

Comprehension of Functional Morphemes by Labrador Inuit Receptive Bilinguals

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1. Introduction

Receptive (or passive) bilingualism – a case when an individual understands a language, but does not produce speech in it - is a common kind of incomplete language knowledge, resulting either from incomplete acquisition or attrition. However, no previous psycholinguistic studies focused specifically on receptive bilinguals.

What kind of knowledge underlies understanding a language in the absence of production? While RBs report that they have good comprehension abilities, they admit that they do not understand everything they hear. The question is, what is missed. While it is possible that RBs have limited vocabularies (and therefore, might often encounter unfamiliar words), it is also likely that they miss elements of meaning supplied by functional morphemes. In the latter case, morphemes and their features may differ in terms of vulnerability in incomplete acquisition. Studies of comprehension in incomplete acquisition and attrition (in individuals with at least some speaking abilities) suggest that RBs might ignore or misunderstand at least some functional morphemes. For example, Polinsky (2008) found that heritage speakers ignored case and agreement markers as cues to identifying whether the subject or the object was the relative clause head in Russian. In Montrul's (2002) study, heritage speakers misinterpreted tense and aspect morphology in Spanish.

The goal of this study¹ is to test whether RBs can access semantic features supplied by functional morphemes. There are three possibilities: no access at all, access to all features, or incomplete or inaccurate representations of the features carried by a given morpheme.

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¹ The study reported here is part of a larger study consisting of several tasks, Sherkina-Lieber (forthcoming)

2. Method

2.1. Participants

This study took place in Nain, a community in Nunatsiavut, the Inuit area in the province of Newfoundland and Labrador, Canada, where a language shift has been going on since mid-20 century, resulting in a large population of Inuit with only receptive knowledge of their ancestral language, Labrador Inuttitut (a dialect of Inuktitut, an Eskimo-Aleut language). These receptive bilinguals are heritage language learners, i.e. they were exposed to Inuttitut since childhood (as monolinguals or English-Inuttitut bilinguals), but did not acquire full knowledge of the language.

20 residents of Nain who reported being fluent English speakers and having receptive knowledge of Inuttitut participated in the study. Later, 3 of them were separated into another group based on their self-assessment: while the majority of the group reported understanding most of the input or the general idea, these 2 RBs reported understanding about 25% of the input. The former are referred to as high-proficiency receptive bilinguals (HRBs), and the latter, as low-proficiency receptive bilinguals (LRBs). In addition, 8 fluent speakers from the same community participated as a control group.

2.2. Materials

The materials were designed and used to test comprehension of tense, aspect, and agreement; however, for the space reasons, I report only the data on tense in this paper (see Sherkina-Lieber (forthcoming) for the rest of the data). 40 mini-stories (consisting of one or two sentences each) in Inuttitut have been constructed to test comprehension of tense morphemes. In addition, 2 lexical control mini-stories were used. The target items are constructed so that the right interpretation crucially depends on the target morpheme, so that if the listener does not process the target morpheme, the sentence is ambiguous for him/her: the context is compatible with opposite tense interpretation. The comprehension questions ask for the time interpretation, i.e. when the event described took place.

In Inuttitut, tense morphemes are separate from agreement and aspect. Each tense morpheme has two dimensions: time (past/present/future) and remoteness degrees distinctions within past and future (recent past/same-day past/distant past/long-ago past; similar distinctions exist for future). Present tense is morphologically unmarked, but other tenses must be expressed by a morpheme. Probably the most salient remoteness contrast in Labrador Inuttitut is same-day vs. yesterday or beyond. Thus, four tense morphemes were targeted: distant past *-lauC-*, same-day past *-kKau-*, same-day future *-niaC-*, and distant future *-lâC-*. Each morpheme was tested in two contrasts: time (past vs. future) and

remoteness (same-day vs. distant)² The questions were of the forced-choice type, with two options for the answer. The question for same-day past vs. same-day future was “Did X already V, or will X V soon? ”, and for distant past vs. distant future, “Did X already V, or will X V later? ”.

(1) *Past versus future*

IKalu-luvini-Ka-vuk kom-mi. Johnny iKalu-nnia-gia-**niat**-tuk³.

