

# Indexicality: *de se* semantics and pragmatics

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## Abstract:

I offer a new theory of indexicality in which indexicals are characterized as presuppositionally anchored to a doxastic center, of the general sort introduced by Lewis, Quine and Stalnaker to model *de se* attitudes. I argue that this theory is empirically superior to direct reference (and constant function) accounts of indexicality, and show how it accounts for a variety of puzzles for those accounts, including shifted indexicals, problems about *de re* belief, the behavior of indexicals in Free Indirect Style; bound indexicals, and so-called "fake indexicals", *inter alia*. This account draws essentially on the theory of Aloni (2001), accounting for *de re* belief attribution and counterpart relations under epistemic modality, and on Stalnaker (2008) for his modification of the account of Centers due to Lewis (1979). And it shares important features with Wechsler's (2010) recent theory of first and second person plural pronouns across languages.

## 0. Introduction<sup>1</sup>

We should start by giving an account of self-location, in thought, which will also give us a more general account of the complex iterated attitudes that define common ground (including the presumed common knowledge about who and where we are, and what time it is). When we have a notion of the common ground that can accommodate such information, the semantics for indexical pronouns will be a relatively straightforward matter.

Stalnaker (in press) Ch.2

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The indexicals are a cross-linguistic class usually taken to include a number of pronouns and demonstratives, at least including English *I, we, you, here, now*; the demonstratives *this* and *that*, and demonstrative uses of *he, she, her* and *his*; a range of other nominal and adverbial elements including *today, tomorrow, actual, and present*; and their counterparts in other languages. Since 1977, the standard theory of the semantics of indexicals has been that of Kaplan (1977): an indexical is directly referential, with no Fregean sense. Its conventional content is a Character, a function taking as argument the concrete situation of utterance to yield the referent itself, the latter a concrete individual in that situation (speaker, addressee, time, etc.). In standard variants of this account in offshoots of Montague Grammar, an indexical's Character plus contextually given argument yields a constant function from worlds to individuals, i.e. one with the same value in all possible worlds (or at least, in all worlds in which that individual exists). This constant value is the intuitive counterpart of the referent on the direct reference account.

This essay argues for a theory of indexicality which is empirically superior to the direct reference approach (and its Montagovian counterpart), one which can both account for the apparent wide scope of indexicals which motivated Kaplan and for a variety of cross-linguistic features of indexical meaning which are problematic for that account. I will argue that none of the accounts of indexical expressions developed to this point capture an essential feature of this class: Their interpretations crucially depend on the doxastic point of view, and associated doxastic perspective, of a salient and relevant agent, typically that of the speaker or addressee, but not always so for all indexicals in all contexts. Such a claim may call to mind theories of self-reference and *I* like that of Perry (1979,1993,2001). But though our views converge on a crucial feature of linguistic indexicality—that it presupposes something about the doxastic state of a distinguished individual—in the present theory the empirical motivation, the generalization to cases not involving the speaker, and the realization of this idea in a truth conditional semantics are very different from Perry's.

What do I mean by an agent's *doxastic* point of view and perspective? Consider first the usual spatial notions, with space modeled as a three-dimensional Cartesian coordinate structure. A point of view in such a space can be characterized as a point in that space and a vector for which the point serves as origin (Barlew, in press)—that is, as a location (or origin) plus an orientation. Then the perspective available from that point of view is that portion of the Cartesian space which is perceptually accessible from the adopted point of view (origin+orientation). Spatial perspective is not entirely given by the point of view, but depends in part on the perceptual mechanisms available at the origin, the circumstances in the perceptual field, etc. If an agent's visual field is omnidirectional, then even if in some sense he is oriented in one particular direction, he might have visual access in other directions as well; to calculate his perspective, we need information about his perceptual apparatus, etc. So the accessibility relation itself may be complex to specify; but we can abstract over such complications here. This notion can be generalized metaphorically to talk about different kinds of space and accessibility relations over those. A perspective reflects the information available from a given point of view about the space in question, as a function of an appropriate kind of accessibility relation over that space.

I will use the term *doxastic* of operators and states that depend on the beliefs of some agent(s). Since epistemic operators and states depend on beliefs, they are doxastic as well. A doxastic point of view is the origin for an accessibility relation over the space of possibilities, that space modeled, say, as the set of possible worlds. The origin of this relation is an agent-in-a-world-at-a-time, and the orientation is the doxastic attitude of that origin, offering a kind of vector through that space (in this case, a modal accessibility relation). This yields a doxastic perspective: the set of worlds compatible with that agent's beliefs at that time in that world. Call the origin in a doxastic state the **center**.

But we know from Lewis (1979b) (as discussed in §2 below) that the doxastic state of an agent-in-a-world-at-a-time is not just a simple set of worlds. Doxastic propositional attitudes are not relations to propositions *simpliciter*, but must also reflect the agent's self-location in the worlds in question. Intuitively, the *relata* in a doxastic attitude are worlds labelled with a sort of you-are-here arrow: "and this is me, there, at that time"; technically, both the world in which the beliefs obtains and those reflecting what is believed are *centered* worlds, each a pair of a world and an individual (at a time) in that world. The individual-at-a-time is the center of a centered world. The agent whose doxastic perspective is reported is the center of the centered world in which the beliefs hold, and that centered world is the adopted point of view. Since some of the agent's beliefs are *de se*, i.e. about herself *qua self*, the center self-locates in each of her belief-worlds. So the doxastic perspective corresponding to a doxastic point of view is a set of centered worlds, the agent's belief state, the worlds being those in which all her beliefs are true and the center of each world in that state serving to characterize what the doxastic agent self-ascribes in that world.

The interpretation of an indexical conventionally depends on the doxastic point of view assumed by the speaker at the time of utterance. This dependence is what I call (doxastic) *anchoring*; unlike the Kaplanian story, this dependence on the context of utterance does not imply coreference with any element in that context. This may at first seem an unlikely way to characterize the class of indexicals. To whet your intuitions, consider the following tantalizing bits:

- Unless otherwise stated, the default doxastic point of view in any utterance is that of the speaker. This is fairly obvious intuitively, since it is propositions (purportedly) reflecting the speaker's view of the way the world is that are asserted, and, more generally, that form the background reflected in her presuppositions across all moods.<sup>2</sup> We also see this, for example, in the fact that epistemic modals like *must* are by default anchored to the speaker (DeRose 1991), though that needn't always be the case (von Stechow & Gillies 2010).
- All the indexicals are by default intuitively anchored to the point of view of the speaker (or her addressee) in their utterance situation: Something is here because I am here; something takes place now because I am talking now. This is why *I am here now* is always true: It is first of all a pragmatic, and not a semantic truth, about what it is to do an embodied action. Similarly, the demonstrations canonically accompanying demonstratives can only be understood by imaginatively adopting the physical perspective of the pointing speaker.

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<sup>2</sup> This is not to deny that it is the Common Ground (CG) which constrains what can be felicitously presupposed. Rather, first, if the speaker *s* is cooperative, then (ignoring times and centers) her doxastic state  $DOX(s) \subseteq \cap CG$ , and, second, when a presupposition requires accommodation, it is always taken to reflect the beliefs of the speaker.

- There is a discourse style called Free Indirect Discourse (FID, described below), in which the speaker adopts the point of view of a 3<sup>rd</sup> person agent. In that style, all the indexicals except for *I* and *you* are typically shifted to be anchored the point of view of the agent whose perspective is described.
- In a number of languages, the counterparts of *I*, *you* and other indexicals may be shifted under certain attitude predicates to be anchored to the agent of the attitude. Typically these are predicates reporting the agent's claims about the way things are (verbs of saying, e.g.). This wide-spread phenomenon is taken to argue, contra Kaplan's claim to the contrary, that there are "Monsters"—operators which shift context in the course of interpretation. In sign languages, this shifting is signaled iconically by an actual shift of the eyes and body (physical attitude) of the signer as if adopting the locus of the discourse referent for the agent whose point of view is being adopted.
- In all languages where 1<sup>st</sup> and 2<sup>nd</sup> person pronouns can be monstrously shifted, such use always yields a *de se* interpretation, a reflex of the self-location of the doxastic agent *qua* center in her associated doxastic state.
- As observed by Wechsler (2010), it is a *language universal* that 1<sup>st</sup> and 2<sup>nd</sup> person plural pronouns are **associative**. This means that across all languages studied the counterparts of *we* or plural *you* are *never* to be understood as *coreferential* with a plural group of speakers or addressees, but instead only as including the indicated discourse participant, understood as an agent of self-ascribing belief. That is, he argues, these features should be understood as pertaining to doxastic self-ascription, explaining their universal associative character.

All of this will be described in more detail below. Let me note, here, that besides offering an account of these phenomena, there is an additional pay-off of characterizing the indexicals as those expressions which depend for their interpretation on the doxastic point of view adopted by the speaker. This clearly differentiates indexicals from the broader class of context-sensitive expressions, most of which are *not* indexical in this sense, not perspectival. This addresses a problem for Kaplan's theory, and for most of the modifications and alternatives proposed to date, a problem hinted at in Braun (1997). On the direct reference account, there is no clear difference between the class of indexicals Kaplan considers (which include those noted in the first paragraph above), and the broader class of context-sensitive expressions. For example, on the direct reference theory, how should we distinguish *here*, one of Kaplan's indexicals, from *local*? Partee (1989) and others have noted that *local* is context sensitive. But it is more flexible than *here* in how that context-sensitivity can be resolved. E.g. consider this variation on her famous example:

- (1) After the game, every sports fan stopped at a local bar.

The locale(s) denoted may be that of the speaker, the game, or the (widely dispersed) sports fans. By contrast, as we see in (2), in this context *here* can only be taken to refer to the speaker's locale:

- (2) After the game, every sports fan stopped at a bar here for a drink.

If both *local* and *here* are indexical, how are we to distinguish them?

Our first thought might be to take *here* to be a “pure indexical” in Kaplan’s sense: The reference of a pure indexical is said to differ from that of a demonstrative or other impure indexical in that it is not dependent on the intentions of the speaker (which may be manifest in the impure indexicals in a number of ways, including accompanying demonstrative gestures). Perhaps *here* always just directly refers to the location of the speaker at the time of utterance, and hence requires no reference to the speaker’s intentions. In contrast, in (1) *local* is clearly impure in this sense, since the speaker’s intentions to refer to one or the other of the possible locales must be ferreted out in order to determine the proposition she intended to express—these intentions make a truth conditional difference to the result. But is *here* pure?

Apparently not, as we can see in the use of *here* (like *now* and *this*) in Free Indirect Discourse (FID), illustrated in (3):

- (3) John pondered all that had transpired in the past year. After the move, he thought they’d be happy here in Tulsa, but he’d been wrong, terribly wrong. And this house was part of the problem! Now he had to reconsider all their options.

Clearly the speaker in (3) intends *here* to refer to Tulsa and *now* to the time of John’s pondering—some time in the past, while *this house* refers to a house in John’s proximity. FID is sometimes described as a literary style, and it is used quite often by authors. But it is also quite common and unobjectionable in ordinary usage. Here is a first, informal description of the style (Eckardt 2014, Chapter 1):

Free indirect discourse is a way of reporting a person’s thoughts as if one could listen to their inner monologue. The effect is achieved by the use of perspective indicating elements in the sentences as if the sentence was uttered by a particular protagonist. . . . [It] is characterized by the fact that grammatical perspective of the sentence, and other types of perspectivising elements do not single out the same person as the speaker.

Besides several expressions typically taken to be indexical, like *here*, *now*, and *this* in (3), a great number of other expressions may be used in FID in such a way as to reflect the information, tastes, and judgment of the protagonist whose perspective is adopted, rather than that of the speaker. For example, in the following example cited by Eckardt, the evaluative adjective *wretched* as applied to the matter in hand, and the judgment that it was “the worst of all” reflect the protagonist Emma’s view of the matter in question, and not necessarily that of the author Austin:

- (4) The hair was curled, and the maid sent away, and Emma sat down to think and to be miserable.—It was a wretched business, indeed!—Such an overthrow of every thing she had been wishing for. —Such a development of every thing most unwelcome!—Such a blow for Harriet!—That was the worst of all.

(J. Austen, *Emma*. 1816[1994]. Penguin Classics, London. p. 103)

Uses in FID argue that *here* and *now* are not pure indexicals in Kaplan’s sense. To understand them, we must grasp the perspective intended by the speaker. So we cannot satisfactorily distinguish *here* from *local* by claiming that only the former is pure.

There are two indexicals in English which resist shift in FID, and hence still fulfil Kaplan's criteria: *I* and singular *you* (though not *we* or plural *you* because of their associative character, examined in detail in §4). These singular pronouns cannot be understood to refer to anyone other than the speaker or addressee, even in FID, as is well known; for example, in (3), even though John's perspective is assumed, we cannot replace *he* with *I*, and similarly, Emma can only be referred to in the 3<sup>rd</sup> person in (4). Alas, even with the 1<sup>st</sup> and 2<sup>nd</sup> persons singular the matter is difficult. For, as we noted above, though English *I* and *you* are pure in this sense, when their counterparts occur in the complements of certain attitude predicates (typically verbs of saying) in a wide variety of other languages, those 1<sup>st</sup> and 2<sup>nd</sup> person pronouns can be taken to refer not to the actual speaker and addressee, but to the agent of the attitude or her addressee in the reported situation (Rice 1986, and much subsequent work discussed in §1.3 below). But those shifted pronouns are still indexical in some sense, e.g. when they occur outside the relevant shifting contexts, so far as I know they show the same wide-scope effects as English *I*. Schlenker (2003) argues that such languages provide evidence of the existence of Kaplanian "Monsters", operators that shift the context of utterance in the course of interpretation. So assuming that we want a characterization of indexicality which can capture what is essentially indexical in any given language, purity in Kaplan's sense will not suffice.

Thus, the direct reference theory cannot clearly characterize what it is to be an indexical. No surprise then that in the literature in philosophy of language the term *indexical* is often used quite broadly (as Braun notes), the class of indexical expressions sometimes taken to include, *inter alia*, tense, modality, attitude predicates, *local* (as above), adjectives like *rich* ('for a philosopher' vs. 'for a CEO'), and even implicit domain restriction and vagueness. This ill-defined use of the term is neither intuitively satisfying nor, as we briefly illustrated with *here* vs. *local* above, empirically adequate for describing the more limited distribution and attested range of interpretations of the indexicals themselves.

The account I propose takes indexicals to be context dependent, but starts from a different notion of context than that assumed by Kaplan. His Character of an indexical is a function whose argument is the context in which it is uttered, by which he seems to mean the *concrete situation* in which the speech act occurs. But not everyone would agree that this is how we should characterize a context of utterance, perhaps modeled in terms of certain distinguished parameters (like speaker, addressee, time, place, etc.). E.g., see Lewis (1979), who models context as an organized body of information, shared by the interlocutors, that changes dynamically throughout discourse, his *scoreboard for a language game*. I have argued extensively that a characterization along the lines Lewis proposes is more appropriate for a theory of context-sensitivity in natural language (see, e.g., Roberts 1996/2012, 2004, in press). So I take the context of utterance to be the discourse context, an organized body of shared information. This body of information includes information about the interlocutors' Common Ground,<sup>3</sup> but other kinds of information as well. This article offers further evidence for this general conception, in that this more abstract notion of context is crucial to the empirically superior account of indexicals I will provide here.

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<sup>3</sup> I assume the standard notion of C(ommon)G(round) due to Stalnaker (1979): A set of propositions, each of these a set of possible worlds. The intersection of the CG is the Context Set (CS), the set of worlds compatible with all the information in the CG.

One of the types of information I take to be in the dynamic discourse context is a set of *discourse referents*. Following Karttunen (1976), Heim (1982), these are indexed bodies of information (Heim's "files") associated with actual or hypothetical entities about which the interlocutors share assumptions. An entity needn't be mentioned in order for there to be a corresponding "file" on that individual; common knowledge of its existence ("weak familiarity") suffices. Hence, there are always weakly familiar discourse referents for the interlocutors in a discourse, for the time of utterance, etc. I introduce a special class of discourse referent, the *discourse centers*, informational counterparts of the doxastic centers sketched above. These are the discourse referents corresponding to agents whose *de se* (self-locating) doxastic perspective is under immediate consideration in the discourse. The speaker in a context is a distinguished center in any discourse, since the speaker of a given utterance plays the role of a doxastic center, intentionally reporting on her purported doxastic state, and hence aware of doing so. I.e., the role of speaker is a *de se* role, so long as she is aware that she's speaking. The addressee (as opposed to an eavesdropper) is also, similarly, a center aware of his own role *qua* addressee. As they change roles, the set of discourse referents is updated accordingly to reflect the change. And other centers may be introduced, either compositionally—as when under the scope of an attitude predicate its agent's doxastic perspective becomes temporarily relevant—or via pragmatic conventions like FID. The set of relevant discourse centers thus may change over the course of discourse, and even over the course of interpretation of a single utterance. But which centers are available in that set is always constrained by (a) the identities of the speaker and addressee, as features of the context of utterance, (b) the dynamic semantics of interpretation (which introduces new centers under the scopes of doxastic attitude predicates, possibly iterated under multiple embeddings), and (c) pragmatic conventions like FID.

At a given point in discourse, any of the elements of the set of discourse centers may potentially serve as doxastic anchors for indexicals, subject to certain constraints imposed by the lexical content of the indexicals themselves. For example, while English *I* can only be anchored by the distinguished center corresponding to the actual speaker, Amharic *I* may shift to be anchored by the center corresponding to the agent of certain embedding attitudes. English *here* may shift in FID, while *I* never does. Thus, shifting the doxastic perspective to someone other than the speaker(/addressee) is conventionally constrained by the combination of general constraints on center introduction and those on lexical anchoring for particular indexical expressions.

Then this is the essence of what it is to be indexical:

An indexical is an expression whose interpretation conventionally presupposes a relation to the doxastic point of view of a contextually available discourse center, its anchor.

The anchoring discourse center serves as Nunberg's (1993) *index*, while the lexically given relation presupposed is his *relational component*. Since the relation needn't be co-reference, indexical anchoring is not generally coreference. The only candidates for what Kaplan called "pure" indexicals, those like English *I* and singular *you*, are those whose relational component requires coreference with a distinguished type of discourse center that is instantiated in any given utterance situation by virtue of what it is to *be* such a situation. Without a speaker, there is no utterance, and any speaker arguably has an intended audience, if only himself or an imaginary other.

I will also argue that demonstratives are indexical in the sense just defined, though the lexically presupposed relation to the anchoring center is not coreference. Hence demonstratives are also essentially indexical,<sup>4</sup> something that isn't adequately captured by recent accounts of demonstratives due to King (2001), Roberts (2002), or Elbourne (2008).

The treatment of 1<sup>st</sup> and 2<sup>nd</sup> person pronouns on this approach is closely related conceptually to that of Wechsler (2010).<sup>5</sup> His associative generalization will be accounted for by the fact that anchoring of a plural indexical needn't entail coreference, but only that the indexical's denotation must include someone whose *de se* perspective is relevant.

Along the way, this approach also offers a natural account of another problematic phenomenon for the direct reference approach, the existence of so-called *fake indexicals* (Kratzer 2009), yielding the attested interpretations without special indices or stipulation.

There is another way in which N(oun)P(hrase) interpretations can be anchored to a doxastic center, one which is essentially pragmatic and is seen in classic problems for theories of reference, involving definite NPs of all types. The most famous examples (Quine 1956, Kripke 1979, et al.) involve NPs often taken to be rigid designators—proper names. For example, in the complement of an attitude predicate, if the information that the agent of the attitude has about the denotatum of a definite is taken by the interlocutors to differ from their own, this can lead to a shifted interpretation of the definite, yielding a sense which reflects the agent's doxastic perspective on the denotatum—the intuitive *res*—and giving the impression of non-rigidity. Consider:

- (5) Plato didn't know that Hesperus was Phosphorus.
- (6) a. Pierre believes that Londres is pretty.  
b. Pierre believes that London is not pretty.

If both *Hesperus* and *Phosphorus* are rigid designators, each yielding the same value in all possible worlds, and if in fact they denote the same entity (Venus), then how could it be informative to come to know that *Hesperus is Phosphorus* is true? And then how can (5) report something about Plato's simple ignorance about the planets, instead of incorrectly attributing to him a lack of appreciation of the self-identity of a given *res*. Similarly, Kripke's Pierre knows the city of London under two different names, the French *Londres* and the English *London*, being thereby acquainted with the city under very different guises. He fails to know that they are the same city. So it seems entirely rational for him to simultaneously hold the views attributed to him in the utterances in (6). But this cannot be captured by treating the two names simply as rigid designators, since this would incorrectly attribute to him logically inconsistent beliefs. Heim (1985) noticed related examples for demonstratives under epistemic modality, and Stalnaker (in press) considers similar cases with *I*, both discussed below, both problematic for the direct reference theory of indexicals and its constant function counterpart. Once we look for

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<sup>4</sup> Pun intended, with apologies to Perry (1979,1993).

<sup>5</sup> Wechsler doesn't address the problem of shifted indexicals, assuming that both these and the "fake" indexicals, both discussed below, are instances of mention rather than use of the indexical pronouns (fn.7, p.343). That is not the account proposed here.

them, such interpretations under doxastic attitudes and epistemic modality are quite common and unexceptional.

