Modal strengthening in Ecuadorean Siona

In this work, I expand the known typology of modal force by characterizing and analyzing a unique modal force system, found in Ecuadorean Siona (Western Tucanoan language, 250 speakers), from original field data. There is only one functional deontic modal in Siona – *ba’iji*. In embedded contexts, it is unambiguously interpreted as a necessity modal (cf. (1)). However, there are environments in which it can be interpreted as a possibility modal (cf. (2), (6a), (6b), (7)). I argue for an analysis of *ba’iji* as an underlying possibility modal that is grammatically strengthened to a necessity modal in upward-entailing contexts, due to the lack of a necessity scalemate. This strengthening is neutralized in non-upward-entailing contexts (e.g. negation, questions and conditionals). I implement this analysis in Fox’s (2007) framework to account for grammaticalized scalar implicatures and Free Choice.

The modal construction *ba’iji* is formed from the impersonal construction ‘it is’/‘there is’, with the embedded verb in the infinitive (Bruil 2014), as shown in (1).

(1) Sai-ye ba-’i-ji.
    go-inf be-ipf-3s
We must/should go.

(2) Elena sai-ye beo-ji.
    Elena go-inf neg.be-3s
Elena {mustn’t,*doesn’t have to} go.

The negated version of this modal construction (cf. (2)) is formed by the negated copular verb *beo* and an embedded verb in the infinitive. This is the first indication that the modal force of *ba’iji* is underlyingly existential: if it were universal, we would expect the reading "not have to" to be available. These strong readings are obligatory in unembedded contexts: this can be checked with examples in which only the possibility interpretation is available, as in (3) and (4), to be contrasted with (5), that uses the possibility construction *deoji* "is good".

(3) #Sai-ye ba-’i-ji, bëa-ye ba-’i-ji.
    go-inf be-ipf-3s, stay-inf be-ipf-3s.
# One should go, one should stay.

(4) #Sai-ye beo-ji, bëa-ye beo-ji.
    go-inf neg.be-3s, stay-inf neg.be-3s.
# One shouldn’t go, one shouldn’t stay.

(5) Sai-ye deoji, bëa-ye deoji.
    go good stay good
One can go, one can stay (= you have the option).

In questions, conditionals, and under extra-clausal negation, the possibility reading of *ba’iji* emerges (though it is optional).

(6) Context: I am waiting to see if there is going to be a spot for me in the boat, wondering whether I should go.
   a. Sai-ye bai-to, sa-si-’i.
      go-inf exist-cond go-fut-ass
      If I can go, I will go.
   b. Bai-quë saiye?
      go-non.ass go?
      Can I go?

(7) Sai-ye ba-’i-ji ca-ye bahuë më’ëre.
    go-inf be-ipf-3s say-ipf neg to.you
I didn’t say that you could leave.
I propose a strengthening analysis for Siona ba’iji. For similar strengthening analyses in other quantificational domains, see Bowler 2014, Bassi & Bar-Lev 2016, Singh et al 2016. Like these authors, I argue that ba’iji is a possibility modal that lacks a stronger scalemate, but still triggers subdomain alternatives. Strengthening effects have been analyzed as the result of recursive application of Fox’s (2007) **exh** operator, developed for accounting for Free Choice within a grammatical neo-Gricean approach to scalar implicatures. The **exh** operator, cf. (8), is akin to a covert only and negates all innocently excludable (IE) alternatives, cf. (9).