Char-a.lot.of-have-3s river-loc Johnny char-hunt-go.to-**sfut**-3s

‘There is a lot of char in this river. Johnny will go fishing for char.’

Question: Did Johnny already go fishing, or will he go fishing soon?

Correct answer: he will go fishing soon

In the remoteness contrasts, the question for same-day past vs. distant past was “Did X V today or on some other day? ”, and for same-day future vs. distant future, “Will X V today or on some other day? ”.

(2) *Same-day versus distant*

Mary nunivap-vi-mik Kaujima-juk. Nuniva-ppa-**kKau**-juk.

Mary pick.berries-place-mik know-3s Pick.berries-a.lot-**spst**-3s

‘Mary knows a good place for berry-picking. She just picked a lot of berries’

Question: Did Mary pick berries today or on some other day?

Correct answer: Mary picked berries today

The order of conjuncts in the questions was counterbalanced within each condition to avoid a bias towards repetitions of a second conjunct in answers. Each morpheme appeared five times with a question testing time contrast, and five times with a question testing remoteness contrast. The second conjunct was the correct answer two times for each morpheme within each contrast, and three times, the incorrect answer.

The difference between the target and the lexical control items was that in the latter, the information encoded by the tense morpheme was also encoded lexically by a temporal adverbial (*ippasak* ‘yesterday’ or *Kauppat* ‘tomorrow’). In order to answer the questions, it was enough to understand the adverbials⁴.

² Strictly speaking, same-day future/past vs. distant future/past is also a kind of time contrast, but I reserve the term *time contrast* for the past vs. future distinction, for ease of discussion

³ Abbreviations: sfut – same-day future, spst – same-day past. 3s - third person singular, loc – locative case, mik – case on the object of an antipassive sentence.

⁴ The contrast between morpheme only and morpheme plus an adverbial as a lexical cue was used previously by Valian (2006) to test children’s understanding of tense in English.

2.3. Procedure

The participants heard a mini-story in Inuttitut and were asked a comprehension question in English. English was used as a meta-language to ensure that the questions are understood. The participants were also requested to answer in their dominant language, English (since they normally do not produce speech in Inuttitut). After they answered, they moved on to the next mini-story. The participants were presented with two practice items first, then with the target items. The target items were presented in pseudo-randomised order (no more than two items in a row can be from the same condition) which was the same across participants. The task was untimed (since an online task would not work well with this population). The responses were audio-recorded and later transcribed.

3. Results

Almost all participants gave correct answers for tense lexical control items. Therefore, these participants understood the sentences, the questions, and the task.

For the target items, performance on time contrasts was better than on remoteness contrasts in the HRB group, even though the morphemes involved were the same.

The results for time contrasts are presented below. Table 1 gives mean number of correct answers for each group in each condition (i.e. for each tense marker), and Table 2 gives percentage of correct answers.

Table 1. Mean number of correct answers in time contrasts

	distant SD	same-day SD	distant SD	same-day SD	TOTAL SD
	future	future	past	past	
Fluent	4.88	0.4	4.88	0.4	4.88 0.4 3.25 1.5 17.9 1.6
HRB	4.29	1.2	4.47	1 4	1.2 3.59 1.1 16.35 3.5
LRB	1.33	1.2	1.67	0.6 3.67	1.2 2.33 0.6 9 3

Table 2. Mean percentage of correct answers in time contrasts

	distant SD	same-day SD	distant SD	same- SD	TOTAL SD
	future	future	past	day past	
Fluent	97.5	7.1	97.5	7.07	97.5 7.1 65 29.8 89.38 8.2
HRB	85.88	24.3	89.41	20.2	80 24.5 71.77 29.2 81.77 17.2
LRB	26.67	23.1	33.33	11.6	73.33 23.1 46.67 11.5 45 15

In the fluent speakers results', the scores in three of the four conditions (with the exception of recent past) were identical and at the ceiling level (97.5%). HRBs had slightly lower scores in these conditions, with a widening

gap from near future to distant future to distant past. Both fluent speakers and HRBs had lowest scores in the sentences with the recent past marker, and it is in this condition that the difference between the groups was the smallest (looking at individual results reveals that half of each group gave 3(60%) or less correct answers in this condition). In fact, numerically, HRBs' mean score was even slightly higher than FBs. Therefore, HRBs' low scores in the recent past condition are likely due not to incomplete knowledge, but rather to other reasons.

