

Person features and shiftiness

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1 Theme

What are the basic grammatical pieces underlying person systems, and how does the grammar combine and manipulate them? Such questions have attracted significant attention as relates to matters of possible and impossible pronouns and paradigms (Noyer 1992, Harley and Ritter 2002, Bobaljik 2008, Wechsler 2010, Harbour 2016, Maldonado and Culbertson 2022, i.a.) as well as patterns of agreement (Béjar 2003, Nevins 2007, Wechsler 2011, Grishin 2023). These discussions have taken place against a relatively simple and familiar backdrop of semantic behaviors for first and second person elements. First person refers to the individual who is speaking, and second person refers to the individual who is being addressed.

This paper explores what can be learned about the syntactic and semantic representation of person from cases where this baseline behavior fails to hold: morphological first person fails to refer to the individual who is speaking, and/or morphological second person fails to refer to the individual who is being addressed. I will describe such cases as involving *shifty person*. Such behaviors are readily found in direct quotation, of course, as a consequence of the general way in which direct quotations represent or mimic the words of another speaker. But they are also found in a range of cases to which a direct quotation analysis is inapplicable, and I will reserve the term *shifty person* for these cases. Examples from Amharic (Semitic; Ethiopia) and Nez Perce (Penutian; USA) are given in (1) and (2).

(1) *Amharic* (Leslau 1995, 779)

pro [*pro*_{subj} *pro*_{obj} [*pro* mīm amt'-a] ind-al-ə-ññ]
1SG [3SG 1SG [2SG what bring.IMPER-2M] COMP-say.PERF-3M-1SO]
al-səmma-hu-mm
NEG-hear.PERF-1S-NEG

I didn't hear what he told me to bring.

more literal: I didn't hear what he told me, you bring!

(2) *Nez Perce* (Deal 2020, 22)

Context: I travel to the town where my dad grew up and I go to the address he said he grew up at. Someone sees me looking at the house and I explain:

Na-'toot-am hi-i-cee-ne *pro* [kine 'iin tewyenik-θ-e]
my-father-ERG 3SUBJ-say-IMPERF-REM.PAST 1SG [here 1SG live-P-REM.PAST]

My father_i told me he_i used to live here.

more literal: My father_i told me I_i used to live here.

These examples demonstrate two types of evidence against a clausal quotation account. First, shifty person complement clauses do not demonstrate the characteristic syntactic opacity of quoted clauses; for instance, a *wh*-phrase inside this type of complement clause may scope outside its clause, as (1) shows.¹ Second, deictic elements in these clauses may diverge in their anchoring. In (2), the first person subject pronoun is shifty; one might think of this element as deictically anchored to the reported speech context. The locative adverbial, on the other hand, is deictically anchored to the overall utterance context. By contrast, deictic elements in clausal quotation must all draw their anchoring from the context of reported speech. As evidenced by data of these two general types, shifty person is a widespread phenomenon in the languages of the world. It is found, for instance, in Athabaskan languages such as Navajo (Platero 1974, Schaubert 1979, Speas 2000) and Dene (previously known as Slave; Rice 1986, 1989); in Dravidian languages such as Malayalam (Anand 2006), Tamil (Sundaresan 2011, 2012, 2018), and Telegu (Messick 2016, Sundaresan 2018); in Korean (Park 2016) and Japanese (McCready 2007, Sudo 2012, Maier 2014); in Indo-Iranian languages such as Farsi (Anvari 2019) and Zazaki (Anand and Nevins 2004, Anand 2006, Akkuş 2018); and in numerous Turkic languages such as Mishar Tatar (Podobryaev 2014), Poskart Chuvash (Knyazev 2022), Turkish (Gültekin Şener and Şener 2011, Özyıldız 2012, Özyıldız, Major, and Maier 2018, Akkuş 2018), and Uyghur (Sudo 2012, Shklovsky and Sudo 2014, Major and Mayer 2019).²

The characterization of shifty person given above is deliberately broad, leaving open the choice between two quite different analytical perspectives that may be taken on examples such as (1) and (2). A first possibility is that shifty person involves indexical shift. An indexical element is one whose meaning draws on the context of interpretation; English personal pronouns such as *I* and *you* are classic examples. Theories of indexical shift such as Schlenker 1999, 2003, Anand and Nevins 2004, and Anand 2006 (as well as my own, Deal 2020) posit that morphological first and second person have an essentially familiar indexical semantics, but that the context with respect to which their meaning is calculated need not be the context of utterance. The relevant context is instead determined, wholly or in part, by the meaning of the attitude verb under which the person indexical is embedded. From this perspective, the difference between a first person that refers to the individual who is speaking and one that does not can be approached as a matter of what context the first person feature is interpreted with respect to. The meaning of first person—what Kaplan (1989) called its *character*—remains the same: it invokes a function that picks out the speaker of the context. Shifty person can arise when the input context for this calculation is varied.

A second possibility is that shifty person reflects the possibility of *morphological* first or second person that does not involve an indexical semantics at all. That is, the meaning of the person feature does not draw, as an indexical would, on the context of interpretation. There are several precedents for this type of hypothesis in the analysis of morphological first and second person, perhaps the most familiar of which comes from the literature on “fake indexicals”, such as *my* in (3).³

(3) I am the only one taking care of my children.

One reading of this sentence conveys that the speaker is the only individual *x* such that *x* is taking care

¹ While this scope-taking involves no overt movement in Amharic, it does in corresponding examples in Nez Perce, for instance; see Deal (2014, 2020) for examples.

² This is not a complete list of languages in which shifty person has been reported. See Deal (2020) for a more exhaustive listing. Note furthermore that not every language on this list allows mixed deictic anchoring. For Zazaki, for instance, Anand (2006) presents evidence for shifty person based purely on the absence of quotational opacity.

³ Other precedents include Anand (2006), von Stechow (2003), and Deal (2018) on certain cases of shifty person in attitude reports. (Note that (3) is not an attitude report.) I return to this matter below.

of *x*'s children. On this reading, the morphologically first person pronoun *my* is interpreted as a bound variable, rather than a referential expression; and moreover, it ranges over individuals other than the sentence utterer. A prominent class of approaches holds that this reading is obtained via a semantic representation of *my* that involves no reference to the context at all (Kratzer 1998, 2009, von Stechow 2003, Rullmann 2004, Heim 2008, Reuland 2010, Sudo 2012, Podobryaev 2014, 2017, Landau 2016, Wurmbrand 2017). Broadly, from this perspective, the difference between a first person that refers to the person speaking and one that does not may reflect underlying semantic differences which happen not to receive distinct morphological realization.⁴

These possibilities for the analysis of shifty person are not incompatible with one another. It could be that some instances of shifty person merit an analysis of the first type, whereas others merit an analysis more along the lines of the second. Here I will argue (as Anand 2006 also did) for a view on which there is a role for each to play. Some cases of shifty person involve indexical shift; this is for example the case for instances of shifty person in Nez Perce such as (2) (Deal 2020). Other cases involve syncretism between indexical person and a related though non-indexical semantic category; this is a notable source of shifty person in Amharic (Anand 2006). Both types of shifty person offer an opportunity to investigate the syntactic and semantic foundations of person systems. The case of indexical shift, as I will show, allows for a close study of the relationship between first person syntactic and semantic primitives and those involved in second persons and in locative indexicals. The case of shifty person without indexical shift—in particular, as instantiated in Amharic and languages with a similar pattern—points the way to a rethinking of the primitive nature of first person features.

The paper is organized as follows. I begin in section 2 with an overview of indexical shift, drawing from recent work (Deal 2020). I highlight three generalizations about indexical shift of importance to the theory of person, and briefly demonstrate how they can be captured on the shifty operator approach pioneered by Anand and Nevins 2004 and Anand 2006. This background makes it possible to identify distinctive behaviors for indexical shift as opposed to other types of shifty person phenomena. In section 3, I explore how indexical shift can cast light on the relationship between second person and first person. Drawing on Rice's (1986, 1989) study of indexical shift in Dene, I argue that the basic semantics for second person must not be defined in terms of first person primitives. On the syntactic side, the data from indexical shift is (perhaps surprisingly) compatible both with a view that posits a distinctive second person feature (e.g. [ADDR], [2nd], [HEARER]) and with a view that treats second persons as syntactically endowed only with a [PARTICIPANT] feature, in contrast to the [PART,SPKR] feature of first person. In section 4, working again with indexical shift, I ask how widely person features are distributed in the grammar, and in particular, whether (as per Harbour 2016) person features play a role in the feature structure of locative indexicals such as *here*. I argue once again that distinct classes of indexicals require distinct semantic primitives; locative indexicals such as *here* cannot be given meanings akin to 'the vicinity of the speaker'. Finally, in section 5, I return to shifty person beyond indexical shift, focusing in particular on the behaviors of a class of elements that have been described as 'first person logophors' (Curnow 2002), 'personal logophors' (Anand 2006), 'egophors' (Coppock and Wechsler 2018), or 'indexiphors' (Deal 2018, 2020). Here I argue, based on patterns of syncretism in Amharic and other languages, for a representation of standard indexical first person which is not atomic. First person should be modeled as possessing not simply an [AUTH] or [SPKR] feature, but rather, this type of feature in combination with a feature that specifies reference to the context.

⁴ I note that it is the general logic of this argument I wish to draw on here, rather than the particular analysis of (3) and similar sentences. For an alternative approach to such data, see Jacobson (2012), Sauerland (2013).

(6) *Nez Perce* (Deal 2020, 22)

Context: I travel to the town where my dad grew up and I go to the address he said he grew up at. Someone sees me looking at the house and I explain:

Na'-toot-am hi-i-cee-ne *pro* [kine 'iin tewyenik- \emptyset -e].
my-father-ERG 3SUBJ-say-IMPERF-REM.PAST 1SG [here 1SG live-P-REM.PAST]
My father_i told me he_i used to live here.
lit.: My father told me I used to live here.

In (7), the second person indexical 'ee refers not to the utterance addressee, but to the reported addressee (R.).

