and reciprocal) will not be lexicalized using morphological patterns (P5, P6). The hypothesis would be supported if P1 and periphrastic constructions were used instead of P5 and P6.

3. Methodology

3.1 Participants

Fifteen French-Moroccan heritage speakers (eight women, seven men) participated in this study. Of these, eight were between the ages of 18 and 25, five were 26–35, and two were 36 and above. In terms of immigration status, 11 were born in France and four came to France before age 7. Furthermore, 11 had been exposed to both languages (MA and French) since birth. The other four had been exposed to MA since birth and were exposed to French later in childhood. One of these four participants was exposed to French starting at age 5, while the other three were first exposed to French at age 7.

All participants were living in Nice or the neighboring cities Grasse or Cannes. They did not have formal education in Arabic, except for two participants who rated their writing and reading skills at 2 on a 5-point Likert scale. According to them, this reading and writing ability stemmed from their exposure to written Arabic at the mosque when they had learned to memorize and write the Quran. All participants

were heritage speakers and not language learners since they did not learn their heritage language in a formal setting.

Participants came from working class families, and their parents had less than a high-school diploma and were born in Morocco. Twelve participants had completed high school, two had an associate degree (but were still continuing their education), and one had a middle school diploma. Thirteen reported visiting Morocco regularly every summer, and one visited it every two years. Another used to visit Morocco every year but had started visiting it only every five years since becoming a mother. A questionnaire in French (see Appendix 1) was used to collect data on participants' demographic background and perceived proficiency in the heritage language and French.

Participants were asked to rate their language skills in MA and French on a 5-point Likert scale (0 = Very bad; 1 = Bad, i.e., a few words such as greetings; 2 = Average; 3 = Good; 4 = Very good; 5 = Excellent). The questionnaire results suggested that participants had strong skills in their

dominant language, French. The only skill in the heritage language they rated as good was speaking. This data on proficiency was needed to proceed to the verb alternation task and helped with recruiting participants. All 15 participants rated their MA proficiency at 2 or above for speaking. They rated their French proficiency at higher levels than the heritage language for speaking, reading, and writing. This suggested they had not received formal education in the heritage language.

3.2 Experiment and Procedures

The recommended baseline against which heritage speaker performance should be compared is debatable (Montrul, 2016). However, it is better not to compare heritage speakers to monolingually raised speakers to avoid negative implications and destructive judgments about heritage speaker grammar and because heritage and monolingual speakers acquire their native language in distinct contexts (Pascual y Cabo & Rothman, 2012).

In this production experiment, participants were tested in four MA verb derivation patterns: P1 (CCeC), associated with various semantic functions depending on the meaning of the root; P2, the causative (CeCCeC); P6, the reciprocal (tCaCeC); and P5, the medio-passive (tCeCCeC). Participants were shown 40 pictures in random order (10 for each of the target patterns). They were asked to describe each picture guided by four questions, each of which was meant to elicit one of the four target patterns for a given verb root (adapted from Badry, 2005; Berman, 1982). That is, each verb root was used in more than one context, thus calling for a change in pattern. In this way, the task reflected both semantic contrasts (active/medio-passive, basic/causative, and reciprocal/basic) and morphological contrasts (CCeC, CeCCeC, tCaCeC, and tCeCCeC). Before the main part of the experiment, four additional pictures were used in a practice session to familiarize participants with the task. To elicit the use of P1, for example, participants were asked, "What did X do?" For causatives, the question was "What is X doing to

Y?" To elicit a reciprocal, the question was "What are they doing to each other?" For medio-passive, they were asked, "What has happened to X?" Verb roots were common verbs in MA, the majority of which were adopted from Badry (2005). All instructions in the experiment were in MA.

Figure 1 shows a sample picture with stimuli used in this experiment. The tested patterns and stimuli are detailed in Appendix B. Participants were tested individually and the entire task took about 40 minutes. Responses were written down and audio recorded. The mean usage rate for each pattern was calculated. Responses were first compared to the source language[1] and scored as source-like or not source-like. The percentage of source-like forms was calculated for each pattern.

[1] Source language is used to refer to MA, the variety spoken by monolingually raised Arabic speakers in Morocco. Source-like refers to forms conforming to the source language. Non-source-like describes forms not conforming to MA. It implies difference but does not imply any type of violation of MA grammar.

The criterion for deciding whether a participant had acquired a pattern was that it had to be used at least seven out of 10 times (70%). There were 600 tokens in total used to represent the target patterns. ANOVA and *t*-test pairwise comparisons were run to assess variation in pattern production.

The resulting data were analyzed to look for general trends and strategies in deriving the four patterns.

Figure 1. Example Picture, Question, and Target Response

Question: /ʔaʃ wqaʕ əlʕasˁir/

"What has happened to the juice?"

Target answer: /tkeffeħ/

"The juice was spilled."

4 Results

4.1 Acquisition of Verb Patterns

Figure 2 reports the mean rates that each pattern was used by participants when responding to the stimuli, while Table 1 reports the acquisition rate for each pattern. The mean rate of source-like use differed from one pattern to another. As expected, the basic pattern was the only one with a high rate of use (100%), followed by the causative (51%), medio-passive (22%), and reciprocal (15%). The rate of acquisition likewise differed between patterns. The basic pattern was acquired by all participants, while only 40% had acquired the causative, and no one had acquired the medio-passive or reciprocal.