In each condition, HRBs' results were significantly different from chance (2.5, or 50%), as shown by Wilcoxon signed rank test⁵: for distant future, $V=147$, $p=0.0006$; for distant past, $V=143.5$, $p=0.0014$; for same-day future, $V=149.5$, $p=0.0004$; for same-day past, $V=139.5$, $p=0.0026$.

LRBs, however, had scores lower than 50% in all conditions except distant past, i.e. performed at chance level or lower, and did not show comprehension of time contrasts in tense morphemes. Individually, each LRB had 3 or less correct answers in each condition (i.e. chance performance), with one exception: 1 LRB had a score of 5 (100%) in the distant past condition, and the high group mean in that condition was caused by this participant's score.

A binary multilevel logistic regression was performed on the time contrasts data from HRBs and fluent speakers, with fluency (fluent vs. HRBs), time (future vs. past), and remoteness (distant vs. same-day) as fixed effects. None of the main effects was significant. Of all the interactions, only the interaction between time and remoteness was marginally significant. The reason is likely that performance of both groups in the same-day past condition is different from their performance in the other conditions. Since the effect of fluency was not significant, and did not interact with any other predictor, it was eliminated from a new, more precise model that was fitted to this data. In the absence of fluency as a predictor, the interaction between time and remoteness reached higher significance, as can be seen in Table 3.

Table 3. A logistic regression without fluency on the time contrasts data

	Estimate	SE	p
(Intercept)	-2.66	0.41	< 0.0001
time(past)	0.43	0.43	0.32
remoteness(same-day)	-0.32	0.48	0.5
time*remoteness	1.48	0.6	0.014

In order to get a clearer picture, I compared HRBs' and fluent speakers' performance in each condition via a logistic regression on a corresponding subset of the data, with fluency as the only predictor. The coefficients, standard

⁵ This test was used, rather than a t-test, because the data does not have normal distribution.

errors, and p-values for fluency in each condition are given in Table 4.

Table 4. Effect of fluency for each condition in time contrast data

	Estimate	SE	p
distant future	2.06	1.93	0.29
same-day future	1.62	1.62	0.32
distant past	2.51	1.43	0.079
same-day past	-0.34	0.49	0.49

Only in one condition, the distant past, there was a marginal difference between HRBs and fluent speakers. There was no difference in the other conditions.

Individual results showed that 10 HRBs performed exactly as fluent speakers: they had 4 or more correct answers (i.e. 80-100%) in every condition except recent past, and the total score of 17-20 (85-100%). Among these 10 HRBs, 4 HRBs (and 1 FB) gave 100% correct answers, and 4 other HRBs (and 3 FBs) had 4-5 correct answers in each condition. Among the remaining 7 HRBs whose scores were lower, 5 HRBs with the scores 13-16 had 4 or more correct answers only in the future tense conditions, with one exception, an HRB who got 4 or more correct answers in near future and distant past, but not distant future. There was one more exception: 1 HRB with the lowest score on time contrast (9) had 4 correct answers only in the near future condition, and low scores in all other conditions. Finally, one of the weakest HRBs, with a score of 10 (50%), had 4 correct answers in both past tense conditions, and 1 in both future tense conditions, showing a past time bias (choosing "it already happened" 80% of the time, regardless of tense markers).

Since the questions were of the forced choice type, most errors were the choice of the wrong alternative, with very few exceptions: providing a present-time interpretation (1-2 in each group), giving ambiguous or irrelevant answers (3 fluent speakers), and "don't know"/"don't understand" (2 LRBs). One HRB either heard or repeated a tense marker incorrectly, and gave the answer consistent with that repetition: "*-lât-tuk*, so he will make it later" (although the actual marker was *-lauC-*, not *-lâC-*).

