

# NOUN INCORPORATION AND CASE IN HERITAGE INUKTITUT\*

*Marina Sherkina-Lieber and Kumiko Murasugi  
Carleton University*

## 1. Introduction

A heritage language grammar is an incomplete grammar resulting from partial or interrupted acquisition due to insufficient exposure to that language in childhood, or attrition caused by reduced input and usage later in life. It is common in immigrant and aboriginal communities, where a minority language is spoken alongside a majority language (such as English in Ontario). Heritage language grammars can make important contributions to the study of language by providing new sources of data for linguistic theory, or new perspectives on first and second language acquisition and bilingualism (Montrul 2008, Benmamoun, Montrul and Polinsky 2013).

The linguistic variables in heritage language grammars differ in vulnerability to incomplete acquisition or attrition. Morphology, in particular inflectional morphology such as verb and noun agreement, is more vulnerable than syntax (Håkansson 1995, Montrul 2004, Keijzer 2008). Within inflectional morphology, nominal morphology such as gender, number and case appears to be less stable than verbal morphology (e.g. subject-verb agreement, tense and aspect) (Bolonyai 2007, Montrul, Bhatt and Bhatia 2012). The vulnerability of case in heritage languages has been shown in comprehension as well as production for Korean (Song et al. 1997), Russian (Polinsky 2008), and Inuktitut (Sherkina-Lieber 2011, Sherkina-Lieber, Perez-Leroux & Johns 2011). It has been claimed that functional categories are more vulnerable than lexical categories, regardless of their status as free or bound morphemes (Benmamoun et al. 2013). Finally, synthetic structures are often replaced by analytic forms, such as the use of prepositions in place of case affixes (Maher 1991, Schmidt 1985, Schmid 2002).

In this paper, we present our study on the knowledge and processing of noun incorporation (NI) in heritage speakers of Inuktitut, the language of the Inuit in the eastern Canadian Arctic. It is the first study of NI in adult heritage language grammar, as NI does not exist in the more commonly studied heritage languages such as Russian, Spanish or German. Our study investigated the linguistic knowledge of Inuktitut heritage speakers living in Ottawa, Canada. There is a sizeable Inuit population in Ottawa (over 3,000 Inuit) due to its proximity to the Inuit communities in the eastern Arctic. The full study included three tasks: a grammaticality judgment (GJ) task, elicited imitation, and a picture-sentence matching task. Only the results of the GJ task will be reported here.

---

\*We would like to thank Tunngasuvvingat Inuit (Inuit Community Centre, Ottawa), Joan Cunha, Saila Michael, Jeela Palluq-Cloutier, and our participants. This study was supported by SSHRC Postdoctoral Fellowship #756-2013-0702 to Marina Sherkina-Lieber.

## 2. Noun Incorporation (NI) in Inuktitut

Inuktitut is an Eskimo-Aleut language with rich morphology and polysynthesis, including noun incorporation. In ergative sentences, the subject has ergative case, the object has absolutive case, and the verb agrees with both the subject and the object (termed 'transitive agreement' in the literature on Inuktitut). A two-argument verb may also appear in the antipassive form, where the verbal complex contains an (overt or non-overt) antipassive suffix, and agrees only with the absolutive subject. This agreement on antipassive verbs is described in the literature as 'intransitive agreement' because it cross-references only the subject, even though an object is present as well. The case on the object in such sentences is known as oblique, instrumental, modalis or accusative case (Johns 2001). We will call it the MIK case (*-mik* is its singular form), following Johns (2001, 2006). The non-incorporated sentences in this study were in the antipassive form.

NI involves the following properties: a noun and a verb combine to form a complex verb, the incorporated noun is normally an argument of the verb, and the incorporated element may be an N head (Baker 1988, 1996), an NP (Déchaine 1999), or even a wh-word (Sadock 1991, Davis and Sawai 2001). Furthermore, modifiers such as demonstratives, adjectives and quantifiers may appear in the empty object position left by the noun when it moves. NI in Inuktitut differs from, for example, Mohawk (Baker 1996, Johns 2007) in that only a restricted set of bound affixal verbs can incorporate nouns, and incorporation is obligatory with those verbs. Johns (2007, 2009) claims that these incorporating elements in Inuktitut are light verbs. Shown in (1) are unincorporated (1a) and incorporated (1b) structures in Inuktitut.

- (1) a. *Iisaiji niuviq-tuq saa-mik uujaujar-mik.*  
 teacher.ABS buy-PART.3S<sup>1</sup> table-MIK green-MIK  
 'The teacher bought a green table.'
- b. *Iisaiji saa-taaq-tuq uujaujar-mik*  
 teacher.ABS table-get-PART.3S green-MIK  
 'The teacher got a green table.'

In (1b), the noun head *saa* 'table' is incorporated with the verb *-taa-* 'get'. As shown in (1a), the non-incorporating counterpart of *-taa-* is a different lexical item, *niuviq-* 'buy'. We will refer to the incorporating verbs as 'NI' verbs, and the non-incorporating lexical ones as 'Lex' for short. According to Johns (2007, 2009), the NI light verbs are less specific than their Lex synonyms, and this applies to our example as well. The NI verb has intransitive agreement, as shown by the intransitive participial ending on the verb. The Lex verb in (1a) also has intransitive agreement, as it is an antipassive structure with an absolutive subject and an object marked with MIK case. The modifier *uujaujaq* 'green' appears with a MIK case marker, regardless of whether the

---

<sup>1</sup> The following abbreviations for morphemes specific to Inuktitut have been used in glosses: MIK – the MIK case, part. – participial mood (marks declarative sentences in the examples in this paper).

noun is incorporated, as in (1b) or not, as in (1a). An incorporated noun cannot be marked for case and number, but any modifiers of such nouns must have case and number markers.

