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## Reasoning about equivalence in semantic fieldwork

Amy Rose Deal  
University of California, Santa Cruz

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Semantic fieldwork is about figuring out the truth and felicity conditions of expressions of a natural language on the basis of the behavior of other human beings. You can be a semantic fieldworker far from home, or in your own community. You can concentrate on your native language, or on a language very different from what you know. When you are doing fieldwork, though, your project is always centered on other people. It's about figuring out what they know about how meaning is conveyed in a language that belongs to them.

There's a challenge in that. We all know that speakers aren't endowed with any direct access to the generalizations they employ in the creative use of language. Nor do they have direct access to the content of the lexical items that tend to be most interesting to semanticists – tenses, modals, articles, discourse particles, and the like. This means that particular methodologies for semantic fieldwork have to be built up around indirect approaches to speaker knowledge. We go about it in various ways. We ask for translations by asking speakers questions like 'How would you say that in your language?' or (frequently) 'What does that mean?' We ask for judgments by producing a sentence for speakers in the context of some linguistic or nonlinguistic information, and asking, in view of that information, 'Could you say that?' or 'Would that be an okay thing to say?' Then we reason from the answers speakers give to a theory of the ways in which meanings are conveyed in their language.

The subject of this paper is that process of reasoning. How do we get from some data points about speaker behavior to a view of linguistic meaning? It's a question we must take seriously in thinking about methodological matters. After all, we spend the time to go out and collect particular data points in view of a theory of how one might reason from such data points to wider conclusions. The theory usually remains implicit. What I want to do here is try to make explicit some of the hypotheses that are at stake, in particular as concerns translation and judgment tasks. These hypotheses matter because they are useful and natural but also imperfect. Their imperfections must be weighed against their usefulness in the practice of research.

Let me get started by walking through two particular hypotheses a fieldworker might use in reasoning about translation and about judgment. That should illustrate the point about usefulness and naturalness. It takes us to the issue of imperfection, however, which is the topic of sections 2 (on translation) and 3 (on judgment). In these sections I will

emphasize how the reasoning we apply to basic fieldwork data can influence the types of semantic analyses we arrive at. We stand the best chance of navigating toward the types of theories we want to produce when we keep this multiplicity of possible interpretations in mind.

## 1 Two hypotheses

We've just met, you and I. After chatting a little bit and getting to know one another, we've agreed that you will help me learn about your community's language. So I ask you, "How do you say 'cat' in your language?" and you respond, "Picpic." What can I conclude from that response?

Nothing, without a theory of translation. Fortunately, I have such a theory, and it's pretty easy to state it explicitly. It's something like this.

(1) Equivalent translations hypothesis (ETH)

The input to translation and the output of translation are equivalent in meaning.

Without the ETH or some alternative hypothesis playing a parallel role, all I have gathered is a data point about how you responded to a question. That's not in itself something that's very useful for linguistics research. But I hypothesize that we both understand that I have asked you for a translation, that you've responded in a cooperative way, and that we are in agreement that the task works as the ETH proposes. Now I can conclude something useful, namely that *cat* in our shared language (English) and *picpic* in your language (Nez Perce) mean the same thing.

I don't want to stop there, of course. Once we've been chatting a little bit longer, I might ask you a more complex question, like, "How could you say, 'There's a cat outside?'" Here's your response:

(2) Picpic hiiwes 'eemtii.

This response, in view of the ETH, is very useful indeed. I've asked you for a translation of an English sentence that quantifies existentially over cats, and if I've reasoned correctly, you've given me back a Nez Perce sentence that does that, too. Now I can start to think about all the sorts of things we think about in doing semantics. I can investigate the formal properties of that quantification and how they are related to the sentence's words and structure. I can investigate how that quantification behaves in discourse and in reasoning. I am started on a research project. Your answers to my questions didn't get me to that point on their own. They got me there together with a theory of how those answers can be interpreted – a theory in which the ETH plays a central role.

Let's fast forward a bit to a different sort of scenario. Now that we've been meeting with each other for a little while, I can start to construct and produce sentences in your language that you understand and you judge to be grammatically well-formed. This means we can start to talk about semantic judgments. We are sitting in the town of Lapwai, and I tell you a little story about our friend Harold. Harold, I say, is down the road in the town of Clarkston, and he is wondering where I am. "If that's so," I say, "could I say

(3) Pay's Harold hinekise wees Clarkstonpa.

Would that make sense?" Yes, you say. What can I conclude from that?

I need a theory again. You haven't translated anything from one language to another, so the reasoning doesn't turn on the ETH. A major hypothesis I could use is rather something like this.

(4) Equivalent judgments hypothesis (EJH)

In a particular context, speakers accept/reject sentences expressing the same range of propositions regardless of what language they are speaking.