Figure 2. Mean Percentage of Source-Like Responses

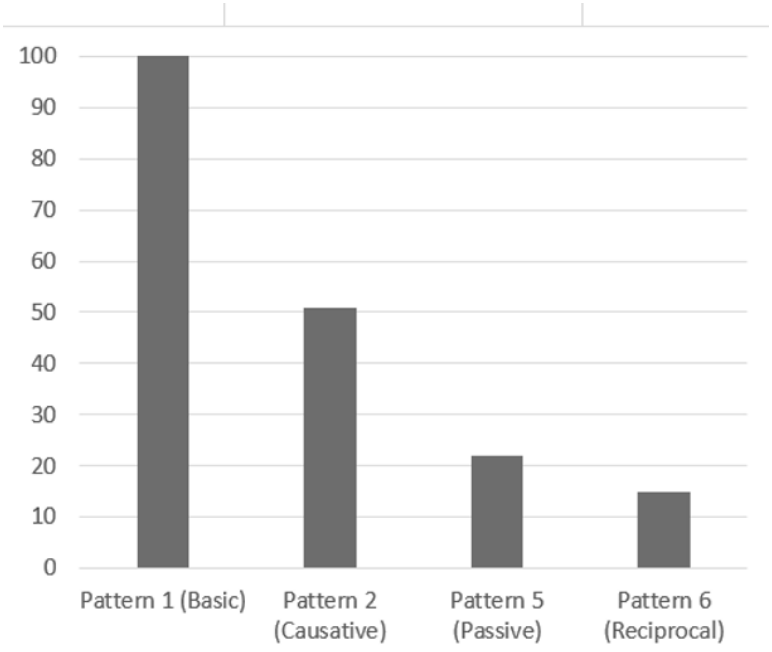


Table 1. The Percentage of Acquisition of the Four Verb Patterns

Required Pattern	*Rate of Acquisition*
Basic (P1, CCeC)	*100%*
Causative (P2, CeCCeC)	*40%*
Medio-passive (P5, t-CeCCeC)	*0%*
Reciprocal (P6, tCaCeC)	*0%*

4.2 Pattern Usage Differences

The ANOVA revealed statistically significant differences in how the four patterns were used, ($F(df=3) = 160.57$, $p<0.01$). *T*-test comparisons were performed to look for significant differences between each pair of patterns. T-test pairwise comparisons showed that between the usage of the basic pattern (P1) and causative (P2), there was a significant difference ($t(df=149) = 11.88$, $p<0.008$). There was also a highly significant difference in the usage of the basic pattern (P1) and the medio-passive pattern (P5) ($t(df=149) = 22.98$, $p<0.008$). Between the usage of the basic pattern (P1) and the reciprocal pattern (P6), there was a significant difference ($t(df=149) = 28.68$, $p<0.008$). There was also a significant difference in the usage of causative (P2) and medio-passive (P5) ($t(df=288) = 5.51$, $p<0.008$). Between the usage of P2 and P6, there was a significant difference as well ($t(df=271) = 7.13$, $p<0.008$). There was no significant difference between P5 and P6. Therefore, there were statistically

significant differences in the usage of the four patterns. The findings for each target pattern are reported below.

4.3 Characterization of Target Patterns in Participant Productions

4.3.1 The Basic Pattern (P1)

According to the results of the production task, P1, which expresses multiple semantic notions and is acquired at an early age by Moroccan children, was used at a far higher rate (100%) than other patterns, as all participants had acquired it and applied it productively. Furthermore, all participants applied P1 in the studied data without resorting to pattern substitutions, as in /dˤreb/ "to hit" and /ʃreb/ "to drink." Hence, participants' productions showed P1 to be very productive and stable in their verbal derivational system. However, P1 was used significantly more often than the other three patterns.

4.3.2 The Causative Pattern (P2)

P2 is used to express causativeness and this semantic meaning is lexicalized in the morphological form CeCCeC. P2 was the second most common pattern used (51%), 40% of

participants were determined to have acquired it, and it was used significantly more than P5 or P6. However, in 49% of P2 target data, P1 was substituted for P2, and P1 was used with periphrastic constructions to express causativeness without the P2 lexical pattern. In Examples 1–5, P2 (CeCCeC) is needed, with the target answers being /ka-y-ʕewwem wald-u/ "he is bathing his son," /ferreħ wald-u/ "he made his son happy," /ʒerra-t əl-kalb/ "she made the dog run," /qerra-t-u/ "she taught him," and /ʃerreb/ "he watered." In all five examples, however, participants expressed causativeness with periphrastic constructions that included P1. P1 plus a periphrastic construction is available as another option in MA to express causativeness, but the semantic pattern for causativeness was not used in this data, despite participants being asked a question that rendered P2 as the best candidate.

1. ta-y-dir li-h ǝd-duʃ

   Asp-3-do-SM for-him DEF-shower

   'He is giving him a shower'

2. daba fǝrħan ħit baba-h ǝʕta-h kadu

   now happy because dad-his gave-3SM gift

   'Now, he is happy because his dad gave him a gift'

3. ka-t-ʃad ǝlkalb baʃ ta-ʒri

   Asp-3-hold-SF DEF-dog so run-3SF

   'She is holding the dog in order to run'

4. ta-tǝ-qra ǝl-wald-ha

   Asp-3-read-SF for-son-her

   'She is reading for her son'

5. ka-j-ʕtˁi-h ǝlma

   Asp-3-give-S-him DEF-water

   'He is giving him water'

Within the 51% of the data that used P2, the phonological form was modified, with CeCCeC realized as CeCeC. For example, participants used the pattern CeCeC in /t-aj-naʕes

wald-u/ "getting his son to sleep" instead of the causative pattern CeCCeC. Gemination, an important process in forming P2, was not applied. Participants appeared to depend on vowels as a clue in using P2 to express causativeness, as vowels were not substituted. The only process that was not applied was gemination of the second consonant. Since some roots were used in both P1 and P2 in this experiment, the use of those patterns in participant productions could be compared to show that the morphological distinction of P1 and P2 was maintained (see Examples 6–9). As can be seen, participants modified the phonological realization of P2.

6. lbes 'wear' (P1)

CCeC

l b s

7. lebes (P2)

CeCeC

l b s

8. ʃreb 'drink' (P1)

CCeC

Ka-t -ʃ re b 'she drinks'

9. ʃareb (P2)

CaCeC

ka-j-ʃa re b wald-u 'he gives water to his son'

4.3.3 The Medio-Passive Pattern (P5)

No participant had acquired P5, with it used only 22% of the time on average. According to *t*-test pairwise comparisons, this pattern was used significantly less than P1 or P2. In the 71% of the P5 target data that did not use P5, P1 was employed instead, despite participants being given a question that rendered P5 the best candidate. For example, the medio-passive pattern (tCeCCeC), as in /tderbat/ "it was hit," /tesbeɣ/ "it was painted," /tkeffeħ/ "it was spelled," /teʃreb/ "it was drunk," and /teqtˁeʕ/ "it went off," was replaced by P1, as in Examples 10–14. Hence, participants highlighted the agent of an action when they used P1.