(7) *Nez Perce* (Deal 2020, 12)

Manaa we'nikt 'u-us haama-nm, ke ko-nya₁ T.-nm pee- \emptyset -n-e
how name.NOM 3GEN-be.PRES man-GEN C RP-ACC T-ERG 3/3-say-P-REM.PAST
R.-ne, ['ee 'o-opayata-yo'qa t₁] ?
R-ACC [2SG.CL 3OBJ-help-MODAL]
What is the name of the man that T told R_i that he_i should help?
lit.: What is the name of the man that T told R that you should help?

It is certainly not the case that every type of indexical can shift in every language. (We see this, for instance, by the impossibility of the shifted readings in the literal English translations of the above examples.) However, the crosslinguistic data are consistent with the claim that every type of indexical can shift in *some* language (Anand 2006, Deal 2020). This generalization highlights the need for a theory of indexical shift which is not specific to person, but rather general enough to cover temporal, locative, and other types of indexicals.

2.2 Shift Together

The second generalization is emphasized by Anand and Nevins (2004) and Anand (2006). Noting that shifted readings of indexicals are in many cases optional, their core observation is that shift is a clause-level phenomenon and does *not* operate on an indexical-by-indexical basis. The statement of the Shift Together constraint in (8), capturing this behavior, follows Deal 2020.⁶ Classes of indexicals include first person, second person, locative, and temporal.

(8) *Shift Together*

If one indexical of class Ψ picks up reference from context c , then all indexicals of class Ψ within the same minimal attitude complement must also pick up reference from context c .

This behavior can be seen in (9) for temporal indexicals in Korean, a language where shift is in general optional (Park 2016). Here the embedded clause contains two temporal indexicals, *onul* 'today' and *nayil* 'tomorrow'. Sentence (9) has a reading according to which *onul* denotes the utterance day (June

⁶ This formulation is slightly different from those given by Anand and Nevins (2004) and Anand (2006). See Appendix B of Deal 2020 for discussion of the motivation behind the revised formulation, as well as critical discussion of putative counterexamples to Shift Together mentioned by Quer (2005), Korotkova (2016), Sundaresan (2018), and Hübl, Maier, and Steinbach (2019), some of which appear to be based on faulty interpretations of the principle as motivated by Anand and Nevins.

25) and *nayil* denotes the day thereafter (June 26), as well as a reading on which *onul* denotes the day of the reported speech (June 18) and *nayil* denotes the day thereafter (June 19). These readings, indicated as (a) and (b) below, are both in keeping with Shift Together. In the first case, both temporal indexicals pick up their reference from the utterance context. In the second case, both pick up their reference from the context of reported speech. What is ruled out are the mixed readings in (c) and (d), where the indexicals draw on two different contexts.

(9) *Korean* (Deal 2020, 81)

Context: It is June 25. We are discussing Bob’s strange work schedule. I consulted Bob’s supervisor, John, on June 18, and am sharing with you the information I got from him.

Cinan cwu-ey John-i [Bob-i onul-pota nayil te il-ul (manhi)
 Last week-Loc John-Nom [Bob-Nom today-than tomorrow more work-Acc (a.lot)
 hal-geora] malhay-ess-ta.
 do-C.fut] say-Pst-Decl

Lit: Last week John said that Bill work[FUT] more tomorrow than today.

- a. The plan was for Bob to work more on June 26 than on June 25.
- b. The plan was for Bob to work more on June 19 than on June 18.
- c. ✗ The plan was for Bob to work more on June 19 than on June 25.
- d. ✗ The plan was for Bob to work more on June 26 than on June 18.

The same can be seen for locative indexicals in Nez Perce, (10). This sentence attempts to report an inequality of temperature between two locations, each denoted by the locative indexical *kine* ‘here’. Because the two indexicals cannot refer to different locations—for instance, the utterance location and the location of reported speech—the sentence only has the (necessarily false) reading that a single location is hotter than itself. Accordingly, the sentence is infelicitous.

(10) *Nez Perce* (Deal 2020, 19)

'In-lawtiwaa-nm paasxa-pa hi-hi-n-e *pro*, [*kine* hii-wes qetu
 my-friend-ERG Boise-LOC 3SUBJ-tell-P-REM.PAST 1SG [here 3SUBJ-be.PRES more
 'iyeeqis kin-ix].
 hot here-from]

- a. ✗ My friend in Boise told me it was hotter here than there.
- b. ✗ My friend in Boise told me it was hotter there than here.

Finally, the Shift Together pattern is shown for person indexicals in Nez Perce (11). Shift of person indexicals is optional, though preferred, in Nez Perce. Example (11) is parallel to Korean (9): the only possible readings are those where either the first person indexicals both draw on the utterance context or both draw on the reported context.

(11) *Nez Perce* (Deal 2020, 18)

Ne-'níc-em pee-∅-n-e 'in-haama-na,
 1SG-older.sister-ERG 3/3-tell-P-REM.PAST 1SG-husband-ACC
 ['iin-im ciq'aamqal hi-twehkey'k-∅-e 'iin-e].
 [1SG-GEN dog(ERG) 3SUBJ-chase-P-REM.PAST 1SG-ACC]

- a. ? My sister_s told my husband that my dog chased me.
- b. My sister_s told my husband that her_s dog chased her_s.
- c. ✗ My sister_s told my husband that my dog chased her_s.
- d. ✗ My sister_s told my husband that her_s dog chased me.

The Shift Together effect is a distinctive behavior for indexical shift compared to a number of surface-similar phenomena. One of these is logophoricity. Logophors are classically like shifted first person indexicals in that, when embedded in a speech report, they refer to the reported speaker.⁷ However, logophors are typically not subject to a restriction like Shift Together. In Ewe (Niger-Congo), for instance, two clausemate logophoric pronouns need not have the same reference:

(12) *Ewe* (Pearson 2015, 96)

Marie be Kofi xɔse [be yè na yè cadeau].
 Marie say Kofi believe [COMPL LOG give LOG gift]

- a. Mary said that Kofi believed that she gave him a gift.
- b. Mary said that Kofi believed that he gave her a gift.

Another case in which no Shift Together-like behavior is found is fake indexicality. In English sentences containing multiple first or second person pronouns which can be interpreted as bound variables, mixed readings are possible: one pronoun is interpreted as a bound variable while the other retains its ordinary indexical meaning.⁸

(13) Only you recommend your books to your librarian. (Kratzer 2009, 217)

- a. You are the only x such that x recommends x 's books to x 's librarian.
- b. You are the only x such that x recommends your books to your librarian.
- c. You are the only x such that x recommends your books to x 's librarian. (Mixed reading 1)
- d. You are the only x such that x recommends x 's books to your librarian. (Mixed reading 2)

This contrast in behavior between fake indexicals and indexical shift underlines the need to treat shifty person as a heterogeneous phenomenon.

2.3 Shifty asymmetries

The Shift Together effect regulates the behavior of indexicals of the same class. Across classes, we find asymmetries, in particular an implicational hierarchy, (14). This constitutes our third generalization about indexical shift.⁹

⁷ There is a further similarity in that, in both cases, *de se* interpretation is typically required (though perhaps not always). See Anand (2006), Haida (2009), and Bimpeh (2019) for evidence that some logophors require *de se* interpretation and Pearson (2015) for evidence that some do not. Issues in the *de se* interpretation of shifted indexicals are discussed at length in Deal (2020, ch 3).

⁸ Kratzer (2009, 218) claims that a Shift Together-like pattern reemerges when the fake indexicals are further embedded. However, I have not found any English speakers who share the judgment she reports.

⁹ See Deal (2020, ch 4) for discussion of certain complexities related to this pattern in Korean.

- (14) *Shifty hierarchy by indexical type* (Deal 2017, 2020)

Within and across languages, the possibility of indexical shift is determined by the hierarchy *temporal* > *1st* > *2nd* > *locative*. Indexicals of a certain class undergo shift in a particular verbal complement only if indexicals of classes farther to the left undergo shift as well.

Internal to particular languages, aspects of this hierarchy effect can be seen in patterns of indexical shift in Dene and Nez Perce. In Dene, the set of indexicals that can be shifted in a particular clause is determined by the choice of embedding verb. Under *hadi* ‘say’, only first person shifts; second person remains anchored to the utterance context.

- (15) *Dene* (Rice 1986, 53)

Simon [*rásereyineht’u*] *hadi*.
Simon [2SG.hit.1SG] 3SG.say
Simon_i said that you hit him_i.

Under *édedi* ‘tell/ask’, by contrast, both first and second persons shift: first person refers to the reported speaker, and second person to the reported addressee.

- (16) *Dene* (Rice 1986, 51)

[*Segha ráwqdí*] *sédiidi* *yílé*.
[1SG.for 2SG.will.buy] 2SG.tell.1SG PAST
You told me to buy it for you.
lit.: You_i told me_j that you_j will buy it for me_i.

What is not found is a Dene verb in whose complement only second person is shifted.

In Nez Perce, the hierarchy effect can be seen even in cases where the embedding verb is held constant. Under *hi* ‘say/tell’, for instance, it is possible for locative indexicals and person indexicals to shift; see (4) and (6)-(7), respectively. In a clause that contains only locative indexicals or only person indexicals, indexical shift is optional. When both types of indexicals are present in a single clause, however, the hierarchy effect emerges: locative indexicals shift only if person indexicals also shift. A case of person shift without locative shift was given in (2), repeated below in (17a). The ill-formedness of locative shift without person shift is shown in (17b). In this example, given the shifty interpretation of *kine* ‘here’, the first person embedded subject must be shifty.¹⁰

- (17) *Nez Perce* (Deal 2020, 22, 57)

- a. Context: I travel to the town where my dad grew up and I go to the address he said he grew up at. Someone sees me looking at the house and I explain:

Na-’toot-am hi-i-cee-ne *pro* [*kine ’iin tewyenik-0-e*].
my-father-ERG 3SUBJ-say-IMPERF-REM.PAST 1SG [here 1SG live-P-REM.PAST]
My father_i told me he_i used to live here.
lit.: My father_i told me I_i used to live here.