The goal of our study is to investigate NI in the grammar of heritage Inuktitut speakers by focusing on three salient properties of this structure: the formation of a verbal complex consisting of a verb and a noun, the absence of the MIK case on the incorporated noun, and the obligatory MIK case on the modifying adjective. Comparing NI structures with their unincorporated counterparts allows us to explore heritage speakers' knowledge of properties that are specific to NI as well as those that are part of their general linguistic knowledge. The research questions of this study are as follows:

1. Analytic structures are often preferred in heritage grammars over synthetic structures. Do Inuktitut heritage speakers prefer analytic unincorporated (Lex) structures over synthetic incorporated (NI) ones?
2. In the NI structure, the object is identified through incorporation into the verbal complex, while in the Lex structure, it is identified with the MIK case. Do Inuktitut heritage speakers know that unincorporated objects of antipassive lexical verbs must be marked with the MIK case, but incorporated nouns must not?
3. A modifying adjective is marked with MIK in both NI and Lex structures. Do heritage Inuktitut speakers know that object modifiers must have MIK case even when they modify an incorporated noun?

### **3. Method**

#### **3.1 Participants**

Eight heritage speakers of Inuktitut (mean age 26), and 16 fluent Inuktitut-English bilinguals (mean age 40) participated in the study. All were residents of Ottawa and spoke at least one Baffin dialect of Inuktitut (Iqaluit, Pangnirtung, Cape Dorset, Rankin Inlet, Pond Inlet, Igloodik, Arctic Bay, Lake Harbour). The participants were classified as a heritage or fluent speaker based on their language acquisition history, language use and self-assessment of Inuktitut language proficiency (obtained via a questionnaire). Speakers who rated their speaking abilities in Inuktitut as 1 or 2 out of 5 and reported interrupted or insufficient exposure to Inuktitut or its attrition during childhood were assigned to the heritage speaker group. Those who rated their speaking abilities in Inuktitut as 4 or 5 out of 5 and had no history of incomplete acquisition or attrition of Inuktitut were assigned to the fluent speaker group.

#### **3.2 Materials**

Two experimental tasks were employed in this study: (1) an NI (incorporating) and Lex (non-incorporating lexical) verb preference task, and (2) a case-testing GJ task with four conditions. The NI-Lex preference task was designed to test whether heritage speakers

recognize both structures as grammatical, or prefer the analytical structure with a lexical verb, judging the NI sentence to be ungrammatical. The four case-testing conditions were created to test heritage speakers' knowledge of the MIK case requirements on nouns and adjectives, with and without NI.

The materials in the NI-Lex preference task consisted of grammatical sentence pairs that were synonymous in meaning. The verb in one of the sentences involved an incorporated structure with an NI light verb, while the other contained a semantically similar (at least in the context of a given sentence) non-incorporating Lex verb and an object with MIK case. A list of the pairs of NI and Lex verbs is provided in (2).

- |     |                                                |                                   |
|-----|------------------------------------------------|-----------------------------------|
| (2) | - <i>liuq</i> - 'make'                         | <i>sana</i> - 'make'              |
|     | - <i>siuq</i> - 'search, look for'             | <i>qiniq</i> - 'search, look for' |
|     | - <i>taaq</i> - 'get'                          | <i>niuviq</i> - 'buy'             |
|     | - <i>tuq</i> - 'consume, use'                  | <i>niri</i> - 'eat'               |
|     | - <i>qaq</i> - 'have'                          | <i>tigumiaq</i> - 'hold'          |
|     | - <i>liri</i> - 'do with, occupy oneself with' | <i>uasaq</i> - 'wash'             |

Six items were included in this condition, with each of six verb pairs occurring once. The order of the sentences within pairs was counterbalanced across the pairs. In the following example, (3a) contains the NI verb *-liuq*- 'make', while in (3b) we see the semantically equivalent Lex verb *sana*-.

- |     |    |                                  |                     |
|-----|----|----------------------------------|---------------------|
| (3) | a. | Anguti iglu- <b>liuq</b> -tuq.   | (NI-Lex preference) |
|     |    | man.ABS house-make-PART.3S       |                     |
|     |    | 'The man is building a house'    |                     |
|     | b. | Anguti iglu-mik <b>sana</b> -juq |                     |
|     |    | man.ABS house-MIK make-PART.3S   |                     |
|     |    | 'The man is building a house'    |                     |

The four case-testing conditions (NI-Noun, NI-Adj, Lex-Noun and Lex-Adj) consisted of either an NI or Lex sentence pair, where one sentence was grammatical and the other was not. The difference in grammaticality resulted from the presence or absence of the *-mik* morpheme. Two of the conditions investigated MIK case on the noun, while the other two focused on MIK on the adjective.

Condition NI-Noun contained sentences with an NI verb and an incorporated object. In the grammatical sentence (4a), the object noun has no *-mik*, while in the ungrammatical (4b) it does.