I hypothesize that we both understand that I have asked you, in view of a context, to accept or reject a sentence that expresses some particular proposition (or family of propositions, should it be an ambiguous sentence), and that you've responded cooperatively. Your acceptance lets me conclude, by the EJH, something about what the proposition expressed could possibly be. It is not the proposition expressed by these English sentences:

(5) Maybe Harold thinks I am here in Clarkston.

(6) Harold is not in Clarkston.

I know this because English speakers reject these sentences in the context I've described. (I can ask you about the English sentences to confirm that.) According to the EJH, there will be no context where someone would reject a sentence expressing proposition  $\phi$  if speaking English, but accept a sentence expressing  $\phi$  if speaking Nez Perce. To figure out what proposition it is that (3) expresses, then, I should consider what is expressed by English sentences that *are* accepted in this context, like

(7) Maybe Harold thinks I am in Clarkston.

(8) Harold is in Clarkston.

(9) Harold is wondering whether I am in Clarkston.

Since I have some idea of which propositions are expressed by which English sentences, I can start to narrow down the range of possible propositions that could be expressed by Nez Perce sentence (3).

Now I want to ask you about a sentence that is like (3), but contains an additional word. "What about this," I say. "In that same situation where Harold is in Clarkston wondering where I am, could I say this sentence?"

(10) Pay's Harold hinekise wees kine Clarkstonpa."

You shake your head no. "You could only say this if you were in Clarkston," you say. I can now entertain the possibility that (10) expresses the same proposition as one of the sentences in (5)-(6), which are likewise rejected in this context. And what you've helpfully told me about the sentence lets me go even farther. Sentence (5) is a sentence that is rejected in this context, but which would have been accepted if I were saying it while in Clarkston. So sentence (5) is an especially plausible candidate for a sentence that expresses the same proposition as does this Nez Perce sentence (10).

## 2 What can go wrong: translation

Those who are keeping track will have noticed that I've now assumed quite a number of important things. I've assumed the ETH and the EJH as hypotheses about how translation and judgment work. I've also made a number of assumptions about you as a speaker and about our conversation. It's no surprise that those latter assumptions could be incorrect, and that there would be potentially disastrous results in that scenario for my research project. If you are joking with me in a way I haven't figured out, or if you have a different idea than I do about what my English questions mean, I may be totally wrong about how your responses relate to the questions I am trying to answer about meaning in your language. But for right now I want to grant that we are communicating and cooperating in pretty much the way I thought we were. What needs to be shown is that even in this scenario, I might end up with faulty conclusions about your language simply in virtue of assuming that we will always stick to the ETH and EJH.

Consider what could go wrong in my reasoning about the situation of translation. If we are communicating and cooperating normally, what reason could you have to avoid giving me a translation that expresses the same meaning as the original material I asked you to translate? Both semantic and pragmatic factors can get in the way. In semantic terms, your language might simply not make it possible to express the meaning I am asking you to express. (More on this just below.) In pragmatic terms, it might be possible to express a certain meaning in your language, but there might be unwelcome consequences of that expression in situations of actual conversation. If you're not a semanticist (and even potentially if you are), I can't count on you to say, "The task you've asked me to perform is not possible, or not practical, in view of such-and-such facts about my language." Most likely you will simply give me a translation (and if I'm lucky, say something insightful about it), and I will have to figure out how that data point fares in view of the space of possible hypotheses about what translation data means.

Both semantic and pragmatic factors that can interfere with reasoning via the ETH come up in dealing with fieldwork data from Nez Perce. The following three sections feature examples from real life.

### 2.1 *When equivalence of meaning is not possible*

Before we come to the first example, a few words are in order concerning this section's title. How could I claim that equivalence of meaning between two languages might not be possible? This claim of mine seems to run contrary to the received wisdom we so often encounter in our introductory training, where we are faced with the view from such luminaries as Jakobson:

"All cognitive experience and its classification is conveyable in any existing language. Whenever there is deficiency, terminology may be qualified and amplified by loanwords or loan-translations, neologisms or semantic shifts, and finally, by circumlocutions. . . . No lack of grammatical device in the language translated into makes impossible a literal translation of the entire conceptual information contained in the original." (Jakobson 1959, 234-5)

Jakobson's remark makes for a useful clarification of what I am concerned with here. It could well be that every language has the *grammatical* means to describe the same range of experiences and their classification. It is certainly not the case that every language has the *lexical* means to do this, though, at least not at any given time. Fortunately, it is easy for communities to gradually modify the lexicon, to 'qualify' and 'amplify' in the ways that Jakobson suggests, when it becomes useful for speakers to talk about some aspect of experience they have not had occasion to talk about before. When Jakobson speaks of language here, it's language in this temporally extended sense he seems to have in mind.