Aloni (2001) offers an empirically satisfying and explanatory account of puzzles involving *de re* belief attribution with proper names, applying a contextually-given perspective operator  $\wp$  to shift the interpretation of the rigid designators. Given the related examples with indexicals, I propose we extend her account to the indexicals, as well.<sup>6</sup> The perspective shift in all these cases is not licensed by the lexical content of the *de re* definite NP itself (proper name or indexical), unlike the presuppositional anchoring (and potential shifting) conventionally involved in an indexical's interpretation. Instead, the NP's standard conventional interpretation is shifted by the pragmatically available perspective shifting operator  $\wp$ . I propose a friendly modification of  $\wp$  which constrains its application: Not just any salient entity that happens to have attitudes can serve to anchor  $\wp$ ; instead, only those perspectives can be brought to bear which are themselves relevant in the context—those of the speaker, addressee, agent of an embedding attitude, or agent whose perspective is adopted in FID, i.e. those of the discourse centers. To capture this restriction,  $\wp$  itself requires a discourse center as argument. Then its application to the troublesome proper names and indexicals yields the attested interpretations and, so constrained, is far less likely to over-generate pragmatically induced perspectival shifts in NP interpretation.

Thus, in this theory discourse centers are argued to play three kinds of roles in interpretation:

(i) they are crucial features of a theory of *de se* interpretation, as in Lewis (1979b) and Stalnaker (2008);

but they serve two new roles as well:

(ii) they are the presupposed perspectival anchors for indexicals of all types; and

(iii) they also serve to anchor a pragmatically deployed perspective operator, in a modification of Aloni (2001), permitting an account of *de re* belief attributions for all kinds of definite NPs, including indexicals themselves.

In what follows, in §1 I review general properties of indexical NPs across languages and consider the problems these present for theories in which they are taken to be directly referential. In §2, I introduce Stalnaker's theory of centered worlds and their use to model the semantics of self-location. In §3, I offer formal characterizations of the notions of doxastic center and doxastic perspective, and define a notion of discourse center in a formal pragmatic theory. In §4, I give a formal semantics for English indexicals *I*, *we*, *you* and *this*, all presuppositionally anchored to a discourse center, and discuss how this yields the attested appearance of wide scope relative to modals and other operators. In §5, I consider the applicability of the proposed framework to indexical semantics across languages: I compare the account to Wechsler's, sketch how it has the flexibility required to account for languages which have various kinds of conventionally shifted indexicals in attitude contexts, and discuss the so-called fake indexicals and other bound-variable interpretations of indexicals. In §6, I introduce and extend the theory of *de re* belief attribution of Aloni (2001), as sketched above, and show how this plays a role in accounting for the relevant interpretations of English indexicals under attitude predicates and epistemic modals. Finally in §7, I summarize and present some conclusions and prospects.

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<sup>6</sup> This extension is perfectly compatible with what Aloni says.

## 1. Properties of indexical NPs across languages

In this section I offer a quick survey of some of the properties of indexical NPs which we will need to address in any account of indexicality. Since we are interested not just in the English indexicals, but in indexicality *per se*, we need to keep in mind those properties displayed by indexicals in other languages and, especially, any universal properties displayed in all.

### 1.1 The definiteness of demonstratives and indexicals

Clearly demonstratives are context-sensitive expressions. One simply cannot grasp the speaker's intended meaning for an expression in which one of these occurs without grasping which contextually salient entity the speaker intends to be its denotation. Accordingly, they share a number of properties with their close etymological cousins the English definite descriptions and the 3<sup>rd</sup> person pronouns, both of these, in English, etymologically derived from demonstratives.

In all three of these types of NP we find the following types of uses:

coreferential with a preceding NP:

- (7) A man and a boy were coming down the street. The man looked worried.
- (8) A man was walking down the street. He looked worried.
- (9) I saw one quilt which was quite abstract, with lots of asymmetric diagonals. Another one was more traditional, worked in an old Amish pattern. This quilt was less busy than the other, but just as bold.

with a non-linguistically salient referent:

- (10) [Context: looking together at a house:] The roof needs fixing.
- (11) [Context: looking together at a house:] It needs a coat of paint.
- (12) [Context: looking together at a house:] That roof needs fixing.

The non-linguistic salience of the intended referent illustrated for definite descriptions in (10) is much like that displayed in the canonical use of demonstratives, as in (12). Because the neuter singular pronoun *it*, unlike the 3<sup>rd</sup> person masculine and feminine or plural pronouns, has no demonstrative uses,<sup>7</sup> its use in (11) cannot be demonstrative.

All three types of NP also have bound variable interpretations, where they have a quantificational antecedent. The presence of examples of this sort was crucial to arguments developed independently by King (2001) and Roberts (2002), against the directly referential analysis of demonstratives.

quantificationally bound:

- (13) At the boy scout camp, every father and son that built a fire together decided that the boy would gather brush and wood while the man made a clearing and laid the fire.

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<sup>7</sup> a claim to be substantiated below.

- (14) Every couple that built a fire together decided that she would gather brush and wood while he made a clearing and laid the fire.
- (15) Every dog in my neighborhood, even the meanest, has an owner who thinks that that dog is a sweetie.

donkey anaphora:

- (16) If a cat and a dog have a fight, the cat usually wins.
- (17) If John sees a car he likes, he should buy it.
- (18) If an upwardly mobile yuppie sees that a neighbor has a car, he usually worries that that car is cooler than his.

The underlined NPs in (16) – (18) are instances of the donkey pronouns discussed by Geach (1962), the problems they present for anaphora and semantics admirably explained in the first chapter of Heim (1982). Each takes as its antecedent (the discourse referent corresponding to) an arbitrary instance of an entity introduced by an indefinite NP in the conditional antecedent.

The uses noted above are those used by Partee (1984) to characterize the class of anaphoric expressions. Note that, given (10)-(12), this sense of *anaphora* does not imply that the NPs in question must have a coreferential antecedent NP. Rather, Heim (1982) had argued that in order for an anaphoric presupposition to be satisfied, it sufficed that the interlocutors have common knowledge of the intended referent at the time of utterance, something she reflected in a common discourse referent corresponding to that entity.

I would add two additional types of use involving narrow scope under operators, uses also reflecting anaphoricity in this sense:

Inverse linking:

- (19) The political gathering was attended by the mayor of every city in Indiana.
- (20) S/he who must be obeyed in each family is usually the dog.
- (21) That senator with the most seniority on each committee is to be consulted. [King 2001:10]

In (19) *every city in Indiana* is understood to take wide scope over *the mayor*; in (20) *each family* takes wide scope over the rest of the subject NP, and in (21), *each committee* does the same.

bridging: (Clark 1977)

- (22) Every car had a statue on the dashboard.
- (23) In every 1960s marriage it was understood that he should take out the garbage and she should wash the dishes.
- (24) [Pointing to an empty car that's taking up two parking spaces in a full lot:] That driver needs a courtesy lesson.

The definite description in (22) depends for its interpretation on a prior NP, the quantificational *every car*; but it is not coreferential with this antecedent. Rather, any given dashboard is understood to stand in some functional relation with one of the cars in the domain of *every*, the pragmatically retrieved function picking out, for any car, its dashboard. This is also the case

with *he* in (23), which is understood to take as antecedent *every marriage* and to implicate that the man in question is the husband in a given (traditional heterosexual) marriage, just as *she* is associated with a function that returns the wife of that same marriage. The demonstrative in (24) also has an “antecedent”, but instead of an NP, it is the demonstratum of the accompanying deictic gesture made by the speaker, a particular car. Moreover, *that driver* is not coreferential with its “antecedent”; rather it is the value of a function on that entity, the driver who parked the car (the function suggested by the demonstrative’s head *driver*). This is what Nunberg called *deferred ostension*, but it seems to closely parallel the bridging exemplified in (22) and (23). Such examples are found under quantification, as well, as in (25), where the demonstratives take as their bridging “antecedent” the quantified NP *every table*:

(25) [Maitre d’ instructing waiters how to set up a dining room, pointing to one set of chairs among a group of identical sets in the storage room:] Every table should be set up so that this one [pointing to the unique chair with arms] is at the head, looking toward the dais, with these others [sweeping gesture at the remaining chairs in the set] are at the remaining places.

(25) means that for each table, the chair with arms *in the set assigned to that table* should be placed at the head *of that table*, while the remaining chairs *in the set assigned to that table* should be distributed to the remaining places.

Roberts (2002,2003,2004) offers an account of the anaphoricity just illustrated. There I argued that the correct way of understanding what these three types of NPs (and others as well) have in common is that they involve *weak familiarity*: that is, the interlocutors' common information in felicitous contexts of use entails the existence of the intended denotatum. This contextual entailment can be the consequence of prior utterance of a coreferential antecedent, but it needn't be. When the interlocutors jointly see the house in (12) and it is evident to both that that object is the focus of attention, then this joint information satisfies the familiarity presupposition, without the requirement of prior mention. In bridging, typically the salient discourse referent (denotatum of a preceding NP or demonstratum of an accompanying demonstration) denotes some entity which is associated with the existence of a functionally related entity, at least as a default assumption: Cars have unique dashboards (22), marriages in the 1960s US involved a unique husband (23), and parked cars were parked by a unique driver (24). So in all the examples above, weak familiarity and salience are satisfied. Since we also see this under the scope of quantification, we cannot talk about the familiarity of *the* denotatum *per se*. So, following Heim (1982), one way of giving a unified description of what's presupposed in such uses is that they require a familiar discourse referent as antecedent.<sup>8</sup> That is, what satisfies such a presupposition isn't a coreferential NP or a salient entity in the non-linguistic world, but salient information in the local context of interpretation (perhaps under the scope of an operator, as in the donkey sentences) which entails the existence of a coreferential entity.

Note that this anaphoricity is, in principle, independent of the question of whether the relevant NPs also have uniqueness implications, as is typically assumed for definite descriptions in the philosophical literature after Russell (1905). This is still quite a controversial question. Some of the most sophisticated contemporary linguistic accounts of definite descriptions argue that they do not involve uniqueness (e.g., Heim 1982, Roberts 2003), while others argue that it is a conventional presupposition (Heim 1992, Elbourne 2005,2013). But that is beside the point here. Our central interest in these patterns is in the demonstratives. And it seems quite clear that their felicitous use, like that of the pronouns, requires weakly familiarity. Generally they either have an accompanying demonstration, making the intended demonstratum evident and salient, or an antecedent NP in discourse, in either case guaranteeing a weakly familiar discourse referent in the interlocutors' common information. Even in the case of bridging, if we don't know that the demonstratum typically stands in the appropriate relation to some entity of the appropriate sort to serve as antecedent for the demonstrative, the bridging just won't work.

As for 1<sup>st</sup> person *I* and 2<sup>nd</sup> person *you*, one can argue that the speaker and addressee are always familiar in discourse, hence that they are always anaphoric in the sense just sketched. In fact, any of Kaplan's pure indexicals, and *now* and *here*, are similarly familiar under his account, since the use of each effectively presupposes a denotatum weakly familiar to all the interlocutors in the context of utterance.

The Kaplanian (1977) account of demonstratives is only applicable to the so-called canonical uses accompanied by a demonstrative gesture toward some entity in the local context. But the

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<sup>8</sup> Again, the "lifespan" of a discourse referent is limited by any operators under whose scope it occurs. So, in donkey sentences, the apparent indefinite antecedent—say *a dog* or *a car* in (16) or (17)—occurs under the scope of the conditional, and accordingly can only serve as antecedent to definites under its scope, not in subsequent discourse. See Heim (1982) for an excellent primer, Roberts (2004) for a review of relevant literature to that point.

parallels between those cases and the anaphoric uses outlined here are too strong to ignore, as argued in detail by King (2001), Roberts (2002) and Elbourne (2008). But this raises another question.

## 1.2 Are demonstratives indexical?

The parallels with definite descriptions and pronouns observed in the preceding section might lead one to question whether demonstratives are indexical after all. Basing his account on related evidence, King (2001) argues that the demonstratives are a type of generalized quantifier. Similarly, the theory of demonstratives in Roberts (2002) is very close to that proposed by Elbourne (2008), as the latter concedes. I take the ways in which the last two theories converge to be more important than their relatively minor differences:

- Unlike the directly referential account, which cannot explain non-canonical uses of demonstratives—those not accompanied by demonstrations—these approaches take English demonstratives to be presuppositional and anaphoric, and in this respect like English definite descriptions. Elbourne makes less of the anaphora than I do, but it's essential to his account of definite descriptions too, since in the latter he cannot distinguish definites from indefinites unless he assumes the former are anaphoric (see the discussion in Elbourne 2005:59ff). The patterns considered above appear to argue that the behavior of demonstratives is parallel in this respect. Once we take demonstratives to be anaphoric, the uses under quantification and across discourse, as well as other types of examples discussed by King (2001), like the *paycheck sentences* with demonstratives, are just what we would expect.
- The role of optional deixis (e.g. pointing), as in Nunberg's (1993) characterization of the components of the meaning of an indexical, is more nuanced, just a part of the whole conventional content of the demonstrative, and no longer sufficient to determine intended reference. This these two theories share with King's.

But there is reason to think that none of the authors cited above, including Kaplan, have yet adequately modeled the respect in which demonstratives are indexical. This is not just about deixis, the sometime-association with a demonstrative gesture, though that is, of course, a concomitant of their indexicality, which in its particular, 3<sup>rd</sup> person character is somewhat different from that reflected in *I, now* and *here*. In Roberts (2002), I relegated the role of the demonstration to an associated indicative intention, treating it much like additional descriptive content. This is also Elbourne's (2008) view:

I hope to show that, once pronouns are correctly understood, demonstrative [descriptions]. . .are just pronouns provided with some extra descriptive content in the form of Noun Phrase [complements]....[fn20:] More precisely, demonstratives in English are pronouns with the addition of NPs and proximal or distal features. But some demonstratives in other languages, like the French *ce*, do not have proximal or distal features, and are hence plausibly just pronouns with nouns stuck on them.

But consider this: Why are there three types of 3<sup>rd</sup> person anaphoric expressions in English? These nominal elements are very, very old, and their use seems to be built into the deep fabric of the language. What does it matter whether we use a pronoun or a demonstrative or a definite description? If we are to believe Elbourne (2008), not much. A definite description is just a

pronoun with its clothes on; a demonstrative description is a definite description plus an indication of proximity from some salient entity.

I think that is incorrect. Deixis is not so much an optional add-on as a reflection of the deeper nature of demonstratives. We have the variety of definite NPs that we find in a language because they divide up the functional space of referential use, each appropriate for somewhat different purposes. For example, English definite descriptions differ from pronouns in at least two ways, which Roberts (2003, 2005) argues are closely related: They have potentially richer descriptive content, and so are able to distinguish familiar discourse referents which could not be distinguished with person, number and gender alone—the sole descriptive content available to pronouns. And pronouns can only be used when their intended antecedents are maximally salient and relevant, whereas definite descriptions, if sufficiently rich in descriptive content, are not so restricted in their use. What, then, gives demonstratives their distinctive utility?

Consider:

- (26) [Butler directing two porters A and B about which parcels *c* and *d* to bring:]  
You [nodding at A] get that parcel [pointing at *c* in the corner] and you [nodding at B] get that parcel [pointing at *d* under the window].
- (27) [same situation as (26):]  
You [nodding at A] get the parcel [pointing at *c* in the corner] and you [nodding at B] get the parcel [pointing at *d* under the window].

Though (26) with *that parcel* is perfectly felicitous, (27) with *the parcel* is not, a contrast pointed out (with other examples) by Maclaran (1982). We complete the paradigm by considering demonstrative *him* in (28) and *it* in (29):

- (28) [Relief worker A to another B at a bomb site with numerous victims:] You<sub>dem-B</sub> help him<sub>dem-c</sub>, and I<sub>A</sub>'ll get him<sub>dem-d</sub>.
- (29) [same situation as (27):] You [nodding at A] get it [pointing at *c*] and you [nodding at B] get it [pointing at *d*].

Native speakers agree that the non-coreferential use of two tokens of *it* in (29) is very odd, while the non-coreferential use of two tokens of demonstrative *him* in (28) is fine; this contrast argues for the claim made above, that *it* does not have a demonstrative use, as argued in Maclaran (1982). Additional evidence that *it* and *that* differ in important ways is offered by minimal pairs of examples like the following:

- (30) Hilary has lent me her bicycle. She doesn't need it/#that. (Maclaran 1982)
- (31) First square nineteen, then cube it/that. (Isard (1975))

Maclaran (1982,§4) claims that such examples show that “the force of a demonstrative is to signal that the context is not necessarily the expected one” and that “the speaker thinks he needs to draw his addressee's attention to something”. Putting my spin on it, I think such examples argue that the intended discourse referent antecedent for a demonstrative is not an entity which is already the uniquely *most salient* such discourse referent in the context of utterance. This might

occur because the intended denotatum is not familiar and salient *prior* to utterance, as in the canonical uses of deixis (and in the topical indefinite use of NPs with *this*, discussed in Prince (1981) and Ionin (2006)), or because there are already two or more familiar entities which satisfy the definite's descriptive content.

Illustrating the second kind of case, note that (32), where the antecedent is explicit and uniquely salient under its descriptive content, implies that there is more than one relevant dog:

- (32) Every dog in my neighborhood, even the meanest, has an owner who thinks that that dog is a sweetie.

Use of *that dog* instead of *the dog* carries the implication that the arbitrary owner might be contrasting his own sweet dog with those other mean ones. This implication is explicit in (33), where the neighbor's car is contrasted with the worried yuppie's own:

- (33) If an upwardly mobile yuppie sees that a neighbor has a car, he usually worries that that car is cooler than his.

Similarly, in cases like (30), where there is only one salient and relevant non-human antecedent, non-demonstrative *it* is preferred over *that*. In Isard's (31), the explicit *nineteen* introduces the maximally salient antecedent, and, accordingly, *it* can only be taken to refer to that number (Roberts 2003). If *that* is unaccented, it's a bit odd here (implying no contrast, and hence making it odd not to use *it*). Accented *that* is felicitous; however it cannot be used to refer to the number nineteen, but only to nineteen-squared (361). Again, the use of the demonstrative, whether accented or not, always implies two or more potential antecedents satisfying its descriptive content (if any). The contrastive accent plus the distal feature of *that* in (31) together imply that the intended antecedent cannot be the maximally salient 19, so must be the merely weakly familiar 361 (the only other relevant number)—which is metaphorically more “distal” because less salient than the strongly familiar 19.

Then I conclude that use of the demonstrative implies that (a) there is a non-singleton contrast set of entities satisfying the demonstrative's descriptive content, and (b) that the intended referent is not the uniquely most salient element of that set. Roberts (2002) argued that this is a reflex of the distal/proximal distinction evident in the English demonstratives. We see both the explicit contrast set and equivalent salience of its members in (34):

- (34) I saw one quilt which was quite abstract, with lots of asymmetric diagonals. Another one was more traditional, worked in an old Amish pattern. This quilt was less busy than the other, but just as bold. (Roberts 2002)

The use of the demonstrative *this quilt* more skillfully and unambiguously picks out the most recently mentioned quilt than would use of *the quilt*. Not only is the contrast implicit in the proximal/distal distinction used to underline a contrast between the denotatum and some other entity of the same sort, but the marked proximal demonstrative is selected to disambiguate between two possible *antecedents* of the same sort. Even though the demonstrative is not used with a demonstration, the proximal/distal distinction is alive and active pragmatically.

But this implies that the demonstratives are essentially indexical in the sense I would define. For the very notions of *proximal* and *distal* presuppose location in space relative to a given origin. In demonstrative uses of demonstratives, the origin is always the location of the speaker in actual space. The demonstration indicates the vector along which the denotatum can be found in that space, and the proximal or distal feature indicates relative distance along that vector from the origin. Roberts (2002) argues that non-demonstrative uses always presuppose some other type of space. For example, the two-dimensional time-line of the discourse (earlier in the preceding discourse for *that* vs. more recent or immediately following for *this*), distance from the written location in the actual text (see her discussion of the use of *former* vs. *latter*), etc.

Thus all the observed differences between the demonstratives and non-demonstratives like *it* and definite descriptions—optional accompaniment by a distinguishing deictic gesture, use of the proximal/distal distinction to distinguish potential antecedents, and the underlying implication that there are multiple possible denotata in the context—arise because the interpretation of the demonstrative is essentially anchored to a point of view, which is used by addressees to determine the intended denotation. Thus, while demonstratives, like the English definite article and pronouns, are anaphoric, they are also, like 1<sup>st</sup> and 2<sup>nd</sup> person pronouns, *essentially* indexical. That is, they retain the indexicality which has atrophied in their etymological descendants the definite descriptions and pronouns. This is not captured in any of the theories of demonstratives considered above.

From here on out, I'll use the term *indexicals* to cover demonstratives, even in their discourse deictic use, as well as Kaplan's pure indexicals.

### 1.3 Monsters

In contrast to English *I*, the conventional content of 1<sup>st</sup> person singular pronouns famously works quite differently in some other languages. Consider Amharic (a Semitic language spoken in Ethiopia), as reported in Schlenker (2003). Amharic has a counterpart to *I* that varies in interpretation when embedded under a verb of saying (and not just in direct quotation), e.g. under an attitude predicate. It always refers to the speaker of *some* context, but that doesn't have to be the context of the actual speech act. Here is a schematic example (35), comparing the Amharic pronoun to English *I*:

- (35) Situation to be reported: John says: 'I am a hero'.
- a. *Amharic* (lit.):            John<sub>i</sub> says that I<sub>i</sub> am a hero.
  - b. *English*:                    John<sub>i</sub> says that he<sub>i</sub> is a hero/\*John<sub>i</sub> says that I<sub>i</sub> am a hero.