- |     |    |                             |           |
|-----|----|-----------------------------|-----------|
| (4) | a. | Ataata-ga qukiuti-taaq-tuq  | (NI-Noun) |
|     |    | father-my rifle-get-PART.3S |           |
|     |    | 'My father got a rifle.'    |           |

- b. \*Ataata-ga qukiuti-**mik**-taaqa-tuq  
 father-my rifle-get-PART.3S  
 'My father got a rifle.'

In the NI-Adj condition, *-mik* was present on the adjective in the grammatical sentence (5a), but absent in the ungrammatical one (5b). In both sentences, the adjective is modifying the incorporated noun.

- (5) a. Surusiq qaju-tuqa-tuq mamaqtur-**mik** (NI-Adj)  
 child.ABS soup-consume-PART.3S delicious-MIK  
 'A child is eating delicious soup.'
- b. \*Surusiq qaju-tuqa-tuq mamaqtuq  
 child.ABS soup-consume-PART.3S delicious-Ø  
 'A child is eating delicious soup.'

Condition Lex-Noun contained grammatical sentences with a Lex verb and a free object noun marked with *-mik* (6a), paired with ungrammatical sentences where *-mik* was missing (6b).

- (6) a. Ataata-ga qukiuti-**mik** niuviqa-tuq (Lex-Noun)  
 father-my rifle-MIK buy-part.3s  
 'My father bought a rifle.'
- b. \*Ataata-ga qukiuti niuviqa-tuq  
 father-my rifle-Ø buy-part.3s  
 'My father bought a rifle.'

In the Lex-Adj condition, the adjective modifying the free unincorporated noun is marked with *-mik* in the grammatical sentence (7a), but not in the ungrammatical one (7b). (In both sentences, the unincorporated noun is also correctly marked with *-mik*.)

- (7) a. Surusiq niri-juq qajur-mik mamaqtur-**mik** (Lex-Adj)  
 child.ABS eat-PART.3S soup-MIK delicious-MIK  
 'A child is eating delicious soup.'
- b. \*Surusiq niri-juq qajur-mik mamaqtuq  
 child.ABS eat-PART.3S soup-MIK delicious-Ø  
 'A child is eating delicious soup.'

Table 1 summarizes the four case-testing conditions.

Table 1. Case-testing conditions

| Condition | Verb type  | Case host | Presence of MIK |
|-----------|------------|-----------|-----------------|
| NI-Noun   | NI (Light) | Noun      | Ungrammatical   |
| Lex-Noun  | Lexical    | Noun      | Grammatical     |
| NI-Adj    | NI (Light) | Adjective | Grammatical     |
| Lex-Adj   | Lexical    | Adjective | Grammatical     |

The order of grammatical and ungrammatical sentences in each pair was counterbalanced within each condition (i.e. in half of the pairs, the first sentence was grammatical, while in the other half, the first sentence was ungrammatical). Each condition contained six items with a different NI or Lex verb. The sentences in the NI-Noun and NI-Adj conditions were identical to their Lex counterparts - Lex-Noun and Lex-Adj, except for the verb and, in Lex-Adj, MIK case marking on nouns. Two versions of the experimental materials were created. In the case-testing task, the NI verbs in version A were replaced by their Lex counterparts in version B, and vice versa. The items in the NI-Lex preference task were identical in both versions.

### 3.3 Procedure

The participants were tested individually in a quiet room. They listened to pairs of sentences presented auditorily using PsychoPy 1.80.06 (Peirce, 2007). After hearing a sentence pair, the participant was presented with four choices on the screen: “√x” (first sentence is good, second sentence is bad), “x√” (first sentence bad, second good), “√√” (both sentences are good), and “xx” (both sentences are bad). The participant had to click on the appropriate choice with the mouse. After his/her response, the next pair of sentences was presented, until the participant had rated all the pairs. Response accuracy and reaction times were measured.

## 4. Results

### 4.1 NI-Lex preference task

Fluent speakers accepted both sentences most of the time, as expected (see Figure 1). However, the heritage speakers' choices were evenly distributed between accepting both (*Both*), accepting only incorporation (*NI*), and accepting only sentences without incorporation (*Lex*). Both groups rarely rejected both sentences in a pair (*Neither*). Figure 1 shows the mean percentage of responses for each choice in the two groups of participants.