It's language in a different sense that's encountered in a conversation at a particular time with a particular consultant. If, for instance, Nez Perce speakers found it useful to talk about particle physics in their language, over a period of time one might expect the lexicon of Nez Perce to change in ways that make it possible to accurately convey notions of mass, charge, chirality and all the rest in fluent Nez Perce. But someone who masters the grammar and lexicon of Nez Perce as it exists *right now* cannot express the precise set of propositions that are needed for that task. What an unreasonable request it would be for me to ask you to qualify and amplify on the spot, inventing new words as needed in order to translate! I can only ask you to translate into your language using the grammar and lexicon that you and your community have antecedently agreed upon. And that means that I should not be surprised if you cannot give a semantically equivalent translation of every possible type of sentence I might present you with in an elicitation session. Your language *as it exists right now* might not give you the ingredients that would be required.

I think that is compatible with Jakobson's view. In the long run, speakers of any language will be able to find a way to use their language to talk about any kind of thing. In the short run, there may be 'deficiencies', or lexical gaps, and this can affect the sorts of messages that speakers are able to straightforwardly convey. English has gaps of various sorts (some of which we will see a bit later on), and other languages do too. The potential for gappiness on both sides of the process of translation has to be taken seriously as a cause for deviation from the ETH.

The relevance of lexical limitations comes up in a serious way in studying Nez Perce modals. In Deal 2011, I argued that one fact about the lexicon of Nez Perce as it exists right now is that it doesn't have any simple non-epistemic necessity modals. The only simple non-epistemic modal is a suffix, *o'qa*, which conveys possibility, not necessity. That means that translators can stick to the ETH when they are translating possibility modals from English into Nez Perce, but not when they are translating necessity modals. For a sentence like

- (11) Employees must wash their hands before returning to work.

there is no semantically equivalent Nez Perce translation.

Let's see how this plays out in reasoning about translations of modal sentences. Here are two translation tasks I presented to consultants, and the responses they gave (with my glosses).

- (12) ARD: How could a mother say to her kid, "You can eat candy after the meal"?

C(onsultant): Tepelwéeku's-ne 'aa-p-ó'qa hip-naaq'í-t-pa.  
 candy-OBJ 3OBJ-eat-MODAL eat-finish-PART1-LOC

(13) C: [having just commented in English on the size of hamburgers at Burger King]  
I can finish a small one.

ARD: How would you say that in Nez Perce?

C: Hiinaq'i-yó'qa kúckuc.  
finish-MODAL small

If I reason via the ETH, I conclude that the Nez Perce sentences I've just been given express possibility, like the English originals do. The one morpheme in common is the suffix *(y)o'qa* (the glide being phonologically predictable), so it seems reasonable to conclude that that morpheme is a possibility modal.

What about necessity sentences? Here are two more translation prompts and the responses from Nez Perce speakers.

(14) ARD: We have to get home before it gets dark.

C: Kíye pe-ckilíi-toq-o'qa kulaawit-'ásx.  
we S.PL-return-back-MODAL dark-before

(15) ARD: According to the rules, I should leave.

C: Tamáalwit-ki 'aat-ó'qa.  
rule-INST go.out-MODAL

(Comment:) That's not really saying I should go out. It's just saying I *could* go out.

If I reason via the ETH again, I take the translation of (14) to express necessity. Curiously, *o'qa* shows up here as well. Something funny is going on in (15). The speaker has translated the English necessity sentence with *o'qa*, as in (14), but she felt it necessary to follow that up with a serious hedge. Her hedge casts doubt on whether she really thinks that (15) and its Nez Perce translation express the same proposition. It sounds like she takes her Nez Perce sentence to express not necessity, but possibility.

How should we proceed in the face of this seeming inconsistency? Perhaps we could just temporarily discount this funny fact about sentence (15). A reasonable thing to hypothesize would be that *o'qa* is a modal, but one that's lexically ambiguous. It can express either possibility or necessity. There are more funny facts about the hypothesized necessity modal *o'qa*, though – in fact, so many that it becomes very difficult to discount them. One major curiosity is that when speakers translate *o'qa* sentences from Nez Perce to English, they always translate with a possibility sentence if *o'qa* is in a non-upward-entailing environment – in the scope of negation, in a conditional antecedent, or in the restrictor of a universal quantifier. These are environments which share the logical property of not supporting inferences from necessity to possibility.

A few words are in order on this logical behavior. Suppose I tell you that you must enter this pie-eating contest. That's a necessity claim, and it says something about the set of possible worlds that are compatible with the rules: you enter the contest in all of the best of those worlds. It follows from that, of course, that you also enter the contest in *some* of the best of the rule-following worlds. From the fact that your entry is necessary, it follows that it is possible. The key thing to observe is that that inference disappears when the necessity sentence is embedded in certain types of grammatical environments.