In the Amharic (36), the 1st person embedded pronoun (apparently incorporated into the embedded verb, whose suffix *-ññ* is glossed as "1s", i.e. 1<sup>st</sup> person singular, highlighted below) is clearly evaluated with respect to the context of the reported rather than of the actual speech act, while in (37), the embedded object (highlighted) is 2<sup>nd</sup> person, again clearly intended to refer to the actual speaker *qua addressee in the reported speech act*:

(36) *Situation reported:* John says: ‘I am a hero’ (D. Petros, p.c. to Schlenker)

j̣ʼon j̣ʼ\_gna n\_-ññ y\_l-all  
*John hero be.PF-ISO 3M.say-AUX.3M*  
 ‘John says that he is a hero’

(37) m\_n amt’-a \_nd-al\_-ññ al-s\_mma-hu-mm  
*what bring.IMPER-2M COMP-say.PF-3M-ISO NEG-hear.PF-1S-NEG*

‘I didn’t hear what he told me to bring.’  
 (lit. I didn’t hear that he said to me bring what.) (Leslau 1995, p. 779)

About these and other examples, Schlenker (2003:67-69) convincingly offers both syntactic and semantic arguments against taking the embedded clauses in such examples to be quoted. And he points out that “it is *only* in attitude reports that Amharic 1st and 2nd person pronouns can be shifted.” Without an embedding attitude verb, shifting is not possible. Finally, shifting seems to be optional in Amharic, so that the suffix *-ññ* embedded under an attitude predicate can either be anchored to the actual speaker or the reported agent. Hence, (36) can also be synonymous with the English *John says that I am a hero*.

In closely related work, Anand & Nevins (2004) talk about two languages, Zazaki (an Indo-European language in the Iranian family, with data based on their own fieldwork with native speakers) and Slave (an Athabaskan language spoken in western Canada, with data reported by Rice 1986), which display extensive “shifting” of indexicals under certain verbs, wherein the understood antecedent of a 1<sup>st</sup> (or 2<sup>nd</sup> person pronoun or locative) is not the speaker (or the addressee or utterance location), but the agent subject of the verb (or the individual addressed by that agent or the location of the reported utterance). In Zazaki, this happens only under *vano* ‘say’, but with all the classic pure indexicals (‘I’, ‘you’, ‘today’, ‘now’, etc.). This arguably is not direct quotation, because the construction isn’t opaque with respect to various grammatical processes, like NPI licensing and A’ extraction (as in the Amharic (37) above), that typically cannot operate into direct quotations. In Slave, in some contexts 1<sup>st</sup> person indexicals (and only those) shift. The contexts are the complements of ‘say’ and ‘want’, where the shift is optional, and the complements of ‘tell’, where the shift is obligatory and applies to 2<sup>nd</sup> person, as well. No other indexicals ever shift in Slave. In these languages the indexicals in these contexts also display what Anand & Nevins call “Shift Together” effects—if one shiftable indexical shifts, then all shiftable indexicals under the scope of the same predicate must shift, even across coordination.

Deal (2013) reports another distribution of shifted indexicals in Nez Perze (a Sahaptian language spoken in the northwestern US), where we find shifting in embedded attitude contexts with 1<sup>st</sup> and 2<sup>nd</sup> person pronouns and *kíne* ‘here’; and the personal indexicals, but not the locative, show Shift Together effects. She argues for separate shifters for person effects and for locative effects, because “locative shift entails person shift, but person shift does not entail locative shift” (p.11). Yet other patterns are observed in other languages, e.g. Uyghur (a Turkic language spoken in the Xinjiang Autonomous Region of China and parts of Kazakhstan) and Japanese, both discussed in Sudo (2012).

Another thread in the literature on shifted indexicals pertains to their appearance in a variety of sign languages: American Sign Language (ASL: Lillo-Martin 1995, Koulidobrova & Davidson 2014, Schlenker 2014), Deutsche Gebärdensprache (DGS: Hermann & Steinbach 2012; Hübl 2013), L'langua de Signes Catalana (LSC: Quer 2005, 2011, 2013), Langues des Signes Française (LSF: Schlenker 2014), and Lingua dei Segni Italiana (LSI: Zucchi 2004). There are at least two classes of predicates in these languages in whose complements indexicals display shifted interpretations, e.g. 1<sup>st</sup> person denoting someone other than the actual signer in the context of utterance. But the status and nature of the context shifting, and even whether it might, in some of these sign languages, in one class or another, be a form of quotation instead of context shift, is still quite controversial (see Koulidobrova & Davidson 2014 and Schlenker 2014 for a recent extended discussion of the controversy, and Zucchi 2004, who would even make something of the fact that the indication of context-shifting in predicate complements and in direct quotation are so similar gesturally). But all the authors (and the data) seem to agree that there are some cases in (at least) ASL, DGS and LSC in which attitude predicates and verbs of saying have a non-quoted complement clause which clearly involves shifted indexicals. Consider the following LSC examples from Quer (2011):

(38) \_\_\_\_\_t \_\_\_\_\_RS-i  
 IX<sub>a</sub> MADRID<sub>m</sub> MOMENT JOAN<sub>i</sub> THINK IX-1<sub>i</sub> STUDY FINISH HERE<sub>b</sub>  
 ‘When he was in Madrid, Joan thought he would finish his study in Barcelona.’

(39) YEAR-LAST JOAN-<sub>i</sub> DECLARE IX-1<sub>i</sub> HERE YEAR-THIS STUDY FINISH  
 \_\_\_\_\_RS-i  
 ‘Last year Joan declared: ‘This year I’ll finish my study here.’’

As is usual in the notation of sign languages, the sign *IX* is a pronoun, indexed with the locus of that individual in the discourse space; this is represented by a particular location in the actual space around the signer, indicated simultaneously with the use of the pronoun (or other NP). The index *I* is located at the signer, indicated by pointing toward herself. The over-lined segments are accompanied by special non-manual gestures: “\_\_\_\_t” indicates topicalization of the associated constituent, while “\_\_\_\_RS-*i*” indicates Role Shift to adopt the role of the agent indexed *i*. Role Shift involves shifting eye gaze and, usually, body orientation in such a way as to iconically suggest that the signer has adopted that agent’s point of view (e.g., in some cases, directing her gaze toward the established indexed location for the agent’s addressee, instead of toward the actual addressee). In (38), there is Role Shift over the attitude predicate and its complement, indexed to the agent Joan, and accordingly the first person pronoun in the complement (with the signer pointing to herself) is understood to refer to Joan, not to the signer. But the locative indexical *HERE* is anchored to the actual place of utterance, Barcelona, rather than to the location of the reported attitude. This contrasts with (39), where the 1<sup>st</sup> person pronoun is shifted to refer to Joan, but the sign for ‘this year’ may either be anchored to the actual year of utterance or to the time of Joan’s reported attitude.<sup>9</sup> LSC 1<sup>st</sup> and 2<sup>nd</sup> person

<sup>9</sup> In ASL, Koulidobrova & Davidson (2014) note a difference in scope of RS in the counterparts of examples like (38), where it extends over the embedding predicate, and those like (39), where it does not; they take this as evidence of a different status of the two kinds of examples. However, Quer (p.c.) says that LSC signers do not make the distinction Koulidobrova & Davidson discuss, spreading over the predicate in the non-speech verb class. And Quer (2013) reports examples like the following (his (33)):

\_\_\_\_\_RS-i

pronouns obligatorily shift in these contexts (per Quer 2013), while locative indexicals do not. The interpretation of NOW as the time of the actual utterance rules out a direct quotation analysis of (38); while the possibility of interpreting *YEAR-THIS* as the year of the actual (not the reported) utterance similarly rules out a direct quotation analysis for (39). There is also syntactic evidence that Role Shifting is non-quotational in LSC; for example, direct quotations can be topicalized in LSC, but complements with shifted indexicals cannot.

Sign languages differ in how they realize shifted indexicals. DGS is similar to LSC in permitting mixed indexical interpretations: Hübl (2013) reports on experimental work verifying that 1<sup>st</sup> and 2<sup>nd</sup> person indexicals are obligatorily shifted in the scope of RS in DGS, whereas *HERE* never shifts unless explicitly modified to do so (like *HERE (in) MADRID* in (38)), but the DGS counterpart of *YEAR-THIS* optionally does. In contrast, Schlenker (2014) reports that in LSF all indexicals obligatorily shift, including not only 1<sup>st</sup> and 2<sup>nd</sup> person, but ‘here’; however, in LSF, a quotational analysis cannot be ruled out on purely syntactic grounds. ASL doesn’t seem to display the kind of mixed shifting just illustrated in (38), but *wh*-extraction is allowed from the relevant complement clauses, arguing that these complements aren’t interpreted as direct quotes (or at least, not purely so—see Maier (to appear) for a “mixed quotation” analysis). Koulidobrova & Davidson (2014) report that in ASL, shift is obligatory with 1<sup>st</sup> person under verbs of saying marked with RS, but optional under attitude predicates so-marked. Summarizing, the situation is complex and differs from one sign language to another, as we might expect—why should ASL be any more like LSF than English is like Amharic? But it is clear that there is some authentic indexical shifting going on.

There is one more important fact to note about the available cross-linguistic evidence about shifting indexical anchors. It seems that in all the spoken languages considered above—Amharic, Zazaki, Nez Perze, and Uyghur—shifted 1<sup>st</sup> person pronouns are obligatorily interpreted *de se* with respect to the anchoring center (Schlenker 1999,2003, Anand & Nevins 2004, Anand 2006, Sudo 2012, Deal 2013). The literature on the signed languages doesn’t always address this issue, but Schlenker (2014) does, and finds in his experimental work on ASL that the shifted 1<sup>st</sup> person pronouns are obligatorily read *de se*, while 3<sup>rd</sup> person pronouns in indirect discourse are not.

None of these facts about the interpretation of 1<sup>st</sup> person singular pronouns and other indexicals across languages seems amenable to explanation on the direct reference approach.

#### 1.4. Associativity: Wechsler’s observation

Wechsler (2010) observes that *without exception across a broad variety of surveyed languages* 1<sup>st</sup> and 2<sup>nd</sup> person pronouns universally have an **associative semantics** for their plural forms. That is, their plural forms are never interpreted to mean that there is a plural coreferential set of speakers (addressees). Instead, it’s always understood that the denotation may include a possibly

- 
- (i) SOME THINK CAN IX-1<sub>i</sub> EXAM FAIL  
‘Someone<sub>i</sub> may think he<sub>i</sub> has failed the exam.’

Here RS is over the complement of *think*, but the main clause also contains the modal CAN. In this case, the RS does not extend over the embedding predicate.

non-null complement to speaker (addressee), which latter needn't itself be plural. I.e. "there are no [plural] pronouns specialized for referring to 'only addressees' or 'only speakers'." Wechsler further argues on the basis of an extensive cross-linguistic search that conventional associative semantics is very rare in other kinds of NPs. This makes the universal associative semantics for the indexical pronouns all the more striking. It also contrasts sharply with other "phi features" of pronouns, including gender, number and case, which all display considerably greater flexibility and variation across languages.

Wechsler argues that the explanation for this striking language universal is that "reference to 'addressee' and 'speaker' is not directly distinguished at all within pronoun systems." Instead, the person feature indicates self-ascription, guaranteeing *de se/de te* interpretation. That is "the value of the person feature (1<sup>st</sup>/2<sup>nd</sup>/inclusive) indicates which speech-act participant self-ascribes, instead of indicating which speech-act participant the pronoun refers to" so that "self-ascription exhausts the person semantics of [*you* and *I*]" (2010:348)

In support of his general view, Wechsler discusses at some length experimental work in psychology investigating the use of 1<sup>st</sup> and 2<sup>nd</sup> person pronouns by children in the early stages of language acquisition (up to about age 3½) and by children on the autism spectrum. Both classes of subjects have problems using and interpreting these pronouns properly. And both groups are now generally agreed to have either a not-yet-fully-developed or an impaired theory of mind, in the psychological sense of that term.

Summarizing the relevant experimental literature:<sup>10</sup>

...we find early PRODUCTION of first person and COMPREHENSION of second person, with other combinations developing later. One aspect of this pattern has appeared particularly mysterious. In language acquisition, comprehension normally precedes production, but for the first-person forms the order is reversed: 'As Charney points out, the production of *my* without comprehension seems illogical. The children would only be able to produce *my* in self-reference if they had already understood other speakers' use of *my* as self-referring' (Chiat 1986:347).

But...this pattern of acquisition is exactly what is expected if the ability to self-ascribe precedes the mastery of theory of mind. During the period before theory of mind is in place, successful pronoun use is favored for the self-ascribers, that is, for the speakers producing *I/my/mine* and the addressees comprehending *you/your/yours*.

In contrast, on the standard view it was hard to see why the acquisition of these pronouns should proceed in exactly this order. If first- and second-person pronouns were designated as referentially anchored to 'speaker' and 'addressee' respectively, then that anchoring would apply equally regardless of whether one were producing or comprehending the utterance.

In one revealing study, Loveland (1984) investigated the developmental relationship between spatial point of view and correct use of *I/you* pronouns by means of a cross-sectional and longitudinal study of two-year-olds. Loveland concluded that 'a breakthrough in pronoun use comes at about the time the child learns that points of view can differ' (Loveland 1984:554), and

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<sup>10</sup> Recent work by Moyer et al. (2014) is critical of the work by Charney summarized by Chiat, arguing that the experiments were poorly designed and underestimate normal two-year-olds' ability to use 1<sup>st</sup> and 2<sup>nd</sup> person pronouns correctly. However, even if this is correct, the difference between the normal children and those with autism still seems to be accepted, so far as I know

specifically claimed that children master spatial point of view first, then apply it to pronoun comprehension and production.

Wechsler (2010:359-360)

In children with autism, there is “a special difficulty with the use of first- and second-person pronouns [involving the use of person], ‘to a degree that seems out of keeping with other aspects of their language development’ (Lee et al. 1994:156).” These children tend to reverse the person feature of these pronouns, referring to themselves as *you* and an addressee as *I*. This contrasts very clearly with pronoun-use errors in children with Down syndrome: While the autistic children had more problems with person reversal but only very rarely made a case error, the Down syndrome children showed the opposite pattern. In the psychological literature, this has been correlated with the autistic children’s inability to grasp the idea that other people have distinct “conceptual perspectives”. Again, this behavior is very difficult to explain on the standard theory of indexical pronouns: “On the standard theory of indexicals there is no need to take the speaker’s perspective in order to understand their utterance of a first-person pronoun. All that one needs to know is (i) who is speaking, and (ii) that a first-person pronoun refers to whoever is speaking.”

Roughly, one might say that there is evidence that for normal children producing *I* is easy, but understanding it is hard; while understanding *you* is easy, but producing it is hard. And for children with autism, grasping the distinction between 1<sup>st</sup> and 2<sup>nd</sup> person is hard. Wechsler argues that this correlates with a failure to grasp the notion of self-ascription which is central to the meanings of these pronouns.

For the ADDRESSEE to understand Mary’s use of the first person...he must infer Mary’s self-ascribed belief. He does so in roughly the same way that we as linguists have analyzed her utterance: he constructs a model of Mary’s belief state by applying the rules of the language. To construct a model of someone else’s belief state, an agent must exercise the human ability known as THEORY OF MIND, the cognitive ability to impute mental states to others and draw inferences from them (Premack & Woodruff 1978). Thus for an addressee to correctly interpret a first-person utterance requires theory of mind, while the speaker can interpret (and therefore produce correctly) her own first-person utterance without the need for theory of mind.

Similar reasoning applies to 2<sup>nd</sup>-person pronouns, only with the speech-act participants reversed...

Wechsler (2010:257)

## 1.5 Indexicals and problems with *de re* belief attribution

The original arguments for the indexicality of demonstratives stem from Kaplan, and draw on examples where demonstratives are embedded under modals and in conditionals. E.g. consider:

- (40) [Stalnaker and Chomsky are sitting at opposite ends of a long table on a stage at MIT. One audience member says to another:]  
If he had changed places with Noam, that guy [pointing to Stalnaker] would be a linguist.

This, of course, is false, ridiculously so. The demonstratum in the actual context of utterance is Stalnaker, and no matter the counterfactual situation, the denotation in that situation of the NP

*that guy* is still going to be Stalnaker. Just because Stalnaker changes seats on the dais with Noam Chomsky, that doesn't transform him into a linguist. To account for such behavior, Kaplan argued that demonstratives are directly referential, their meaning given directly by the context of utterance, via their Character, unmediated by a Fregean sense. Thus their interpretation doesn't shift under modality.

In this respect, the demonstrative NP *that guy* displays parallel behavior in counterfactuals to that of the English 1<sup>st</sup> person singular pronoun: The intended (true) interpretation of (41) is just as silly as that of (40):

(41) [Laura is speaking to Calvin:] If you were speaking now instead of me, I would be a boy.

Kaplan takes the meaning of a conditional like that in (40) to be a singular (structured) proposition, one in which the actual demonstratum Stalnaker is embedded in the structure; he assumes the same kind of interpretation for indexical *I* in an example like (41). Most linguists have instead modeled the Kaplanian character of a demonstrative as a function from context of utterance to an individual concept, the latter a constant function from worlds to the demonstratum of the accompanying demonstration—e.g. in (40), Stalnaker.

The problem with this is that just like those rigid designators the proper names, demonstratives and so-called pure indexicals like *I* present us with puzzles when they occur in the scope of doxastic modals and attitude predicates. Heim (1985) constructed an example which illustrates the problem:

(42) [Context: The speaker sees two images of chairs in the room where she sits, one to her left, the other image to her right. The image to the right is either a reflection in a mirror or else behind a piece of clear glass.  $\delta_1$  is a pointing by the speaker to the image to her left,  $\delta_2$  is a pointing to the image to her right:] That [ $\delta_1$ ] is that [ $\delta_2$ ].

Now consider two different possible contexts of utterance for (42), *c* and *c'*. *c* is the mirror world, so that  $\delta_1$  and  $\delta_2$  are in fact gestures which pick out the same chair. On Kaplan's theory, (42) expresses the necessarily true proposition in *c*. *c'* is the glass world, where the speaker is pointing at different chairs, so that, again on Kaplan's theory, (42) expresses the necessarily false proposition. But our intuitions tell us that in neither case does utterance of (42) seem trivial. Kaplan (1977, 1978) explains this apparent non-triviality for related examples as follows: The audience for (42) trusts that the speaker is saying something true. However, they don't know which context they're in, *c* or *c'*. From the character of (42), they know that it expresses either a necessarily true or a necessarily false proposition. They conclude that they're in a context like *c*, not *c'*, hence acquiring new information, even though the proposition expressed was not contingent. This is effectively the diagonalization strategy of Stalnaker (1979).

However, Heim points out that although this might seem a plausible explanation for the informativeness of (42), this type of explanation doesn't seem to be extendable to examples like her (43) and (44):

(43) That [ $\delta_1$ ] might well be that [ $\delta_2$ ].

(44) If that  $[\delta_1]$  were that  $[\delta_2]$ , there would be only one chair in the house.

Kaplan argues that the content of a sentence in any given context is a function of the contents of its parts in that same context ("There are no monsters."). Therefore, since (42) is a part of both (43) and (44), the propositions they express should be calculable on the basis of the proposition expressed by (42). But this is not the case. E.g., consider (43). Suppose its LF is  $\diamond(42)$ , and that it is uttered in context  $c$ . Since  $|(\delta_2)|^c$ , the proposition expressed by (42) in context  $c$ , is the necessarily true proposition,  $|(\delta_3)|^c$  should be the same. And the same argument would hold for  $c'$ , where both (42) and (43) would express the necessarily false proposition. But intuitively, (42) and (43) have different meanings. Similarly, given the counterfactual mood of the antecedent of (44), we might felicitously utter it in a situation known by the interlocutors to be like  $c'$ . Then the antecedent would be necessarily false, on Kaplan's theory. If we take the meaning of a counterfactual to be basically that of Lewis (1973), then the sphere of worlds in which the antecedent would be true (which are closest in other respects to the actual world  $c'$ ) would be the empty set, and (44) would be trivially true. But (44) seems to be contingent, instead, its truth dependent on other facts about the household in question.

Here's an example from Stalnaker (2012) which gets at the same problem:

I [Stalnaker] am talking with John Perry at an APA meeting, but he is not wearing his nametag, and I am not sure who he is. I know Perry's work, but (let's suppose) I had never before met him. I am pretty sure the guy I am talking with is either John Perry or Fred Dretske, but I am not sure which. He is telling me what a fantastic book *Knowledge and the Flow of Information* is, and I am wondering whether he is bragging or praising the work of a colleague. I believe that the person with whom I am talking thinks that *Knowledge and the Flow of Information* is an excellent book, and I also of course believe that he believes that he is telling this to me (though he may not know who I am, since I am not wearing my nametag either). . . . Suppose John comes to realize that I am not sure whether he is Perry or Dretske.

In this context, Stalnaker claims that Perry might utter (45):

(45) [Perry to bystander:] This guy thinks I might be Fred Dretske.