10. dar-at əksida
    Did-3SF accident
    'It had an accident'
11. sabɣ-u-h
    painted-3PL-it
    'They painted it'

12. tˤaħ əl-kas

f ell-3S DEF-cup

'The cup fell down'

13. ʃarb-u-ha

drank-3PL-it

'They drank it'

14. ətˤfa-w əl-dew

turned off-3PL DEF-light

'They turned off the light'

In 29% of the target P5 data that did not use P5, participants used adjectives derived from verbs (see Harrel, 1962). Such adjectives are also referred to as passive participles of P1, with the form /mefʕul/, as in /mebjuʕ/ "sold" (Harrel, 1962). Examples 15–18 are derived from transitive verbs: /sbeɣ/ "to paint," /qteʕ/ "to cut," /xzen/ "to hide," and /ħell/ "to open." This replacement of the medio-passive with an adjective was also acceptable in monolingual speech, but

P5 was still the best candidate when using the prompt "What has happened to X?"

15. məsbuɣ

    'painted'

16. məqtuʕ

    'cut'

17. məxzuna

    'hidden'

18. məħlul

    'open'

4.3.4 The Reciprocal Pattern (P6)

No participant had acquired P6, the reciprocal pattern (tCaCeC), which appeared only 15% of the time on average. As such, this form was used significantly less than P1 or P2. The 85% of the target P6 data that did not apply P6 used P1 with analytical phrases. For example, to express reciprocity and agency of two participants performing an action, tCaCeC is needed, as in /tɣamzu/ "they winked at each other,"

/tʕanqu/ “they hugged each other,” /traʃʃu/ “they sprayed each other,” /ddaʕaw/ “they sued each other,” /tšaddu/ “they held hands,” /tsˁaħbu/ “they became friends,” /tʒarru/ “they pulled each other,” and /tsalmu/ “they greeted each other.” Examples 19–26 show the use of an analytical phrase and P1 in place of the target pattern. For example, to express a reciprocal action, P1 was used with a demonstrative pronoun, as in Example 20, /hada əmʕanəq hada/ “this one is hugging this one,” and Example 24, /hadi ədʕat hadi/ “this one sued this one.” Expressions such as “this one” + P1 + “and the other” + P1, as in Example 25, were also used. Other expressions that accompanied P1 included “each other” and “between them.”

19. ka-j-sad-u ʕajni-hum

Asp-3-close-PL eyes-their

‘They are closing their eyes’

20. hada əmʕanəq hada

this hugging Part this

'This one is hugging this one'

21. ka-j-raʃʃ-u binat-hum

Asp-3-spray-PL between-3PL

'They are spraying water'

22. dʕa-w bəʕdəjat-hum

sued-3PL each other-3PL

'They filed a lawsuit against each other'

23. ka-t-ʃadd li-ha jad-ha

Asp-3- hold-SF for her hand-her

'She is holding her hand'

24. hadi dʕa-t hadi

this sued-3SF this

'This one filed a lawsuit against this one'

25. waħəd ʒar wa laxar ʒar

this one pulled-3SM and the other one pulled-3SM

'This one is pulling and the other one is pulling'

26. ka-j-salm-u bi-jadi-hum

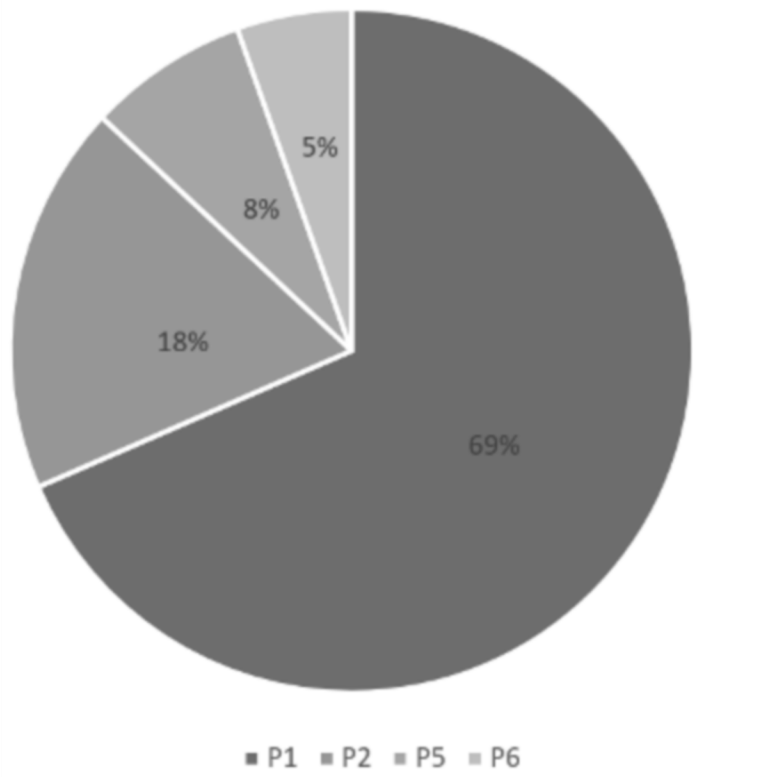
Asp- 3-greet-PL with-hand-their

'They are greeting and shaking hands'

4.3.5 Overall Trends

The analysis revealed that participants relied heavily on P1 and did not emphasize target semantic distinctions. In the data targeting P2, P5, and P6, P1 was used 69% of the time instead of the target form, as illustrated in Figure 3, even though the prompt favored P2, P5, and P6. In contrast, the causative (P2) only appeared 18% of the time when it was supposed to, the medio-passive (P5) only appeared in 8% of target cases, and the reciprocal (P6) in 5%. Participants' verbal derivation system was thus mainly characterized by P1. The low use of P5 and P6 suggested these were not productive in participants' verbal derivation processes.