Sentence (16) does not entail sentence (17), for instance. Plausibly, you are permitted but not required to compete.

(16) It's false that you must enter this pie-eating contest.

(17) It's false that you may enter this pie-eating contest.

That shows us that negation removes the inference from necessity to possibility. The same holds for restrictors of universal quantifiers, and for conditional antecedents, which we see in (18) and (19). The first of these sentences certainly does not entail the second.

(18) If you are required to enter, you will win.

(19) If you are permitted to enter, you will win.

Now, all this is relevant for the analysis of Nez Perce modal sentences in view of a correspondance between these inference patterns and the translations of sentences with *o'qa*. The environments where necessity sentences aren't logically stronger than possibility sentences are also the environments where *o'qa* isn't translated with English necessity modals. When *o'qa* is embedded within a conditional antecedent like in (20), for instance, the result is always translated with a possibility modal, not a necessity modal – 'if I can enter' or 'if I could enter', not 'if I should enter' or 'if I have to enter'.

(20) c'alawí 'ac-ó'qa,      kaa 'ac-ó'  
if          enter-MODAL then enter-PROSP  
If I can/could enter, I will enter.

The fact that this translation pattern is quite systematic makes it doubtful that *o'qa* sentences are lexically ambiguous in the simplest sense. Their two possible translation types are not distributed randomly, but rather correlated with a logical property. If I insisted on sticking strictly to the ETH in the face of these data, I might be able to propose, at the limit, that *o'qa* is ambiguous between a possibility modal that imposes no special requirement and a necessity modal that is a positive polarity item. That accounts for the missing translations of sentences like (20). But I am still left with no good analysis of simple sentences like (15) where speakers for some reason find it necessary to severely hedge.

The alternative would be to fail to apply the ETH to sentences (14) and (15). This is essentially what the speaker's hedge on (15) seems to be telling us to do. That comment suggests that there's something difficult about the task of translation for this example. On the view I initially outlined, the difficulty is that there is in fact no possibility of a semantically equivalent translation of *According to the rules, I should leave* into Nez Perce. That sentence expresses a flavor of weak necessity, and in translating (15), the speaker has done her best to approximate that meaning given the lexical resources her language provides. What her comment suggests to us is that the *o'qa* sentence she's given in fact expresses possibility. It might be a *good enough* translation for the necessity sentence – it will be true whenever the necessity sentence is true – but the match is not a perfect one.

This account explains not only the hedge on (15) (and parallel hedges that show up in other discussions) but also the facts about how sentences like (20) are translated. When we translate from Nez Perce into English, we have both possibility and necessity modals

at our disposal. Suffix *o'qa* is strictly a possibility modal, so an English possibility modal can be used to translate it. There is no lexical gap to cause us to deviate from the ETH.

At this point, this case study points to two things that can be said about the ETH. On one hand, it's not the case that speakers always keep to this hypothesis in performing the task of translation. Granting that leads to a simpler and more explanatory view of the meaning of *o'qa*. On the other hand, in a situation where linguists and speakers have come to a pretty good understanding of what the task of translation ought to be, speakers' comments can give a sense for when the ETH should be taken off the table. Lisa Matthewson has very aptly emphasized the status of speaker comments as data points for semantic fieldworkers (Matthewson 2004). This case study shows how such data points may inform our reasoning about the rest of what speakers are doing.

## 2.2 When equivalence of meaning is not practical, part I

Now I want to illustrate how pragmatic factors can interfere with equivalence in translation. I'll first give an example that continues the discussion of Nez Perce modals. Then, in the following section, I'll give an example from the domain of time and tenses before returning to the modal system once again. The plan here is to get some further ideas about why the ETH might not hold in particular translation situations, and also to understand how one might reason instead in those situations.

What I've said so far about the suffix *o'qa* leads us to expect that *o'qa* will never be translated with English necessity modals. But in point of fact it is sometimes translated that way – only when it occurs in upward-entailing contexts, i.e. contexts where necessity entails possibility. Here is a sentence that was translated in a conversation about how the speaker finds it difficult sometimes to understand younger people. She first uttered the sentence in Nez Perce, and then translated it into English.

- (21) 'Yéwki hi-pa-c'íiġ-no'qa.  
slowly 3SUBJ-S.PL-speak-MODAL  
They should speak slowly.

This looks like a gratuitous violation of the ETH. If *o'qa* (here in morphologically-conditioned form *no'qa*) expresses possibility, why isn't it translated with a possibility modal? English provides the speaker with plenty of options to choose from. Why has she chosen a translation with *should* instead of with *could* or *can*?