¹⁰ Note that a first person parse of the null embedded subject in (17b), rather than a third person parse, is forced by verb inflection. Nez Perce (like English) shows a typologically unusual pattern of overt agreement for third person subjects but not local person subjects: if the embedded subject were third person, the embedded copular verb would take the form *hiiwes*. On agreement in Nez Perce, see Deal (2015). Note also that all Nez Perce first and second person pronouns (whether tonic, clitic, or null) are subject to indexical shift (Deal 2020).

- b. 'In-lawtiwaa-nm Boston-pa hi-nees- \emptyset -n-e *pro* [weet'u kine *pro*
 1SG-friend-ERG Boston-LOC 3SUBJ-O.PL-say-P-REM.PAST 3PL [NEG here 1SG
 wees kii kaa].
 be.PRES this then]

My friend_{*i*} in Boston_{*j*} told them that { \checkmark he_{*i*} is / \times I am } not there_{*j*} right now.

Such data again indicate that person indexical shift must be understood as part of a broader phenomenon, encompassing shifty indexicals of other types.

2.4 The shifty operator theory

The shifty operator theory of indexical shift was introduced by Anand and Nevins (2004) and Anand (2006). It begins with relatively standard assumptions about semantic interpretation and the meanings of indexical expressions, following Kaplan (1989). Linguistic expressions are interpreted with respect to a context c and an index i (what Kaplan 1989 called a ‘‘circumstance of evaluation’’), as well as a variable assignment g . Indexicals’ meanings are functions on context. First person, for instance, picks out the speaker in a context of speech, or the thinker in the context of thought; these two can be thought of as particular instances of a more general role of context *author*.¹¹

$$(18) \llbracket I \rrbracket^{c,i,g} = \text{author}(c)$$

The dependence on context central to indexical meaning can be contrasted with the dependence on index exhibited by elements with world (or time) sensitivity, such as ordinary nominal predicates:

$$(19) \llbracket \text{linguist} \rrbracket^{c,i,g} = \lambda x.x \text{ is a linguist in } w_i$$

It can also be contrasted with the dependency on assignments exhibited by ordinary pronouns:

$$(20) \llbracket \text{she}_n \rrbracket^{c,i,g} = g(n) \text{ (defined when } g(n) \text{ is female)}$$

At the point of interpretation of an entire sentence, the context and the index have the same values (see Deal 2020, 35). *I am a linguist*, spoken by me, is true iff the author of the context (namely myself, speaking) is a linguist at the world of the index (namely the world in which we find ourselves, conversing):

$$(21) \llbracket I \text{ am a linguist} \rrbracket^{c,i,g} = \text{T iff } \text{author}(c) \text{ is a linguist in } w_i$$

Context and index notably diverge in the scope of attitude verbs. This is because attitude verbs quantify over the index used for evaluation for their complement clause, but do *not* quantify over the context. The general result is that index values and context values in these complements come apart.

The nature of the quantification contributed by attitude verbs provides insight into the type of formal object that the index is. This quantification is sufficiently rich to delimit a *de se* perspective, identifying not only worlds in which the attitude holder self-locates but also individuals that she considers she might be, times she considers she might be located at, etc (Schlenker 1999, Ogihara 1999, von Stechow 2003, Anand 2006, i.a.; cp. Lewis 1979). This type of *centered* quantification indicates that indices, like contexts, specify not just worlds but also other aspects of a self-locating perspective. Indeed, indices and contexts can be taken to have the same structure (von Stechow 2003,

¹¹ Note that I will often abbreviate ‘author’ to ‘auth’.

von Stechow and Zimmermann 2005, Anand 2006): tuples that specify an author, a time, a location, etc. (Thus, in principle, just as certain linguistic expressions must denote the author of the context, others could denote the author of the index. We return to this idea in section 5 below.) A sample denotation for an attitude verb, incorporating these assumptions, is given in (22).

- (22) $\llbracket think \alpha \rrbracket^{c,i} = \lambda x. \lambda e. thinking(e)(w_i) \ \& \ \forall i' \in DOX(x, \tau(e), w_i) : \llbracket \alpha \rrbracket^{c,i'}$
 Where $i' \in DOX(x, \tau(e), w_i)$ iff x thinks in w_i at $\tau(e)$ that she might be $auth(i')$ in $world(i')$ at $time(i')$ at $loc(i')$.

Note that the verb's complement is interpreted with respect to shifted index values, namely those picked out by the centered belief relation DOX. Verbs themselves, however, do not change the *context* used for the interpretation of their complements. Thus with nothing else added, embedding of the clause *I am a linguist* under an attitude verb results in the world argument of the predicate (which is index-dependent) interpreted with respect to the attitude holder's perspective, but leaves the interpretation of the indexical (which is context-dependent) unchanged.

- (23) $\llbracket She_n thinks I am a linguist \rrbracket^{c,i,g} = \top$ iff $\exists e [thinking(e)(w_i) \ \& \ \forall i' \in DOX(g(n), \tau(e), w_i) : auth(c)$
 is a linguist in $w_{i'}$]

Against this background we can introduce the distinctive innovation of Anand and Nevins (2004) and Anand (2006): the shifty operator. This is a linguistic element (presumably a functional head) which sits in the scope of an attitude predicate, and thus in the scope of centered quantification over indices. The semantic contribution of the operator is to change the context used for the interpretation of its complement, in particular by overwriting information in the context tuple with information from the index tuple. The OP_{auth} operator in (24), for instance, forces its complement to be interpreted relative to a context whose author value has been overwritten with the author value of the index.

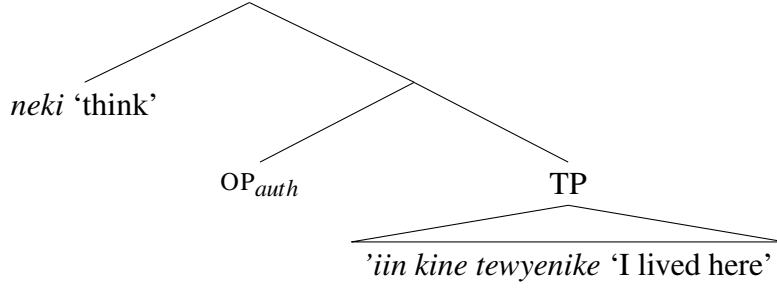
- (24) $\llbracket OP_{auth} \alpha \rrbracket^{c,i,g} = \llbracket \alpha \rrbracket^{c^{auth(i)/auth}, i, g}$

The effect of this overwriting will be felt on any element in the complement of the shifty operator that references the overwritten value. In the complement of OP_{auth} , for example, a first person indexical will refer not to the original context author (the utterer), but rather to the attitude holder, *de se*. An example demonstrating how such an operator makes its compositional contribution is given in (25), based on the Nez Perce example repeated from (17). Note that the complement TP in this example contains two indexicals, *iin* 'I' and *kine* 'here'. Because OP_{auth} overwrites only the author coordinate of context, the former shifts and the latter does not.¹²

- (25) a. Na-'toot-am hi-i-cee-ne *pro* [*kine* 'iin tewyenik- \emptyset -e].
 my-father-ERG 3SUBJ-say-IMPERF-REM.PAST 1SG [here 1SG live-P-REM.PAST]
 My father_i told me he_i used to live here.
lit.: My father_i told me I_i used to live here.

¹² Here and below I generally omit irrelevant parameters of interpretation, especially the variable assignment g .

b.



c. $\llbracket (25a) \rrbracket^{c,i} = \llbracket think \rrbracket^{c,i}(\lambda i'. \llbracket OP_{auth} 'iin kine tewyenike \rrbracket^{c,i'})$

d. (by lexical entry 'think') = $\lambda x. \lambda e. thinking(e)(w_i) \ \& \ \forall i' \in DOX(x, \tau(e), w_i) : \llbracket OP_{auth} 'iin kine tewyenike \rrbracket^{c,i'}$

Where $i' \in DOX(x, \tau(e), w_i)$ iff x thinks in w_i at $\tau(e)$ that she might be $auth(i')$ in $world(i')$ at $time(i')$ at $loc(i')$

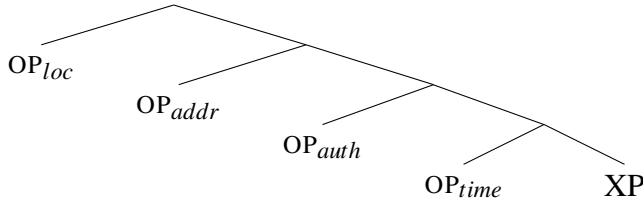
e. (by lexical entry OP_{auth}) = $\lambda x. \lambda e. thinking(e)(w_i) \ \& \ \forall i' \in DOX(x, \tau(e), w_i) : \llbracket 'iin kine tewyenike \rrbracket^{c^{auth(i')/auth, i'}}$

f. (by remaining lexical entries) = $\lambda x. \lambda e. thinking(e)(w_i) \ \& \ \forall i' \in DOX(x, \tau(e), w_i) : auth(i')$ lived at $loc(c)$ in $world(i')$

The difference between this example and (23) should be clear: in the scope of OP_{auth} , the first person no longer denotes $auth(c)$, as in (23), but rather $auth(i')$, where i' represents a variable over indices bound by the attitude quantifier.