Figure 3. Pattern use in Causative, Medio-Passive and Reciprocal Targeted-Data



5. Discussion

The findings of this study supported Hypothesis 1, as participants had acquired P1 and used it productively in their heritage language. This supports previous studies on Semitic language acquisition. For instance, it is in line with studies

suggesting that complexity and frequency are the main factors in language acquisition (e.g., Albirini & Benmamoun, 2014; Montrul, 2016). All participants in this study acquired the basic pattern (P1), using it 100% of the time on average when they were prompted to use it. Badry's (1982, 1983, 2005) research on the acquisition of verb patterns by Moroccan children showed that P1 was stable by age 3 and was the first pattern analyzed by children. Additionally, it is very frequent and easily understood by them (Badry, 1982; Berman, 1982). It is also used productively to derive verbs from roots. As a result, it has been claimed that P1 is morphologically simple and the unmarked pattern (Badry, 2005; Berman, 1985).

In a study on verb pattern alternation in Hebrew speaking children, Berman (1982) found that the basic pattern (P1) was the most frequent among children 2–4 years old, as a given verb root was used largely in a single pattern. These results also suggested that P1 was the first pattern to be acquired and used productively in Hebrew. Along the same lines, the presents showed the stability and productivity of P1

in the MA verb pattern system of heritage speakers well into adulthood.

The prevalence of P1 in this study could be explained by Clark and Hecht's (1982) proposal of the principles affecting the acquisition of word formation devices, including semantic transparency, productivity, and conventionality, in addition to formal simplicity (Clark & Berman, 1984). Formally, P1 is the simplest pattern as only one vowel is added to the root (C-C-C). Functionally, it has multiple semantic functions depending on the meaning of the root. Pragmatically, it can be used in many discourse situations (Badry, 1983). As a result, it is the most common verb pattern (Al-Qahtani, 2003, 2005; Danks, 2011). In this study, P1 was considered to be used productively as it was the most used pattern in the MA data. Clark and Hecht (1982) defined the most productive forms as the ones used most often by adults in word innovations. The most used forms in adult speech are adopted predominantly by children to form new words. Furthermore, simpler forms are easier to acquire. Simplicity is

measured by the amount of change a form undergoes; the less a word form changes, the simpler it is (Clark & Berman, 1984, p. 9). Based on this definition, patterns that make few changes to the root are more preferred in word derivation. Therefore, participants in this study acquired a pattern that was morphologically simple, highly productive, and very common in MA and the heritage language.

Hypothesis 2 was not fully supported as it was expected that the causative (P2) would be used more frequently since it is acquired and stabilized at an early age in childhood (see Badry, 1983, 2005; Berman, 1982). As such, previous research has predicted it to be the second pattern acquired in Semitic languages and the second most common in derivation (Al-Qahtani, 2003, 2005; Danks, 2011). In keeping with past literature, P2 was the second most common pattern in MA heritage speaker production in the present study; 40% of participants had acquired it, it was used in 51% of cases in which it was the target form, and it was significantly more common than P5 or P6.

The phonological form of P2 was modified, as Hypothesis 2 predicted. This finding was in keeping with El Aissati's (1997) conclusion that heritage speakers in the Netherlands relied on geminate reduction. Likewise, the present study showed that MA heritage speakers in France had constraints against the production of geminate consonants. This may be explained in terms of their other first language, French, in which gemination is not attested. The distinction between P1 and P2 was maintained as participants depended on other clues such as vowels, but the second geminate consonant was absent in their production, as CeCCeC became CeCeC. In the P2 target data that did not use P2, a transitive verb (P1) was used with periphrastic constructions, which was also attested in monolingual speech. Although the prompt in the experiment favored the use of P2, it was not used in 49% of data targeting the causative.

Despite being described as formally simple in first language acquisition (Badry, 1983), the data in the present study suggested that the complexity of P2 in the heritage

language may result from its phonological realization. Participants first need to acquire the singleton/geminate contrast in order to produce the geminate in P2. Khattab and Al-Tamimi (2015) claimed to be the first to study the acquisition of gemination in Arabic by conducting an acoustic experiment. Their results suggested that the acquisition of this feature among Lebanese children was a complex process due to language contact in Lebanon. Additionally, geminates are marked consonants (Khattab & Al-Tamimi, 2015). Along similar lines, language contact might make it challenging for gemination acquisition among MA heritage speakers in France. Hence, the acquisition of the singleton/geminate contrast may be acquired later on.

Medio-passives in Semitic languages such as Arabic and Hebrew are acquired late in the language acquisition process (Badry, 1983; Berman, 1982, 1985). In Badry (1982, 2005), MA speaking children overused the causative at the expense of medio-passive forms. Badry (1983) claimed that the medio-passive in MA was expected to present some

difficulties in language acquisition because of its formal structure and semantic ambiguity. Additionally, P5 is formed by attaching a prefix [t-] to the template CeCCeC. This prefix has several derivational and inflectional functions in Arabic. P5 is also used to derive reciprocal patterns and reflexives (Badry, 1983). Berman (1985) argued that acquisition of the passive was delayed in Hebrew as it occurred more rarely as an input and was morphologically marked. The availability of periphrastic constructions for expressing the same meaning is another factor contributing to its late acquisition. In Berman (1982), the oldest children, aged 5–6, were able to use most of the studied patterns, including causative forms. However, they did not master passive forms. It was suggested that Hebrew speakers did not master this pattern until a later stage in grade school and that literacy enhanced its acquisition. It was also suggested that the critical age for the acquisition of passives in general was 7–9.

Hypothesis 3 of this study was supported since P1 was used predominantly in P5 and P6 target data. Therefore,

morpho-semantic distinctions were neutralized in the heritage language, as the semantic distinction between the medio-passive and reciprocal was not lexicalized using the specified morphological patterns, i.e., tCeCCeC for P5 and tCaCeC for P6. Instead, P1 and periphrastic constructions were used. This meant that heritage speaker language was reanalyzed by extending the use of P1 to environments where the morphologically specified P5 or P6 would normally be needed.