We have to think carefully about what the Nez Perce sentence expresses, and how that compares with what would have been expressed by various English translations. The Nez Perce sentence makes a possibility claim about slower speaking by the relevant group. Since there's no necessity modal that could have been used instead of *o'qa*, there's no scalar implicature that comes from using a possibility modal. So the Nez Perce sentence simply expresses a possibility claim of the type we record in propositional logic as  $\Diamond\phi$  (proposition  $\phi$  is possible). The sentence is true and appropriate iff there is at least one accessible world in which the proposition  $\phi$  (that they speak slowly) is true, which would still be the case even if all accessible worlds are that way. This is not quite the situation in English. If the speaker had translated (21) with a possibility sentence like 'They could



‘speak slowly’, she would have chosen a sentence that comes with a scalar implicature. It has an enriched meaning which we record in propositional logic as  $\diamond\phi \wedge \neg\square\phi$ : it’s possible for them to speak slowly, but it isn’t necessary. So the Nez Perce sentence can be translated with either of two choices in English, considering enriched meanings:  $\diamond\phi \wedge \neg\square\phi$  ( $\phi$  is possible but not necessary, in this case expressed by ‘They could speak slowly’) or  $\square\phi$  ( $\phi$  is necessary, in this case expressed by ‘They should speak slowly’). Neither one of those perfectly matches the meaning of the Nez Perce sentence. So the ETH can’t be fully followed.

We must go one step further concerning sentences like (21), where  $o'qa$  is in an upward-entailing environment. If the speaker is giving a translation that doesn’t keep to the ETH, what exactly is she doing? She’s not pairing Nez Perce and English sentences at random, to be sure. She makes her choice among English translations using a principle that is weaker than the ETH. If the speaker believes that  $\square\phi$  is true, only one of the English translations expresses what she takes to be a true proposition. In choosing among potential translations, she seems to be following reasoning like this:

(22) Lower Bound on Good Enough Translation

Within a particular context, if the original sentence is true and felicitous, its translation is true and felicitous.

That’s how she’s getting to an English necessity sentence as the translation of a Nez Perce possibility sentence. If  $\square\phi$  is true in this context, a Nez Perce speaker may use an  $o'qa$  sentence to truthfully and felicitously express  $\diamond\phi$ , which of course follows from  $\square\phi$ . An English speaker uttering a simple sentence does not have a clear route to  $\diamond\phi$ . Following this ‘lower bounding’ rule, her fallback plan should be to express some proposition in the neighborhood of the original which is both true and felicitous. A sentence which expresses  $\square\phi$  is the most natural choice.

But wait. The scalar implicature borne by the English possibility sentence is, after all, famously cancellable. Couldn’t the speaker give one of these translations for (21)?

(23) They could talk slowly. In fact they should.

(24) It is at least possible that they talk slowly.

The answer should be clear – one would be quite surprised to find a consultant who gives this type of translation. These are complex and somewhat technical sentences of English. It is possible though not practical to translate this way. It’s really the impracticality of this type of translation that pushes the speaker back into the choice between  $\diamond\phi \wedge \neg\square\phi$  (*could*-translation) or  $\square\phi$  (*should*-translation).

Now we have a clear explanation for one final detail that has been left mysterious. Why exactly should the logical property of upward-entailingness correlate with necessity translations for  $o'qa$ ? Why don’t necessity translations show up for sentences like (20), where  $o'qa$  is in a non-upward-entailing environment?

(20)  $c'alawí 'ac-ó'qa,$        $kaa 'ac-ó'$   
 if          enter-MODAL then enter-PROSP  
 If I can/could enter, I will enter.

The solution lies in the fact that possibility modals bring scalar implicatures only in contexts where they are logically weaker than necessity modals. In a non-upward-entailing environment like the antecedent of a conditional, an English possibility modal triggers no scalar implicature. That means that just in these cases, the English possibility modal can provide an equivalent translation for the Nez Perce modal *o'qa*. In this example, Nez Perce sentence (20) expresses a conditional of the type  $[\diamond\phi] \rightarrow \phi$  (if  $\phi$  is possible, then  $\phi$  holds true; in this case  $\phi$  is the proposition that I will enter). When the speaker translates with the English sentence 'If I can enter, I will', she chooses a sentence which carries this very meaning. There is no unwanted enriched meaning found in the English but not in the Nez Perce. So, there is no cause for deviation from the ETH.

We should dwell a bit on this issue of enriched meanings, since it bears on the question of when we expect speakers to deviate from the ETH. Sentence (24) plausibly expresses the very same proposition as (21), so it is not a lack of lexical means that leads the speaker not to choose a fully semantically equivalent translation for that example. There seems to be an important pragmatic principle at stake. Some additional examples might make it clearer how this worry about practicality relates to familiar types of pragmatic concerns.