Shift of multiple types of indexicals—for instance, both first person and second person, or both first person and locative—involves stacking shifty operators, the relative syntactic position of which is specified by a functional sequence (Deal 2014, 2017, 2020):

(26)



The denotations for the various operators in this sequence can be given on the model of (24); each shifts just one coordinate of context, overwriting the original value with a *de se* value from the index.¹³

The generalizations about indexical shift reviewed in this section are captured on this theory in the following way. To capture the broad domain of indexical shift, and in particular the fact that all types of indexicals are shiftable in at least some language, we posit a shifty operator for every parameter of context, including author (relevant for first person), addressee (relevant for second person), location (relevant for locative indexicals), and time (relevant for temporal indexicals). The semantics of shifty operators involves overwriting of contextual parameters. Once contextual parameter Ψ is determined for a given attitude complement, all indexicals of class Ψ must reference it; there is no storage of values that Ψ would counterfactually have had had an operator not been present. This gives rise to the Shift Together effect. Finally, the postulation of a functional sequence as in (26) allows implicational hierarchies in co-shifting to be captured as a pattern of syntactic selection. Whenever OP_{addr} is

¹³ This is a slight simplification of the proposal in Deal (2017, 2020), where I propose that shifty operators may also overwrite context information with information drawn from the attitude event, skirting the *de se* requirement.

present, for instance, OP_{auth} must be present to head its complement. Shift of some indexical types but not others can be modeled by truncation of (26). In a truncated structure, some contiguous portion of (26), starting from the bottom, will be present. This might be a structure containing only OP_{time} ; OP_{time} and OP_{auth} ; OP_{time} , OP_{auth} and OP_{addr} ; or all four shifty operators, OP_{time} , OP_{auth} , OP_{addr} , and OP_{loc} . These various options yield shift only of those types of indexicals whose corresponding operators are syntactically present.

3 Case study: second person

With this background in hand, we now turn to the question of how shifty person can inform and constrain theories of person more generally. The impetus for this first case study is Rice’s (1986, 1989) observation, noted above, that first person may be shifty in Dene even in cases where second person is not. Suppose, for instance, I utter sentence (27) to Mary, describing a conversation between Simon and Bart.¹⁴ The embedded morphological first person refers to the reported speaker, Simon, (and so is shifty,) but the embedded second person refers to the utterance addressee (and so is not shifty).

- (27) *Dene* (Rice 1986, 53)
 Simon [*rásereyneht’u*] hadi.
 Simon [2SG.hit.1SG] 3SG.say
 Simon said that you [Mary] hit him [Simon].

What can such data tell us about the relationship between the primitives underlying second person and those underlying first person?¹⁵

The question can be addressed in two interrelated ways. First, it might be thought of as a matter of morphosyntactic featural representation. Most theories of person features have a distinctive second person feature (labeled [ADDR], [HEARER], [2nd], or similar), either as a privative feature or a binary one (Noyer 1992, Harley and Ritter 2002, Béjar 2003, McGinnis 2005, Nevins 2007, Bobaljik 2008, Kratzer 2009). Some theories, however, restrict this feature only to certain languages, typically those with clusivity contrasts (see Harley and Ritter 2002, McGinnis 2005, Nevins 2007). Finally, at least one approach does without distinctive second person features entirely, even for languages with clusivity (Harbour 2016).

- | | |
|--|---|
| (28) Some theories of the syntax of second persons | |
| [2ND] | Kratzer 2009 |
| [ADDR,PART] | McGinnis 2005 (languages with clusivity) |
| [PART] | McGinnis 2005 (languages without clusivity) |
| [-SPKR, +HEARER] | Bobaljik 2008 |
| [+PART,-SPKR] | Harbour 2016 |

¹⁴ I add these details for clarity of exposition. Note that Rice does not provide this particular context, though she is clear in her description of indexicals’ behavior: when the embedding verb (the “direct discourse verb” in Rice’s terms) is *ndi/hadi* ‘say’, “first person in the complement is interpreted as coreferential to the subject of the direct discourse verb... Second persons are interpreted from the point of view of the speaker rather than from the point of view of the subject of the direct discourse verb; that is, they have indirect discourse interpretation” (Rice 1989, 1279).

¹⁵ Thanks to Karlos Arregi and Peter Jenks for raising this question.

The question here is whether indexical shift can bear on this range of choices and the corresponding issue of how the featural make-up of first and second person are related (if at all).

The second way we might address the question raised by data like (27) concerns to the *semantic* primitives involved in person systems. Here, on the model of the featural choice point just outlined, we might envision options with and without a second person semantic primitive. Theories with a second person semantic primitive are those that generally expect contexts to provide a value for an addressee, understood as a primitive (partial function) of contexts of the same nature as the speaker (function). The vast majority of theories of person which are semantically explicit enough to classify are of this nature. (This is also the understanding of contexts sketched in the previous section.) For Kratzer (2009), for instance, the semantically primitive nature of second person as compared to first person is witnessed by the parallel nature of (29a,b).

- (29) Kratzer (2009, 220)
- a. $\llbracket \text{1st} \rrbracket^{g,c} = \text{the speaker(s) in } c (= \text{auth}(c))$
 - b. $\llbracket \text{2nd} \rrbracket^{g,c} = \text{the hearer(s) in } c (= \text{addr}(c))$

A second person semantic primitive is also posited by Harbour (2016), in spite of a rather different morphosyntactic feature theory: Harbour’s “mental ontology... assumes a unique speaker, *i*, a unique hearer, *u*, and multiple others” (p. 67). The primitive status of *i* and *u* reflects the assumption that determination of the speaker and of the addressee are independent matters. That is to say, even though there is no dedicated second person morphosyntactic feature on Harbour’s theory, there *is* a dedicated semantic primitive.

What contrasts with these views is a theory on which all reference to second persons goes through primitive reference to the speaker—that is, *speaker/i* is a semantic primitive, but *addressee/u* is not. Such a theory was recently proposed by Holladay (2023), building on work by Charnavel (2019). Charnavel argues that some instances of second person are to be understood as containing a first-person core: *you*, that is to say, is underlyingly akin to *my interlocuteur*. Holladay proposes that this is always the case. On his proposal, contexts provide a value for author, building first person indexicals; second persons are strictly constructed from first person indexicals by adding a feature that maps the first person to their interlocuteur.¹⁶

- (30) Second person without a distinctive semantic primitive (after Holladay 2023)
- a. 1st person:
 $\llbracket [\text{SPKR}] \rrbracket^c = \text{auth}(c)$
 - b. 2nd person:
 $\left[\left[\begin{array}{c} \diagup \quad \diagdown \\ \text{INTER} \quad \text{SPKR} \end{array} \right] \right]^c = \llbracket [\text{INTER}] \rrbracket^c(\text{auth}(c)) = \text{the interlocuteur of } \text{auth}(c)$

What (30) amounts to is a paring back on the basic semantic notions underlying person—we have a primitive speaker function on context, but not a primitive (partial) addressee function on context. This has the notable result that second person is more (featurally) complex than first person—there *is* a distinctive second person morphosyntactic feature on this theory (viz. INTER), but not one that

¹⁶The details of (30) are slightly modified from Holladay’s presentation. In particular, I have treated the added feature in second persons as INTER, following Charnavel (2019). Holladay’s treatment of the feature added to first person to make second person is a bit more complex; see his §2.3.2.

is semantically parallel to the first person feature.¹⁷ The first person feature is essentially referential, whereas the distinctive feature of second person is essentially relational. The general moral here is that a theory without a distinctive second person semantic primitive cannot avoid introducing a relational primitive of some type in order to derive the meaning of *you* from the meaning of *me*. If this relational primitive can be considered a morphosyntactic feature specific to second person, then we expect the lower right corner of the table in (31) to remain necessarily empty.

(31) Theories of second person

		Is there a morphosyntactic feature specific to 2nd person?	
		YES	NO
Is there a semantic primitive specific to 2nd person?	YES	Kratzer 2009	Harbour 2016
	NO	Holladay 2023	

We now turn to the ways that indexical shift bears on these questions of person representation, beginning with the question of a semantic primitive for second person. Could the paring back of semantic primitives envisioned by (30) help us explain the first person/second person shifty asymmetry, perhaps even without positing a functional sequence of shifty operators?

Alas, no. Quite to the contrary, (30) makes it impossible to derive cases of first person shifting without second person shifting. We predict that first and second person should always shift together, even if we only posit an OP_{auth} shifter. To see this, we return to the Dene example with which this section began, repeated in (32a). Suppose the structure for this sentence is as outlined in (32b) (noting the presence only of an OP_{auth} shifter¹⁸). A proposed denotation for the speech verb is given in (32c), on the model of the centered denotation for a verb of cognition given in (22). As shown in (32d-g), if we model the semantics of second person strictly in terms of first person semantic primitives, the result is not the desired one: we derive only a reading where both second and first person shift, rather than the attested reading where only first person shifts.

(32) a. *Dene* (Rice 1986, 53)

Context: I say to Mary, describing a conversation between Simon and Bart:

Simon [*rásereyineht'u*] hadi.

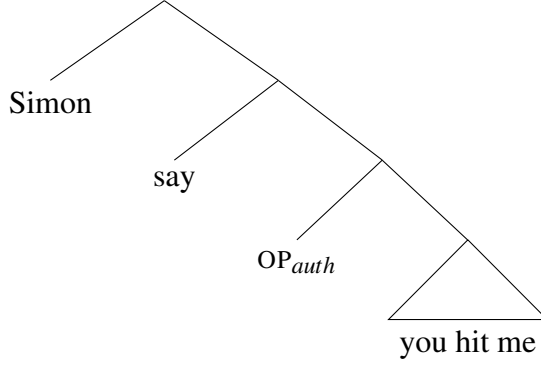
Simon [2SG.hit, 1SG] 3SG.say

Simon said that you [Mary] hit him [Simon].

¹⁷ If we wished to call the [INTER] feature [ADDR], as Holladay does, then in morphosyntactic featural terms, first person has [SPKR] and second person has [SPKR, ADDR]. While this representation superficially recalls the treatment of inclusives on theories such as McGinnis (2005), the meaning of the [ADDR] feature is markedly different.

¹⁸ Compliance with (26) requires that there also be an OP_{time} shifter in this structure, though I omit all temporal aspects of interpretation here for simplicity.

b.