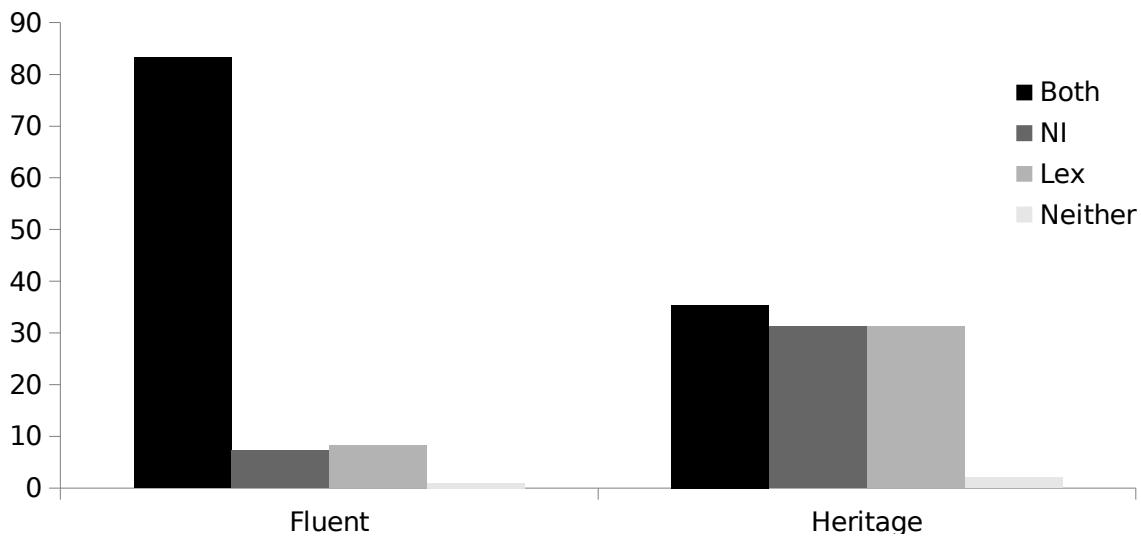


Figure 1. Mean percentage of each choice in the NI-Lex preference task for each proficiency group.

The heritage speakers' performance was significantly different from that of the fluent speakers, as shown by a multinomial logistic regression with Both as the baseline answer: the likelihood of choosing NI or Lex instead of Both was significantly higher for the heritage speakers than for the fluent speakers (for choosing NI: Coefficient=2.009, SE=0.515,  $p<.001$ ; for choosing Lex: Coefficient= 1.875, SE=0.498,  $p<.001$ ). Furthermore, within the fluent speaker group, the likelihood of choosing Both was significantly higher than choosing NI or Lex (NI: Coefficient=-2.436, SE=0.394,  $p<.001$ ; Lex: Coefficient=-2.302, SE=0.371,  $p<0.01$ ). In contrast, heritage speakers showed no significant differences in the likelihood of choosing NI or Lex over Both, or choosing either NI or Lex over the other.

Table 2 presents the reaction times on the NI-Lex preference task for the two participant groups. Since RTs are shown only for correct answers, the results for "Neither," where both sentences were rejected, are not included in the table.

Table 2. Mean reaction times (SD) for NI-Lex preference task

|                 | <b>Both</b> | <b>NI</b>   | <b>Lex</b>  |
|-----------------|-------------|-------------|-------------|
| <b>Fluent</b>   | 1910 (1436) | 3022 (1357) | 3122 (2408) |
| <b>Heritage</b> | 1993 (831)  | 2040 (1104) | 2470 (1260) |
| <b>Total</b>    | 1925(1347)  | 2352 (1248) | 2697 (1720) |

An analysis of covariance with RT as the dependent variable, answer type (Both, NI, Lex) as the independent variable and proficiency (Fluent, Heritage) as the covariate revealed a significant effect of answer type on RT after controlling for the effect of proficiency,  $F(2, 138) = 7.21$ ,  $p = .028$ . Planned contrasts revealed that participants were

significantly faster at choosing Both than Lex,  $t(138) = -2.59$ ,  $p = .011$ ,  $r = -.91$ , but not faster at choosing Both than NI,  $t(138) = -.807$ ,  $p = .42$ ,  $r = -.337$ . A separate one-way ANOVA run for each proficiency group revealed that the effect of answer type was present only in the fluent group,  $F(2, 92) = 3.687$ ,  $p = .04$ . For this group, then, it appears that the Both response takes the shortest time to decide on, and is also the one that is selected the most often.

Unlike on the percentage of Both, NI and Lex responses discussed above (see Figure 1), there was no significant effect of proficiency on RT,  $F(1, 138) = 1.02$ ,  $p = .31$ . This means that while there is a significant difference between the fluent and heritage groups in their judgments on the acceptability of the NI-Lex pairs, there is no difference in the overall time it takes them to make the judgments.

## 4.2 Case-testing GJ task

The participants chose one of four possible responses: (1) *Grammatical*: they correctly chose only the grammatical sentence as being good and rejected the ungrammatical one; (2) *Ungrammatical*: they incorrectly chose only the ungrammatical one as being good and rejected the grammatical one; (3) *Both*: they considered both the grammatical and ungrammatical sentences to be good, or (4) *Neither*: they considered neither sentence to be good. Out of the four responses, only Grammatical is correct.

The mean percentage of each type of answer in each condition is shown in Figure 2 for the fluent group and in Figure 3 for the heritage group. Fluent speakers performed almost at ceiling, choosing Grammatical for most pairs, with the exception of one condition, Lex-Adj, where they made slightly more errors. The performance of the heritage speakers was much lower, as they selected considerably more incorrect answers.