### 2.3 *When equivalence of meaning is not practical, part II*

The starting point for these next examples is Jakobsonian: languages are clearly different in the types of information they require their speakers to express. An English speaker, for instance, is required to pick a tense in order to utter a finite sentence, whether or not particulars of time are important to what that speaker wants to say. A speaker of Mandarin or St'át'imcets is not always required to make a parallel choice (Lin 2006, Matthewson 2006). Speakers of those languages can grammatically utter finite sentences which leave unspecified whether the events they describe are occurring in the present, or have already occurred in the past. English makes it possible, but less practical, to do this.

We see a version of this issue in comparing the expression of time in English to the corresponding system in Nez Perce. Both languages distinguish present from past tenses, but Nez Perce has two past tenses, the distinction between which has something to do with remoteness. Events in the distant past are described using verbs with the tense suffix *ne/na*. Events in the more recent past are described using verbs with the tense suffix *qa*.

(25) hani-sa-qa  
 make-IMPERF-REC.PAST  
 I was making something (recent)

(26) hani-sa-na  
 make-IMPERF-REM.PAST  
 I was making something (remote)

This means that an English speaker can easily utter a temporally vague past sentence like 'I was making something', whereas Nez Perce makes it less practical to do so. The simplest Nez Perce sentences along this line are more temporally precise than are their English counterparts.

How, then, should I expect you to respond if I ask you to translate a temporally vague sentence like ‘I was making something’ into Nez Perce? Certainly you could in principle say something like this:

- (27) hani-sa-qa                                    ’iitq’o hani-sa-na  
       make-IMPERF-REC.PAST or        make-IMPERF-REM.PAST

That would plausibly conform to the ETH. But of course you are exceedingly unlikely to respond in this way. That’s probably because the pragmatics of the original English sentence and the pragmatics of this potential disjunctive translation are markedly different. The disjunctive translation calls attention to the time in a way that the original sentence does not – it brings into play the maxim of manner. Is the speaker unsure about the time at which she made something? Does she not want to share that information? There’s no way to leave the past time entirely vague and not draw the issue into the spotlight. The situation arises because Nez Perce requires its speakers to provide more information about location in the past than does English.

There is an aspect of the grammar of modals where English requires less precision than Nez Perce does, and the same situation arises here, too. English modal auxiliaries are famously flexible in what type or “flavor” of modality they express. The same sentence with modal *may*, for instance, expresses epistemic possibility in the discourse in (28) but non-epistemic possibility in the discourse in (29).

- (28) John eats a lot of meat, but I’ve spotted his car outside this vegan restaurant. John may eat here.  
 (29) John is coming to town, and he’s a strict vegan. Fortunately, this is a vegan restaurant. John may eat here.

Nez Perce, on the other hand, uses different modal morphemes for epistemic and non-epistemic modality. Words like *pay’s* are used for epistemic possibility; *o’qa* is reserved for non-epistemic possibility. What kind of Nez Perce translation should I expect, then, for a sentence like ‘John may eat here’, which leaves open which sort of possibility is at stake? Certainly not like this:

- (30) pay’s    Caan hi-ip-teetu                                    kine    ’iitq’o    hi-ip-o’qa                                    kine  
       maybe John 3SUBJ-eat-HABITUAL here    or            3SUBJ-eat-MODAL here  
       John may<sub>epistemic</sub> eat here or he may<sub>non.epistemic</sub> eat here.

That kind of translation would conform to the ETH, of course. Like the English original, it’s non-committal about whether the modality in question is epistemic or non-epistemic. Once again, this absence of precision can be produced in Nez Perce only by a disjunctive translation that calls attention to the very matter that the English sentence conveniently sidestepped.

If we take this type of foregrounding of unwelcome issues to constitute infelicity in a particular context, then examples (27) and (30) will be ruled out by the Lower Bound on Good Enough Translation. Alternatively, we might conclude that speakers are using some additional principle to guide their translations away from such choices, perhaps something like this.

(31) Equivalent implicatures hypothesis (EIH)

The input to translation and the output of translation are equivalent in what they implicate.

The important bit about the EIH is that it seems to outrank the ETH in a number of situations. Where speakers can't give translations that are equivalent in both content and implicature, they sacrifice equivalence of content to make sure that certain types of implicatures are avoided. That's what stops speakers from translating simple, everyday sentences into complex technical explications which preserve the content but not the implication.

### 3 What can go wrong: judgment

The interpretation of translation is complex. It's more complex than we countenanced in section 1, where all we needed was the ETH. Let's now consider how things look for the other hypothesis that came up in that section, namely the hypothesis EJH about judgment.