- c. $\llbracket \text{SAY } \alpha \rrbracket^{c,i} = \lambda x. \lambda e. \text{saying}(e)(w_i) \wedge \forall i' \in \text{SAY}(x, \tau(e), w_i) : \llbracket \alpha \rrbracket^{c,i'}$
 Where $i' \in \text{SAY}(x, \tau(e), w_i)$ iff x thinks in w_i at $\tau(e)$ that she might be $\text{auth}(i')$ in $w(i')$ at $\text{time}(i')$ at $\text{loc}(i')$ (talking to $\text{addr}(i')$), and $w(i')$ conforms to what x says in w_i at $\tau(e)$
- d. $\llbracket (32b) \rrbracket^{c,i} = 1$ iff $\exists e. \text{saying}(e)(w_i) \wedge \forall i' \in \text{SAY}(\text{Simon}, \tau(e), w_i) :$
 $\llbracket \text{you} \rrbracket^{c, \text{auth}(i')/\text{auth}, i'} \text{ hit } \llbracket \text{me} \rrbracket^{c, \text{auth}(i')/\text{auth}, i'}$ in $w(i')$
- e. If we adopt a theory where second person involves an $\text{auth}(c)$ function:
- i. $\llbracket \text{you} \rrbracket^{c,i} =$ the interlocuteur of $\text{auth}(c)$
 - ii. $\llbracket \text{you} \rrbracket^{c, \text{auth}(i')/\text{auth}, i'} =$ the interlocuteur of $\text{auth}(i')$
- f. $\llbracket (32b) \rrbracket^{c,i} = 1$ iff $\exists e. \text{saying}(e)(w_i) \wedge \forall i' \in \text{SAY}(\text{Simon}, \tau(e), w_i) :$ the interlocuteur of $\text{auth}(i')$ hit $\text{auth}(i')$ in $w(i')$
- g. \approx according to Simon, the person who Simon is talking to [Bart] hit Simon

In a theory that recognizes an $\text{addr}(c)$ function, or a u mental primitive, no such problem arises. Example (33) resumes the computation with (32d) and continues with a theory of this type, (33b):

- (33) a. $\llbracket (32b) \rrbracket^{c,i} = 1$ iff $\exists e. \text{saying}(e)(w_i) \wedge \forall i' \in \text{SAY}(\text{Simon}, \tau(e), w_i) :$
 $\llbracket \text{you} \rrbracket^{c, \text{auth}(i')/\text{auth}, i'} \text{ hit } \llbracket \text{me} \rrbracket^{c, \text{auth}(i')/\text{auth}, i'}$ in $w(i')$
- b. If we adopt a theory where second person involves a distinctive $\text{addr}(c)$ function:
- i. $\llbracket \text{you} \rrbracket^{c,i} = \text{addr}(c)$ (Positing a distinctive semantic primitive for 2nd person)
 - ii. $\llbracket \text{you} \rrbracket^{c, \text{auth}(i')/\text{auth}, i'} = \text{addr}(c)$
 $\llbracket (32b) \rrbracket^{c,i} = 1$ iff $\exists e. \text{saying}(e)(w_i) \wedge \forall i' \in \text{SAY}(\text{Simon}, \tau(e), w_i) :$ $\text{addr}(c)$ hit $\text{auth}(i')$ in $w(i')$
- c. \approx according to Simon, Mary hit Simon

The correct result is derived here: first person receives a shifty reading and second person does not. This is because first person *but not second person* depends semantically on the author parameter of context, shifted by OP_{auth} . We have seen, then, that indexical shift can play a crucial role in assessing proposals to do without a purported semantic primitive, such as (30). Without a semantic primitive for second person, the reported pattern of indexical shift in Dene cannot be derived.

We noted above that theories that do posit a distinctive semantic primitive for second person diverge in whether they posit a distinctive morphosyntactic feature for second person, e.g. [ADDR], [HEARER], or [2ND]. On this question, data from indexical shift are less informative. Consider that the crucial premise for our argument above is (33b)—a semantic claim that leaves open exactly

how the second person is morphosyntactically represented. It could, certainly, be represented with a distinctive morphosyntactic feature, as Kratzer (2009) proposed:

$$(34) \quad \llbracket \text{you} \rrbracket^c = \llbracket [2\text{ND}] \rrbracket = \text{addr}(c)$$

But it could equally well be represented on a theory with a [PARTICIPANT] feature and no feature [2ND]/[ADDR]. What is crucial is that the participants, relative to a context c , be identified as $\text{addr}(c)$ and $\text{auth}(c)$. Dene does not make aclusivity contrast (Rice 1989, 253, 431), meaning that a theory such as McGinnis (2005) would represent its second person as merely [PART], in contrast to [PART,SPKR] for first person. Second person is then that participant that is not $\text{auth}(c)$ (owing, perhaps, to a Maximize Presupposition effect). A simple way of cashing this out is shown below.

(35) Features

- a. $\llbracket [\text{SPKR}] \rrbracket^c = \lambda x : x \in \{\text{auth}(c)\}.x$
- b. $\llbracket [\text{PART}] \rrbracket^c = \lambda x : x \in \{\text{auth}(c), \text{addr}(c)\}.x$

(36) 1st person:

$$\left[\begin{array}{c} \diagup \quad \diagdown \\ \text{SPKR} \quad \text{PART} \end{array} \right]^c = \lambda x : x \in \{\text{auth}(c)\} \cap \{\text{auth}(c), \text{addr}(c)\}.x = \lambda x : x \in \{\text{auth}(c)\}.x$$

(37) 2nd person:

$$\llbracket [\text{PART}] \rrbracket^c = \lambda x : x \in \{\text{auth}(c), \text{addr}(c)\}.x$$

Strengthening via Maximize Presupposition: $\lambda x : x \in \{\text{addr}(c)\}.x$

The same (minus the strengthening step) holds in a system where second person is [+PART,-SPKR] (Harbour 2016): the feature [+PART] includes $\text{auth}(c)$ and $\text{addr}(c)$, and second person meanings are derived by excluding first person referents from this set.

The upshot is that shift of first person without second person causes no problem for a system without distinctive second person morphosyntactic features, so long as that system recognizes an $\text{addr}(c)$ function on context and uses it to constrain the denotation of the features that *are* found on second person, e.g. [PART]. In a theory without [ADDR] syntactic features, the result is a kind of mismatch between the semantic (or “ontological”) primitives and the syntactic ones. The semantics has a dedicated addr function (in Harbour’s (2016) terms: u is a “mental primitive”). But there need not be any dedicated syntactic piece that references it.

4 Case study: locative indexicals

There are two primary reasons to suspect that person and locative indexicals are in some way connected. The first, as we saw in section 2, is that person indexical shift and locative indexical shift stand in an implicational relationship: person indexicals can shift without their clausemate locative indexicals also shifting, but not vice versa. The second reason comes from Harbour’s (2016) work on locative indexical typology, and in particular, his finding that the structure of locative systems shows parallels with the typology of personal pronouns.

Harbour describes locative systems as divided among four types. The first type, found in English, is an author-based two-way locative system, where one element (*here*) picks out the vicinity of the speaker, and the other element (*there*) is an elsewhere item. This is in parallel to a rare but attested type of person system which opposes a form for first person to one used for second and third person

alike; such a system is found for instance in Sanapaná (Enlhet-Enenlhet, Paraguay; Harbour 2016, 55-56). The second type of locative system, found in Bulgarian, is a participant-based two-way system, where one element (Bulgarian *tuk*) picks out the vicinity of either the author or the addressee, and the other element (*tam*) is an elsewhere term (Harbour 2016, 58). This is in parallel to another type of rare but attested person system, in which one form is used for first and second person alike and stands in opposition to a third person form. Such a pronominal system is found in Hocak (Siouan, USA; Harbour 2016, 57-58). The third type of locative system, found in Korean, is a participant- and author-based three-way system, where one element (Korean *yeki*) picks out the vicinity of the author, another (*keki*) picks out the vicinity of the addressee, and a final element (*ceki*) is an elsewhere term (Harbour 2016, 172). This is in parallel to a classic three-person system. Finally, the fourth and last type of locative system, found in languages such as Waray-Waray (Austronesian), is a participant- and author-based four-way system, essentially a three-way system with the addition of a clusivity distinction; the four elements pick out the vicinities of the author alone (Waray-Waray *a(a)di*), the author and addressee (*a(a)nhi*), the addressee alone (*a(a)da'*), and elsewhere (*a(a)dtu*) (Harbour 2016, 172-173). This is in parallel to a three-person system with an inclusive/exclusive contrast. To capture these patterns, Harbour proposes that pronouns and locative indexicals share a common syntactic and semantic core. Locative indexicals are essentially person indexicals with something added. This extra piece contributes a meaning of “vicinity of” or “characteristic space of” (p. 179).

As we will see in this section, it turns out that these two reasons for finding a connection between person and locative indexicals are at odds with one another. Harbour’s proposal has in common with the approach to second person raised in (30) the use of a single semantic primitive to underlie two types of indexicals that are notionally distinct. In parallel to (30), this proposal can be schematized as (38):

(38) Locative indexicals without a distinctive semantic primitive (after Harbour 2016)

a. 1st person:

$$\llbracket [\text{SPKR}] \rrbracket^c = \text{auth}(c)$$

b. Speaker-proximal locative:

$$\begin{array}{c} \llbracket \begin{array}{ccc} & \diagup & \diagdown \\ & \text{SPACE-OF} & \text{SPKR} \end{array} \rrbracket^c \\ = \llbracket [\text{SPACE-OF}] \rrbracket^c(\text{auth}(c)) \\ = \text{the characteristic space of } \text{auth}(c) \end{array}$$

Like in the case of second person, indexical shift offers a means of assessing whether this reduction in semantic primitives is warranted. The conclusion in the case of locatives is like the conclusion in the case of second persons: locative indexicals require their own semantic primitives and cannot be reduced to those of first (or second) person.

The logic of the argument to be given here closely follows the previous section. Like for second person, getting rid of a semantic primitive for locatives means that we expect locatives and the appropriate persons to show a Shift Together effect. But this is not what we find. Consider the case of Nez Perce, a language with an English-style two-way locative system. *Kine* ‘here’ is used for the vicinity of the speaker; otherwise, *kona* ‘there’ is used.