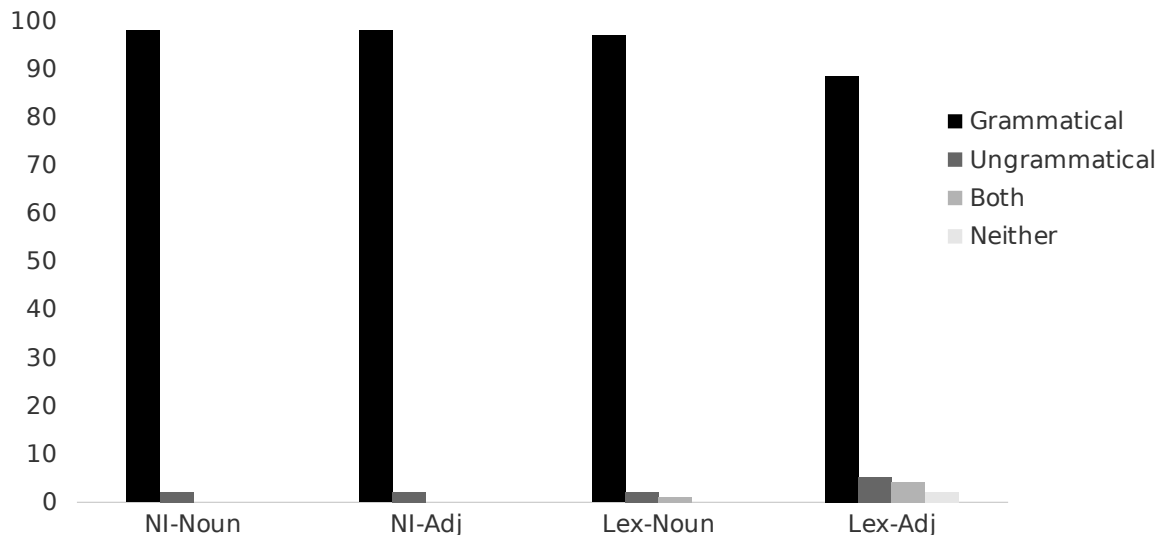


Figure 2. Mean percentage of answers of each type in the case-testing conditions, fluent speakers.



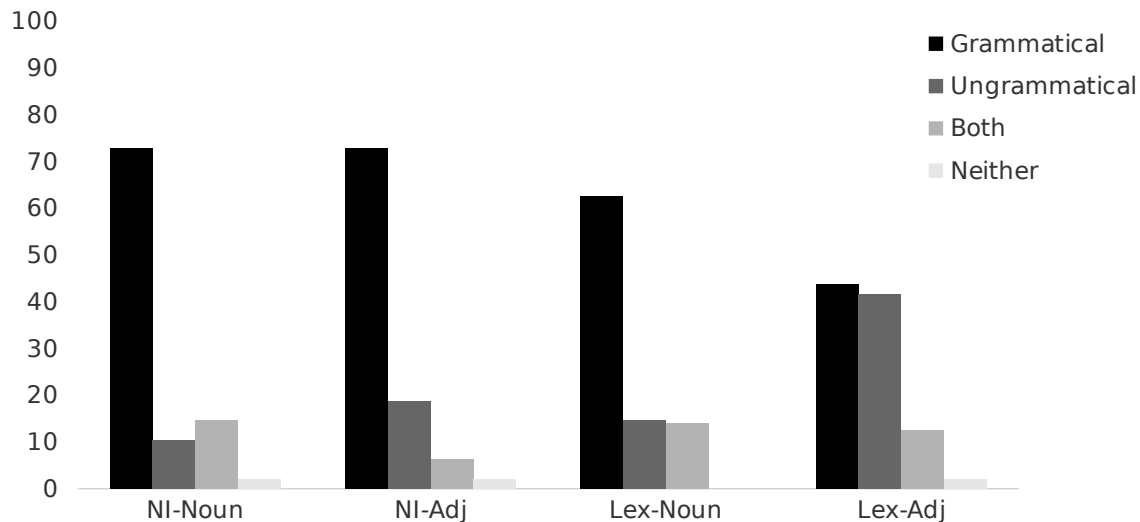


Figure 3. Mean percentage of answers of each type in the case-testing conditions, heritage speakers.

The results of a multinomial logistic regression with Grammatical as the baseline answer showed a highly significant effect of proficiency for all answer choices except Neither. Heritage speakers provided fewer Grammatical responses overall than fluent speakers. In particular, they were more likely to select Both and Ungrammatical over Grammatical compared to the fluent group (Both: Coefficient = 2.866, SE=0.503,  $p < .001$ ; Ungrammatical: Coefficient = 2.536, SE=0.364,  $p < .001$ ). As with the NI-Lex preference task, the choice of Neither was very rare in both groups.

A separate multinomial logistic regression on heritage speakers' data revealed that even though they were overall more likely to make errors than fluent speakers, their likelihood of choosing Grammatical was still significantly higher than that of choosing the Both or Ungrammatical options (Both: Coefficient=-1.732, SE=0.377,  $p < .001$ ; Ungrammatical: Coefficient= -2.243, SE=0.402,  $p < .001$ ). Furthermore, they were more likely to choose Ungrammatical over Grammatical with Lex rather than NI verbs (Coefficient=0.997, SE=0.385,  $p < .001$ ), and when MIK presence was tested on adjectives rather than nouns (Coefficient=1.055, SE=0.396,  $p < .001$ ). Table 3 shows the mean percentage of correct answers by verb type and case host in the heritage group.

