The Ordering Source and Graded Modality in Gitksan Epistemic Modals

Tyler Peterson, University of British Columbia

This paper directly addresses the empirical and theoretical issues that arise when attempting to model a speaker's intuition and translations of modal force in languages that do not lexically encode modal force. An example of this is found in the Tsimshianic language, Gitksan, given in (1), where the modal enclitic =*ima* can be interpreted as 'might' or 'must' depending on the context of the utterance (Peterson *to appear* a/b). Gitksan represents a class of languages in which two of the core parameters of a modal interpretation are 'flipped': English lexically encodes modal force as either existential ('might') or universal ('must') quantification over possible worlds, while the conversational background (epistemic vs. deontic etc.) is determined by the context. In Gitksan, the quantificational force is contextually determined, while the conversational background is lexically encoded. The claim pursued in this paper is that the variable modal force interpretations of =*ima* are an effect of another contextually determined parameter, the ordering source (Kratzer 1991).

This approach has direct roots in two previous accounts of gradable modal force, and the data from Gitksan is used to distinguish them: the first is a similar analysis of modal evidentials in St'át'imcets (Salish), a language with evidential modals which have similar variable modal force interpretations to those in Gitksan. Rullman et al. (2007) analyze St'át'imcets modals as uniformly universal modals with an embedded choice function (CF) that picks out a subset of the modal base which it universally quantifies over. The appearance of variability in modal force arises because the choice function can select a larger or smaller subset of accessible worlds. The second approach is the well known application of the ordering source to gradable modality found in languages such as English, where the existential/universal opposition in determining modal force is fixed (see Kratzer 1981, 1991 for details). Thus, one of the outcomes of this paper is not only an account of this effect in Gitksan (and possibly this class of evidential/modal languages), but the reduction of the CF analysis with a standard ordering source treatment of gradable modal force.

It is standardly assumed that epistemic modality is associated with two contextually determined parameters (Kratzer 1991): a function f that takes a world $w \in W$ as an argument and returns a set of propositions which constitute a CONVERSATIONAL BACKGROUND, or $f(w)$. The CB could be a subset of what the speaker knows in w or what the speaker assumes to be true in w. In addition to the CB, Kratzer introduces another contextually determined function, ORDERING SOURCE, which is another contextually determined function g which takes w and returns a set of propositions that constitute what is known in w. The set of propositions in $g(w)$ is the ordering source which induces an ordering on the set of worlds in $\cap f(w)$, or the set of worlds where all the propositions of $f(w)$ are true. World u is at least as close to the ideal represented by $g(w)$ as world v iff all propositions of $g(w)$ which are true in v are true in u as well ($u \leq_{g(w)} v$). A general formula for this is given in (2). In a nutshell, the apparent variability of the quantificational force found in (1) is attributed to the function $\text{MAX}_{g(w)}$ rather than in the quantifier, which is uniformly universal: $\text{MAX}_{g(w)}$ is a function that orders the $\text{MAX}_{g(w)}$-ideal worlds $\cap f(w)$ as evaluated in w. The larger $\text{MAX}_{g(w)}$-ordered set of $\cap f(w)$ the stronger the proposition that is expressed. According to this proposal, there is a continuity of different degrees of strengths, depending on the size of the subset of $\cap f(w)$ that is selected by $\text{MAX}_{g(w)}$. The smaller $\text{MAX}_{g(w)}(\cap f(w))$ is, the more restricted the universal quantifier is, and the more likely it is to be translated as English *might* rather than *must*.

This analysis adopts the technical innovation introduced in Rullman et al., who also locate the apparent variability of the quantificational force of modals in St'át'imcets not in through quantification, but in the choice function of F (see example (3)) which picks out a particular subset of $\cap f(w)$. Like the ordering source, F is also determined by the context. If F is simply

the identity function, the resulting reading is the same as on the standard analysis of strong modals. If F is not the identity function, and thus selects a proper subset of $\cap f(w)$, the resulting reading is weaker.

The basic intuition behind an ordering source analysis of graded modality is that the more worlds ordered and universally quantified over, the stronger the modal force reading. As a brief illustration, a *might* reading will emerge in (1) if there are either fewer worlds in the epistemic modal base in (4)a. to be ordered by $g(w)$ in (4)b., or fewer propositions in the ordering source to order the modal base. Likewise, the more propositions in $g(w)$ to order a modal base, the stronger, *must*-like reading emerges.

This analysis can be distinguished from a CF analysis on other empirical and conceptual grounds, and these are dicussed in detail. Among these, in the CF analysis, Rullman et al already implicitly assume an ordering source. It is unclear, however, what the ordering source in a CF analysis contributes to the interpretation of a modal. Additionally, while a CF analysis simply picks out subsets of $\cap f(w)$, $\text{MAX}_{g(w)}$ offers a way to not only select, but evaluate (through ordering) sets of worlds. This ordering may be thought of as an 'epistemic ideals', the effect of which when translated into a metalanguage such as English, is reflected the apparent variable modal force. It is suggested that the CF can in fact reduce to the ordering source, thus offering a more restrictive analysis through reducing the number of contextually determined parameters of interpretation from three (the modal base, CF, and ordering source), to two under this approach (the modal base and ordering source). A variety of predictions are examined, including supporting evidence and discussion from Gitksan. Among this is the interaction between =*ima* and other evidentials in Gitksan, and how the utterance context can further determine the ordering source and hence the various modal force interpretations of =*ima*. Lastly, a central intention of this paper is to draw attention the cognitive roots of the ordering source, and how it contributes to modal meanings.

(1)   *yukw=**ima**=hl*   *dim*   *wis*
       PROG=MODAL=DET   FUT   rain

       "It might be raining." "It must be raining." "Its's probably raining." "It's likely raining."
       "It could be raining." "Maybe/perhaps it's raining."

(2) $\lambda f.\lambda g.\lambda q.\forall w' \in \text{MAX}_{g(w)}(\cap f(w)) : q(w')$ (Based on von Fintel & Heim 2007: 55)

(3) $\lambda f.\lambda q.\forall w' \in F(\cap f(w)) : q(w')$

(4)   a.   **Epistemic modal base:** $f(w)$ = {Many people are wearing boots, some people carrying an umbrella, nobody is wearing sunglasses, etc.}

          b.   **Ordering source (stereotypical):** $g(w)$ = {People wear wear boots when it rains, People don't typically wear sunglasses in the rain, etc.}

von Fintel, K. & Heim, I. 2007. "Intensional Semantics" Lecture notes, MIT.

Kratzer, Angelika. 1981. "The notional category of modality." In *Words, worlds, and contexts: New approaches in word semantics*, eds., H- J. Eikmeyer and H. Rieser, 38-74, Berlin: de Gruyter.

Kratzer, Angelika. 1991. "Modality." In Semantics: *An international handbook of contemporary research*, eds., Arnim von Stechow and Dieter Wunderlich, 639-650, Berlin: Walter de Gruyter.

Rullman H., Matthewson, L. & Davis, H. 2007. "Modals as Distributive Indefinites" UBC Ms.

Peterson, T. *to appear a.* "Pragmatic Blocking in Gitksan Modality and Evidentiality" in *Proceedings of the 38th Meeting of the North East Linguistic Society (NELS)*, Amherst, Mass: GLSA Publications

Peterson, T. *to appear b. Modality and Evidentiality in Gitksan* UBC diss.