(39) *Nez Perce*

Context: We are in different places, talking on the phone.

Weet kine hi-weeqi-se?
 Y.N.Q here 3SUBJ-rain-IMPERF
 Is it raining { ✓ here / ✗ at your location } ?

We saw a case of person shift without locative shift in Nez Perce in (17) above. An additional example is given in (40):

(40) *Nez Perce* (Deal 2020, 22)

Context: my friend is calling me on his cellphone and describing his location. He is trying to make it to Lapwai, but he is lost.

pro hi-hi-ce [*pro* kine paay-ca], met'u weet'u *pro*
 3SG 3SUBJ-say-IMPERF [1SG here arrive-IMPERF] but NEG 3SG
 hi-paay-ca kine.
 3SUBJ-arrive-IMPERF here

He_i says he_i is arriving here, but he is not arriving here.

Suppose that the locative indexical *kine*, relative to a context *c*, denotes the vicinity of the author of *c*, per Harbour (2016). In the bracketed clause of (40), the contextual value for the author is shifted, as witnessed by the shifty interpretation of the first person pronoun. The expectation is that the locative will shift as well. Treating attitude quantification as above, the predicted meaning of the relevant part of (40) is that all indices *i'* compatible with what my friend told me are such that *auth(i')* is arriving in the vicinity of *auth(i')*. This (rather strange, if not tautologous, reading) is not what the sentence means. By contrast, if we treat the locative, relative to a context *c*, as denoting the location of *c*, the intended meaning is derived: all *i'* compatible with what my friend told me are such that *auth(i')* is arriving at *loc(c)*. This makes for a sensible interpretation of the follow-up, which clarifies that the report is erroneous and the friend (corresponding to *auth(i')* for the attitude report) is indeed *not* arriving at *loc(c)*.

Could this problem be avoided by positing that the [AUTH] feature internal to locatives picks out not one single author, but a set of authors, corresponding to the authors of the various contexts involved here? No: then we lose our account of locative Shift Together. In example (41), for instance, there is no reading where one locative picks out the vicinity of the overall context author whereas the other picks out the vicinity of the author of the embedded context.

(41) *Nez Perce* (Deal 2020, 19)

'In-lawtiwaa-nm paasxa-pa hi-hi-n-e *pro*, [kine hii-wes qetu
 my-friend-ERG Boise-LOC 3SUBJ-tell-P-REM.PAST 1SG [here 3SUBJ-be.PRES more
 'iyeeqis kin-ix].
 hot here-from]

- a. ✗ My friend in Boise told me it was hotter here than there.
- b. ✗ My friend in Boise told me it was hotter there than here.

More generally, if the [AUTH] feature could pick out an author of any context, matrix or embedded, we lose our account of first person Shift Together, as in (11). Overall, the data from Shift Together indicates that only a single reference value is available within a given clause for first person or for locative. To capture the availability of two reference points for clauses with both locatives and person indexicals, person and locative indexicals require distinct underlying semantic primitives.

Note that this argument is not specific to languages with a two-way locative system. The very same demonstration can be made in the three-way system of Korean. A possible reading of (42) is one where the embedded first person shifts but the locative does not: the ostensibly author-based locative indexical *yeki* need not shift together with first persons.

(42) *Korean* (Park 2016)

Context: John and Mary are having a conversation in Seoul. John says:

Tom-i New York-eyse [nay-ka yeki-eyse thayenassta-ko] malhayssta.

Tom-NOM New York-at [I-NOM here-at be.born-C] said

Tom said in New York, “I was born in Seoul.”

lit.: Tom said in New York that I was born here.

The conclusion of this case study is that at least one contextual semantic primitive for location is required. Locatives cannot be totally reduced to person features semantically.¹⁹ This conclusion is certainly compatible with an approach to locative indexicals like *here* that renders them entirely independent of the person system, as in (43):

(43) $\llbracket \textit{here} \rrbracket^c = \textit{loc}(c)$

We saw in the previous section, however, that this sort of conclusion regarding semantic primitives does not rule out a connection to person features syntactically. A logical possibility is that person indexicals and locative indexicals share a feature in common, the semantics of which references both person-based and locative-based functions on context. Here, for concreteness, is an example of how such a system could look, extending (35)-(37) above:

(44) Features

a. $\llbracket [\text{SPKR}] \rrbracket^c = \lambda x : x \in \{\textit{auth}(c)\}.x$

b. $\llbracket [\text{PART}] \rrbracket^c = \lambda x : x \in \{\textit{auth}(c), \textit{addr}(c)\}.x$

c. $\llbracket [\text{LOCATED}] \rrbracket^c = \lambda x : x \in \{\textit{auth}(c), \textit{addr}(c), \textit{loc}(c)\}.x$

(45) 1st person: $\left\| \begin{array}{c} \text{[SPKR]} \\ \diagup \quad \diagdown \\ \text{[PART]} \quad \text{[LOCATED]} \end{array} \right\|^c$
 $= \lambda x : x \in \{\textit{auth}(c)\} \cap \{\textit{auth}(c), \textit{addr}(c)\} \cap \{\textit{auth}(c), \textit{addr}(c), \textit{loc}(c)\}.x = \lambda x : x \in \{\textit{auth}(c)\}.x$

(46) 2nd person: $\left\| \begin{array}{c} \text{[PART]} \quad \text{[LOCATED]} \end{array} \right\|^c$
 $= \lambda x : x \in \{\textit{auth}(c), \textit{addr}(c)\} \cap \{\textit{auth}(c), \textit{addr}(c), \textit{loc}(c)\}.x = \lambda x : x \in \{\textit{auth}(c), \textit{addr}(c)\}.x$
 Strengthening via Maximize Presupposition: $\lambda x : x \in \{\textit{addr}(c)\}.x$

¹⁹ Are there any locatives that *are* person-based? Indexical shift gives a test: if a locative references a person category, then we should see bidirectional Shift Together between the locative and elements of that person category. Across the indexical shift literature, I am not aware of any language where this behavior is attested, apart from languages like Zazaki where all indexicals must shift together (Anand 2006). This includes temporal indexicals, which I take to be poor candidates for semantically person-based elements. See Deal (2020) for an analysis of Zazaki omnibus Shift Together. Learnability evidence potentially bearing on this question is also discussed in recent work by Maldonado and Culbertson (2021).

- (47) Locative: $\llbracket \text{[LOCATED]} \rrbracket^c$
 $= \lambda x : x \in \{auth(c), addr(c), loc(c)\}.x$
 Strengthening via Maximize Presupposition: $\lambda x : x \in \{loc(c)\}.x$

Notably, such a system relates person to locative in a purely syntactic way. As such, it does not respond to Harbour’s typological observations, which are fundamentally about what locatives mean. What such a system predicts is morphosyntactic behavior (e.g. participation in agreement) in common to person indexicals and locative indexicals. To my knowledge, such behaviors do not occur. If this is correct, the overall conclusion is that person indexicals and locative indexicals share primitives neither semantically nor syntactically. Plausibly, a featural theory of locative systems—one that might help to explain, for instance, why many languages make the same distinctions in demonstratives as in locative adverbs—will run on dedicated locative features.

5 Shifty person beyond indexical shift

We began with a characterization of shifty person that was deliberately broad—broad enough to include both cases where morphological first and second person reflect indexical person features as well as cases where they don’t. There are several ways in which morphological person systems might fail to reflect semantically indexical person features. One of these is a morphology-semantics mismatch, as highlighted in the introductory section, where features are deleted at LF or added at PF. Another possibility will be of interest in this section. This is the possibility of syncretism with a nonindexical category—that is, cases where a language possesses grammatically distinct indexical person items and nonindexical items, but makes no visible morphologically distinction between them. The possibility of conflation of indexical first person with a nonindexical category comes up in connection with phenomena I have elsewhere discussed under the heading of indexiphoricity (Deal 2018, 2020), also known as “first person logophoricity” (Curnow 2002), “personal logophoricity” (Anand 2006), and “egophoricity” (Coppock and Wechsler 2018). I will first present a case study of apparent “shifty agreement” in the Dogon language Donno So as a way of exploring non-indexical elements of this nature. I then turn to the morphological conflation of indexiphors and indexicals, notably in Amharic.

5.1 An indexiphoric author feature: not indexical first person, but close

In simple clauses, Donno So (Dogon, Burkina Faso/Mali; Culy 1994, Heath 2016) has what looks like an ordinary pattern of subject person agreement on finite verbs: 1st person singular subjects take a verb inflection I will indicate as *-N* (*-ŋ* according to Heath, *-m* according to Culy), 2nd person singular subjects take verb inflection *-w*, and 3rd person singular subject inflection is null.

- (48) *Donno So* (Heath 2016, 167-168)
- a. Dǎ:ŋà-ŋ.
 sit.STAT-N
 I am seated.
 - b. Dǎ:ŋà-w̃.
 sit.STAT-2sg
 You are seated.

- c. Dǎ:ŋà.
sit.STAT
He/she is seated.

In attitude reports, however, *-N* inflection on the embedded verb occurs only when the embedded subject is the attitude holder. (For Culy, who identifies *-N* as first person inflection, this leads to the remark that “first person inflection acts as logophoric inflection when it occurs in indirect discourse” (1994, 123).) In the pair of examples in (49), from Culy (1994), note that *-N* occurs in (49b), where the subject is a logophoric pronoun referring to Oumar, but not in (49a), where the subject is a first person singular indexical.

(49) *Donno So* (Culy 1994, 123)

- a. Oumar [ma jɛmbɔ paza boli] miñ tagi.
Oumar [1SG sack.DEF drop left] 1SG.OBJ informed
Oumar informed me that I had left without the sack.
- b. Oumar [inyemɛ jɛmbɔ paza bolu-m] miñ tagi.
Oumar [LOG sack.DEF drop left-N] 1SG.OBJ informed
Oumar_i informed me that he_i had left without the sack.