Table 3. Mean percentage of correct answers by verb type and case host in heritage group.

|               | <b>Noun</b> | <b>Adjective</b> | <b>Noun+Adj</b> |
|---------------|-------------|------------------|-----------------|
| <b>NI</b>     | 72.9        | 72.9             | 72.9            |
| <b>Lex</b>    | 62.5        | 43.8             | 53.2            |
| <b>NI+Lex</b> | 67.7        | 58.4             | 63.1            |

Wilcoxon tests were used to compare the number of Grammatical responses in the four conditions in each group. Differences were found in the fluent speakers' group between Lex-Adj and the other conditions (significant: Lex-Adj vs. NI-Adj,  $W=85$ ,  $p=.04$ ; Lex-Adj vs. NI-Noun,  $W=171$ ,  $p=.042$ ; marginal: Lex-Adj vs. Lex-Noun,  $W=164.5$ ,  $p<.001$ ). Similar results were found in the heritage group: a significant difference between Lex-Adj and NI-Adj ( $W=12.5$ ,  $p=.04$ ) as well as a marginal difference between Lex-Adj and NI-Noun ( $W=50.5$ ,  $p=.55$ ).

Table 4 shows the mean reaction times of the fluent and heritage groups for the four conditions, as well as the total means for each verb type and case host.

Table 4. Mean reaction times (SD) on case-testing task for fluent and heritage groups

| <b>Verb type</b> | <b>Case host</b>  | <b>Fluent</b> | <b>Heritage</b> | <b>Total</b> |
|------------------|-------------------|---------------|-----------------|--------------|
| <b>NI</b>        | <b>Noun</b>       | 1661 (367)    | 1749 (620)      | 1705 (100)   |
|                  | <b>Adj</b>        | 1804 (483)    | 2010 (470)      | 1907 (104)   |
|                  | <b>NI Total</b>   | 1732 (106)    | 1879 (149)      | 1806 (91)    |
| <b>Lex</b>       | <b>Noun</b>       | 1650 (489)    | 2079 (1214)     | 1864 (172)   |
|                  | <b>Adj</b>        | 1874 (647)    | 2888 (1129)     | 2381 (180)   |
|                  | <b>Lex Total</b>  | 1762 (177)    | 2483 (250)      | 2123 (153)   |
| <b>Total</b>     | <b>Noun Total</b> | 1655 (120)    | 1914 (170)      | 1785 (104)   |
|                  | <b>Adj Total</b>  | 1839 (138)    | 2449 (195)      | 2144 (120)   |

A mixed design analysis of variance was conducted with RT as the dependent variable, verb type (NI, Lex) and case host (Noun, Adj) as the repeated-measures variables and proficiency (Fluent, Heritage) as the between-subjects factor. The main effect of proficiency just reached significance,  $F(1,22)=4.33$ ,  $p=.05$ , indicating that overall the fluent group had faster RTs than the heritage group, but the difference was relatively small. The test also revealed a significant effect of verb type,  $F(1,22)=5.03$ ,  $p=.04$ , as well as case host,  $F(1,22)=19.522$ ,  $p<.001$ . The participants had longer RTs with sentences containing Lex than NI verbs, and much longer RTs on sentences with case on the adjective than on the noun. These effects can be seen in the longest RTs for Lex-Adj in both groups and the shortest RTs with NI-Noun for the heritage group. These RT results seem to parallel the accuracy results presented above, where sentences with a

Lex verb or an adjective case host were more likely to elicit an Ungrammatical over Grammatical response.

There was also a significant interaction between case host and proficiency,  $F(1, 22)=4.668$ ,  $p=.04$ , with the heritage group showing a greater difference between a noun and adjective case host than the fluent group. Finally, there was a marginal interaction between verb type and proficiency,  $F(1, 22)=4.137$ ,  $p=.05$ , with the heritage speakers showing a greater difference between NI and Lex verbs than the fluent speakers, whose RTs on the two verb types were very similar.

## 5. Discussion and conclusion

Our first research question explored whether Inuktitut heritage speakers' choice of Lex or NI as their preferred structure would reflect vulnerability of synthetic structures (i.e. NI) previously observed in heritage speakers. When presented with synonymous sentences with and without NI, the heritage speakers in our study did not show a preference for either structure. Instead, their choice of NI, Lex or Both as the preferred (i.e. grammatical) structure appeared to be random. In contrast, fluent speakers accepted both variants as grammatical over 80% of the time. There are several possible explanations for the heritage speakers' random choices and limited flexibility with different structures encoding similar meaning. The first possibility is that they were insufficiently or unequally exposed to both variants. While we chose lexical and incorporating light verbs that matched as much as possible in meaning, it may be that one of the forms is more commonly used and thus was more familiar to the heritage speakers.

Another possible explanation for the heritage speakers' random acceptance of Both, NI and Lex is that they were not confident in their judgments due to their inadequate knowledge of Inuktitut, whether at the sentential, inflectional or lexical level, and thus chose randomly between NI and Lex structures.

Based on the many examples in the literature of synthetic forms being replaced by analytic ones (e.g. Maher 1991, Schmidt 1985, Schmid 2002), it is surprising that the heritage speakers in our study did not prefer the analytic Lex structure over the synthetic NI one. However, in the previous studies, the synthetic and analytic forms involved inflectional morphology, such as case affixes being replaced by prepositions in Dyrbal (Schmidt 1985) and Finnish (Larmouth 1974), or the periphrastic *go*-future replacing the inflected future in some enclaves of French (Maher 1991). Perhaps the vulnerability of synthetic forms applies more to inflectional morphology, and not to noun roots or affixal verbs. This would follow from the claim mentioned above that functional categories, which include inflectional morphemes, are more vulnerable than lexical categories (Benmamoun et al. 2013). On the other hand, heritage speakers of Russian replace perfective verbs with derivational prefixes by an analytical construction – an ungrammatical combination of a lexical verb and a light verb (such as the equivalent of *begin*), as illustrated in (8) (Polinsky 2008b:378).