We assume that both Perry and Stalnaker know that Perry and Dretske are distinct philosophers, and that they take it that any reasonably well-informed contemporary American philosopher knows this. If we take  $I$  in (45) to denote a constant function picking out the actual speaker, Perry, in every world, then *This guy thinks I might be Fred Dretske* would be attributing to Stalnaker an irrational belief. But that doesn't seem to be the case. Instead there are some worlds in Perry's conception of Stalnaker's belief state in which Perry *qua the guy Stalnaker is speaking with* is the philosopher known as John Perry, but others in that state in which Perry *under that same guise* is the philosopher known as Fred Dretske. This seems to be behind the intuitively correct understanding of (45). Stalnaker notes that in (45) Perry's  $I$  will pick out Dretske in some of the worlds he takes to be compatible with Stalnaker's beliefs. Thus,  $I$  somehow tracks something like Stalnaker's concept 'the person I am talking with'.

Similarly, an amused bystander, acquainted with both Stalnaker and Perry, might utter (46), while Stalnaker himself might utter (47): [these are my variants]

- (46) [spoken *sotto voce* by an amused savvy bystander to someone who joins the group:]  
Stalnaker thinks Perry might be Dretske.  
(47) [aside by Stalnaker to someone else standing nearby:] This guy [indicating Perry] might be Dretske, or he might be Perry.

The same problem arises for *Perry* in (46) and for *this guy* in (47) as for *I* in (45). Note that in all these cases we have *de re* interpretations of the underlined expressions: For example, the understood issue in (46) isn't whether Stalnaker thinks the individual named *John Perry* is the same individual as the one named *Fred Dretske*, but whether the particular individual in front of Stalnaker is or is not Fred Dretske. Hence, (45) – (47) illustrate how the classic problems about identity in *de re* belief contexts arises not only for proper names, but for indexicals and demonstratives as well. That is, this problem can arise whenever a doxastic operator like epistemic *might* or a doxastic attitude predicate like *thinks* takes in its syntactic scope an NP of a type usually taken to denote (in a context) a constant intensional concept, i.e. a function from worlds whose value is the same individual in each world. In these doxastic contexts, taking such NPs to be constant functions doesn't yield the intuitive interpretation.

In each of (45), (46) and (47), the individual whom the speaker intends to refer to via his use of *this guy* or *Perry* or *I* happens to be the actual John Perry. But the agent of the attitude—which is Stalnaker in each case, whether he's the reported agent (in (45) and (46)) or the speaker himself (47)—is unaware that the referent is Perry. This doxastic agent has partial information about the individual he's speaking with, which permits him to identify that individual in one sense (as via the descriptions *this guy* or *the guy I'm talking with*), but not to properly identify him in other respects, such as via his name. Hence, this is an essentially *de re* (non-*de dicto*) interpretation. How can we capture the apparent insensitivity to scope that seems called for in examples like (40), while accounting for the problem just illustrated, which seems to be caused by the very mechanism introduced to explain that apparent wide scope—the constant value of the content of an indexical in any given context? And when might we expect these kinds of interpretation?

All the cases of interest involve situations where a doxastic agent has information about some *res* which is partial or incorrect in some particular crucial respect; they are all cases of not-knowing-who-or-what the *res* might be under some relevant guise. Consider Kripke's (1979) Peter. He knows (i) that there was someone named *Paderewski* who was a Polish nationalist leader and Prime Minister, and (ii) that there was someone named *Paderewski* who was a famous Polish pianist and composer who died in the U.S. in 1941. But he has never met either of these Paderewskis nor seen a photo, and all of his information was gathered through reading, listening to recordings, and hearsay. Though he takes all this information to be true, Peter doubts that one can be both an accomplished musician and a successful politician; none of the sources he's familiar with explicitly equates the two Paderewskis; and so he assumes—reasonably, but as it turns out, incorrectly—that Paderewski<sub>i</sub> and Paderewski<sub>ii</sub> are two different individuals with the

same, not uncommon Polish name.<sup>11</sup> Although the name *Paderewski* in the two conjuncts refers to the same individual familiar in our Common Ground, Peter's prejudices prevent him from recognizing the same individual under the two different guises. This is to say that from Peter's perspective, i.e. in all of the worlds reflecting his beliefs there are distinct values for the two uses of the name, corresponding to the distinct guises. All of the puzzles about *de re* belief arguably come down to problems of belief in agents having merely partial, sometimes incompatible information about the denotatum, which information does not suffice to make a correct judgment about identity. Direct reference accounts of indexicals don't give us a way to get at this partiality because they assume direct access to the denotatum, the *res*.

Moreover, I will argue that the partiality that underlies puzzles about belief is actually crucial to understanding indexicality generally: that at the core of an indexical expression is the speaker's supposition that the intended denotatum can only be retrieved by the addressee *from a given perspective*, and that, as with anaphora, in the general case this perspective is one which is only accessible via the common information of the interlocutors, and not necessarily in the concrete situation of utterance (or at least, via that situation alone). We can predict the relevant problems of identity to typically arise in contexts where there is consideration of the beliefs of a third party agent because it is precisely such contexts that make salient a different doxastic perspective on the *res* in question from that of the speaker/interlocutors, i.e. that of the other doxastic agent.

Such shifting is completely unexpected on the direct reference account of indexicals. If the content of an indexical were fixed by its Character, given once and for all for the entire utterance, it would be surprising that an embedding predicate or modal could shift the context so as to affect that content. Moreover, as the data from Amharic and Slave and the other languages considered in §1.3 show, different indexicals are sensitive to different particular types of embedding context. Again, if we take indexicals' contents to be fixed by the context of utterance, then if there *were* monsters that shifted context, we'd expect them to shift context for all indexicals. Since this is not the case, modification of the direct reference account does not seem promising.

As a basis for the alternative account I will propose, intended to address all the problems noted in this section, in the next section we consider work which serves as important background: Stalnaker's theory of centered worlds.

## 2. Centers and centered worlds in *de se* interpretation

The notion of a center has been proposed in work on the semantics of self-location and *de se* interpretation (Casteneda 1966,1967,1968; Morgan 1970; Lewis 1979b; Richard 1983; Perry 1993; Maier 2009; Ninan 2010, etc.). This phenomenon is illustrated in the following story, a variation on one due to Morgan (1970):

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<sup>11</sup> *Paderewski*: "habitational name, probably for someone from Paderew in Siedlce voivodeship, or possibly Padarew, now in Ukraine." [www.ancestry.com](http://www.ancestry.com).

- (48) [Context: The baseball player Ernie Banks gets hit on the head and develops total amnesia. He doesn't know his name or remember anything about his past, though he is lucid. During his long recuperation, he reads in the newspapers about a baseball player named Ernie Banks, and becomes fascinated with the guy's career. His social worker reports to a nurse:]  
Ernie Banks thinks he is one of the greatest shortstops of all time.

Though *Ernie Banks* and *he* are coreferential, (48) need not attribute to Ernie Banks awareness that he *himself* was a shortstop. In fact, it's more consistent with the facts about his situation to assume that he does *not* so self-attribute. But now suppose that Ernie begins to take a new drug and his memory completely returns. In such a case, utterance of the same sentence by the excited social worker would likely be taken to implicate that Ernie *does* self-attribute baseball greatness; this is the *de se* reading. Notice that the two interpretations are not truth conditionally equivalent: In the context given in (48), the amnesiac, non-*de se* version is true, while the *de se* version is false. So this ambiguity would appear to motivate a semantic distinction. But it seems clear that in both interpretations the NPs *Ernie Banks* and *he* are coreferential; this shows that coreference is not sufficient to guarantee the *de se* reading. Then the question is how that reading arises, and how to model it in the semantics.

A Hintikka-style (1969) account of the semantics of attitude reports characterizes a doxastic agent *a*'s attitude in a given world at a given time via a modal accessibility relation relativized to *a*. A doxastic accessibility relation *DOX* takes an agent *a*, a time *t*, and a world *w*, and yields a set of worlds (or world-time pairs), those in which every proposition that *a* believes at *t* in *w* is true. Stalnaker calls the output set of worlds the agent's *belief state*. But Lewis (1979b) argued that (48) and other similar examples show that this relation is not yet adequate to capture what it is to hold a belief *when that belief pertains to oneself*. The proposition that Ernie Banks is one of the greatest shortstops of all time is a set of possible worlds. To say that this proposition is true in all the worlds in Banks' belief set fails to capture the difference between his believing this as a proposition *about himself* and believing it about *someone else*.

Quine first introduced the idea of a *centered possible world*, and Lewis (1979b) adopts a variant to address the problem of *de se* interpretation. Very briefly, Lewis argues (p.518) that one who has a propositional attitude "locates himself in a region of logical space...He has a belief about himself, namely that he inhabits one of the worlds" where his belief is true. This is self-ascription of "a locational property: it is the property that belongs to all and only the inhabitants of a certain region of logical space." Such propositions divide up the populace: some inhabit worlds where the belief is true, others do not. So the believer "has a partial opinion as to who he is: he is one of *this* class, not one of *that* class." Thus Lewis takes this to be a kind of property: the property of inhabiting such and such a type of world.<sup>12</sup> But this property  $\delta$  is equivalent to a set of centered worlds: pairs of a world and a "designated space-time point therein"; these are those

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<sup>12</sup> Lewis also argues that the *de se* examples ultimately show that the objects of the attitudes are not propositions, but properties. Self location may bear not just on which world the agent is in, but on *where* she is in that world, so that her self-locating properties are not equivalent to pairs of an individual and a *world*. But Stalnaker argues convincingly that this argument does not go through: Where a given individual is at a given time is a fact about the world she is in. If she might be in place *p* or in *p'*, then there is one world in which she is in *p* and a distinct world where she is in *p'*.

pairs  $\langle c, w \rangle$  in which the designated space-time point  $c$  corresponds to (a time-slice of) an individual which has the corresponding property  $\delta$ , and in which the world  $w$  is one of those inhabited by  $c$  in virtue of his belief. Then the objects of attitude predicates are such properties or sets of centered worlds. Ninan (2010) succinctly characterizes how this works:

A centered world  $\langle w_0; x_0 \rangle$  is compatible with what an agent  $x$  believes in a world  $w$  iff  $x$  thinks in  $w$  that she might be  $x_0$  in  $w_0$  ( $x$ 's beliefs do not exclude the possibility that she is  $x_0$  in  $w_0$ ). An agent  $x$  believes *de se* in  $w$  that she is  $F$  iff every  $\langle w_0; x_0 \rangle$  compatible with what she believes in  $w$  is such that  $x_0$  is  $F$  in  $w_0$ . To believe a centered proposition (set of centered worlds)  $p$  is for every centered world compatible with what one believes to be contained in  $p$ .

This account has the ability to distinguish between *de se* and non-*de se* contents. Following Egan (2006, 107), we can say that non-*de se* contents are boring centered propositions, where a centered proposition  $p$  is boring just in case for any world  $w$ , and inhabitants  $x, y$  of  $w$ ,  $\langle w; x \rangle \in p$  iff  $\langle w; y \rangle \in p$ . Since boring centered propositions do not distinguish between worldmates, they are essentially equivalent to possible worlds propositions. A *de se* content is an interesting, i.e. non-boring, centered proposition. The account captures the idea that *de se* thoughts are not reducible to non-*de se* ones, since it allows for pure *de se* ignorance, ignorance that cannot be resolved simply by learning more and more boring centered propositions. [Ninan 2010]

Stalnaker (2008, in press) argues for a modification of Lewis' view. He has multiple reasons for this, but here we will focus on one, which he calls a problem of *calibration*, crucial to comparing cognitive states. Hintikka's approach to propositional attitudes via modal accessibility relations, sketched briefly above, makes possible comparison of the content of the objects of such attitudes across times and across persons: Two individuals  $A$  and  $B$  (or one individual at two times) believe the same proposition  $p$  at  $t$  in  $w$  just in case both  $\text{DOX}(A, t, w) \subseteq p$  and  $\text{DOX}(B, t, w) \subseteq p$ . Then:

The unreconstructed Hintikka-style models of cognitive states took calibration for granted, but ignored belief change and self-location. The Lewis centered-worlds models recognized self-location, but provided no resources for representing the relations between informational states across time and across persons, and so no resources for clarifying the dynamics of knowledge and belief, or the communication of information between different subjects. The general framework that I am promoting allows for calibration across time, and across different subjects, but it also recognizes that calibration is a nontrivial problem, and may not be well defined in all cases. [Stalnaker 2012]

If beliefs are sets of centered worlds, and two distinct agents' beliefs involve sets with distinct centers, how can we compare what they believe? If the same agent at distinct times corresponds to two distinct individual-time pairs, two centers, how can we compare what that agent believes at different times?

Stalnaker points out that replacing worlds in the Hintikka approach with centered worlds (below) permits us to talk about just one doxastic accessibility relationship  $R$ , the agent given by the center of its first argument. Hence, a belief-state involving Lewis' centered worlds can be characterized thus:

a **belief state** is a pair consisting of a centered world and its Dox-related belief set:

- the **base (centered) world**: the determining centered world, an ordered pair consisting of (a) the center: a person whose beliefs are being represented and the time at which she has those beliefs, and (b) the possible world in which the center has those beliefs
- the **belief set**: the determined set, a set of centered worlds of the same type as the base world. In each pair  $\langle c, w \rangle$ , the  $c$  represents what the base subject takes herself to be in  $w$ , a world which, for all she believes, may be actual. The worlds in these pairs are those which would be accessible from the base world under Hintikka's doxastic accessibility relation relativized to the base center.

Stalnaker's modified theory of centered worlds is realized with a model  $\langle W, S, T, \geq, E, R \rangle$  where:

1.  $W$  is a nonempty set of possible worlds
2.  $S$  is a set of *subjects* or believers [*my doxastic agents*]
3.  $T$  is a set of times
4.  $\geq$  is a binary transitive connected anti-symmetric relation on  $T$ , a relation that determines a linear order of the times.
5.  $E$  is the set of centered worlds meeting the condition that the subject of the center exists in the world at the time of the center, where
  - A **center** is a pair,  $\langle A, t \rangle$ , where  $A \in S$  and  $t \in T$ . Subjects may exist at some times at some worlds, and not at others.
  - A **centered world** is a pair  $\langle c, w \rangle$ , where  $c$  is a center and  $w \in W$ .
6.  $R$  is a binary relation on  $E$  that is transitive, Euclidean and serial.  $R$  must also satisfy condition (\*), below. To say that  $\langle \langle A, t \rangle, w \rangle R \langle \langle B, t^* \rangle, w' \rangle$  is to say that it is compatible with what  $A$  believes at time  $t$  in world  $w$  that she is in world  $w'$ , that she is person  $B$ , and that the time is time  $t^*$ .

$R$  in 6 is a doxastic accessibility relation (the sort of relation I call *DOX* throughout this paper), representing a subject's beliefs at a time in a world. The requirements on  $R$  guarantee that the agent has access to what she believes and to what she does not. See Stalnaker (2012, Chapter 2) for very useful discussion of the properties of this model. It has the additional condition (\*):

- (\*) For any centers,  $c^*$ ,  $c'$  and  $c''$ , and worlds  $w$  and  $w'$ : if  $\langle c^*, w \rangle R \langle c', w' \rangle$  and  $\langle c^*, w \rangle R \langle c'', w' \rangle$ , then  $c' = c''$ .

Intuitively, (\*) tells us that "ignorance or uncertainty about where one is in the world is always also ignorance or uncertainty about what world one is in" [2012:70]. Stalnaker tells us that (\*) is the main respect in which this model differs formally from Lewis', in which the same center was permitted to occur in two "places" in the same world. Lewis argued that this was necessary in order to properly model the structure of *de se* beliefs, which he argued to be inherently more fine-grained than could be captured with possible worlds. But because of (\*), for Stalnaker the contents of a belief state "can be taken to be ordinary propositions—sets of uncentered possible worlds, even though the centers determined by a particular belief state may play a role in determining which proposition is denoted by a that-clause with indexical expressions in it"

(2008:71). That is, **the “distinctive self-locating character [of self-locating beliefs] will be a feature of the subject’s relation to that content, and not a feature of the content itself”** [my emphasis].

Suppose agent A says to agent B *I am hungry*; they may both grasp the same content of A’s assertion, a set of possible worlds. But *qua* centers at the time of utterance they stand in different relationships to it: A, as the center in the base world of her belief report, is in an identity relationship with derived centers which share a common property of hunger in all the derived worlds at the time of utterance; whereas in B’s belief state resulting from acceptance of the assertion, the derived centers needn’t share that property. So, among other virtues, Stalnaker claims that (\*) permits us to:

- model the denotations of the complements of attitude predicates as simple propositions, and thus straightforwardly:
- compare the beliefs of different subjects (whether self-locating or “boring”), and of a single believer at different times, something not possible in the Lewis model (where two sets of centered worlds with distinct centers were not comparable)
- model the way assertions change the context, as in Stalnaker (1979)
- model the dynamics of belief for a single agent, using standard belief revision theory

As proposed by Ninan (2010), common belief can also be modeled in this framework by taking the center of the base centered-world to be a group such that all believe the propositions  $\phi$  that are true in all the accessible worlds, all believe that all believe those propositions, all believe that all believe..., etc. The group can be modeled as a sequence of individuals, the sequences representing where the members of the group mutually locate themselves and each other in the possible worlds compatible with their common beliefs. Common Ground, as in Stalnaker (1979), is more common *acceptance*, rather than common belief, coinciding with belief only “in naïve conversations”. But otherwise it behaves like common belief. Thus, the interlocutors’ **Context Set** (CS) is a certain type of purported belief set, as defined in terms of this model. This is the notion of (purported) **doxastic state** we will assume henceforth.

Thus, the denotation of the complement of *believe* can itself be a simple proposition, say, a set of possible worlds. *believe* denotes a complex relation which takes the proposition and the agent denoted by its subject and yields a relation between centered worlds. The base world is the pair of the agent (at the time of utterance) and the world of evaluation; the derived worlds are those in which the complement proposition is true *of the self-identified counterparts of the agent*. The ambiguity of interest then is captured by whether a pronoun in the complement clause that’s coreferential with the subject has a denotation in the belief worlds which is the same as that of the derived centers, i.e. whether its denotation is taken by the base world’s center to be his counterpart in the centered worlds in the belief set. This is the case in the 2<sup>nd</sup> of the logical forms for (48) given below, yielding the *de se* interpretation, but not in the first:

[Ernie Banks believes he is a great shortstop]<sup>w</sup>

believe(<eb,w>) $\subseteq$ {<©,w’>   eb is a great shortstop in w’}	[non <i>de se</i> ]
believe(<eb,w>) $\subseteq$ {<©,w’>   © is a great shortstop in w’}	[ <i>de se</i> ]

In both interpretations,  $\{w' \mid \exists \odot: \langle w', \odot \rangle \in \text{believe}(\langle w, \text{eb} \rangle)\} \subseteq [\text{he is a great shortstop}]^{w, g}$ , where  $g(\text{he})$  is Ernie Banks. That is, we can compare Banks' beliefs on the two interpretations. Thus, one of the virtues of this model is that because the content of an attitude-complement clause can be characterized as a simple proposition, a set of possible worlds, we can ignore centered worlds except when the centers are relevant to capturing truth conditions. In considering the relation of a centered world  $\langle \langle \text{agent}, t \rangle, w \rangle$ , where self-identity is not at issue (there is no coreferential pronoun in the complement clause) we can abstract away from the centers in the belief set, presenting the agent A's doxastic state as a simple set of worlds. But if the passage involves an attitude where the complement clause contains an NP coreferential with A, and pertains to A's view of who he himself is, then we consider the relevant centered worlds.

### 3. Centers as perspectival anchors

I claimed above that indexicals are essentially perspectival. I have in mind a distinctly doxastic notion of *perspective*, related to what Lewis has in mind when he says that the *de se* involves self-ascription of a "locational property...in a certain region of logical space". Doxastic agents arrive at their beliefs on the basis of the partial information they are privy to (both true and false); that is, beliefs reflect a limited point of view and yield an associated (non-omniscient) perspective on the way things are. In terms of the Lewis/Stalnaker framework just discussed, we can define one of the central notions in the account of indexicality I'll propose below, that of a *discourse center*. In this section I will define the basic notions required to explain how point of view and perspective play a role in the semantics of indexicals. In the next section, we'll apply these notions to the analysis of indexicals and demonstratives.

#### 3.1 Doxastic centers and doxastic perspective

As sketched in the introduction, a point of view in actual space, modeled as a three-dimensional Cartesian coordinate structure, can be characterized as a point in that space and a vector for which the point serves as origin (Barlew, in press)—a location plus an orientation. The vector suggests an accessibility relation from the vector's origin to other points ("locations") in the space—those perceptually accessible from the adopted point of view plus orientation. We can metaphorically extend and generalize this locative notion in order to characterize an agent's doxastic point of view, yielding their perspective on a matter.

In the doxastic case, the "space" is that of possibility. In that space, call the origin of a doxastic point of view a *doxastic center* in a world. A doxastic center is an ordered pair consisting of a doxastic agent—an entity capable of being in a belief state—and a time. Then the *origin* of a doxastic point of view is the ordered pair of a doxastic center and a possible world, the world in which the agent has her beliefs at that time. A doxastic origin is thus the same type of object as that of the base centered worlds in a belief relation:  $\langle \langle a, t \rangle, w \rangle$ . Parallel with Barlew's locative point of view, a doxastic point of view is a doxastic origin (the base centered world) plus its associated doxastic relation DOX, which captures the agent's orientation in the space of possibilities. The center's doxastic perspective from the doxastic point of view anchored in the origin  $\langle \langle a, t \rangle, w \rangle$  is the agent's belief set at  $t$  in  $w$ , as given by DOX:  $\text{DOX}(\langle \langle a, t \rangle, w \rangle)$ . This is a specification of the (true and/or false) information to which the agent has access from that point

of view, a set of centered worlds. Continuing the spatial metaphor, a doxastic point of view yields the other “points” in logical space—the other possible centered worlds—to which the center has doxastic access. Because we assume Stalnaker’s (\*) condition on doxastic accessibility, when *de se* interpretation isn’t relevant, we can characterize the perspective as the corresponding set of simple worlds.