Performance on remoteness contrasts had a different pattern. While fluent speakers had high scores again, and LRBs again performed close to chance level, HRBs had lower scores than on time contrasts, and the difference between HRBs and fluent speakers was larger. Table 5 shows the mean number of correct answers for each group in each condition (each tense marker), and Table 6 shows the percentage of correct answers.

Table 5. Mean number of correct answers in remoteness contrasts

	distant SD future	SD	same-day SD future	distant SD past	SD	same-day SD past	TOTAL SD	SD	
Fluent	4.63	0.5	4	1.7	4.38	1.1	4.88	0.4 17.88	2.4
HRB	3.59	1.5	2.88	1.9	2.65	1.8	3.94	1.3 13.06	4.7
LRB	2	1.7	2.67	1.5	1.33	1.5	3.33	1.2 9.33	3.8

Table 6. Mean percentage of correct answers in remoteness contrasts

	distant SD future	SD	same-day SD future	distant SD past	SD	same-day SD past	TOTAL SD	SD	
Fluent	92.5	10.4	80	33.8	87.5	21.2	97.5	7.1 89.38	11.8
HRB	71.77	29.2	57.65	38.7	52.94	35.3	78.82	25 65.29	23.6
LRB	40	34.7	53.33	30.6	26.67	30.6	66.67	23 46.67	18.9

For both HRBs and fluent speakers, performance on remoteness differed depending on the condition (tense morpheme) in the same way: both groups gave more correct answers in recent past and distant future conditions than distant past and recent future conditions, but in the HRB group, the scores were lower in all conditions. In fact, HRBs' scores on same-day future and distant past were at the chance level, i.e. 50%, while their scores on the remaining two conditions, distant future and same-day past, were different from chance. Wilcoxon signed rank tests were used to test difference from chance in HRBs for each condition, with the following results: for same-day future, $V=93.5$, $p=0.43$; for distant past, $V=84.5$, $p=0.72$; for distant future, $V=129$, $p=0.012$; for same-day past, $V=139$, $p=0.0027$.

A logistic regression was performed on the remoteness contrasts data from HRBs and fluent speakers, in the same way as for the time contrasts data, i.e. with fluency (fluent vs. HRBs), time (future vs. past), and remoteness (distant vs. same-day) as fixed effects. The effect of fluency was significant ($p=0.017$), but it did not interact with morpheme types: fluent speakers performed better than HRBs on remoteness distinctions in all conditions. Time and remoteness, however, did interact: both groups gave more correct answers to items containing distant future and same-day past morphemes than to items containing same-day future and distant past. A more precise model, then, is the one where fluency is not included in any interactions. This model is given in Table 7.

Table 7. A logistic regression with fluency+time*remoteness on the remoteness contrasts data

	Estimate	SE	p
(Intercept)	-3.28	0.63	< 0.00001
fluency(receptive)	2	0.64	0.0019
time(past)	1.04	0.43	0.015
remoteness(same-day)	0.94	0.43	0.029
time*remoteness	-2.57	0.63	< 0.00001

In addition, I compared performance of fluent speakers and HRBs in each condition by means of separate logistic regressions on subsets of data corresponding to each condition, with fluency as the only predictor. The coefficients, standard errors and p-values for fluency effect in each of the conditions are given in Table 8.

Table 8. Effect of fluency for each condition in remoteness contrast data

	Estimate	SE	p
distant future	2.25	1.04	0.03
same-day future	1.89	1.27	0.14
distant past	2.85	1.06	0.007
same-day past	2.88	1.67	0.088

The difference between fluent speakers and HRBs was significant for distant future and distant past, and marginally significant for same-day past. It was not significant for same-day future (probably because one fluent speaker had a score of 0 in this condition).