In this study, no participant acquired the medio-passive pattern (P5), with it appearing in only 22% of the target cases on average. P5 was used significantly less than P1 or P2. In 71% of the data that did not use P5, P1 was used. In the other 29% of the data that did not use P5, participles were used, which was also acceptable in monolingual speech. Additionally, Badry (1983) and Berman's (1982) research showed that the medio-passive was acquired gradually at a later stage among children. Accordingly, it was not surprising that heritage speakers in this study had not

acquired this pattern, given its morphological markedness and the availability of periphrastic constructions. Furthermore, heritage speakers' limited opportunities to learn MA and their immersion in the majority language, French, could have further hindered their acquisition of this pattern. Participants' use of P1 when prompted for P5 suggested there was a leveling of verb pattern distinctions.

In this study, P6 was not acquired by any participant, its mean usage was merely 15%, and it appeared significantly less than P1 or P2. When given a prompt calling for P6, participants relied on analytical expressions with P1 and other expressions using pronouns and demonstratives. P6 was one of the more marked patterns targeted in this study (Berman, 1982). It expresses complex semantic relations to refer to a reciprocal action, but reciprocal verbs can also express the notion of competition and rivalry (Harrell, 1962). It is also characterized by a combination of symmetry and reflexivity, which creates an action that takes place between equal participants (Glanville, 2018). This creates more complex

semantic structures. Additionally, P6 is formed by prefixing [t-] to the template t-CaCeC. Badry (2005) claimed that reciprocals were acquired late in MA, suggesting the concept of simultaneity was acquired late in MA as well. This could be due to the complex semantic relations involved, where two agents are simultaneously performing and being affected by an action. Therefore, two perspectives are involved in these reciprocal forms. Reciprocals are also acquired later in other Semitic languages, such as Hebrew, due to being conceptually more difficult (Berman, 1982, 1985).

The medio-passive (P5) and reciprocal (P6) are both morphologically and semantically complex verb derivation patterns. The basic pattern is used as a default morphological device because it is unmarked and underspecified. According to the Underspecification Hypothesis (McCarthy, 2007), structures that are underspecified and unmarked are used as a default and in place of more marked and specified structures. This trend was seen in the present study with the less marked

P1 often being used as a default in place of P5 and P6, which were not productive in participants' linguistic output.

Participants in the present study appeared to follow the previously proposed order of acquisition in Semitic languages: P1>P2>P5>P6 (Badry, 1983; Berman, 1982, 1985). According to the criterion adopted in this research, no participant acquired P5 or P6. Hence, the proposed order of acquisition in the heritage language was P1>P2>P5/P6. In addition, the pattern of acquisition and use could be explained in terms of frequency, with P1 being the most frequent, followed by P2 and then P5 and P6 (see Al-Qahtani, 2003, 2005; Danks, 2011).

Pattern alternation involves the interface of two linguistic components (semantics and morphology), which could affect the acquisition of P5 and P6. According to the Interface Hypothesis proposed in Sorace (2011), grammatical structures that interface are not likely to be acquired completely, as they are complex and integrate multiple linguistic components. Furthermore, both P5 and P6 are

semantically and morphologically complex, and morphological complexity has been suggested as one of the main factors affecting age of acquisition (Albirini & Benmamoun, 2014; Omar, 1973). P5 and P6 are also both morphologically marked. Unmarked structures such as P1 in Arabic should be the first ones acquired as a morphological derivational device, while marked structures such as P5 and P6 are expected to be acquired later. In general, the acquisition of morphology extends well beyond the start of school (Montrul, 2016). However, once children begin attending school in France, they are immersed in French, which could restrict the development of P5 and P6 in the heritage language. This would agree with other studies suggesting that the start of school as early as age 3 could affect heritage language development (Helot & Young, 2002), especially since the acquisition of P5 and P6 is a gradual process requiring an extended period of time.

In a study on the acquisition of diminutive forms among MA heritage speakers, El Haimeur (2019) argued that

non-concatenative morphology was a complex process and found that participants had not acquired complex diminutive patterns. Berman (1982) suggested that the critical period for acquiring the medio-passive was between ages 7 and 9, which would coincide with MA heritage speakers' immersion in French at school. Based on the above data and previous research, I argue that P5 and P6 develop after age 5, spanning the entire school period and ending in the mid-teens. This would fall in line with Berman's (1982) assertation about pattern alternation in Hebrew being acquired later during puberty as a consequence of greater cognitive maturity and literacy. In this way, such forms require "mental space becoming available for the task and [rely] on more exemplars from input" (p. 188). These patterns are also less frequent than P1 and P2, which could explain their later acquisition. Not all morphological aspects are acquired during the preliterate period because some forms have greater complexity and lower frequency in the language. In this study,

structures that were complex and less frequent tended to be absent from heritage speaker language.

The findings also suggested an implicational hierarchy for the acquisition of verb pattern alternation in MA. If a MA learner acquires only one verb pattern, it will be the basic pattern (P1). This implication was supported by how 60% of participants acquired just one verb pattern, P1. Moreover, if a learner acquires two verb patterns, they will be P1 and P2, as 40% of participants acquired these patterns.

Heritage speaker research is relevant to first and second language acquisition and linguistics in general (Montrul, 2016). An inclusive theory of second language acquisition Arabic should predict areas of difficulty and order of acquisition and provide a theoretical background for language instructors. Danks (2011) argued that mastering Arabic verbs is a key to Arabic second language acquisition.

This study provides implicational hierarchies for the acquisition of MA verb pattern alternation. It also proposes a developmental order in the acquisition of those patterns. A

rich linguistic environment and extended period of time are required for second language students to acquire verb pattern alternation. They need metalinguistic awareness and explicit grammatical instruction, as implicit learning may not be sufficient. Granena and Long (2013) claimed that the capacity for implicit learning gradually deteriorates with age (p. 336). However, research indicates that form-focused instruction and feedback is beneficial for learning morphosyntax (Montrul, 2016). Similarly, the acquisition of Arabic verb pattern alternation is a gradual process. Less marked and more frequent ones such as the basic pattern (P1) should be acquired first, followed by the causative pattern (P2). It is likely that the geminates in P2 will require emphasis and articulatory training. In contrast, the passive and reciprocal forms are among the more marked and less frequent structures and will likely present difficulties for second language learners. Therefore, their acquisition may be emphasized by consistent input and explicit grammatical explanation.