Summarizing:

A **doxastic center** is an ordered pair consisting of a doxastic agent  $a$  and a time  $t$ :  $\langle a, t \rangle$ .

A **doxastic origin** is an ordered pair of a doxastic center and a world:  $\langle \langle a, t \rangle, w \rangle$ .

A **doxastic point of view** is a doxastic origin and its associated doxastic relation DOX.

A **doxastic perspective** is the information accessible from a doxastic point of view,  $a$ ’s belief set at  $t$  in  $w$ :  $\text{DOX}(\langle \langle a, t \rangle, w \rangle)$ .

I’ll argue in the following sections that the notion of a Doxastic Center so defined, capturing what Stalnaker (2012) calls “self-location in thought”, proves to be useful in interpretation even when *de se* attitudes are not obviously at issue. One central role is in providing the key to a more flexible, yet constrained account of indexicality.

To model this more general notion of center and how it comes to bear on interpretation, centers will serve not only as the first elements in centered worlds, but also have informational counterparts which are distinguished elements of the interlocutors’ contextual information. Interlocutors track the relevant doxastic centers as these change over the course of a discourse. This little bit of linguistic engineering is intended to make clear how centers systematically interact with both conventional content and pragmatic factors to yield the range of attested interpretations for indexicals across languages, for *de se* interpretations, and for NP uses involving *de re* attribution.

### 3.2 Discourse centers

It is useful in semantics to think of discourse as an interchange based on shared information. While the C(ommon)G(round) is intended to model all the information which the interlocutors take themselves to share in a discourse, it proves to be rather unwieldy as a characterization of what Lewis (1979) called the scoreboard of a language game (see the Afterword of Roberts 1996/2012 and Roberts 2012b for extended discussion). In considering how contextual information comes to bear on interpretation, and to change as a consequence of that interpretation, we find that different types of information regularly bear on interpretation in different ways, and that conventional elements of the non-proffered content of an utterance regularly draw on specific aspects of this shared information. So it is useful to formally distinguish these different aspects of the information in the CG. The result is a tuple, a dynamic body of information updated in the course of interpretation.

In this essay, I want to keep discussion of technical details to a minimum, in the interest of focusing on the basic conceptual structure of the phenomena of interest. Hence, I will abstract away from the dynamics of discourse update. To model the discourse scoreboard I adopt a simplified and modified version of the information structure of Roberts (1996/2012), which

offers a static snapshot of the discourse scoreboard at a given point in the interchange. But I'll give a few hints on how one might model this in a dynamic theory like the well-known Discourse Representation Theory of Kamp (1981), Kamp & Reyle (1993), or the compositional DyCG of Martin (2013).

Here is the scoreboard I assume:

**Context of utterance in a discourse D:**  $\langle DG_D, QUD_D, CS_D, DR_D, \textcircled{D} \rangle$ , consisting of

- DG: the interlocutors' evident goals, their Domain Goals
- QUD: the set of questions currently under discussion
- CS: the interlocutors' Context Set, the set of worlds compatible with their CG
- DR: the set of Discourse Referents (DRefs), a set of variables of type  $\langle s, e \rangle$
- $\textcircled{D}$ : the set of discourse centers, each the ordered pair of a DRef and a time:  $\langle d, t \rangle$ .

I will have nothing to say here about the interlocutors' Domain Goals or the QUD; with one exception below, I will ignore them. As for the CS, the reader familiar with DRT can think of this as the set of worlds in which there are truthful embeddings of the corresponding DRS: those assignments of values to DRefs in its universe which are compatible with the DRS conditions. That is, as in Kadmon (2001), I assume that a DRS is richer than just a record of the conversation in progress, and includes all the information in the interlocutors' CG.

As is usual in dynamic theories of interpretation, a discourse referent (DRef)  $d \in DR_D$  is a variable which serves as the address, or file label for information in the CG about some "entity" which is familiar in the discourse (Karttunen 1976, Heim 1982; cf. the reference markers of Kamp 1981). For an entity to be familiar in this sense, it need only be the case that the CS entails its existence.<sup>13</sup> Thus,  $DR_D$  might be understood as the representational reification of the existential entailments in CS. If something is entailed to exist, then we track the information we have about that entity by introducing a "file" with that information. Because we track not only entities which we take to exist, but also hypothetical or arbitrary individuals under discussion (under the scope of a modal or other quantificational operator), DRefs cannot be reduced to actual individuals in a model. Instead, a DRef (file) acts as an address for tracking the information associated with what the interlocutors take to be a single (real or hypothetical) entity. The elements of DR, then, are correlated with individuals in the real world only if introduced in a *realis* context. Like free variables in static logical forms, elements of  $DR_D$  are interpreted by assigning them values in the model. The admissible assignment functions over  $DR_D$  are not arbitrary (as in the usual Montague grammar model), but are only acceptable insofar as they reflect the shared information associated with the DRefs, as reflected in the CS at the time of interpretation: Heim's File Cards, Kamp's truthful embeddings, and the related assignments in Martin's DyCG.

There is one difference between the classical conception of DRefs in Kamp (his "reference markers") or Heim, and DRefs in the present account. Their DRefs are of semantic type  $e$ , so that admissible assignment functions map them to individuals in the model. But here DRefs will

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<sup>13</sup> This is the weak familiarity of Roberts (2003), discussed in section 1.1. See Martin (2013) for a formal implementation of this idea in his DyCG.

be of type  $\langle s, e \rangle$ , i.e. they are mapped onto individual concepts (ICs). Thus, in a given world in the CS, the interlocutors' familiar DRefs correspond to Fregean senses, not extensions. One reflex of this is that it enables us to model what interlocutors know about what others believe about the entities with which the interlocutors are familiar. For example, one of the things my sister Jane and I know about Santa Claus is that her son Jake believes that Santa exists; so in any given world in our joint CS, the DRef  $d$  corresponding to *Santa Claus* will denote an IC whose value in all the worlds in Jake's counterfactual doxastic state (as we know it) lives in the North Pole in that world, drives a sleigh on Christmas eve, etc. Take  $\text{DOX}_{\text{CS}}(\text{Jake})$  to be those worlds which reflect all the things that the interlocutors agree that Jake believes; hence, for all  $p$  s.t. the interlocutors believe that Jake believes  $p$ ,  $\text{DOX}_{\text{CS}}(\text{Jake}) \subseteq p$ . Then because the interlocutors agree that they disagree with Jake about the existence of Santa Claus:

$$\text{DOX}_{\text{CS}}(\text{Jake}) \cap \text{CS} = \emptyset$$

Now consider the possible values of the DRefs in our discourse context corresponding to Jake and Santa. These values are all those given by assignments  $g$  of values for those DRefs s.t. these values are consistent with the information in the interlocutors' CS (and hence, in a DRS reflecting that CS would make all the DRS conditions true). Since DRefs are of type  $\langle s, e \rangle$ , then these  $g$  are s.t. given the Santa DRef  $d$ , for all worlds  $w \in \text{DOX}_{\text{CS}}(\text{Jake})$ ,  $g(d)(w)$  is an individual who has all the properties that we agree that Jake believes Santa Claus has. Then if Jane and I disagree about whether Jake thinks there's a Mrs. Claus, there are worlds  $w, w' \in \text{DOX}_{\text{CS}}(\text{Jake})$  s.t.  $|\text{married}|^w(g(d)(w))$  is true while  $|\text{married}|^{w'}(g(d)(w'))$  is false. In this way, the information associated with DRefs is cross-referenced, as it were, with the information the interlocutors share about others' beliefs.<sup>14</sup>

Besides this virtue of the new type for DRefs, I note without extended discussion that it permits the resulting theory to reflect many of the desirable features of the account of Elbourne (2005, 2008), as well as facilitating incorporation of Aloni's (2001) perspective shifting operation, discussed and suitably revised below. And it will permit appropriate DRefs to represent the doxastic centers which play a role in indexical anchoring, even when those agents themselves are irrealis, as in iterated belief contexts.

The scoreboard contains a set of **discourse centers**  $\mathbb{C}_D$ , a dynamically changing indication of those familiar doxastic centers (agents at a time) whose doxastic perspective the interlocutors take to be relevant at that time in the discourse. A discourse center  $\mathbb{C} \in \mathbb{C}_D$  is a pair  $\langle d, t \rangle$

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<sup>14</sup> But suppose that Jake sees a fellow named Orcutt walking on the beach with his family and thinks he's a sterling citizen. On another occasion Jake sees Orcutt late at night in a dive bar, wearing a trench coat and with his face mostly hidden by a pulled-down fedora, and Jake thinks this fellow must be a spy. It seems that Jake simultaneously has two distinct perspectives on this fellow Orcutt, which lead him to incompatible beliefs about what is, in fact, the same guy. Then what do we say about the value of  $d$ , the discourse referent for Orcutt, in the worlds in  $\text{DOX}_{\text{CS}}(\text{Jake})$ ? From Jake's point of view, these are not the same guy; hence Jake doesn't know that his beliefs are inconsistent. If we want perspectives to be consistent, we might want to say that this situation is one where Jake has two distinct perspectives on what is actually the same individual; see §6 below. As Quine (1956) discussed, this reveals a number of thorny issues pertaining to the semantics of belief. But since nothing requires us here to make firm decisions about how many perspectives a doxastic agent might bring to bear on a single individual, or even about the consistency of an agent's beliefs, I'll ignore these issues in the remainder of this discussion.

representing the agent  $d$  of a contextually relevant doxastic attitude at a given time  $t$ . Both elements of this pair are DRefs, since times—or events—are taken to be also familiar in the context, following Partee (1984). For simplicity here, we'll assume that times are comparable across worlds, so under any assignment of values to DRefs,  $t$  will denote a constant function. Thus, a discourse center is the conversational correlate of a center in Lewis' centered-worlds framework. To distinguish centers, they are doubly co-indexed to reflect both the agent and time; so  $\odot_{i,j} = \langle d_i, t_j \rangle$ . Accordingly, if  $j \neq k$ ,  $\odot_{i,j} \neq \odot_{i,k}$ , since the same agent may have different beliefs at different times.<sup>15</sup>

The set of **centers in a discourse**  $D$ ,  $\odot_D$ , is as follows:

$\odot_D \subseteq \{ \langle d_i, t_j \rangle \mid d_i, t_j \in DR \ \& \ d_i \text{ is a doxastic agent whose beliefs at } t_j \text{ are under discussion in } D \}$ . Given indices  $i, j, k, l, m$  for familiar DRefs  $\in DR$ :

- $\odot_D$  always includes a distinguished center  $\odot_{i,j}^*$ , corresponding to the speaker(s)  $d_i$  at the time of utterance  $t_j$ , and another  $\odot_{k,j}^@$  corresponding to the addressee(s) at that time.
- additional centers  $\odot_{k,m}$  may be introduced in conjunction with the interlocutors' consideration of alternative doxastic states, triggered in a constrained fashion either by lexical semantics or in accordance with the conventions of discourse styles like FID. In particular:
  - dynamic compositional interpretation of an attitude predicate conventionally triggers the introduction of a discourse center corresponding to the agent of the attitude at the event time of the holding of the attitude; and
  - discourse conventions associated with FID trigger introduction of a center corresponding to the agent whose perspective at a given time is adopted by the author.

In addition, like other components of the language scoreboard,  $\odot_D$  is updated as the speaker changes, or when leaving the scope of a doxastic operator or FID.

In a normal, “non-defective” context,  $\odot^*$  will take the same value for all the worlds in CS—i.e., the interlocutors will assume that they know who the speaker is, in some sense of *knowing who*. If they know that John Perry is speaking, then the discourse referent corresponding to the agent of  $\odot^*$  will be the IC whose value in all worlds compatible with CS is John Perry, a constant function. (More on what happens when the identity of the speaker is unknown, in §6 below.) This center is updated whenever the speaker changes. Just as in Partee (1984), where in order to adequately model temporal semantics and pragmatics in discourse, the Reichenbachian Reference Time RT and the utterance time are updated dynamically over the course of interpretation, in this framework the distinguished center  $\odot^*$  at any given time is updated to be  $\langle d, t \rangle$ ,  $d$  the familiar discourse referent corresponding to the speaker at that time, and  $t$  the time of utterance. The speaker is always the principal discourse center on the scoreboard—intuitively, the individual whose purported beliefs (presupposing the CG) are being reported in an assertion, whose identity serves as index for *I*, whose location serves as default location for *here*, etc., and whose perspective on the entities under discussion is the default assumed for the

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<sup>15</sup> Whenever I don't think it will lead to confusion, I suppress the relativization to times in the interest of simplicity, and talk about a Center  $\odot_i$  as a distinguished type of discourse referent  $d_i$ , corresponding to a contextually relevant doxastic agent.

interpretation of NPs, at least in non-intensional contexts. Take  $\text{DOX}(\odot)(w)$  for a given world  $w$  to be the set of (for this illustration, non-centered) worlds consistent with the beliefs in  $w$  of the agent of  $\odot$  (the value of that IC  $g(d_k)$  in  $w$ ) at the time of  $\odot$ . Then assuming the speaker is sincere and competent and that a sincere speaker's purported beliefs include the propositions in the CG, for any CS-consistent world  $w$  her belief state in  $w$  at the time of utterance,  $\text{DOX}(\odot^*)(w)$ , is a subset of the interlocutors' CS prior to utterance,  $\text{DOX}(\odot^*)(w) \subseteq \text{CS}$ .

At certain junctures in utterance interpretation, under DR update/downdate (Kamp 1981, Heim 1982, Partee 1984, Martin 2013) other discourse centers besides  $\odot^*$  may become salient, relevant, and accessible in the technical sense of Kamp (1981). First, when the speaker changes, the value of  $\odot^*$  changes, and similarly with the addressee and  $\odot^@$ . In some cases additional centers are introduced as a function of the compositional update of the context in the course of interpretation of a single utterance: For example, following Heim (1992), use of *believe* introduces quantification over worlds in the doxastic state of the subject. Then under the scope of this predicate, that agent (at the relevant time and world) serves as a subordinate center,  $\odot^{\text{believe}}$ , whose life-span *qua* center is the scope of the operator itself. Generalizing, an attitude predicate or other expression whose meaning involves quantification over the worlds in a belief state (or, like *wish*, is founded on such a belief state), always subcategorizes for a corresponding doxastic agent; typically with an attitude predicate, this is the denotation of the predicate's subject (though see the object of *convince* in *Carol convinced Georgia to cut her hair*). Then under the scope of the attitude predicate  $R$ , there will be an accessible discourse center  $\odot^R$  corresponding to that doxastic agent. This is crucial for capturing *de se* interpretations and indexical shifting in languages like Amharic and Zazaki, and for addressing the *de re* interpretation of NPs in attitude complements, as I will illustrate below.

A pragmatic counterpart of this semantic mechanism serves to license shifted uses of English indexicals like *here* and *now* in FID. In FID, typically the author uses a variety of markers to indicate that this style has been adopted, and hence that the perspective has been shifted (see Eckardt 2014); then a new  $\odot^{\text{FID}}$  is pragmatically introduced to the set of salient centers, the agent of  $\odot^{\text{FID}}$  corresponding to the literary character whose perspective is to be adopted.

The introduction of discourse centers is more restricted than the introduction of discourse referents themselves. The latter (I have argued) requires only weak familiarity. But update of the set  $\odot_D$  occurs only (a) when the interlocutors' roles change, (b) when subordinate centers are introduced as part of conventional update/downdate, as when triggered by attitude predicates, or (c) as a reflection of FID. There are, arguably, other doxastic operators besides those in the lexical semantics of attitude predicates and in FID that may induce  $\odot_D$  update. For example, English epistemic *must* is by default anchored to the speaker (e.g. see DeRose 1991) or, in interrogatives, the addressee; but under the scope of a perspectival adverbial like *according to John*, the anchor is shifted in (49), as it is in the complement of *thinks* with John as agent in (50). However, for introduction of a new center, it does not suffice that the most salient individual under discussion is a doxastic agent, even where that individual's doxastic state is explicitly mentioned, as we see in (51), where the speaker is still the understood anchor of *must*.

(49) According to John, it must be raining.

(50) I just asked John what he thought about the weather. He thinks it must be raining.

(51) I just asked John what he thought about the weather. It must be raining.

Thus, even though the set of discourse centers may be a proper superset of the set of interlocutors, it is far more constrained than the set of weakly familiar anaphoric antecedents, any additions and changes given either by compositional semantics or conventions of use like those associated with FID.

Centers other than  $\textcircled{*}$  are subordinate to  $\textcircled{*}$  just because in ordinary conversation the main goal of discourse is for the interlocutors to share content. The CG is the central doxastic perspective (or purported doxastic perspective) for the exchange, what speakers may always reasonably presuppose. Other agents' views are relevant only insofar as they contribute to the developing shared CG. This is why  $\textcircled{*}$  has a special status in discourse—it is always relevant, as reflected in its special role in indexical anchoring: Hence, in languages like English, a non-speaker center is subordinate to  $\textcircled{*}$  in the sense that even in subordinate doxastic contexts it is still the distinguished  $\textcircled{*}$  which serves as origin for indexicals like *I*.

As in standard theories of dynamic interpretation, we need to guarantee a tight relationship between CS and DR, such that the interlocutors track the information they share about the elements of DR, and use that information to constrain the interpretation of anaphoric NPs. Again, in the interest of simplifying exposition, in what follows I will assume the notion of a **CS-consistent assignment**  $g$ ; such a function assigns to discourse referents in DR values which are consistent with the interlocutors' information about them as reflected in CS. As in DRT or Heim's File Change Semantics, tracking information about familiar discourse referents is accomplished by putting constraints on assignments of values to variables. The index associated with a discourse referent serves as its address, and as we add information about that discourse referent, this successively constrains the values which can be assigned to it in interpretation, requiring that all contextually felicitous assignments only give values which respect that information. Hence, if, say, a pronoun takes DRef  $d_i$  as its antecedent, the value assigned to the pronoun by a CS-consistent assignment  $g$  for a given world  $w$ ,  $g(d_i)(w)$ , will be an entity which has all the properties the interlocutors take to hold of  $d_i$  in  $w$ . This information is updated throughout interpretation, dynamically; and the lifespan of  $d_i$  is restricted to the scope of any operators which have scope over the NP introducing  $d_i$ . Since all this information is in the interlocutors' context for interpretation at a given point in discourse, we say that the felicitous assignments are CS-consistent.

#### 4. A semantics for English indexicals and demonstratives

In §1, we considered three kinds of definites in English, semantically and etymologically akin—the demonstratives (both demonstrative pronouns and descriptions), the definite descriptions, and the 3<sup>rd</sup> person pronouns. As their name suggests, they are all used by a speaker to refer to a definite something, in some pretheoretic sense of “definite”. But we also saw that indexicals and demonstratives display a sensitivity to shifted point of view which is not found in definite descriptions and non-demonstrative pronouns like *it*.

In the current model, this sensitivity is captured for all indexicals by making their interpretation dependent upon a discourse center. Again:

An **indexical** is an expression whose interpretation conventionally presupposes a relation to the doxastic point of view of a contextually available discourse center, its anchor.

Thus, in indexical semantics a discourse center plays the role of Nunberg's (1993) *index*, the entity (at a time) to which an indexical expression is anchored. Like the pure indexical *I*, English *you* is also always indirectly anchored to  $\textcircled{*}$ , since we infer from the speaker's stance and gaze, along with prior conversation and occasional vocatives, which individuals one might reasonably take to be  $\textcircled{*}$ 's intended addressees, hence to correspond with  $\textcircled{^@}$ . Besides the 1<sup>st</sup> and 2<sup>nd</sup> person and demonstrative pronouns, other indexicals include *here*, *now*, *recent*, *tomorrow*, and *yesterday*. These are by default anchored to  $\textcircled{*}$ , but unlike *I* and *you*, they may in certain contexts be anchored to a subordinate center, as in FID. This same difference in anchoring potential is observed somewhat further afield in what Potts (2005) called Conventional Implicature (CI) triggers. Potts had argued that CIs are always "speaker-oriented". This seems to be true of his "emotive CIs". For example, French *tu/vous* and Japanese honorific NP-suffixes like *-san* always anchor to  $\textcircled{*}$ ; it is *not* that they are co-referential with the speaker, but that they reflect a particular social relationship between the speaker and the NP's denotatum. But Amaral et al. (2007) note that some supplemental CIs, like non-restrictive relative clauses and appositives, may sometimes be anchored to some other relevant point of view, e.g. to a subordinate center when embedded under attitudes or in FID, an observation subsequently experimentally verified by Harris & Potts (2009).

It is useful to compare the indexicals to lexical items like *local*, *recent*, and *actual*, which are more flexible in their anchoring requirements. Consider again Partee's (1989) *local*:

- (1) After the game, every sports fan stopped at a local bar.
- (2) After the game, every sports fan stopped at a bar here for a drink.