Examples (50), from Heath (2016), further confirm the generalization. What is crucial for the occurrence of *-N* is that the embedded subject references the attitude holder, not that it is expressed with a logophoric pronoun, as (50a) shows. This example shows that either a logophor or an ordinary third person pronoun may serve as subject in an *-N*-marked embedded clause. Furthermore, it is possible for *-N* to occur with an embedded subject that references the speaker, so long as this is *also* the attitude holder, as (50b) shows.

(50) *Donno So* (Heath 2016, 303)

- a. Sé:dù [ñjèmé / wó yèl-lì-ŋ] gî-y̆.
Seydou [LOG / 3SG come-PERF.NEG-N] say-PERF
Seydou_i said that he_i didn't come.
- b. Mí [*pro* dǎ:ŋà-ŋ] gî-y̆-ŋ.
1SG [1SG sit.STAT-N] say-PERF-N
I said that I am seated.

The analysis I would like to advance for *-N* draws on Coppock and Wechsler's (2018) work on a partially similar type of inflection in Kathmandu Newari (which they call “egophoric”).^{20 21} This is that *-N* inflection indicates that the subject of its clause holds the author role not necessarily in the context (as a first person indexical would) but rather in the index, or circumstance of evaluation. We saw above that attitude verbs quantify over the circumstances of evaluation for their complement clause, and that this quantification is centered; it picks out not just a set of possible worlds, but also individuals in those worlds that the attitude holder takes themselves to be, as indicated in (51) (repeated from (22)). Inside the embedded clause, an element that must refer to the author of the index must, therefore, refer to the attitude holder (*de se*).

$$(51) \llbracket \text{think } \alpha \rrbracket^{c,i} = \lambda e. \lambda x. \text{thinking}(e)(w_i) \ \& \ \forall i' \in \text{DOX}(x, \tau(e), w_i) : \llbracket \alpha \rrbracket^{c,i'}$$

²⁰ For further details of this pattern, in comparison with the pattern of *Donno So*, see Deal (2020, ch 5).

²¹ Other antecedents include Stephenson's (2007, ch 4) analysis of controlled PRO.

Where $i' \in DOX(x, \tau(e), w)$ iff x thinks in w at $\tau(e)$ that she might be $auth(i')$ in $world(i')$ at $time(i')$ at $loc(i')$

Recall that, outside of quantification over indices, the index by default matches the context (Kaplan 1989). Therefore, in a matrix clause, an element that must refer to the author of the index will also have to refer to the author of the context, and will appear to have a normal first person semantics and distribution.

Here is a way of making precise the details of “shifty agreement” with $-N$ in this language. Let us suppose that there is a meaningful feature [AUTH-I]. Whenever the subject bears [AUTH-I], it will denote (relative to the index i) $auth(i)$. I will refer to this inflection, which directly references information from the index, as *indexiphoric*.²²

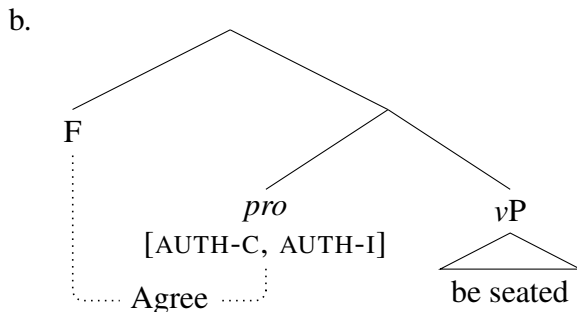
$$(52) \quad \llbracket [AUTH-I] \rrbracket^{c,i} = auth(i)$$

To highlight the parallel with an ordinary first person indexical feature, I will refer to the latter as ‘[AUTH-C]’:

$$(53) \quad \llbracket [AUTH-C] \rrbracket^{c,i} = auth(c) = \text{“first person”}$$

Consider a pronoun in a matrix clause that refers to the speaker. Reference to the speaker is standardly understood to require the presence of a first person feature; if one wishes to refer to $auth(c)$, that is, the [AUTH-C] feature is required (presumably due to Maximize Presupposition). By the same logic, given that the speaker is also $auth(i)$ in a matrix context, we expect that reference to the speaker will also require the pronoun to bear [AUTH-I]. Suppose that the pronoun in question is in subject position and therefore accessible to agreement, as in (54a). Agree transfers the features of the subject, [AUTH-C, AUTH-I], to a functional head F, (54b). This is then subjected to spell-out. The core idea of the analysis I have sketched is that the morpheme $-N$ is inserted to realize the feature [AUTH-I], *not* [AUTH-C]. This is represented in the proposed vocabulary item for $-N$ in (54c).

(54) a. Dǎ:ŋà-ŋ.
sit.STAT-N
I am seated.



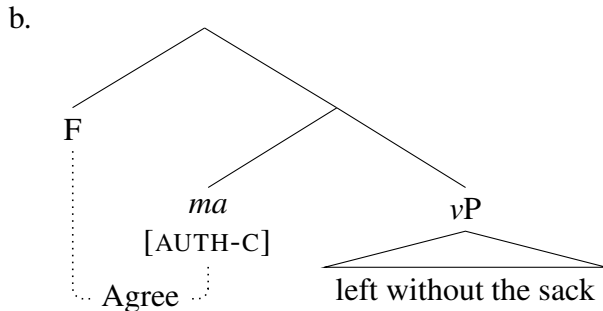
c. $-N \leftrightarrow [AUTH-I, F]$

Consider now a pronoun that refers to the speaker that appears in an attitude report with a non-first person subject, as in Culy’s example (49a) (repeated below). As above, reference to the overall speaker,

²² Note that this usage (carried over from Deal (2020)) is a different (and, I believe, improved) use for the term ‘indexiphoric’ than the one found in Deal 2018. In that work, ‘indexiphor’ is a term used for a logophor (a special type of bound pronoun) that agrees like an indexical. The current approach but not its predecessor allows for an element to be both indexical *and* indexiphoric, as discussed just below, and does away with a close connection to logophoricity, as highlighted by (51a).

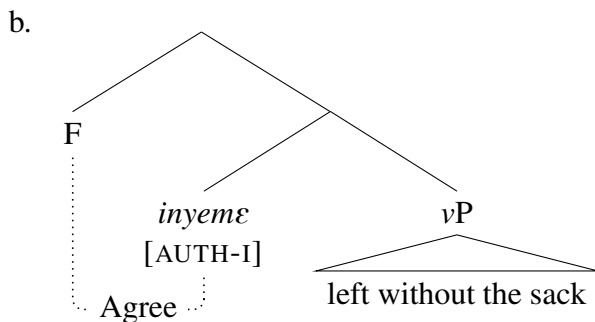
auth(c), requires the presence of the feature [AUTH-C]. What is different is that the pronoun falls in the scope of a quantifier over indices, where the indices so quantified reflect the *de se* perspective of Oumar, not the speaker. Thus an element that refers to the speaker in this context does *not* refer to the author of the index with respect to which it is evaluated, and so cannot bear the feature [AUTH-I]. Without [AUTH-I] on the subject, this feature cannot appear on the agreeing head F, and the exponent *-N* cannot be inserted.

- (55) a. Oumar [ma jɛmbɔ paza boli] miñ tagi.
 Oumar [1SG sack.DEF drop left] 1SG.OBJ informed
 Oumar informed me that I had left without the sack.



In the minimally different case where the embedded subject refers to the attitude holder, (56), the situation is reversed. The embedded subject refers to the author of the index with respect to which it is evaluated, but not the author of the context. It bears [AUTH-I], not [AUTH-C]. When it agrees, the feature [AUTH-I] is copied to the agreement head, and the exponent *-N* is inserted.

- (56) a. Oumar [inyemɛ jɛmbɔ paza bolu-m] miñ tagi.
 Oumar [LOG sack.DEF drop left-N] 1SG.OBJ informed
 Oumar_i informed me that he_i had left without the sack.



The table in (57) summarizes the derivations sketched above, highlighting that *-N* appears when the subject bears an [AUTH-I] feature.

(57) Subject type, embedding type, Donno Sɔ verbal inflection

SUBJECT	FEATURES	VERB INFLECTION
Matrix		
1st person	[AUTH-C], [AUTH-I]	-N
Embedded in a 3rd person _i attitude report		
1st person	[AUTH-C]	∅
3rd person _i	[AUTH-I]	-N

The analysis just sketched accounts for a pattern of apparent “shifty person agreement” in a way that involves no indexical shift. It makes a key prediction about the interpretation of *-N* inflection in environments of multiple embedding: *-N* should indicate only reference to the attitude holder of the immediately embedding attitude verb. This is because when attitude verbs quantify over indices, as in (51), they overwrite previous values. Thus we expect that an index-sensitive element will show strict locality in multiple embedding. This expectation is borne out in (58), where the doubly-embedded subject, occurring in an *-N*-marked clause, can only corefer with the intermediate subject and not the outermost subject.

(58) *Donno So* (Heath 2016, 304)

Sé:dù [ú wà [*pro* yóǵù wǎ-ǵ] gí-ỳ] gì-y.
 Seydou [2SG QUOT.SUBJ [nasty be-N] say-PFV] say-PFV
 Seydou_i said you said that {you are / *he_i is } nasty.

Note that this pattern is different from indexical shift, where long-distance shifting is possible. In Korean example (59), for instance, *na-lul* ‘me’ may find an antecedent two clauses up (among other possibilities discussed by Park 2016). This results from a structure in which the closest *OP_{AUTH}* operator to the doubly-embedded first person occurs just under the outermost attitude verb, not the more deeply embedded one.

(59) *Korean* (Park 2016, (53))

John-i Seoul-eyse [_{CP} *OP_{AUTH}* Bill-i yeki-eyse [_{CP} Mary-ka na-lul cohahanta]-ko
 John-Nom Seoul-at [Bill-Nom here-at [Mary-NOM I-ACC like-C
 malhayssta]-ko malhayssta.
 said-C said
 John_j said in Seoul that Bill said here that Mary likes him_j.