Another implication of this study is that structures that depend on the interface between two linguistic components are likely harder for second language learners to acquire. As a result, they may need more consistent instruction and time. Therefore, this study could inform the theoretical foundations for the sequence of acquisition in second language education.

It is worth noting that this study depended mainly on production experiments to study heritage speakers' final attainment of verb patterns. However, comprehension tests could also be effective in this regard. Clark and Hecht (1983) stated that in many areas of language use, comprehension and production remain distinct (p. 326). Studies in first language acquisition also propose that understanding and perceiving sound structure and meaning precedes production (Clark & Hecht, 1982). Polinsky (2008) emphasized the use of both comprehension and production experiments in heritage speaker research. Production experiments remain the most appropriate way of studying heritage speakers, but future

studies could use them alongside comprehension tasks to be more effective.

Conclusion

This study examined the acquisition of four verb derivation patterns in MA as a heritage language in France. It was the first such study to analyze MA heritage language acquisition in a European immigrant context as well as the first to examine the acquisition of morphological structures by Moroccan-French MA heritage speakers.

This study explored the complex linguistic realities of acquiring a native language in an immigrant minority. The resulting heritage language was different from the source language as a result of reanalysis but was still systematic and rule governed. The findings suggest that linguistic experience plays a major role in shaping the acquisition of a native language. More specifically, participants' acquisition of verb pattern alternation was shown to be a gradual process. Patterns that were more common and simpler semantically and morphologically were acquired first, while structures that

were less common and more formally and semantically complex were acquired later. Accordingly, the latter patterns were more likely to be absent from heritage speakers' verb pattern system. Their variety of MA shared many grammatical aspects with the source language but diverged in distinct ways, such as by neutralizing grammatical differences, suggesting that heritage speakers reanalyzed their variety of Arabic.

This study also proposes implicational hierarchies and a developmental order for the acquisition of MA verb patterns. The findings could help Arabic instructors plan their teaching and provide a richer learning environment for heritage learners. Additionally, the study recommends explicit teaching for Arabic verb patterns. Studying heritage speaker phonology could help understand the acquisition of causatives in Arabic, as they depend on the phonological process of gemination. Studying germination would also help better understand the phonology of MA heritage speakers and second language learners in general.

References

Aalberse, S., & Muysken, P. (2013). Language contact in heritage languages in the Netherlands. *Linguistic Superdiversity in Urban Areas: Research Approaches, 2*, 253–274.

Albirini, A. (2014). Toward understanding the variability in the language proficiencies of Arabic heritage speakers. *International Journal of Bilingualism*, *18*(6), 730–765.

Albirini, A., & Benmamoun, E. (2014a). Aspects of second-language transfer in the oral production of Egyptian and Palestinian heritage speakers. *International Journal of Bilingualism*, *18*(3), 244–273.

Albirini, A., & Benmamoun, E. (2014b). Concatenative and nonconcatenative plural formation in L1, L2, and Heritage Speakers of Arabic. *The Modern Language Journal*, *98*(3), 854–871.

Albirini, A., Benmamoun, E., & Chakrani, B. (2013). Gender and number agreement in the oral production of

Arabic Heritage speakers. *Bilingualism: Language and Cognition, 16*(1), 1–18.

Albirini, A., Benmamoun, E., & Saadah, E. (2011). Grammatical features of Egyptian and Palestinian Arabic heritage speakers' oral production. *Studies in Second Language Acquisition, 45*, 273–303.

Al-Qahtani, D. M. (2003). *A dictionary of Arabic verbs.* Librairie du Liban.

Al-Qahtani, D. M. (2005). *Semantic valence of Arabic verbs.* Librairie du Liban.

Ayalew, B. T. (2011). Causative of the 'passive' in Amharic. In E. G. Bokamba, R. K. Shosted, & B. T. Ayalew (Eds.), *Selected Proceedings of the 40th Annual Conference on African Linguistics* (pp. 53–64). Cascadilla Proceedings Project.

Badry, F. (1982). The centrality of the root in Semitic lexical derivation. *Papers & Reports on Child Language Development*, 9–15. Stanford University.

Badry, F. (1983). *Acquisition of lexical derivational rules in Moroccan Arabic: implications for the development of standard Arabic as*

a second language through literacy [Doctoral dissertation, University of California, Berkeley]. ProQuest Dissertations and Theses.

Badry, F. (2005). Acquisition of Arabic word formation: A multi-path approach. *Perspectives on Arabic Linguistics*, *XVII–XVIII*, 243–272

Badry, F. (2009). Milestones in Arabic language development. In *Encyclopedia of language and literacy development* (pp. 1–7). Canadian Language and Literacy Research Network. http://literacyencyclopedia.ca/pdfs/topic.php?topId=274

Benmamoun, E., Montrul, S., & Polinsky, M. (2013a). Heritage languages and their speakers: Opportunities and challenges for linguistics. *Theoretical Linguistics*, *39*(3–4), 129–181.

Benmamoun, E., Montrul, S., & Polinsky, M. (2013b). Defining an "ideal" heritage speaker: Theoretical and

methodological challenges Reply to peer commentaries. *Theoretical Linguistics*, *39*(3–4), 259–294.

Berman, R. A. (1982). Verb-pattern alternation: the interface of morphology, syntax, and semantics in Hebrew child language. *Journal of Child Language, 9*(1), 169–191

Berman, R. A. (1985). The Acquisition of Hebrew. *The Cross-Linguistic Study of Language Acquisition, 1*, 255–371.

Berman, R. A. (1999). Children's innovative verbs versus nouns: Structured elicitations and spontaneous coinages. In L. Menn & N. Bernstein (Eds.), *Methods for studying language production* (pp. 75–98). Psychology Press.