As noted above, in (1) the locale may be that of the speaker, the game, or the (widely dispersed) sports fans, only the first of them corresponding with a discourse center under the rules for center introduction discussed in the previous section. As we saw, this contrasts with the behavior of *here* in (2), which can only be anchored to  $\textcircled{*}$ . See also Barlew (2013) for additional arguments that such locatives are not point-of-view sensitive. Hence, *local* is not indexical in the sense defined here.

In any case, the indexicals so-defined constitute a much larger class than Kaplan's. His pure indexicals are those which are lexically anchored to  $\textcircled{*}$  or  $\textcircled{^@}$ , so that they can never be anchored to a subordinate or merely contextually salient center. Besides *I* and *you*, English *we* and plural *you* must be lexically anchored to  $\textcircled{*}$ , but, as Nunberg (1993) showed, the intended plural denotatum can also include entities bound by a higher quantifier, as in:

- (51) Whenever  $I_7$  play duets with someone<sub>11</sub>, we<sub>12</sub> always play Fauré.

Here, the other member of the plural entity denoted by *we* (besides the speaker-anchor) is the instantiation of a donkey variable, whose antecedent is *someone*, under the scope of *whenever*. *now*, *here* and other English indexical temporal adverbials are more flexible in their choice of anchor, e.g., as we saw, amenable to shifting in FID, but nonetheless more restrictive than *local*, requiring an anchor which is a true doxastic center. And as we'll discuss below, languages with conventionally shifted indexicals permit anchoring to specific types of subordinate centers.

I propose a semantics for *I* which at first sight resembles Kaplan's in that it is lexically anchored to the contextually understood speaker. Assume that the notion of context is as given in the previous section, where it yields information about the CG/CS and about what entities are familiar in that body of information—the DR. Also, the distinguished center  $\odot^*$  at any given time is updated to be  $\langle d, t \rangle$ , where  $d$  is the familiar discourse referent corresponding to the speaker at that time, and  $t$  is the time of utterance; and other elements of the set  $\odot_{\mathbf{D}}$  are updated as discussed above.

Each indexical's conventional content—its Character—has two parts, its felicity condition (reflecting any presuppositions or other conditions on felicitous use) and its proffered content (assuming that those conditions are met):

(52) **Character of English *I*:**

Given a context  $K = \langle CS_K, DR_K, \odot_K \rangle$ , with  $\odot^* = \langle d_k, t \rangle$  a distinguished element of  $\odot_K$ :

**Presupposed content:** Use of  $I_i$  is felicitous in  $K$  at time  $t$  just in case  $d_i \in DR_K$  and for all CS-consistent assignments  $g$ ,  $g(d_i) = g(d_k)$ .

**Proffered content:** Where felicitous, for all CS-consistent assignments  $g$ ,  $|I_i|^{K,g} = g(d_i)$ .

The presuppositional content of  $I_i$  is a requirement that there be a familiar entity in the discourse (the DRef  $d_i$  coindexed with the NP) which is known by the interlocutors to be the agent of the distinguished discourse center  $\odot^*$  at the time of utterance. The requirement of a familiar DRef  $d_i$  is an anaphoric presupposition: the denotatum must be weakly familiar. The requirement that it be equivalent to the agent of the current discourse center  $\odot^*$  anchors it indexically. We might have given a simpler condition requiring that the index on  $I$  be that on the DRef agent of  $\odot^*$ , but have instead made it a condition on the CG/CS that  $d_i$  and the agent of  $\odot^*$  map onto the same value (an IC), for reasons that will be clear below; that is, though the two DRefs may be distinct, they are presupposed to denote the same individual in all the CS-worlds. Given that in any of the worlds in the CS we take the actual speaker at the utterance time to be the value of  $\odot^*$ , then so long as the interlocutors know that someone is actually speaking, this presupposition is trivially satisfied, even if they don't know who that individual is in other respects—all that's required to guarantee that  $d_i$  is in DR is that the interlocutors know there is a speaker (in which case  $i = k$ ), satisfying weak familiarity. The proffered content then just identifies the sense of  $I_i$  with the IC which is the value under any CS-consistent assignment  $g$  of the familiar  $d_i$  which satisfies the anaphoric familiarity presupposition.  $I_i$  thus has a sense, a function from worlds to individuals. But since its interpretation is indexically anchored to the actual speaker via  $\odot^*$ , and required to have the same value as the center's agent, then relative to any given  $K$ ,  $g$ ,  $|I_i|^{K,g}$  always denotes that actual speaker. Satisfying the presuppositions of such an indexical will give it the effect of always taking wide scope over any operators introduced compositionally in the interpretation of the utterance in which it occurs—modals, attitude predicates, negation, interrogation, etc.—

giving the effect of direct reference via global presupposition satisfaction, while the indexical itself stays *in situ* at LF. That is, operators in the proffered content of an utterance only target proffered content, and here the anchoring is presupposed.

One interesting question about the proposed semantics for *I* is whether, for a given  $\langle d_k, t, w \rangle$ , CS-consistent  $g, g(d_k)$  is always a constant function, yielding the same value for all worlds in the domain. Nothing here guarantees that, nor do I think it should. Note first that such a function is not required to guarantee the kind of wide scope effect noted by Kaplan; as we just saw, that follows from the presuppositional anchoring to discourse context which is conventionally associated with *I*. Of course, in any context in which the interlocutors know who the speaker is,  $g(d_k)$  will have a constant value across the CS worlds; that is, this account guarantees doxastic rigidity (the same value in all belief worlds) for well-informed interlocutors. But suppose that the speaker is Ernie Banks. There is a sense in which he knows who he is—this self-present guy in a hospital bed, with a headache, who cannot remember his name or his past. But suppose Banks extends his sick-bed reading matter to include not only Chicago baseball heroes but also great figures in Chicago linguistics. Reading about the famous linguist James D. McCawley of the University of Chicago, Banks learns that, like him, McCawley was a big fan of the Cubs,<sup>16</sup> that he loved Chinese food,<sup>17</sup> and that he was around his same age. Banks, fascinated since childhood by linguistic puzzles, gets really excited and tells his nurse:

(53) I know now who I am! I'm James McCawley!

Though Bank's last utterance contains no modals or attitude predicates, its interpretation raises the same kind of puzzle we saw in the examples involving *de re* belief attribution considered in §1.5. As in those, we don't want to characterize Banks' confusion as a matter of incorrectly thinking that the baseball great is a linguist. I.e. he isn't saying that Ernie Banks is James McCawley. If that were the meaning of (53), it would imply that Banks does not know what he's saying, that he cannot himself retrieve either the meaning of *I* or the proposition expressed.

I don't think that's right. Banks is talking about *himself*, a *res*, and saying that one feature of that *res* is that it is the individual known as McCawley. We'll return to this question below in §6. For the moment, it is enough that we derive the wide scope effect. But keep in mind that Banks, like any other competent speaker of English, does know this: Assuming there's (exactly one) person speaking, then that speaker is a singular individual located at the place of utterance at the time of utterance. That is, the pragmatics of what it is for someone to speak—an occurrence that causes sound waves to emanate from the speaker into her immediate environment, or for signers something visually similar with light waves—and of location for embodied beings together entail that there's a specific speaker at the given time of speaking, and hence, *that it is that particular speaker, whoever it turns out to be, that will yield the intended denotatum for any 1<sup>st</sup> person pronouns in the utterance*.<sup>18</sup> This is a *de re* belief. In what immediately follows, I will typically

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<sup>16</sup>assumed purely for the sake of this example. Does anyone know if McCawley liked the Cubs?

<sup>17</sup>James D. McCawley (1984) *The Eater's Guide to Chinese Characters*. University of Chicago Press, 1984. [ISBN 0-226-55591-7](#). Reprint. University of Chicago Press, 2004. [ISBN 0-226-55592-5](#).

<sup>18</sup>Things are a bit different, of course, for written or recorded utterances, and this has led to an extended discussion of various *prima facie* counterexamples to Kaplan's *I am here now*. All the more reason to take the relevant constraint to be pragmatic, and not semantic. But even in these cases, there is a pragmatic assumption of singularity

simplify discussion by considering cases where the speaker(s) is/are aware of her/their identity, and hence the value of the discourse center agent is doxastically rigid in much the same way as the value of a proper name, yielding the same value in all the CS-worlds. Then we can speak, in this relativized way, of the doxastic agent of a center as a singular individual with a particular given name, etc. However, the fact that this proposal does not guarantee such rigidity should be kept in mind, and will be discussed further in §6 below.

The proposed semantics for *I* guarantees that it will always be understood *de se* in the context of utterance. Since the speaker is one of the interlocutors and is self-aware as such, and ©\* is itself a reflection of the interlocutors' CG, the speaker (unless unconscious and rambling) is always self-located *qua* speaker.

The same ©\* anchoring makes *we* be *de se* as well, under the following interpretation:

(54) **Character of English *we*:**

Given a context  $K = \langle CS_K, DR_K, ©_K \rangle$ , with ©\* =  $\langle d_k, t \rangle$  a distinguished element of ©<sub>K</sub>:

**Presupposed content:** Use of *we*<sub>*i*</sub> is felicitous in *K* at time *t* just in case there are  $d_i, d_j, d_k \in DR_K$  s.t. for all CS-consistent assignments *g*,  $g(d_k) \leq g(d_j)$  and  $g(d_i) = g(d_j)$ .

**Proffered content:** Where defined, for all CS-consistent assignments *g*:  $|we_i|^{K,g} = g(d_i)$ .

Like *I*, *we* is always presuppositionally anchored to the agent of ©\*, the DRef  $d_k$ . But unlike *I*, it needn't be coreferential with ©\*'s agent. Instead, it must refer to some familiar entity that includes that agent,  $g(d_k) \leq g(d_j)$ ; typically the denotation properly includes the center. This is the associative semantics noted by Wechsler. If ©\* itself has a plural agent, it may be that  $d_k = d_j$ . But if the agent is a singular speaker, then *we* may be understood to refer to an inclusive group including the addressee ©<sup>@</sup>, or an exclusive group including some salient individual(s) other than the addressee (the difference grammaticized as inclusive vs. exclusive 2<sup>nd</sup> person plural in some languages). In (51) above, assume ©\* has the singular agent  $d_7$ , and  $d_{12} = d_7 \oplus d_{11}$ ,<sup>19</sup> where  $d_{11}$  is the DRef for the narrow scope indefinite *someone*<sub>11</sub>; in that case, *we* is both indexical—anchored to ©\*, and bound to an arbitrary value for  $d_{11}$ . Since anaphora must be resolved with reference to the speaker's evident intentions, *we* cannot be pure in Kaplan's sense.

As with plural denotata generally, whatever is predicated of *we* might either apply collectively (*we are a band*) or distributively (*we are hungry*), as a function of both the lexical semantics of the predicate and pragmatics.<sup>20</sup> In this connection, note that I have not included in (54) a requirement that the value of  $d_j$  under a given *g* be non-atomic, i.e. a plural entity. Requiring this would be easy enough: simply add  $\neg \text{Atomic}(g(d_j))$  as a conjunction in the felicity condition. But instead I assume that the plural feature of *we* is a purely syntactico-pragmatic feature requiring a

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on the part of the speaker or author. It's typically just that there can be a time- and place-lag which confounds interpretation of *now* or *here*.

<sup>19</sup> The join operator  $\oplus$  is borrowed from Link's (1979).

<sup>20</sup> I take as my point of departure here the extended discussion in Roberts 1987, 1987b, 1987c, 1991 of plurals and distributivity, and the associated lexical semantics of predicates, in a modification of the framework of Link (1979). Space precludes discussion of the rich literature on the subject which has evolved over the past 25 years. I don't believe any of it poses a significant problem for the analysis proposed here.

plural antecedent: The familiar  $d_i$  is not marked as atomic, but for felicity must either have been introduced by a syntactically plural NP or represent a weakly familiar non-atomic group. This condition can be added to the felicity condition in (54), but I avoid doing so here because it requires discussing complex matters about plurality more generally.

There is ample evidence that *we* needn't always be given a non-atomic denotation (see the references in the last footnote for discussion of the lack of connection between morphological and semantic plurality). To see this, consider first:

- (55) [My friend Sally and I]<sub>7</sub> were both very tired when we left for our long-planned vacation. We<sub>7</sub> wanted to do so much. But in the end, we<sub>7</sub> slept and read a lot and did fewer things together than we<sub>7</sub> had planned.

Like *want*, the predicates *sleep* and *read* in the last sentence denote intrinsically distributive predicates—things that only a single entity can do. But doing things together is a collective predicate, requiring a group denotation. The conjoined predicates, two distributive and one collective, all take  $we_7$  as subject; the first two then predicate eating/sleeping distributively of each of the atoms of  $g(we)$ , while the last predicates doing-things-together of the group. Because *we* must have a plural antecedent, in typical cases like (55) its denotation will be non-atomic, *unless* it is bound in a distributive predication over that antecedent, as in (56), where adverbial *each* makes explicit the predicate's distributivity over  $[[Sally]] \oplus g(I)$ :

- (56) [Sally and I]<sub>7</sub> each promised ourselves<sub>7</sub> that we<sub>7</sub> would be nice to the other.

For the speakers I've consulted, (56) says that each atom of  $[[Sally]] \oplus g(I)$  has the property of promising herself that she would be nice to the other atom of that group—I'm determined to be nice to Sally and she's determined to be nice to me. So  $we_7$  has a syntactically plural antecedent, but a singular interpretation in any instantiation of that property. Thus, a subtle range of interpretations of *we* falls out from fairly standard assumptions about distributivity and the proposed semantics in (54).

The 2<sup>nd</sup> person pronoun *you* has a similar semantics to that of *we*.<sup>21</sup> The differences are that, of course, it is anchored to the addressee(s) instead of to the speaker(s), and, crucially, that it needn't take a syntactically plural antecedent:

- (57) **Character of English *you*:**

Given a context  $K = \langle CS_K, DR_K, \odot_K \rangle$ , with  $\odot^@ = \langle d_k, t \rangle$  a distinguished element of  $\odot_K$ :

**Presupposed content:** Use of  $you_i$  is felicitous in  $K$  at time  $t$  just in case there are  $d_i, d_j, d_k \in DR_K$  s.t. for all CS-consistent assignments  $g$ ,  $g(d_k) \leq g(d_j)$  and  $g(d_i) = g(d_j)$ .

**Proffered content:** Where defined, for all CS-consistent assignments  $g$ :  $|you_i|^{K,g} = g(d_i)$ .

If  $g(d_k) = g(d_j)$ , the interpretation of *you* is singular. If not, it has a group-addressee interpretation. In the latter case, Wechsler's associative plural generalization still holds: As with

<sup>21</sup>The semantics offered for *you* and discussion of its *de te* properties were prompted by a very stimulating correspondence with Steve Wechsler (p.c.), who pressed me to consider how it might differ from *I/we*. However, he may well not agree with my conclusions here.

*we, you* is not interpreted as denoting a properly plural set of addressees. Instead, it's always understood that the denotation may include a possibly non-null complement to the addressee(s), which latter needn't itself be plural, though it might be.

I leave open here some subtle questions about what it means for  $\textcircled{*}$  or  $\textcircled{a}$  to be a group, in view of their roles as anchors for *de se/de te* interpretation. Can a group have a common doxastic point of view, in something like the sense required for such interpretations? What would it be for a *group* to self-locate? All I can say here is that, as with so many other questions about natural language metaphysics, we seem to *talk as if* groups can serve as *de se* anchors. But serving as anchor needn't mean being the bearer of a *de se* attitude, because the actual predicates which give rise to *de se* interpretations are arguably themselves distributive, hence (in the analysis of Link) ranging over atomic members of their subject denotata. For example, consider:

(58) You all think you are in Chicago.

(59) Mary Margaret thinks you are in Chicago.

In (58), *all* implies that the subject is properly plural, a group addressee. But *think* is an inherently distributive predicate—thinking is arguably something, like sleeping or being hungry, that only a particular organism can do. Still, (58) may have two distinct interpretations: one in which each member of the group of addressees thinks she herself is in Chicago, and another in which each member thinks all the members of the group are in Chicago (assuming, again, that being located in Chicago is an inherently distributive predicate). We will see just below how these are derived on the present account. The point here is that on either interpretation, (58) can only be true if each member of the group of addressees self-locates in Chicago. That is, it is a *de te* belief. Similarly, on one interpretation of (59), *Mary Margaret* may be understood to denote one member of a properly plural group of addressees. Suppose a tour group has gotten lost and disoriented, and their handler in another city is trying to help them figure out where they are. He reports on one member's hunch, addressing the group as a whole (including Mary Margaret). In that case, in order for (59) to be true, Mary Margaret must self-locate in Chicago.

Now for the two readings of (58): Under (57), the presupposition of perspectival anchoring triggered by *you* guarantees that it will be anchored to  $\textcircled{a}$ . But two tokens of *you* addressed to the same entity needn't be coindexed in order to be coreferential. Thus we have logical forms like:

(58') You<sub>7</sub> all think you<sub>8</sub> are in Chicago.

The *all* in (58) guarantees that the value of the subject *you*<sub>7</sub> is properly plural. But note that under Wechsler's associative generalization, the plurality of the denotation of *you*<sub>7</sub> does not guarantee that the anchoring agent of  $\textcircled{a}$ , the addressee itself, is itself properly plural. One might utter (58) to a friend when talking with him (alone) about a group to which he belongs. Then *g*(*d*<sub>k</sub>) is the friend, who is part of the group represented by the DRef *d*<sub>7</sub>, and *g*(*d*<sub>7</sub>) is the denotation of the subject *you*<sub>7</sub>. But because the predicate *think* is distributive, it predicates 'thinking that you<sub>8</sub> are in Chicago' of each atom of *g*(*d*<sub>7</sub>). Technically, distributive predication (like explicit adverbial *each*) involves abstraction over the subject to yield the property:

$\lambda_{x_7}.x_7$  thinks you<sub>8</sub> are in Chicago

which then must hold of each atom of the subject-group. Then what about  $d_8$ ? Assuming we maintain the same addressee  $g(d_k)$  throughout (58), all that's required is that the center's agent  $g(d_k)$  is part of a group that is equal to  $g(d_8)$ . Suppose that the only relevant, salient group is  $g(d_7)$ , which contains  $g(d_k)$ . Then we assume  $d_8 = d_7$ , and the felicity condition on  $you_8$  is satisfied. The interpretation is that each member of the group thinks that the group (as a whole) is in Chicago: 'you each think the group of you is in Chicago'.

The logical form (58') also leaves open the possibility that  $g(d_7) \neq g(d_8)$ , so long as both include the addressee =  $g(d_k)$ . I think that this is not a plausible reading of (58), and that it is ruled out on pragmatic grounds: Without any distinguishing descriptive content, even if two distinct groups, both containing the single addressee, were equally salient, one couldn't reasonably expect an addressee to know which group was intended as denotation of which token of *you*, and hence the intended truth conditions are not retrievable. With more (appositive) descriptive content, this type of reading seems to be available:

- (60) You Army Reserve officers think you weekend warriors are the most important members of the community.
- (61) You professionals all think that you golfers are a breed of gentlemen a cut above the plebian members of the bowling league.

Again, assume that the addressee stays constant in the relevant utterances. In (60) the first group containing the addressee(s) may be a proper subpart of the second (with *weekend warriors* a slang term for all members of the Army Reserve, including non-officers), yet the utterance is still felicitous. Or in (61), the first group, denoted by *you professionals* must have a non-null intersection with that denoted by *you golfers* (in particular, including the addressee(s)), but neither need be a subset of the other. And in both (60) and (61), the atoms of the subject denotata are reported to have a *de te* attitude toward the group-as-a-whole denoted by the second token of *you*, as predicted by this analysis.

There is also a reading of (58) where the two tokens of *you* are coindexed, in (58''). Again, adverbial *all* requires that the subject be properly plural; and the predicate *think* is inherently distributive, so that we abstract over the subject to yield the predicate shown, in this instance binding both tokens of *you*:

- (58'') You<sub>7</sub> all think you<sub>7</sub> are in Chicago.  
 $\lambda_{x_7}.x_7$  thinks  $x_7$  are in Chicago

On this interpretation, the binding of  $x_7$  by the lambda operator, together with its predication of the *atomic* members of the subject group, must yield an interpretation which is consistent with the felicity conditions on *you* in (57). Those require that  $g(d_7)$  be some entity which is equal to or properly includes the agent of  $\odot^*$ . Since the predication (in any instance) is of an atomic entity, this can only be satisfied if the agent of  $\odot^*$  itself is singular: an individual addressee. But the associative semantics permits the denotation of the unbound subject to denote a group which properly includes a singular addressee (satisfying the implication of *all*). Hence, the analysis

correctly predicts that the example has the reading ‘you each think that you (sg.) yourself are in Chicago’, a *de te* attitude toward oneself, rather than toward the group as a whole.