A further correct prediction is that it should be possible for embedded subjects controlling *-N* inflection to be clausemate with ordinary first person indexical pronouns, as in the most embedded clause of (60).

(60) *Donno So* (Heath 2016, 304)

Sé:dù [ú wà [*pro* mì=ǵ dà-dá:-dè-ǵ] gí-ỳ] gì-y.
 Seydou [2SG QUOT.SUBJ [1SG-ACC AUGM-kill-IMPF-N] say-PFV] say-PFV
 Seydou said you said that you will kill me.

That is, subjects controlling *-N* inflection do not obey Shift Together with first person pronouns. This is unsurprising if these subjects are merely required to pick out the author of the index. *Donno So* does not have indexical shift, and therefore the first person pronoun *mì=ǵ* refers to the speaker; no shifty operators are present.

What we have seen in this case study of indexiphoric agreement in *Donno So* is that the morphology of this language is sensitive both to [*AUTH-I*] and to classic first person, i.e. [*AUTH-C*], requiring a clear distinction between the two—first person pronouns always reflect [*AUTH-C*], whereas *-N* inflection reflects [*AUTH-I*]. A first person pronoun, bearing [*AUTH-C*], may or may not control *-N* agreement, depending on whether it also bears [*AUTH-I*].

5.2 Syncretism of [AUTH-I] and [AUTH-C]

In motivating the existence of an [AUTH-I] feature, and distinguishing it from a standard indexical first person feature, [AUTH-C], the Donno Sɔ data just discussed raise questions about how [AUTH-I]—and potentially a similar feature [ADDR-I], to be motivated by addressee indexiphors—should be thought of in relation to person features. Is [AUTH-I] a new type of person feature? Or, to ask the question in a more answerable form, are there grammatical patterns that treat this type of feature in a way parallel to [AUTH-C], confirming that the two make a natural grammatical class?

A first body of evidence that this is indeed the case comes from patterns of syncretism in Amharic. In this language, both [AUTH-I] indexiphors and [AUTH-C] first person indexicals control agreement on the verb from the same “first person” series.²³ Example (61) parallels Donno Sɔ (60) in showing that an indexiphor (bearing [AUTH-I]) can be clausemate with an unshifted first person indexical (bearing [AUTH-C]). Note that an indexiphoric analysis of the embedded subject reconciles this type of data with the Shift Together pattern discussed above for indexical shift. Because the embedded subject is an indexiphor, not an indexical, (61) contains only one embedded indexical and there is no Shift Together violation.

(61) *Amharic* (Leslau 1995)

John [*pro_{subj} pro_{obj}* al-ittazzəzə-ññ] alə.
 John [NEG.1S-obey.MKIMPERF-1S.O] say.PERF.3SM
 John_i says he_i will not obey me.

As expected, when the embedded clause of (61) is further embedded, as in (62), the distinctive indexiphoric locality effect seen in Donno Sɔ (58) emerges. The indexiphoric subject may only refer to the more local attitude holder, not the less local one.

(62) *Amharic* (Anand 2006, 101)

Bill [John [*pro_{subj} pro_{obj}* al-ittazzəzə-ññ] alə] alə.
 Bill [John [NEG.1S-obey.MKIMPERF-1S.O] say.PERF.3SM] say.PERF.3SM
 Bill_b says John_j says he_{j/*b} will not obey me.

Still further evidence for an indexiphoric analysis of Amharic (drawing on *De Re* Blocking effects, as noted by Anand 2006) is discussed in Deal 2018, 2020.

The contrast between these data and the picture that emerges from consideration of shifty person in Nez Perce and Korean (as discussed in section 2) reveals that a full typology of shifty person in attitude reports must be careful not to collapse together two distinct phenomena. One phenomenon is indexical shift, where Shift Together effects are in force for elements with first person morphology. In such cases, “first person morphology” uniformly reflects [AUTH-C] features.

(63) *Nez Perce* (Deal 2020)

Ne-’níc-em pee-∅-n-e ’in-haama-na,
 1SG-older.sister-ERG 3/3-tell-P-REM.PAST 1SG-husband-ACC
 [’iin-im ciq’aamqal hi-twehkey’k-∅-e ’iin-e].
 [1SG-GEN dog(ERG) 3SUBJ-chase-P-REM.PAST 1SG-ACC]

²³ I use the word ‘agreement’ in a general way here; see Kramer (2014) for arguments that certain Amharic “agreement” markers are in fact clitics. The general analysis of Amharic given in this section follows previous work by Anand (2006); see also discussion in Deal (2018).

- a. ? My sister_s told my husband that my dog chased me.
- b. My sister_s told my husband that her_s dog chased her_s.
- c. ✗ My sister_s told my husband that my dog chased her_s.
- d. ✗ My sister_s told my husband that her_s dog chased me.

The other phenomenon is morphological syncretism between indexical first person ([AUTH-C] features) and indexiphoric author ([AUTH-I] features). In this case there are no Shift Together effects for elements with “first person morphology”, because this category does not uniformly reflect indexical first person semantics. In addition to Amharic, languages showing this type of phenomenon include Mishar Tatar, Tamil, and various Papuan languages (e.g. Dani, Gahuku, Golin), as discussed in Deal 2018, 2020. Notably, these languages show syncretism between [AUTH-C] features and [AUTH-I] features across different portions of their “first person” vocabulary; for instance, Tamil shows syncretism in agreement only, whereas Golin (Trans-New Guinea) shows syncretism in independent pronouns only. In Golin, the verbal suffix that Loughnane (2005) describes as ‘first person’ shows the pattern familiar from Donno Sɔ -*N*; it occurs when the embedded subject is the attitude holder, (64a), but not when the embedded subject is the overall utterer but not the attitude holder, (64b). (Accordingly, I gloss this suffix ‘AUTH.I’, and assume that it reflects agreement with an [AUTH-I] feature on the subject.) Unlike in Donno Sɔ, however, the Golin embedded subject pronouns themselves take the same form in the two cases. (For this case I reprint Loughnane’s gloss, ‘1SG’, following the glossing of Amharic above.) This suggests that there is syncretism between [AUTH-C] and [AUTH-I] pronouns but not verbal inflections in this language.²⁴ The pronoun *na* occurs both when [AUTH-C] is present and when [AUTH-I] is. The agreement suffix *-l* on the other hand, uniquely reflects the presence of [AUTH-I].

(64) *Golin* (Loughnane 2005)

- a. gi i [na kon ne-ra-l]-w-a] du-n-g-w-e
 girl TOP [1SG yam eat-IRR-AUTH.I-REP-DIST] say-3-AS-3-PROX
 She_i said she_i would eat yams.
- b. yal i [na ere n-a-m-u-a] di-n-g-w-e
 man TOP [1SG do go-IRR-3-REP-DIST] say-3-AS-3-PROX
 He_i says that I_j will go.

A plausible hypothesis regarding this type of pattern concerns the “subatomic” syntactic feature make-up of first person indexicals and *auth(i)* indexiphors. These elements have in common, semantically, an *auth* function; they differ in whether this function is applied to context or index. We might suppose, then, that the [AUTH-I] and [AUTH-C] features introduced above are not, in fact, truly atomic. Rather, they consist of two subfeatures, one of which is simply [AUTH]. It is this subfeature, I propose, that is realized by all cases of “first person” morphology in Amharic, as well as by “first person” pronouns in Golin. Accordingly, the system does not distinguish in terms of inflectional morphology between indexiphors and first person indexicals. The two categories are syncretic.²⁵ The vocabulary items below spell this out: agreement suffix *-l* specifically spells out [AUTH-I], whereas pronoun *na* is sensitive only to the [AUTH] subfeature.

²⁴ Evidence that this language features indexiphoricity but not indexical shift comes from the possibility of mixed readings for two clausemate elements with “first person” morphology; see Loughnane (2005, §2.2.3.5).

²⁵ Thanks to Mark Baker for suggesting this lens on the morphological overlap.

- (65) Golin vocabulary items
- a. *na* ↔ [AUTH,D]
 - b. *-l* ↔ [AUTH-I,F]

To the extent that syncretisms such as that of the Golin pronoun *na* are best explained by reference to an [AUTH] subfeature, they provide evidence that, contrary to nearly all syntactic theorizing on the subject, first person features are not indivisible atoms of universal grammar.

6 Conclusions

What can shifty person tell us about the semantic and morphosyntactic primitives of person? I have argued for conclusions of two types. First, on the semantic front, patterns of indexical shift underline a need to recognize author, addressee, and location functions, applicable to contexts or to indices, as semantic primitives—or, better yet (though less concretely), they point to the need for a primitive notion of context and index that supports these functions but not various conceivable others.²⁶ Second, on the morphosyntactic front, we have seen that patterns of shifty person are silent on certain matters of featural representation but not others. What they do *not* tell us is whether there is a dedicated second person morphosyntactic feature, or alternatively, whether second persons merely have a subset of the features of first persons. Similarly, they do not rule out a theory wherein locatives and person indexicals have syntactic features in common (though they also provide no support for such a theory). What they *do* tell us is that we must recognize a broader range of person-related phenomena than are typically countenanced, including those needed for person systems with indexiphoricity. Notably, the features of author indexiphors are not always cleanly separated by the morphosyntax from their true indexical cousins. The overlap suggests that at least first person features (and very plausibly, all indexical feature types) are not primitives of grammar, but rather composed of two interpretable subfeatures. One indicates a basic function, e.g. author, and the other indicates the application of this function alternatively to the context or to the index.

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²⁶ It is not entirely clear to me at the moment just what this notion will be. I have argued elsewhere that it cannot be, as per Lewis (1980, p 79) “a location – time, place, and possible world – where a sentence is said”; this conception does not allow for so-called “improper contexts”, which are required for a proper treatment of indexical shift (see Deal 2020), and thus is too restrictive. On the other hand, a treatment in the style of Kaplan (1989), where a context or index is simply a tuple of values (as described in section 2), is not restrictive enough, unless some natural way of constraining the elements that constitute a tuple can be discovered.

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