Boumans, L., & de Ruiter, J. J. (2002). Moroccan Arabic in the European diaspora. In A. Rouchdy (Ed.), *Language contact and language conflict phenomena in Arabic* (pp. 259–285). Routledge.

Bylund, E. (2009). Maturational constraints and first language attrition. *Language learning, 59*(3), 687-715. Cambridge University Press.

Clark, E. V., & Berman, R. A. (1984). Structure and use in the acquisition of word formation. *Language: Journal of the Linguistic Society of America, 60*(3), 542–590.

Danks, W. (2011). *The Arabic verb: Form and meaning in the vowel-lengthening patterns* (Vol. 63). John Benjamins.

El Aissati, A. (1997). *Language loss among native speakers of Moroccan-Arabic in the Netherlands*. Tilburg University Press.

El Haimeur, A. (2019). The acquisition of diminutives in Moroccan heritage speakers in France. *Purdue Linguistics, Literature, and Second Language Studies Conference 5*.

Ennaji, M., Makhoukh, A., Es-saiydi, H., Moubtassime, M., & Slaoui, S. (2004). *A Grammar of Moroccan Arabic*.

Glanville, P. J. (2018). *The Lexical Semantics of the Arabic Verb*. Oxford University Press.

Granena, G. & Long, M. (2013.) Age of onset, length of residence, language aptitude and ultimate L2 attainment in three linguistic domains. *Second Language Research*, *29,* 311–343.

Harrell, R. S. (1962). *A short reference grammar of Moroccan Arabic: With audio CD*. Georgetown University Press.

Helot, C., & Young, A. (2002). Bilingualism and language education in French primary schools: Why and how should migrant languages be valued? *International Journal of Bilingual Education and Bilingualism*, *5*(2), 96–112.

Khattab, G., & Al-Tamimi, J. (2015). The acquisition of gemination in Lebanese-Arabic children. In *Proceedings of the 18th International Congress of Phonetic Sciences*. Newcastle University.

Kupisch, T., & Rothman, J. (2016). Terminology matters! Why difference is not incompleteness and how early child bilinguals are heritage speakers. *International Journal of Bilingualism*, 1367006916654355.

Loutfi, A. (2017). Morphological Causatives in Moroccan Arabic. Retrieved from https://www.researchgate.net.

McCarthy, C. (2007). *Morphological variability in second language Spanish* [Unpublished doctoral dissertation]. McGill University, Montreal, Quebec, Canada.

McCarthy, J. (1979). *Formal problems in Semitic phonology and morphology* [Unpublished doctoral dissertation]. MIT, Cambridge, MA.

McCarthy, J. (1981). A prosodic theory of nonconcatenative morphology. *Linguistic Inquiry, 12*, 373-418.

McCarthy, J., & Prince, A. (1990). Prosodic morphology and templatic morphology. In *Perspectives on Arabic linguistics II: Papers from the second annual symposium on Arabic linguistics* (pp. 1–54). John Benjamins.

Montrul, S. (2005). Second language acquisition and first language loss in adult early bilinguals: Exploring some differences and similarities. *Second Language Research, 21*(3), 199–249.

Montrul, S. (2008*). Incomplete acquisition in bilingualism: Re-examining the age factor*. John Benjamins.

Montrul, S. (2016). *The acquisition of heritage languages*. Cambridge, United Kingdom.

Pascual y Cabo, D., & Rothman, J. (2012). The (il)logical problem of heritage speaker bilingualism and incomplete acquisition. *Applied Linguistics*, *33*(4), 450–455.

Polinsky, M. (2008). Gender under incomplete acquisition: Heritage speakers' knowledge of noun categorization. *Heritage Language Journal, 6*(1), 40–71.

Polinsky, M. (2011). Reanalysis in adult heritage language: A case for attrition. *Studies in Second Language Acquisition, 33,* 305–328.

Polinsky, M., & Kagan, O. (2007). Heritage languages: In the 'wild' and in the classroom. *Language and Linguistics Compass, 1*(5), 368-395.

Rothman, J., & Treffers-Daller, J. (2014). A prolegomenon to the construct of the native speaker: Heritage speaker

bilinguals are natives too! *Applied Linguistics*, *35*(1), 93–98.

Rouchdy, A. (1992). *The Arabic language in America*. Detroit, MI: Wayne State University Press.

Rouchdy, A. (2002). Language conflict and identity: Arabic in the American diaspora. In A. Rouchdy (Ed.), *Language contact and language conflict in Arabic: Variations on a sociolinguistic theme* (pp. 133-148). Routledge Curzon.

Saadah, E. (2011). *The production of Arabic vowels by English L2 learners and heritage speakers of* Arabic [Doctoral dissertation, University of Illinois at Urbana-Champaign].

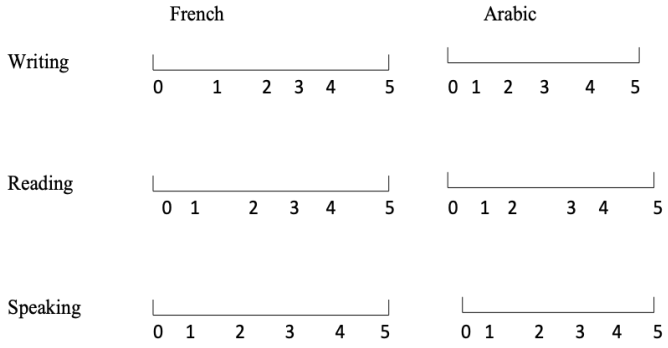
Sorace, A. (2011). Pinning down the concept of "interface" in bilingualism. *Linguistic Approaches to Bilingualism*, *1*(1), 1–33

Appendix A:
Questionnaire

Questionnaire

A. Perceived proficiency: rate yourself from 1 to 5 in the following skills in both French and Arabic: the numbers are equivalent to the following description:

0. Very bad
1. Bad: a few words such as greetings
2. Average
3. Good
4. Very good
5. Excellent



B. Participants demographic variables

1. Complete the following table:

Variable	Category
Gender	M- F
Country of birth	
Age	18-25 26-35- 36 and above

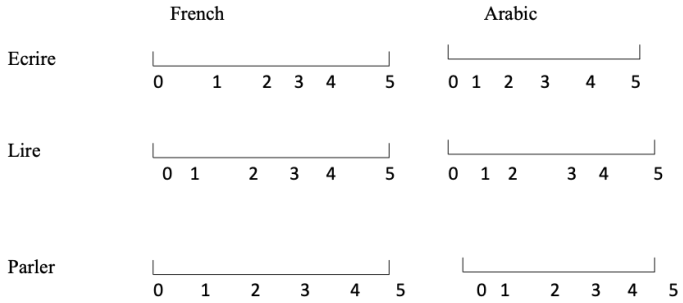
Education	
Number and length of visits to Morocco	Every year- twice a year- every 2 years- above -
Father's / mothers' country of origin	Father: Mother
Father's / mother's job	Father: Mother
Father's and mother's education	Less than high school/ high school- associate degree/ bachelor degree- graduate degree
Age of exposure to Arabic	
Age of Exposure to French	
Age of arrival to France	Born in France- 1, 2, 3, 4, 5, 6

Translated to French

A. Evaluez votre niveau en langues française et arabe selon les niveaux d'aptitude suivants de 1 jusqu'à 5 : les chiffres sont équivalents à la description suivante:

0. Très mal
1. Mal: quelques mots comme les salutations
2. Moyenne

3. Bon
4. Très bien
5. Excellent



A. Complétez le tableau suivant :

Variable	Catégorie
Genre	M- F
Pays de naissance	
Age	18-25 26-35- 36 et plus
Éducation	
Nombre et durée des visites au Maroc	Chaque année, deux fois par an, tous les deux ans,
Le pays d'origine du père / de la mère	Père: Mère:
Travail du père / de la mère	Père: Mère:
Le degré d'études du père et de la mère	Moins que le lycée / lycée / baccalauréat - diplôme d'études universitaires générales (DEUG)/ diplôme d'études supérieures
Âge du début d'apprentissage de la langue arabe	
Âge du début d'apprentissage de la langue française	
Âge d'arrivée en France	Né en France - 1, 2, 3, 4, 5, 6

Appendix B
Word list for verb patterns experiment production

Basic stem	Target	Pattern	Picture used
ʃreb ‘drink’	ʃerbat	CCeC (P1)	a woman drinking juice
lbes ‘dress’	lbes	CCeC (P1)	a man putting on a t-shirt
dˁreb ‘hit’	dˁreb	CCeC (P1)	a boy hitting a ball
kla ‘eat’	kla	CCeC (P1)	a boy eating a sandwich
ʒra ‘run’	ʒrat	CCeC (P1)	a girl running
qra ‘read’	qrat	CCeC (P1)	a women reading a book
ʃra ‘buy’	ʃra	CCeC (P1)	a man buying ice-cream
ħell ‘open’	ħell	CCeC (P1)	a man opening a door
reʃʃ ‘spray’	reʃʃ	CCeC (P1)	a man spraying water
ɣmez ‘wink’	ɣmez	CCeC (P1)	a boy winking
nʕS ‘sleep’	neʕʕes	CVCCVC (P2)	a father putting his son to sleep
ʃreb ‘drink’	ʃerreb	CVCCVC (P2)	a man giving water to his baby
lbes ‘dress’	lebbes	CVCCVC (P2)	a man dressing his son
ʕam ‘take a shower’	ʕewwem	CVCCVC (P2)	a father bathing a baby
ʒra ‘run’	ʒerrat	CVCCVC (P2)	A woman running her dog
qra ‘read’	qerrat	CVCCVC (P2)	a mother teaching a boy

dab ‘melt’	dewweb	CVCCVC (P2)	sun melting snow
freħ ‘happy’	ferreħ	CVCCVC (P2)	father giving a gift to his son
tˤaħ ‘to fall’	tˤajjeħ	CVCCVC (P2)	wind blowing a tree
xaf ‘to be afraid’	xewwef	CVCCVC (P2)	monster scaring a girl
baʕ ‘sell’	tbaʕet	tCeCCeC (P5)	a sold house
kefeħ ‘spill’	tkeffeħ	tCeCCeC (P5)	spilled juice
dreb ‘hit’	tdrebet	tCeCCeC (P5)	a car involved in an accident
xzen ‘hide’	txeznet	tCeCCeC (P5)	hidden girl
ħell ‘open’	tħall	tCeCCeC (P5)	opened window
qtˤeʕ ‘cut’	teqtˤeʕ	tCeCCeC (P5)	power outage picture
xlʕ ‘scare’	texleʕ	tCeCCeC (P5)	scared baby
sˤbeɣ ‘paint’	tesˤbeɣ	tCeCCeC (P5)	painted wall
ʃreb ‘drink’	teʃreb	tCeCCeC (P5)	empty glass
xser ‘broke’	t-xesser	tCeCCeC (P5)	a broken radio
bas ‘kiss’	tbawsu	t-CaCeC (P6)	two women greeting each other
d ˤreb ‘hit’	dˤdˤarbu	t-CaCeC (P6)	2 men hitting each other
ɣmez ‘wink’	tɣamzu	t-CaCeC (P6)	2 women winking at each other

ʕaneq ‘hug’	tʕanqu	t-CaCeC (P6)	2 men hugging each other
reʃʃ ‘spray’	traʃʃu	t-CaCeC (P6)	2 men spraying water at each other
dʕa ‘suit’	ddaʕaw	t-CaCeC (P6)	2 women at the court
ʃedd ‘hold’	tʃaddu	t-CaCeC (P6)	2 girls holding hands
sˤaħeb ‘friend’	t-sˤaħbu	t-CaCeC (P6)	2 friends hugging each other
ʒer ‘pull’	tʒarru	t-CaCeC (P6)	2 boys pulling a rope
selam ‘greet’	tsalmu	t-CaCeC (P6)	2 men shaking hands