As we will see below, the ability of two indexicals in the same utterance to have different indices with the same anchor, just illustrated, plays a crucial role in solving several puzzles associated with indexicals in the literature. An anchor is not a (co)referential antecedent.<sup>22</sup>

The non-personal indexicals are crucially different from those considered above, in that they are not in themselves anchored to an agent. By default, *now* is canonically anchored to the presupposed speech time, the second element of ©\*, *here* to the location of the agent of ©\* at the time of utterance, etc. But with these English indexicals, other centers can under certain circumstances serve as their anchors—if it is understood in discourse that the speaker is adopting the perspective of a doxastic agent other than the speaker, DOX(©), where © ≠ ©\*.<sup>23</sup>

So long as anchoring to ©\* (or ©<sup>@</sup>) is presupposed—either lexically (as with *I* or *you*) or as the arbitrarily chosen center from among those contextually relevant (e.g. for *must*)—then the resolution of the anchoring presupposition leads to projection. When the anchor instead is the agent of an alternative perspective, a doxastic state other than the CS, as in Amharic examples embedded under appropriate attitudes (§1.3, discussed in §5 below) or when the perspective shifting operator  $\wp$  applies (§1.5, discussed in section §6.2 below), then the illusion of direct reference is broken.<sup>24</sup> The trigger introducing the relevant alternative belief state, say an attitude predicate, is not a monster shifting the global context. It is just that in introducing that state it also introduces a new, subordinate center which can serve as an alternative anchor to ©\* for the more flexible indexicals or  $\wp$ . The presupposition of a doxastic anchor is satisfied locally, and there is thus no projection to anchor to the time or place of utterance.

Hence, the apparent scope of an indexical is always a function of the resolution of its doxastic anchor. I borrow a term from Kratzer (1998)<sup>25</sup> and call the apparent wide scope of indexicals when they occur embedded under attitudes and other operators (including negation, etc.) **pseudo-scope**, which I take to be the mere *appearance* of wide scope induced by presupposition satisfaction. The effect is no different from the apparent wide scope of the definite description in a conditional displayed in the following contrast:

- (62) If you park a car on a steep hill, engage the emergency brake.  
(63) The gears on this car tend to slip. If you park on a hill, engage the emergency brake.

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<sup>22</sup> Cf. Kamp & Reyle’s (1993) somewhat different use of the term *anchor*, which has, however, similar consequences.

<sup>23</sup> There is a thread in the recent literature that pertains to problems with Kaplan’s claim that *I am here now* is a logical truth, drawing on problems with examples like *I’m not here right now* as spoken on an answering machine. See Predelli (1998), Mount (forthcoming), among others, for discussion. I take it that the central issue in such examples is what counts as the ‘time of utterance’ (e.g., time of recording vs. time of playing). It seems likely that in such cases what’s involved is the fact that non-personal indexicals like *here* and *now* can take a shifted anchor in FID. In any case, I think these issues are orthogonal to the central theses here.

<sup>24</sup> See Roberts (2014) for discussion of the application and implications of this account for English epistemic modals.

<sup>25</sup> though she might not agree with the sense I would give it here.

In both (62) and (63) the definite description *the emergency brake* is understood functionally as ‘the emergency brake of x’, presupposing an appropriate vehicle as bridge. In (62) that antecedent is the (denotation of the) indefinite *a car* in the conditional protasis; then because the antecedent is non-specific, the presupposition resolved under the scope of the conditional, the target definite is also understood to take narrow scope, be non-specific. But in (63), the presupposition is resolved via the salient *this car* (presumably used demonstratively), which has global scope, denoting a specific car; then the emergency brake is understood to be that of the demonstrated car. This has the effect of giving the definite wider scope than the conditional, but in fact we don’t need scope to achieve this effect. This is *pseudo-scope*. If an indexical’s perspectival presupposition is always satisfied by anchoring to a globally available ©, it always projects, yielding the same effect as wide scope.

About Demonstratives, here I will be relatively brief. In their indexicality, English *this* and *that* are like *here* and *now*, almost always anchored to ©\*, the latter providing the origin of the intended vector and proximity measure. But the demonstratives may be anchored to the shifted point of view in FID style, as we saw in (3) in the introduction. Elbourne offers related examples like his (100) (2008:432) where demonstratives may be anchored to the agent of an attitude:

- (64)a. Mary talked to no senator without declaring afterwards that that senator (?this senator) was the one who would cosponsor her bill.  
 b. Mary talked to no senator without thinking at the time that this senator (?that senator) was the one who would cosponsor her bill.

He argues that in these examples “*that* and *this* indicate relative proximity (in temporal terms...) to Mary, the reported thinker.” But it is difficult to tell in such cases whether the shift occurs because of the embedding or, more likely, because the speaker intends us to adopt the point of view of the embedding agent, in a sort of scopally constrained FID. I know of no language in which demonstratives can be anchored to the agent of a verb of saying, unlike the shifted indexicals discussed by Schlenker et al. So I tentatively conclude that only the speaker or the agent of FID can anchor the demonstratives.

Elbourne’s general claim (p.421) is that “Third-person pronouns work similarly to *we* in Nunberg’s (1993) theory. The differences are that the index can be any salient object, instead of having to be the speaker, and that the relational component can fix on any salient relation, within certain limits.” Taking Nunberg’s *index* for a demonstrative to be “any salient object” would suggest the kind of flexibility in interpretation that we observed earlier for *local*, ignoring the true indexical nature of the demonstratives as indexicality is characterized here. On Elbourne’s account there is no guarantee that the index will be an agent whose perspective is adopted. Hence, he has no explanation for the differences noted in §1.2 above between demonstratives and other third person NPs. Moreover, *this* and *that* (and *here*) differ markedly from *there*, since *there* is merely anaphoric, not indexical. Thus, though *there* in (65) may be anaphoric to the previous location *Tulsa*, in the same context (which fails to stylistically trigger an FID interpretation) *here* or *in this town* can only be the location of utterance:

- (65) John and Marcia moved to Tulsa<sub>i</sub>. He thought they’d be happier there<sub>i</sub>.  
 (66) John and Marcia moved to Tulsa<sub>i</sub>. #He thought they’d be happier here<sub>i</sub>/in this town<sub>i</sub>.

These differences are captured by the following semantics for *this*:

(67) **Conventional content of *this*:**

Given a context  $K = \langle CS_K, DR_K, \odot_K \rangle$ :

**Presupposed content:** Use of  $this_i$  at time  $t$  is felicitous just in case there is a  $d_i \in DR_K$ , and for all  $w \in CS$ , for some  $d_k \in DR$ , for all CS-compatible assignments  $g$ :

- $\exists \odot_{k,t} \in \odot_K$  s.t.  $\odot_{k,t}$  is either  $\odot^*$  or  $\odot^{FID}$ , and
- $g(d_k)(w)$  serves as origin of an indicated vector whose end is  $g(d_i)(w)$ ,<sup>26</sup> and
- $g(d_i)(w)$  is proximal to  $g(d_k)(w)$  on that vector.

**Proffered content:** Where defined,  $|this_i|^{K,g} = g(d_i)$ .

Like any other anaphoric NP, the use of a demonstrative  $this_i$  (with or without nominal complement) presupposes that there is a corresponding familiar discourse referent  $d_i$ , identified by the index on the demonstrative. But like *I*, it also presupposes an indexical anchor. Even in its non-canonical uses (without pointing), *this* is most often anchored to the center  $\odot^*$  corresponding to the speaker in the context of utterance, though there are cases of shift with FID, as in (3). But instead of identity (as in *I*) or a mereological relation between the anchoring  $\odot$  and  $d$  (as in *we*), what corresponds to Nunberg's *relational component* here is a presupposition that to retrieve the intended referent, the interlocutors are to adopt the point of view of  $\odot$ . In the canonical use accompanied by a demonstration,  $\odot^*$ 's actual location serves as origin in a Cartesian space, so that in any CS world  $w$  there is a vector from that origin, parallel to the line of the speaker's indicative gesture, at the proximal end of which is the instantiation in  $w$  of  $d_i$ . Thus, the indicated vector conventionally suggests the intended perspective. But as with the other indexicals, the proffered content is simply the value of the familiar antecedent  $d_i$ . I.e., indexicality and point of view (in the senses defined here) are only tools for retrieving the intended antecedent, and play no role in proffered content.

As with *I*, the way in which the demonstrative is anchored to the speaker or some other center (relevance guiding the resolution of the intended anchoring center) guarantees direct reference effects. An accompanying demonstration, if any, is a conventional way of indicating to the addressee the intended vector, though eye-movement, a nod of the head or non-gestural indication of the vector would suffice. The fact that the agent  $d_k$  intentionally serves as origin of the presupposed doxastic perspective then guarantees that the center is aware of serving in this capacity. This is a *de se* role. I think we find that this is the case even in FID examples like (3)

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<sup>26</sup> I intend that the supposition that  $g(d_k)(w)$  serves as origin of an indicated vector serve to capture the claim by Stojnic et al (2013) that "in deictic utterances of demonstratives accompanied by the act of demonstration the pointing gesture is itself a grammaticized constituent of the speaker's utterance...." They argue that even in utterances not accompanied by deixis, other kinds of conventional factors—discourse coherence relations—determine the intended denotatum. I agree that there are clearly understood ways of indicating the intended referent even without overt deixis (see the discussion in Roberts 2002), but think that (a) though these may be conventionalized in some cases, those conventions aren't part of the grammar in the narrow sense usually intended by linguists, but instead are conventional or even just natural ways of drawing someone's attention, and (b) I take it that the fact, noted by Stojnic et al., that these ways for a speaker to indicate her intentions cannot be felicitously over-ridden is an argument that we must give unambiguous indications of what the addressee is to attend to in order to resolve anaphora, rather than an argument for the grammaticality of the indicative clues themselves.

and (64): The agent's state of mind is being reported, and in that state of mind the agent intends to pick out the demonstratum.

Non-proximal *that* is quite similar to *this*, except that instead of requiring proximity, it at least implicates that the demonstratum is not the most proximal entity along the vector. See Roberts (2002) for further discussion, and for extended discussion of uses of demonstratives without accompanying demonstration, including cases under quantification, discourse deixis and textual deixis. These are all parallel to the demonstrative case in (67), with a metaphorical extension of the Cartesian space to that of the discourse or that of the text in which the demonstrative occurs.

## 5. Cross-linguistic applications

### 5.1 Wechsler's (2010) related account

Wechsler (2010) offers an account of 1<sup>st</sup> and 2<sup>nd</sup> person indexical pronouns which is quite similar in conception to that just sketched. As noted above, his key observation is that the 1<sup>st</sup> and 2<sup>nd</sup> person universally have an associative semantics for their plural forms, like that given for *we* above, so that their use is never interpreted to entail that there is a plural coreferential set of speakers/addressees. Wechsler explains this by taking the 1<sup>st</sup> and 2<sup>nd</sup> person features to indicate self-ascription, the person indicating which speech-act participant self-ascribes, yielding a *de se* or *de te* interpretation. In the previous section, this is accomplished in the semantics for *I* and *we* by anchoring the indexical to the relevant center as determined by person: it's thereby a presupposition of self-ascription on the part of the anchor, not coreference. The proffered content of an indexical on this account is just the denotatum, which need only include the agent corresponding to the center, so that the person feature effectively plays the role that Wechsler posits for it.

Wechsler's formal account is different from the present theory. He takes interpretation to involve the translation of natural language utterances into internal conceptual structures of both speakers and addressees. The translations of 1<sup>st</sup> and 2<sup>nd</sup> person indexicals involve a concept of 'self relative to speaker' (*I* or *we*) or 'self relative to addressee' (*you*). His "self-notion axiom" guarantees that the content of one of these notions will be the relevant agent's self-notion, and hence *de se/de te*. Then he posits a "Self-ascription monopoly":

THE SELF-ASCRPTION MONOPOLY: Only as a consequence of grammatically specified self-ascription can a pronoun be knowingly used to refer to a speaker or addressee.

His explanation for this: "A person who is unable to self-ascribe any properties is psychologically lost. Merely ascribing a property to oneself, without self-ascribing it, suggests confusion or ignorance (compare Grice's 1975 maxim of quantity)." (353)

I take Wechsler's work to show that (in my terms) across languages a given ©\* must contain *all the speakers*, while a given ©<sup>@</sup> must contain *all the addressees*, so that the proper interpretation is derived. Moreover, for the plurals of each indexical person, the relevant centers need only be a sub-set of the denotatum. In languages with an inclusive/exclusive distinction in the first

person plural, in addition one may add another felicity constraint to the effect that the complement of ©\* in the denotatum ( $d_k$  in the definition of *we* above) does/does not include ©@.

The account proposed here was originally conceived in its basic features without knowledge of Wechsler's. I take his independent cross-linguistic evidence for a self-ascriptive semantics for indexical person, and his appeal to the psychological literature to offer striking independent corroboration of the approach proposed here, especially since a version of his account of the associative semantics for 1<sup>st</sup> and 2<sup>nd</sup> person plurals falls out without further stipulation.

One question he sets himself to answer is *why* 1<sup>st</sup> and 2<sup>nd</sup> person should be universally associative. I think he has it right: The personal indexicals are fundamentally different from their 3<sup>rd</sup> person pronominal counterparts in that their person features are not a direct indication of reference, indicating the intended referent like the referential indices are intended to do, but instead only indicate the intended anchor for the indexical self-ascription presupposition. Associativity is a reflex of this merely perspectival anchoring function of the indexical persons, since anchoring isn't the same as coreference.

I think the reason we haven't recognized this sooner is that the usual paradigm: 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> *person* suggests that the "person" feature on so-called 3<sup>rd</sup> *person* pronouns is somehow parallel in role to that of the other two. But Wechsler argues out that that's just not right. Non-indexical pronouns presuppose a familiar coreferential antecedent (modulo binding and distributivity). The fact that it's neither the speaker nor the addressee is an implication of the *non*-use of the personal indexical forms, as captured by his Self-Ascription Monopoly.

## 5.2 Conventionally Shifting Indexicals

As we observed in §4, English indexicals differ in whether they are always lexically anchored to ©\* or, like FID-anchored *here*, can be anchored to other centers as well. Languages differ in the extent to which their indexical systems are flexible in the permitted indexical anchoring. One place we see this is in tense systems. The English tenses, for example, are basically always anchored to the speech time—the second parameter of ©\*. But Korean tenses are not (Yoon 1996). This isn't evident in main clause tenses, which generally anchor to the speech time. However, when embedded in complement clauses (but not relative clauses), the past- or future-ness of a tense is interpreted relative to the event time of the matrix clause; that is, the anchor shifts in certain kinds of embedding context. This iterates in iterated embeddings.

It seems that the shifting indexicals in Amharic and other languages, discussed in §1.3, also represent flexible indexical anchoring, though this is not unconstrained. As we saw there:

- Amharic: 1<sup>st</sup> person singular pronouns vary in interpretation when embedded under a verb of saying, optionally referring either to the speaker or the embedding subject's denotation.
- Zazaki: all the classic pure indexicals (I', 'you', 'today', 'now', etc.) shift under *vano* 'say'.
- Slave: under the complements of 'say' and 'want', 1<sup>st</sup> person pronouns optionally shift. Under 'tell', both 1<sup>st</sup> person and 2<sup>nd</sup> person pronouns obligatorily shift. No other indexicals shift. Embedded 3<sup>rd</sup> person pronouns under 'say' can refer to the subject of 'say', though (as in English) they can't refer to the speaker in matrix clauses.

- Nez Perze: ‘I’ and ‘you’ are optionally shifted in embedded contexts, but crucially they shift together—if both occur in the same embedded clause, one shifts iff the other does too. ‘here’ also may be shifted in such contexts; but while locative shift entails person shift, person shift does not entail locative shift.
- LSC and DSG: 1<sup>st</sup> and 2<sup>nd</sup> persons obligatorily shift in the RS-marked complements of certain verbs of saying and attitude predicates. But ‘here’ never does, though ‘this’ and ‘tomorrow’ may.
- ASL: 1<sup>st</sup> and 2<sup>nd</sup> persons, other indexicals obligatorily shift in the RS-marked complements of verbs of saying, and optionally under RS-marked attitude predicates. They shift together.

Schlenker’s (2003) analysis of this phenomenon in Amharic involves a feature associated with 1<sup>st</sup> person pronouns, [+/-author]. He defines this as a relation between an individual (the denotatum) and a context, and takes it to be interpreted as “a presupposition on the value of a variable”, the variable associated with the 1<sup>st</sup> person pronoun. The full account also involves a binding mechanism to guarantee that this free variable can be affected by an embedding attitude operator; see p.83 and his Appendix II for details.

Anand & Nevins (2004) argue that the shifted interpretations in Zazaki and Slave reflect the following constraints:

- Shift Together: “all indexicals within a speech-context domain must be bound by the same context”, where a speech-context domain is “the scope of a verb of saying, up to the next c-commanded verb of saying”.
- There can’t be mixed interpretations across conjuncts (i.e., even when the shifting is optional, if indexicals are shifted in one conjunct, they must be shifted in the other).

Neither of these constraints would be predicted by “pronoun-centric views” of indexical shift like that of Schlenker, i.e. accounts which deal with each token indexical independently. Instead, Anand & Nevins propose that the shifting is accomplished by operators associated with the verbs in question, which are hence “context shifting operators”, erasing the global context and replacing it with the reported-speech context to which the verb shifts. Instead of such verbs shifting an index of evaluation of the type assumed in classical Montague Grammar, where an index is a world-time pair, for Anand & Nevins the shifted index is itself of the same type as a Kaplanian context, yielding values for “author, addressee, and location” of the reported intensional context for the complement of one of the shifting verbs. Thus, in Zazaki:

$$\text{Zazaki: } [[ OP_{all}[\alpha] ] ]^{c,i} = [[\alpha] ]^{i,i}$$

where  $OP_{all}$  is the shifting operator corresponding to any intensional verb (one which shifts the values for all indexicals, unlike the corresponding operator in Slave which shifts only the subject parameter),  $c$  is the context of utterance, and  $i$  is the shifted context of evaluation (the enriched index of evaluation). This approach is supported by what happens in multiple embeddings in these languages, where one “overwrite” of the actual context by a higher verb of saying makes the parameters of indexicality for the actual context inaccessible for indexicals under a second, lower verb of saying. I.e., in the following,  $c''$  cannot equal  $c$ :

$$[c \dots \text{'say'} [c' \dots \text{'say'} [c'' \dots \dots ] ] ]$$

But as pointed out by Greg Kierstead (p.c.), a 3<sup>rd</sup> person pronoun in the complement of ‘say’ can refer to the subject of ‘say’, which I take to be a problem for their proposal: Normally such pronouns cannot refer to the actual speaker in unembedded contexts (a violation of binding theory). Thus, we wouldn’t expect them when embedded under ‘say’ to take the shifted indexical-anchoring ‘speaker’ as antecedent.

The present proposal can account for the described behavior of 1<sup>st</sup> person indexicals in all these languages, using discourse centers, together with lexical constraints on felicitous indexical anchoring. In Amharic, unlike English, it seems clear that the 1<sup>st</sup> and 2<sup>nd</sup> persons singular are not lexically constrained to be anchored by ©\* or ©<sup>@</sup>. For example, for 1<sup>st</sup> person, when embedded under verbs of saying, both of the available centers, ©\* and the subordinate ©<sup>say</sup>, are possible indexical anchors. This might be appropriately analyzed as a lexical difference between Amharic and English indexical pronouns, unless Amharic does show shift-together effects. But partly because of these effects, a purely lexical approach is not promising for Zazaki or Slave.

In Zazaki, it seems clear that *vano* ‘say’ causes ©\* to be eclipsed in some way, so that only the local discourse center is available to serve as indexical anchor for the full range of lexical indexicals considered by Anand & Nevins; subsequent embeddings continue to eclipse higher centers. Let us assume that *vano* triggers not only the introduction of the discourse center corresponding to the agent of saying, ©<sup>say</sup>, but also a re-ranking of the list of discourse centers, so that ©<sup>say</sup> is more highly ranked than ©\* under the scope of *vano*. The lexical entries of the Zazaki indexicals considered require that they be anchored to the highest ranked center available in the context of interpretation: If ©\* has not been eclipsed—i.e. down-ranked, it will serve as anchor; but under *vano* the higher ranked ©<sup>say</sup> will serve as anchor.<sup>27</sup> Shift Together is predicted on this approach because when ©\* has been eclipsed, the current superordinate ©<sup>say</sup> is the required indexical anchor for all Zazaki indexicals. Contrast these with the Zazaki 3<sup>rd</sup> person pronoun, which is precluded from referring to the actual speaker, the agent of ©\*, even when embedded under *vano* where ©\* is subordinate. But when embedded under *vano*, such a pronoun may take as antecedent the local ‘speaker’, the agent of ©<sup>say</sup>. This is the reason for not simply assuming that in the contexts where the original ©\* is eclipsed the subordinate center ©<sup>say</sup> has temporarily become ©\*: The 3<sup>rd</sup> person pronoun is sensitive to the difference, arguing that even under *vano* the context still tracks who is actually speaking. Then the 3<sup>rd</sup> person pronoun is simply lexically precluded from taking the agent of ©\* as antecedent.<sup>28</sup>

In Slave only 1<sup>st</sup> and 2<sup>nd</sup> person indexicals ever shift, so the Zazaki strategy just sketched isn’t applicable. Given the described distribution of shifting, it seems clear that the explanation must make use of some combination of the lexical semantics of the indexicals and the contexts which make subordinate centers available. I don’t know enough about Slave to develop a well-informed hypothesis about how this works in the language; but just to illustrate the flexibility of the present approach, consider the following possibility: As in Amharic, 1<sup>st</sup> and 2<sup>nd</sup> person Slave

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<sup>27</sup> Thanks to Greg Kierstead (p.c.), who suggested the re-ranking strategy.