Certainly, judgment poses its own challenges of the type we've mostly set aside thus far. If I ask you to judge an utterance, and you reject it, I have to wonder whether you've rejected it because of what it means, or because it's simply not well-formed on grounds that are syntactic, morphological, phonological, or prosodic. (This is another point that's nicely made by Matthewson 2004.) But even leaving such cases, I want to show that we must be careful about the EJH itself. The reasons have to do with the coming together of semantic and pragmatic information.

Why might you reject a sentence expressing  $\phi$  in English but accept a sentence expressing  $\phi$  in some other language? Perhaps because the former sentence carries an enriched meaning that makes it false in the particular situation, even though  $\phi$  itself is true. To exemplify this I propose we turn to a data set featuring modal sentences once again. To change things up a little bit, the particulars for this example come from the work on Gitksan, a Tsimshianic language, by Tyler Peterson (2010). The situation with modals in that language is very much similar to Nez Perce, though the analysis Peterson arrives at is rather different from the one I've outlined above and in Deal 2011. What I want to do is to show how Peterson's analysis is influenced by the EJH, and how a potentially simpler analysis comes into view once our reasoning about judgments is qualified to take pragmatic information into account.

Let's focus on Gitksan sentences involving the clitic *ima*, which relates to epistemic modality and inference. Peterson presents speakers' judgments on such sentences in two types of contexts. In one context, there is strong evidence for a particular inference. Here is one of his examples of an *ima* sentence that is accepted in such a context.

(32) Context: You hear that Alvin's truck broke down on the way up to the Suskwa. It's a very reliable truck, but someone suggests that the problems he's having starting it indicate a problem with the fuel pump.

n̄idimahl            gan    wilt  
n̄it=ima-hl        k̄an    wil-t  
3SG=MOD=CND    COORD do.something-3SG

“That must’ve been why it happened.”  $\succ$  “That might’ve been why it happened.”

Along with the example itself, Peterson presents two alternative English translations. The sentence to the left of  $\succ$  is judged by his consultant to be more felicitous than the sentence to the right, given the context. Reasoning by the EJH, Peterson concludes that the Gitksan sentence could not express the same proposition as the less felicitous translation. It could, however, express the same proposition as the more felicitous translation. All this points to the conclusion that the *ima* sentence expresses some version of epistemic necessity.

In other contexts, this line of reasoning leads to a different result. Here is a context where there is not particularly strong evidence for a particular inference. An *ima* sentence is felicitous again, but the range of felicitous English translations is different.

- (33) Context: You see your uncle stopped at the intersection talking to some people through the window of his pickup. You and your friends don’t recognize the people.

wilaayimas	nibib- $\dot{y}$	( $\dot{n}idiit$ )
wilaa-i-(t)=ima=s	nipip- $\dot{y}$	( $\dot{n}itiit$ )
know-TR-3=MOD-PND	mother’s.brother-1SG	3PL

“My uncle might know them.”  $\succ$  “My uncle must know them.”

Following the EJH, we would have to conclude that this *ima* sentence cannot express the version of epistemic necessity expressed by the less felicitous English translation. It could, however, express the same proposition as the more felicitous translation. This points to the conclusion that an *ima* sentence expresses some version of epistemic necessity in certain contexts (e.g. (32)) but some version of epistemic possibility in other contexts (e.g. (33)). Thus Peterson concludes that this curious clitic “has variable modal force... [it] can be interpreted as *might* or *must*” (p. 166).

There is another way to think about what is happening here, and something pragmatic – scalar implicature – plays an important role. Let’s suppose that *ima* only expresses epistemic possibility. Gitksan doesn’t have an epistemic necessity modal to serve as its dual, however, and so *ima* sentences don’t carry scalar implicatures. An *ima* sentence is therefore possible in a context supporting epistemic mere possibility, like (33), but also in a context supporting epistemic necessity, like (32). The English translations, of course, don’t work the same way. The *must* translation of (33) is disfavored in its context because it expresses a necessity claim which is false. The *might* translation of (32) is disfavored in its context *even though* its narrow content is clearly true. It’s the implicature the sentence carries that is false.

The key test of this alternative proposal would have to come from non-upward-entailing environments, where possibility modals fail to trigger scalar implicatures. Matthewson (2013) observes that there are difficulties producing the relevant data, owing to the syntax of Gitksan epistemic particles. (Rullmann, Matthewson, and Davis (2008) make a similar observation concerning the syntax of modal elements in St’át’imcets, which likewise are acceptable in both possibility and necessity contexts.) These difficulties, of course, should not obscure the methodological point to be made on the interpretation of judgments. If we think that scalar implicatures are not part of propositional sentence content, then this is indeed a situation where we would do well not to totally trust in the validity of the EJH.

In (32), we plausibly have a context where someone would reject a sentence expressing  $\diamond\phi$  if speaking English (given the scalar implicature associated with  $\diamond\phi$  in that language) but accept a sentence expressing  $\diamond\phi$  if speaking Gitksan.