A look at fluent speakers' individual results reveals that the difference between conditions in this group is caused by only two participants' low scores, in one condition each. Otherwise, each participant gave 4-5 correct answers in each condition. However, for HRBs, the difference between the conditions was real. Only 3 HRBs had 4-5 (80-100%) correct answers in each condition and a total score of 19-20 (95-100%). 7 HRBs with total scores 14-17 had 4-5 correct answers in the distant future and recent past conditions, but varying lower scores in the near future and distant past conditions. 7 remaining HRBs did not demonstrate knowledge of remoteness distinctions: 6 of them had total scores of 10 (50%) or lower, and 1 had the score of 13, but showed a bias to the "on some other day" answer. Two HRBs with the score of 10 had a bias towards one of the two possible answers (i.e. either always answering "today" or always answering "on some other day"), but the rest of them had low scores in all conditions. Overall, more HRBs have low scores on remoteness than on time contrasts. Some RBs with low scores (50% or less) explicitly stated that they did not know that Inuttitut tense markers encode remoteness distinctions, and did not understand why they were asked to judge if an event happened today or on some

other

day.

As with time contrasts, the most common error was choosing the wrong alternative, but another common error occurred: identifying time (past or future), but stating that there was no information about the remoteness degree. The typical answer of this kind was: "It already happened but she [the speaker who read the sentence] didn't say when". This error was much less common, though, than the former one: it was limited to 5 HRBs and 1 LRB, and never occurred in the fluent speakers group. Interestingly, the answer "I don't know" was given only by these 5 HRBs and 1 LRB. It is likely, therefore, that participants who were not sure about remoteness interpretation chose one of two available strategies: admit their lack of knowledge or guess using pragmatic information. Other errors (present time interpretation, incorrect time interpretation, irrelevant answers) happened only 1-2 times in each group.

There was no correlation between time and remoteness scores (Spearman's $r=0.15$, $p=0.57$). Two of the weakest HRBs who got 50% or less on time, also got 50% or less on remoteness. Two of the strongest HRBs got 95-100% both on time and remoteness. Most other HRBs had higher scores in time contrasts than remoteness. Those HRBs who had high scores on remoteness also had high scores on time, but not all those who had high scores on time also had high scores on remoteness.

4. Discussion

Overall, while fluent speakers showed high performance (with exception of some tense markers) on both time and remoteness contrasts, there was a difference between the two types of features for HRBs: they were more sensitive to more global time specification (past vs. future) of each morpheme than to its remoteness features. LRBs did not show any knowledge of features encoded by tense markers. This can be one source for the differences in comprehension abilities between LRBs and HRBs.

On time contrasts, more than half of the HRB group performed at the fluent speakers' level. The rest of the group showed better knowledge of the future markers than of the past markers. This finding parallels production data from acquisition of Inuktitut in Swift (2004). Swift found that Inuit children in Arctic Quebec start producing future markers before past markers, although children acquiring other languages usually produce past first. According to Swift (2004), the reason is that, in Inuktitut, the main distinction in the TAM system is realis versus irrealis, with irrealis as the marked member. Future, as a special case of irrealis, is marked: it always has to have an overt morphological marker, but past can be morphologically unmarked (in the case of telic verbs). Verbs without tense or aspectual markers can be interpreted as present or past (depending on lexical aspect), but can never be interpreted as future. Children acquiring languages with past/non-past distinction, where past is marked (such as

English), start using past markers before future markers.

LRBs did not show an advantage of future over past. On the contrary, they chose past somewhat more often than future, regardless of the tense morpheme.

The recent past items elicited the largest number of errors in both FBs and HRBs, including present-time interpretation (which was not an option in the forced-choice questions, but in fact is not incorrect for some of the items). A possible reason is that Inuttitut atelic verbs do not have completion entailment, but only an implicature of completion, which is more easily calculated in the distant past, but less so in the same-day past (an event that took place yesterday or earlier is more likely to be completed and/or be entirely in the past than an event that took place earlier on the same day).

For remoteness contrasts, HRBs performed worse than fluent speakers. Some HRBs did not know at all that remoteness was also encoded, though they knew whether the time reference was past or future.

Both groups showed lower sensitivity to remoteness in the near future marker *-niaC-* and the distant past marker *-lauC-*. The near future marker *-niaC-* also has modal meaning (or is homonymous with) 'to intend, plan, set out to do x' (L. Smith 1978:77). This could obscure its remoteness feature.