(8) \[ **exh** [Alt(p)_{<st>ilit>}(p_{st})(w) \equiv p(w) \land \forall q \in AltIE(p, Alt(p)) [\neg q(w)] \]

(9) \[ AltIE(p, Alt(p)) = \bigcap\{Alt(p) : Alt(p)' is a maximal set in Alt(p), s.t. \{\neg q : q \in Alt(p)\}' \cup \{p\} is consistent \] (the set of IE alternatives of p)

The alternatives \( Alt(S) \) of a sentence \( S \) containing a quantifier \( Q \) are the union of \( S \)’s ‘scalar alternatives’, obtained by replacing \( Q \) with members of its Horn set (e.g. <can, must>), and \( S \)’s ‘subdomain alternatives’, replacing the domain of \( Q \) with all its subsets. I propose that ba’iji projects subdomain alternatives, namely existential modal claims over subsets of its modal base, but crucially, it does not project scalar alternatives, due to its lack of a Horn scalemate. For example, for \( S = [ba’iji(p)] = \exists w \in \{w_1, w_2\}.p_w \), its alternative set is: \( Alt(S) = \{\exists w \in \{w_1, w_2\}.p_w, \exists w \in \{w_1\}.p_w, \exists w \in \{w_2\}.p_w\} \).

I show sample derivation of the strengthening procedure, that achieves the necessity interpretation of ba’iji by **exh** application. I show in (10) the LF before **exh** application, where the modal stays in situ below negation. I assume here that ba’iji has the (simplified) modal base \( \{w_1, w_2\} \), and \( p \) is the proposition denoting its prejacent, e.g. ‘one enters’.

(10) \( S = \Diamond_{\{w_1, w_2\}}p \) (simplified notation for \( \exists w \in \{w_1, w_2\}.p_w \))

(11) a. \( Alt(S) = \{\Diamond_{\{w_1, w_2\}}p, \Diamond_{\{w_1\}}p, \Diamond_{\{w_2\}}p\} \) b. \( AltIE(S) = \emptyset \)

(12) \( S' = **exh** [Alt(S)][S] = \Diamond_{\{w_1, w_2\}}p \) [First **exh** application: no effect on truth conditions]

(13) a. \( Alt(S') = \{ **exh** [Alt(S)][\Diamond_{\{w_1, w_2\}}p], **exh** [Alt(S)][\Diamond_{\{w_1\}}p], **exh** [Alt(S)][\Diamond_{\{w_2\}}p] \}
\[ = \{ \Diamond_{\{w_1, w_2\}}p, \Diamond_{\{w_1\}}p \land \neg \Diamond_{\{w_2\}}p, \Diamond_{\{w_2\}}p \land \neg \Diamond_{\{w_1\}}p \} \]

b. \( AltIE(S') = \{ \Diamond_{\{w_1\}}p \land \neg \Diamond_{\{w_2\}}p, \Diamond_{\{w_2\}}p \land \neg \Diamond_{\{w_1\}}p \}; \)

(14) \( S'' = **exh** [Alt(S')][S'] \equiv \Diamond_{\{w_1, w_2\}}p \land \neg \Diamond_{\{w_1\}}p \land \neg \Diamond_{\{w_2\}}p \land \neg (\Diamond_{\{w_2\}}p \land \neg \Diamond_{\{w_1\}}p)
\[ \equiv \Diamond_{\{w_1, w_2\}}p \land (\Diamond_{\{w_1\}}p \leftrightarrow \Diamond_{\{w_2\}}p) \equiv \Box_{\{w_1, w_2\}}p \) [Second **exh** application: strengthening]

None of the alternatives of \( S \) can be excluded non-arbitrarily (11), making **exh** application trivial. But after the alternatives of \( S' \) are exhaustified with respect to each other (13), **exh** application results in strengthening. Applying **exh** twice to \( S \) is obligatory, since it removes ignorance inferences about alternatives in \( Alt(S) \).

This analysis is reminiscent of that proposed by Deal 2011 for Nez Perce, in which there is one deontic modal o’qa, that is variably interpreted as a possibility or a necessity modal. Deal argues that the variability of the interpretation arises from the lack of a stronger scalemate, and thus the lack of a Gricean scalar implicature. I propose that Nez Perce differs from Siona ba’iji in that only the latter triggers subdomain alternatives, thus grammaticalizing the strengthening process and making the necessity reading obligatory.