This kind of worry motivates at least a partial retreat to a somewhat more austere theory of judgment. Unlike translation, judgment does not inherently trade on a notion of equivalence between expressions of two languages. Judgments can be understood simply as revealing some aspect of the pairing between acceptable utterances and the way the world is.

(34) Austere Theory of Judgment

In a particular context, speakers accept sentences that are both true and felicitous and reject sentences that are false and/or infelicitous.

Let's take this revised theory to our initial example of a judgment scenario, where I sat with you in Lapwai and we talked about our friend Harold down the road. I've explained the backstory and asked, "could I say

(3) Pay's Harold hinekise wees Clarkstonpa.

Would that make sense?" You've said yes. If I don't reason by the EJH, it's no use to sit and think about what sorts of English sentences might be uttered appropriately in this scenario. All I conclude is that sentence (3), whatever it might mean, is true and felicitous in this little context.

#### 4 Conclusions

The bread and butter of empirical semantics is the pairing of such-and-such sentence with such-and-such meaning. We take these pairings as our basic data when we set out to build and evaluate semantic theories. What the fieldworker must confront is that this data can ultimately hardly be taken as basic at all. The basic data is speaker behavior, and to get from this behavior to something that is useful for semantic theory, we have recourse to typically implicit theories of translation and of judgment. It is these auxiliary theories that make it possible to reason from the particulars of observation in the field to the abstractions in which our theories deal. This makes it possible to conduct empirical investigations in semantics.

This situation on an abstract level is by no means unique to one particular corner of scientific investigation. It is much the same in syntax, for instance, where the fieldworker again must bridge a chasm between the type of basic data the theory demands—in this case, distinctions between grammatical and ungrammatical sentences—and the ultimate type of facts that can be confronted in the field. The challenge is fittingly described by Judith Aissen:

"While both linguistic theory and fieldwork deal in data, the sort of data they deal in is absolutely and fundamentally different in kind. Linguistic theories or analyses make predictions about sentences as abstract objects – not utterances used in particular situations or by particular people. On the other hand,

what gets elicited in informant sessions is very much a concrete object: it is a judgment of grammaticality offered by one specific person to another specific person in a particular setting on a particular day and in a particular place. From this point of view, it seems quite clear that data of one type cannot articulate directly with data of the other type. Elicited data has got to be cooked to be brought into meaningful relation with theory." (Aissen 1988)

It is a 'myth of fieldwork', Aissen concludes, that speaker responses can be applied directly to analyses in syntactic theory. Between the speaker response and the analysis stands the fieldworker and his or her auxiliary theories. The particulars of those theories very much can influence the ultimate type of syntactic analysis at which the fieldworker arrives.

The essential outlines of this situation stretch well beyond linguistics. Aissen's description brings us awfully close, for instance, to the description of reasoning in physics by the physicist and philosopher of science Pierre Duhem (Duhem 1914 [1982], 166). Duhem points out that a physicist who wants to apply Boyle's law (which relates the temperature, volume, and pressure of constant masses of gas) is not faced with temperature, volume and pressure as basic data. His basic data, like that of the linguist, is remarkably less abstract than is the currency of his theory. If he is faced with a particular gas, he is faced with a concrete substance which is more or less warm and more or less voluminous and more or less pressurized. To get from the particulars of these things to useful information, the physicist must have not only instruments (like a thermometer) but also theories of how those instruments work. The level of mercury in a thermometer is not a particularly useful point of data considered all by itself. It's only in view of a hypothesis about how such information corresponds to the abstract notion of temperature that the mercury level becomes worth seeking out and recording.

Our situation is of course somewhat messier than that of Duhem's physicist. Our basic data comes from interactions with people, not thermometers. There is no theory of the actions of a human being that has yet been stated in fully predictive form, and so we must consider different possible hypotheses that could explain and render useful the basic data we're provided. That is why there is no one single theory of judgment or translation being used by semantic fieldworkers. For translation, it is also why Matthewson (2004) has so thoroughly emphasized that a translation is "a clue, not a result." There are many ways to interpret clues. Those ways are alternative hypotheses about the workings of translation.

What should not get lost in all this is that simple theories of translation like the ETH and judgment like the EJH are incredibly useful when they work. Certainly, they don't take us to the best conclusions all of the time. But we want our theories to be simple and natural enough to be used on the fly, in conversing with our speakers and modifying (if necessary) the questions we've planned to ask them. If they're useful enough, even theories that are sometimes flawed can play an important role. What we have to do is to routinely check the way we have been reasoning about our collected basic data. What other reasonable hypotheses could be applied to the data at hand? How does that change the ultimate result we take away to our project of theory construction?

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