While there was no correlation between performance on time and remoteness contrasts, there is a dependency. Those who could distinguish remoteness contrasts, could also distinguish time contrasts, but not all those who successfully distinguished time contrasts were able to distinguish remoteness contrasts. Therefore, time is more likely to be acquired by receptive bilinguals than remoteness, and only those who have acquired and maintain broader past vs. future contrasts can acquire and maintain the more fine-grained remoteness distinctions. At least some HRBs have partial (underspecified) representations for tense morphemes in Inuttitut: while for fluent speakers, each tense morpheme is specified for both time and remoteness (as illustrated in Figure 1), for such HRBs, however, each tense morpheme is specified only for time, and contains no information about remoteness (as illustrated in Figure 2). Thus, such HRBs have two markers for past, and cannot distinguish them; the same goes for the two markers for future.

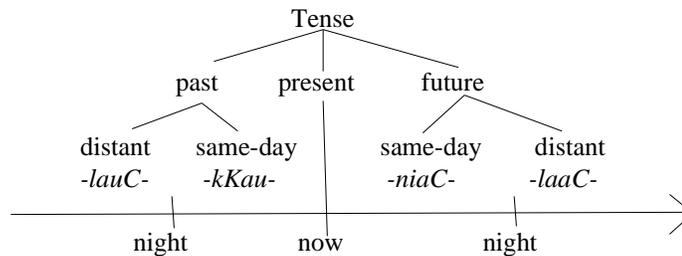


Figure 1. Full representation for the tense morphemes tested

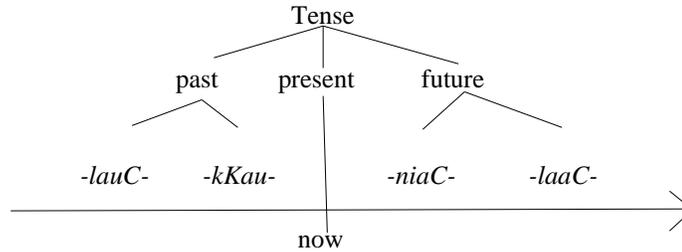


Figure 2. Incomplete representation (no remoteness) for the tense morphemes tested

There are several possible reasons for higher vulnerability of remoteness. The first is simply that past vs. future is a more basic distinction, and remoteness distinctions are more fine-grained: they are made within past and within future. Another likely reason could be non-convergence with English: while both English and Inuttitut have the past vs. future distinction, only Inuttitut has remoteness distinctions 6. The lack of remoteness features in RBs' Inuttitut is an example of "negative borrowing", as in Dorian's (2006) data on attrition and incomplete acquisition of Scottish Gaelic. A distinction which is present in the dominant language (in this case, past versus future) is more likely to be acquired by HRBs than the one which is absent from the dominant language (in this case, same-day past or future versus distant past or future). This can be explained by extending the Functional Convergence Hypothesis (Sanchez 2003). Under the original FCH, forms that are partially similar in two languages of a bilingual converge by bringing Language A features into Language B. In the RBs' data in this study, however, convergence is reached by losing features, rather than bringing features into the language. What happens to tense morphemes in RBs' Inuttitut is a case of what we can call Subtractive Functional Convergence: losing features in Language A (the weaker language) if Language B (the stronger language) does not have them.

5. Conclusion

This study has shown that receptive bilinguals have access to at least some semantic features of functional morphemes. Higher proficiency HRBs can access both time and remoteness features in Inuttitut tense morphemes, and the rest of HRBs can access time features, but not remoteness features, since the

6 While present perfect in English can be viewed as a same-day past form, other past tense forms are not limited to the past beyond the day that includes the speech time. This contrast is not nearly as robust in English.

latter is a more fine-grained distinction and does not exist in English. Lowest-proficiency RBs do not have access to any of the features encoded by tense morphemes, and therefore miss the information about the time of events.

For the future research, it would be interesting to test more variables that are less basic and more complex, and contrasts that do not exist in English, in order to gather more information on what is vulnerable in incompletely acquired Inuttitut, and distinguish between the two possible explanations for the difference between time and remoteness features in HRBs' representations of tense morphemes.

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