- (8) a. *Heritage Russian*  
 \*On načinajet deržit olen' rog-a.  
 He begins.IMPERF holds.IMPERF deer.NOM horn-ACC.PL  
 'He grabbed the deer by the antlers.' (lit. 'He begins holds deer antlers.')
- b. *Full Russian*  
 On s-xvatil olen'-a za rog-a.  
 he PREFIX-grabbed.PERF deer-ACC by horn-ACC.PL  
 'He grabbed the deer by the antlers.'

Therefore, heritage speakers' avoidance of synthetic structures is not limited to those that involve only inflectional morphology.

Another possible explanation for the lack of preference for the NI structure is that NI involves a syntactic rather than morphological structure. A major question in the study of NI is whether NI involves a syntactic process, where the verb and noun originate in distinct structural positions and come together through syntactic means (see, for example, Baker 1988, Massam 2001), or whether it is a morphological process where affixes are added to stems in the lexicon (e.g. Mithun 1986, Anderson 2001). The equal frequency with which the NI and Lex responses were selected suggests that one structure is not more vulnerable than the other, i.e. NI and Lex are both syntactic structures.

Turning now to the case-testing GJ task, we found that heritage speakers do possess knowledge of case requirements for incorporated and unincorporated object nouns and their modifiers, as shown in Figure 3 and Table 3 above. Their scores are lower than those of fluent speakers, who performed virtually at ceiling on all conditions except Lex-Adj, but still, heritage speakers performed better than at chance. For example, their score of 72.9% on the NI-Noun condition reveals their knowledge that an incorporated noun cannot have the MIK case. Furthermore, they have similar knowledge that modifiers of incorporated nouns must have the MIK case, based on their identical 72.9% score on NI-Adj. Their performance is weaker with lexical verbs, but they do have some knowledge that an unincorporated object noun in an antipassive sentence must have the MIK case while an incorporated noun cannot (62.5% correct). Their score on Lex-Adj, though, is only 43.8%, revealing their insufficient knowledge that modifiers of unincorporated object nouns marked with MIK should also have MIK.

Thus, we can conclude that heritage speakers distinguish incorporated and non-unincorporated nouns, and know the case requirements for both. Importantly, noun incorporation does not appear to present any additional difficulties with case assignment; in fact, heritage speakers performed even better on sentences with NI than without it. However, their knowledge is somewhat unstable, and/or access to it is inconsistent, as heritage speakers make more errors and take longer to make judgments than fluent speakers (although this difference is quantitative for three out of four conditions – all except Lex-Adj). Similar results were found in Sherkina-Lieber (2011), where heritage speakers of the Labrador dialect of Inuktitut performed the same paired grammaticality judgment task. The participants in her study performed as follows: (1) 59% correct

answers in the same condition as Lex-Noun (cf. 63% in the present study), and (2) 73% correct answers in pairs where the ungrammatical sentence contained the MIK case marker on the subject of an unergative verb.

The most problematic condition for heritage speakers is case marking on modifiers of objects in sentences without incorporation (Lex-Adj). This is the only condition in which heritage speakers made the correct choice as often as the opposite one (i.e. accepting the ungrammatical sentence without MIK on the modifier and rejecting the grammatical one). It is not the case, however, that heritage speakers do not know that MIK is required on object modifiers, because they performed much better on modifiers and MIK in the presence of noun incorporation.

Since fluent speakers also made more errors in this condition, at least part of the problem may be due to processing. Indeed, this condition involves case marking on both the unincorporated noun and the adjective, requiring more processing than the other conditions, which always have just one element, either a free noun or adjective, requiring case. In the Lex-Adj condition, there could be interference from their knowledge that MIK can only be assigned to one DP in a clause; therefore the second MIK on the adjective would be rejected if it is not immediately recognized as part of a single DP requiring case concord between noun and adjective. The lower performance in the Lex-Adj condition could also result from processing without paying full attention: after accepting the sentence as grammatical when the first MIK is encountered on the unincorporated noun, the additional MIK on the adjective may cause confusion. In the heritage group, their extremely low performance may also indicate lack of knowledge of noun-modifier concord.

One other possible explanation for the low performance of heritage speakers in the Lex-Adj condition is lack of lexical knowledge. Without MIK, the adjective would modify the subject, but the sentences are constructed so that this would be implausible. For example, in (8) above, the ungrammatical (8b) could be structurally interpreted as ‘A delicious child is eating soup’. Not knowing the meaning of the subject noun *surusiq* ‘child’ and/or the adjective *mamaqtuq* ‘delicious’ would mask the implausibility.

To conclude, heritage speakers do not have a preference for analytic Lex structures over synthetic NI in comprehension. Their knowledge of case requirements for noun incorporation, as well as for unincorporated nouns, is much lower than the fluent speakers’ results but are mostly above chance. Noun incorporation appears not to be more difficult for Inuktitut heritage speakers than similar constructions with free objects. Finally, the results support analyses of NI as a syntactic rather than a morphological process.

## References

- Anderson, Stephen R. 2001. Lexicalism, incorporated (or incorporation, lexicalized). In *CLS 36: The Main Session*, eds. Arika Okrent and John P. Boyle, 13-34. Chicago: Chicago Linguistic Society
- Baker, Mark. 1988. *Incorporation: A theory of grammatical function changing*. Chicago: University of Chicago Press.

- Baker, Mark. 1996. *The Polysynthesis Parameter*. Oxford: Oxford University Press.
- Benmamoun, Elabbas, Silvina Montrul, and Maria Polinsky. 2013. Heritage languages and their speakers: Opportunities and challenges for linguistics. *Theoretical Linguistics* 39(3-4): 129-181.
- Bolonyai, Agnes. 2007. (In)vulnerable agreement in incomplete bilingual L1 learners. *International Journal of Bilingualism* 11: 3-21.
- Davis, Henry, and Naomi Sawai. 2001. Wh-movement as noun incorporation in Nuu-chah-nulth. In *WCCFL 20: Proceedings of the 20th West Coast Conference on Formal Linguistics*, eds. Karine Megerdooian and Leora A. Bar-el, 123-136. Somerville, MA: Cascadilla Press.
- Déchaine, Rose-Marie. 1999. What Algonquian morphology is really like: Hockett revisited. In *MIT Occasional Papers in Linguistics, 17: Papers from the Workshop on Structure and Constituency in Native American Languages*, eds. Rose-Marie Déchaine and Charlotta Reinholtz, 25-72. Cambridge, MA: MIT Press.
- Håkansson, Gisela. 1995. Syntax and morphology in language attrition: A study of five bilingual expatriate Swedes. *International Journal of Applied Linguistics* 5(2): 153-171.
- Johns, Alana. 2001. An inclination towards accusative. *Linguistica Atlantica* 23: 127-144.
- Johns, Alana. 2006. Ergativity and change in Inuktitut. In *Ergativity: Emerging Issues*, eds. Alana Johns, Diane Massam and Juvenal Ndayiragije, 293-311. Dordrecht: Springer.
- Johns, Alana. 2007. Restricting noun incorporation: root movement. *Natural Language and Linguistic Theory* 25(3): 535-576.
- Johns, Alana. 2009. Additional facts about noun incorporation (in Inuktitut). *Lingua* 119(2): 185-198.
- Keijzer, Merel. 2008. Language attrition in Dutch emigrants in Anglophone Canada: Internally or externally-induced change? *Linguistics in the Netherlands* 25, 97-108.
- Larmouth, Donald W. (1974). Differential interference in American Finnish cases. *Language* 50: 356-366.
- Maher, Julianne. (1991). A crosslinguistic study of language contact and language attrition. In *First Language Attrition*, eds. Herbert W. Seliger and Robert M. Vago, 67-84. Cambridge University Press.
- Massam, Diane. 2001. Pseudo noun incorporation in Niuean. *Natural Language and Linguistic Theory* 19: 153-197.
- Mithun, Marianne. 1986. On the nature of noun incorporation. *Language* 62: 32-37.
- Montrul, Silvina. 2004. Subject and object expression in Spanish heritage speakers: A case of morphosyntactic convergence. *Bilingualism: Language and Cognition* 7(2): 125-142.
- Montrul, Silvina. 2008. Second language acquisition welcomes the heritage language learner: Opportunities of a new field (Review article). *Second Language Research* 24 (4): 487-506.
- Montrul, Silvina, Rakesh Bhatt and Archana Bhatia. 2012. Erosion of case and agreement in Hindi heritage speakers. *Linguistic Approaches to Bilingualism* 2: 141-176.
- Peirce, Jonathan W. 2007. PsychoPy – psychophysics software in Python. *Journal of Neuroscience Methods* 162(1-2): 8-13.
- Polinsky, Maria. 2008a. Relative clauses in heritage Russian: Fossilization or divergent grammar? In *Proceedings of the 16<sup>th</sup> Workshop on Formal Approaches to Slavic Linguistics*, eds. Andrei Antonenko, John F. Bailyn and Christine Y. Bethin, 333-358. Ann Arbor: Michigan Slavic Publications.
- Polinsky, Maria. 2008b. Without aspect. In *Case and grammatical relations*, eds. Greville G. Corbett and Michael P. Noonan, 263-282. Oxford: Oxford University Press.
- Sadock, Jerrold. 1991. *Autolexical syntax*. Chicago: University of Chicago Press.
- Schmid, Monica. 2002. *First language attrition, use and maintenance: The case of German Jews in Anglophone countries*. Amsterdam/Philadelphia: John Benjamins.
- Schmidt, Annette. 1985. *Young people's Dyirbal: An example of language death from Australia*. Cambridge: Cambridge University Press.
- Sherkina-Lieber, Marina. 2011. *Knowledge of Labrador Inuktitut functional morphology by receptive bilinguals*. Doctoral dissertation, University of Toronto.

- Sherkina-Lieber, Marina, Ana Teresa Perez-Leroux, and Alana Johns. 2011. Grammar without speech production: The case of Labrador Inuit heritage receptive bilinguals. *Bilingualism: Language and Cognition* 14(3): 301-317.
- Song, Minsun, William O'Grady, Sookeun Cho, and Miseon Lee. 1997. The learning and teaching of Korean in community schools. *Korean Language in America* 2: 111-127.