<sup>28</sup> It would be interesting to investigate the behavior of “impure” indexicals in this language—does Zazaki have the equivalent of English *local*, for example—to see whether they could still be anchored to ©\*. Like the behavior of the 3<sup>rd</sup> person pronoun, such anchoring would support the reordering strategy proposed here, as opposed to a sort of “erasure” of ©\* under the scope of *vano*.

indexicals are sensitive to certain kinds of shifted contexts. Let's assume that there are three kinds of distinguished centers in this language: ©\*, as for English, always corresponds to the time-slice of the actual speaker at the time of utterance. ©<sup>say/want</sup> is the agent of a saying or wanting attitude (at the event time of the attitude), and ©<sup>tell</sup> is the agent of a telling (at event time). In addition, other subordinate centers are possible, as in English. There is an order over these centers, with ©<sup>tell</sup> ranked higher than {©\*, ©<sup>say/want</sup>}, which in turn are ranked higher than other subordinate centers. 1<sup>st</sup> and 2<sup>nd</sup> person pronouns are sensitive to this ranking in the resolution of a presupposed perspectival anchor: The 1<sup>st</sup> person pronoun may anchor to any of the three kinds of distinguished centers, while the 2<sup>nd</sup> person pronoun may only anchor to either ©<sup>@</sup> or ©<sup>say/want</sup>. In the context embedded under 'say'/'want', either ©\* or ©<sup>say/want</sup> may be optionally ranked higher than the other, as a function of pragmatic factors—not unlike English FID, the speaker may suggest she wishes the interpretation to be made from the perspective of a reported doxastic agent. When both are available, the one which is ranked more highly will serve as anchor for all 1<sup>st</sup> and 2<sup>nd</sup> person pronouns. When ©<sup>tell</sup> is available, because it is always ranked higher than other centers, including ©\*, it will anchor 1<sup>st</sup> person pronouns; and 2<sup>nd</sup> person pronouns can only anchor to the embedded counterpart of ©<sup>@</sup>--the addressee of the reported telling—in those contexts. All other indexicals lexically anchor to ©\* (via the utterance time *t*, location, etc.). Because of the ranking of the centers, and the sensitivity of 1<sup>st</sup> and 2<sup>nd</sup> pronouns to this ranking, this account captures the limited Shift Together strategy—when 2<sup>nd</sup> person pronouns shift, so do the 1<sup>st</sup>, and when a pronoun with a given person shifts, all pronouns with that person shift. As in Zazaki, this will apply across conjunctions which are under the scope of a shifting predicate. This system, at least, captures the facts as reported by Anand & Nevins.

\*\*\*This predicts that when embedded under 'think', etc., in Slave, 2<sup>nd</sup> person can refer to actual addressee, even when 1<sup>st</sup> person has shifted. Is that correct?

As far as I can tell, in the “eclipsing” account, do all actual contextual participants get “eclipsed”? Do they predict no 2<sup>nd</sup> person pronouns in such contexts under 'think', e.g.?

In her account of indexical shifting in Nez Perze, Deal (2013) argues for separate shifters for person effects and for locative effects, because “locative shift entails person shift, but person shift does not entail locative shift” (p.11). Moreover, 1<sup>st</sup> and 2<sup>nd</sup> person must be interpreted *de se*, but locatives need not be. To account for these distinctions, we can assume that like Slave, in Nez Perze person indexicals like 'I' and 'you' are sensitive to a hierarchy of relevant centers, and that in embedded contexts either ©\* or a subordinate center may be ranked higher, again as a function of pragmatic factors. Whichever one is ranked higher will control the interpretation of all person indexicals. But that leaves unexplained the behavior of Nez Perze *k'ine*, which Deal translates as 'here'. *k'ine* behaves like the person indexicals (and unlike English *there* and its Nez Perze translation equivalent) in the sense that it cannot be bound, as we see in her (68). But it is different from the person indexicals in two important ways: First, it needn't shift together with the person indexicals, as we see in Deal's (69); the location denoted by *k'ine* in both clauses of this example is that of the speaker, though the 1<sup>st</sup> person morphology on the embedded 'arrive' gets the shifted interpretation where it co-refers with the matrix subject, the speaker's friend. Second, *k'ine* needn't receive a *de se* interpretation, as we see in her (70):

- (68) # ke mine Obama hi-c'iiq-tetu-Ø, 'il'xnii-w k'ine hi-wsiix titooqan  
 wherever Obama 3SUBJ-speak-HAB.SG-PRES many-HUMAN there 3SUBJ-be.PRES.PL person  
 Wherever Obama speaks, many people are here.

[Consultant: “I don’t think you say *k’ine* [here]... you’re saying *ke mine*, ‘wherever’, so I think you have to say *kon’a* [there].”]

- (69) [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<sub>subj</sub>* hi-hi-ce-Ø [ *pro<sub>subj</sub>* k’ine Ø-paay-ca-Ø  
*pro* 3SUBJ-say-IMPERF-PRES *pro* here 1SUBJ-arrive-IMPERF-PRES  
 met’u weet’u *pro<sub>subj</sub>* hi-paay-ca-Ø k’ine  
 but not *pro* 3-SUBJ-arrive-IMPERF-PRES here

colloquial: He says he is arriving here, but he is not arriving here.

literal: He<sub>i</sub> says I<sub>i</sub> am arriving here<sub>k</sub>, but he<sub>i</sub> is not arriving here<sub>k</sub>.

- (70) [Context: A man is visiting a city building and he sees a photograph of Bill Clinton shaking hands with someone. He doesn’t know that the picture was taken right where he was standing, some years ago.]

haama hi-neki-se- /0 [ Clinton hi-weeke k’ine ]  
 man 3SUBJ-think-IMPERF-PRES [ Clinton 3SUBJ-be.PAST here ]

The man thinks<sub>j</sub> Clinton was here<sub>j</sub>.

Consultant: “That would be wherever the man was and wherever he saw the picture.”

Use of *k’ine* in (70) doesn’t entail that the speaker was aware that the picture was taken in the location of utterance.

It isn’t all that surprising that Nez Perze ‘here’ doesn’t track the behavior under shifting of the 1<sup>st</sup> and 2<sup>nd</sup> person pronouns in that language, since English *here* and its correlates in other non-shifting languages tends to behave in a shifted manner in FID, and even in FID, across languages ‘here’ and ‘then’ tend to behave differently than other FID-sensitive shifters (the latter discussed in detail in Eckardt 2014, Chapter 5). This may have a bearing on the non-*de se* interpretation of ‘here’ in (70). Consider a possibly related use of English *here* in (71) and (72):

- (71) [Speaker is a man in Montreal gazing at a photo of the Budapest Chain Bridge:] It was here that I first saw my wife, walking across the bridge with friends on Sunday stroll.

- (72) [Speaker is the amnesiac Rudolph Lingens, who is in the Stanford Library but doesn’t know it. He is shown a photo of the exterior of the Stanford library, which he recognizes from having read extensively about the building. Recall that in Perry’s (1979) story, Lingens has all kinds of propositional information about the guy named *Rudolph Lingens*:] Here is where Rudolph Lingens got lost in the fourth floor stacks.

(71) shows that there’s an extended sense of *here* which is anchored to the location of a salient picture (or map). (72) shows that this use is compatible with a non-*de se* interpretation.

Could the use of *k’ine* in (70) be of that nature?

One reason I cannot confidently offer an account of the Nez Perze data is that we do not know about the extent to which *k’ine* may be used in ways that parallel English *here*: Can *k’ine*, like *here*, be used in contexts where the FID style licenses shifted anchoring to some other center than <speaker,utterance time>, as in the following English examples?:

- (73) John brought his cat to stay with Louise. Here Fluffy would feel safe and comfortable while he was away.
- (74) You wouldn't believe what happened to me yesterday at the grocery store: Here I was, minding my own business, and along comes Jim....

Note that *comes* in (74) serves to enforce the suggested adoption of the speaker's point of view on the previous day (assuming that s/he isn't at the grocery store in question at the time of utterance). Presumably, like FID generally, this type of shifting is pragmatically licensed. If shifting of *kíne* under the scope of attitude predicates like 'say' and 'think' were similarly pragmatic, unlike the conventionalized shifting permitted for the 1<sup>st</sup> and 2<sup>nd</sup> persons, then we might expect some independence of *kíne* in cases where the personal pronouns are conventionally shifted. Still, if that pragmatic style were adopted in a context where *kíne* occurs embedded under 'say' or 'think', pragmatically anchored to the matrix subject's point of view, this might lead to a strong preference for a shifted interpretation of any personal indexicals, as well. Since ©<sup>say/think</sup> had been introduced and 1<sup>st</sup> and 2<sup>nd</sup> person may optionally shift, it would be pragmatically inconsistent (and confusing) to shift the intended point of view anchoring *kíne* but not that for the shiftable personal pronouns. I cannot say whether *kíne* displays the kind of behavior we see in (73) and (74), so don't know whether this is a plausible account of the relative independence of *kíne* in Nez Perze.

In their discussions of LSC, Quer (2011) and Schlenker (2014) assume that the language offers evidence against Shift Together; Hübl presents the same kind of evidence for DGS: In §1.3 we saw examples where the 1<sup>st</sup> person obligatorily shifts in an RS-marked complement, but 'here' does not, though 'this' may. This contrasts with ASL, where there is no evidence of mixed shift. The ASL case, insofar as it is represented correctly above, is fairly simple: Suppose that centers are ranked in this language, with ©<sup>-SAY</sup> always highest, but that either of ©<sup>THINK</sup> and ©\* may be ranked higher than the other, on pragmatic grounds (whose perspective the speaker pragmatically implies she intends us to adopt in interpretation). Then the indexicals are all always anchored to the highest ranked center, explaining why in RS-marked verbs of saying all indexicals obligatorily shift, while shift in RS-marked complements of attitude predicates is optional.

In LSC and DGS the fact that the personal indexicals obligatorily shift under attitudes suggests a re-ranking of the embedding center above ©\*, 1<sup>st</sup> and 2<sup>nd</sup> person choosing the highest-ranked center. But some locatives, like 'here', are like English *I* in being inflexibly lexically anchored to the actual context of utterance, in this case to the signer's location. But as we saw in (39), 'this' seems to shift optionally. I take it, then, that it does not anchor to the highest ©, nor necessarily to ©\*, but only to one of the salient centers. Languages like LSC and DGS may shed some light on the Nez Perze case, where we also saw independence of the locatives from the shifting behavior of the personal indexicals. It would be interesting to investigate whether unshifted locatives in these languages are non-*de te*.

Yet other patterns are observed in LSI (Zucchi 2004), LSF (Schlenker 2014), and in Uyghur and Japanese (Sudo 2012), with new studies about yet other languages coming out regularly. My point here is not to offer a complete account for any of these languages, but to suggest how a suitably flexible set of tools for characterizing the possibilities observed in the literature is offered by the present account. Reducing shifted indexical anchoring to either lexical semantics

or to a monster operator, as most of the cited theories do, seems too restrictive. The variation and potential seems to lie in a combination of center-availability (as a function of the usual scope of doxastic operators in a dynamic context, plus FID), language-specific distinctions between types of centers (so that, e.g., Amharic indexicals are only shifted by verbs of saying, whereas the other languages studied show a broader range of attitude-shifters), and the variable lexical sensitivity of particular indexicals to the available center types. Note that the basic elements of this account are independently motivated: Particular indexicals in different languages clearly differ in their potential anchoring. Especially, as we saw in §2, for the purposes of characterizing belief and *de se* interpretation, the lexical semantics of attitude predicates has been taken to relate centered worlds, hence to introduce subordinate centers as the agents of the base worlds in such relations.

But this last feature brings us back to another important fact about shifting indexical anchors. It has been claimed that in all the languages discussed above where the question has been investigated—Amharic, Zazaki, Nez Perze, LSF, and Uyghur—shifted 1<sup>st</sup> person pronouns are obligatorily interpreted *de se* with respect to the anchoring center (Schlenker 1999,2003; Anand & Nevins 2004, Anand 2006; Deal 2013; Schlenker 2014; Sudo 2012). On the account proposed here, the obligatory *de se* interpretation is just what we would expect. To see why, consider again (48), with the matrix and embedded subjects co-indexed to guarantee co-reference:

- (48) [Context: The baseball player Ernie Banks gets hit on the head and develops total amnesia. He doesn't know his name or remember anything about his past, though he is lucid. During his long recuperation, he reads in the newspapers about a baseball player named Ernie Banks, and becomes fascinated with the guy's career. His social worker reports to a nurse:] Ernie Banks<sub>i</sub> thinks he<sub>i</sub> is one of the greatest shortstops of all time.

In terms of Stalnaker's centered worlds theory from §2, we have two interpretations of (48), on the understanding that the discourse referent  $d_i$  is familiar to the interlocutors as the individual named Ernie Banks. Ignoring times here for simplicity, these two interpretations are given by the logical forms below, where for all CS-worlds  $w$ , all CS-compatible assignments  $g$ :  $g(d_i)(w) = \text{Ernie Banks}$ , and  $\odot_i$  is the subordinate center introduced in conjunction with the attitude relation *Dox* corresponding to *thinks*:

$$\begin{aligned} \text{Dox} (\langle g(\odot_i)(w), w \rangle) &= \{ \langle g(d_i)(w'), w' \rangle : g(d_i)(w') \text{ is a great shortstop in } w' \} && [\textit{de se}] \\ \text{Dox} (\langle g(\odot_i)(w), w \rangle) &= \{ \langle x, w' \rangle : g(d_i)(w') \text{ is a great shortstop in } w' \}, \text{ for some individual } x && [\textit{non-de se}] \end{aligned}$$

For any CS-world  $w$ , in each of these interpretations the base centered world in the *Dox* relation is the ordered pair of the subordinate doxastic center corresponding to the agent of the thinking and  $w$ . Since *Ernie Banks* is the subject of that attitude, the value of this center  $\odot_i$  in any CS-world  $w$  is Ernie Banks. Each centered world in the corresponding belief state is such a pair as well: The center is Bank's self-image in his belief world  $w'$ , which must be a world where the value of the Ernie-Banks DRef  $d_i$  (itself assigned an IC by the CS-compatible  $g$ ) is great. The difference between the two interpretations is that in the *de se* interpretation the derived centers in the belief state are the values of the discourse center  $d_i$  corresponding both to the subject of the embedded clause and to the agent of the base centered world—the discourse center thinks the discourse center is great—while in the non-*de se* interpretation that is not necessarily the case.

In the non-*de se*, the great guy  $x$  in  $w'$  is still Banks' counterpart in that world—it's the value of the discourse referent  $d_i$  co-indexed with the base center, who is Ernie Banks in all the CS worlds. But that doesn't mean that the center  $x$  recognizes himself in that image. Only co-indexation of the embedded subject DRef with the derived center can guarantee this self-recognition, yielding the *de se* interpretation.

But this coindexation needn't follow from coindexation of the two NPs themselves. Nothing in the theory of centered worlds requires a realistic trans-world identity (or counterpart) relation between the base center in a doxastic relation and the centers in the derived worlds. And coindexation of the two NPs needs to be independent of the index on the derived center, as we see from the possibility that *de se* interpretation can arise under binding; (75) has a reading where each of the amnesiacs has a non-*de se* relationship to the individual he thinks is great, as we see in the two logical forms just below:

- (75) Every amnesiac <sub>$i$</sub>  thinks that he <sub>$i$</sub>  is a great player.  
 (75.i) True relative to CS-compatible assignment  $g$  iff for all  $g'$  just like  $g$  which differ at most in possible values for  $d_i$  and s.t.  $g'(d_i)$  is an amnesiac,  
 $\text{Dox} \langle \langle g'(\textcircled{i}^*)(w), w \rangle \rangle = \{ \langle g'(d_i)(w'), w' \rangle : g'(d_i)(w') \text{ is a great player in } w' \}$  [de se]  
 (75.ii) True relative to CS-compatible assignment  $g$  iff for all  $g'$  just like  $g$  which differ at most in possible values for  $d_i$  and s.t.  $g'(d_i)$  is an amnesiac,  
 $\text{Dox} \langle \langle g'(\textcircled{i}^*)(w), w \rangle \rangle = \{ \langle x, w' \rangle : g'(d_i)(w') \text{ is a great player in } w' \}$  [non-*de se*]

The difference between the two readings lies in whether the belief is self-ascriptive, as reflected in the differing values for the agent of the derived center.

Now consider (76):

- (76) I <sub>$i$</sub>  think Ernie Banks <sub>$k$</sub>  looks like me <sub>$i$</sub> .

In English, we can attest that the speaker in uttering (76) must be aware that the individual who he reports that he takes Ernie Banks to look like is he/the speaker himself. This self-aware *de se* relationship between the speaker and the object of *like* is part of the meaning of (76). How is that captured in the centered worlds theory? It seems that we want a Doxastic relation of the sort in (i) (*de se*), and not that in (ii):

- (76.i)  $\text{Dox} \langle \langle g(\textcircled{i}^*)(w), w \rangle \rangle = \{ \langle g(d_i)(w'), w' \rangle : \text{EB}_k \text{ looks like } g(d_i)(w') \text{ in } w' \}$  [de se]  
 (76.ii)  $\text{Dox} \langle \langle g(\textcircled{i}^*)(w), w \rangle \rangle = \{ \langle x, w' \rangle : \text{EB}_k \text{ looks like } g(d_i)(w') \text{ in } w' \}$  [non-*de se*]

Assuming that the lexical semantics for accusative *me* is the same as that for nominal *I*, modulo case, we can offer the following explanation of why only (76.i) is a possible reading of (76), while (76.ii) is not:<sup>29</sup>

1. The DRef for a 1<sup>st</sup> person indexical is conventionally coreferential with (the agent of) its anchor, which is always  $\textcircled{i}^*$ , as we saw in the semantics for English *I* in (82). Hence the

<sup>29</sup> Here again I ignore times, and thus loosely identify the discourse referent for the speaker with the corresponding distinguished discourse center  $\textcircled{i}^*$  of which that discourse referent is the doxastic agent.

DRef which satisfies the indexical's familiarity is co-indexed with  $\odot_i^*$ , so that the IC  $g(d_i)$  (for CS-compatible  $g$ ) will have the same values in all CS worlds. Thus, in (76) both the DRef for  $I$  (the base center) and that for  $me$  (the object of *looks like* in the specification of conditions on the derived state) are coindexed with  $\odot_i^*$ , as reflected in both logical forms in (i) and (ii).

2. Recall that according to Stalnaker (§2 above) the Dox relationship is transitive, Euclidean and serial, guaranteeing that the agent of a doxastic attitude is self-aware *qua* agent of that particular attitude. Hence, such an agent is aware that the derived centers in his belief state are his counterparts in his belief worlds. This does not mean that in the report of an attitude the NP denoting the agent (and hence its DRef) should always be coindexed with the derived centers, for coindexation reflects information available to the interlocutors *about the discourse itself*, which is not available to the agent *unless he is one of the interlocutors*. Thus, in (48) the coreference of *Ernie Banks* and *he* is information not necessarily available to Banks himself.
3. But the agent in (76) is the speaker,  $\odot^*$ , one of the interlocutors. As such, the agent is aware that the derived centers in the reported attitude are his counterparts: Technically, they are the value in his belief worlds of the discourse referent  $\odot^*$ , which, as above, the speaker takes to be self-referential. Thus, when the agent of an attitude is 1<sup>st</sup> person, the base discourse center of the reported attitude is coindexed with the derived centers (like that for *me*) in the representation of his belief state.
4. Since by step 1 the DRef for *me* is coindexed with  $\odot^*$ , and by step 3 the DRef for  $\odot^*$  is coindexed with that for the derived centers, then by transitivity, the DRef for *me* is coindexed with the DRef for the derived centers. More generally, in such a 1<sup>st</sup>-person report the DRef for any 1<sup>st</sup> person pronoun in the complement will be coindexed with that for the derived centers.

Thus (76.ii) is not a possible doxastic relation for (76), given the way these relations are defined. All this is to say that the intended interpretation of the indexical, anchored to a coreferential agent, is a self-ascriptive reference. Thus, anchoring the indexical  $me_i$  to the actual speaker, who happens to also be the agent of the attitude, we get the *de se* reading for free.

But note that, as many have argued (Reinhart 1983, Roberts 1987) non-coindexation doesn't entail non-coreference. Even if the speaker of (76) is Ernie Banks, nothing requires *Ernie Banks* in (76) to be coindexed with  $I$  or *me*. So (76) on the interpretation in (76i) is one possible representation of something the amnesiac Ernie Banks might reasonably say, without any *de se* implications about the denotation of the embedded subject.

Also note that in the explanation of how the *de se* reading falls out for (76) it wasn't crucial that the embedded indexical was coindexed with an antecedent which was itself indexical; what mattered for step 4 was that the antecedent, the matrix subject, was coindexed with the embedded indexical. Then the schematic logical form of the English case in (76) is parallel in crucial respects to that of the cases in Amharic, Slave, Nez Perze and Uyghur where the non-1<sup>st</sup> person matrix subject of an attitude predicate can serve as subordinate indexical anchor  $\odot^{\text{sub}}$  ( $\neq \odot^*$ ) to a 1<sup>st</sup> person singular pronoun in the complement clause, with a resulting obligatory *de se* interpretation. Schematically, for the languages with shifting indexicals, the counterpart of (76) is (77):

(77) Ernie\_Banks<sub>i</sub> tells that 1<sup>st</sup>pers-sg<sub>i</sub> is a pitcher.

Recall that in all these languages 1<sup>st</sup> person indexicals in embedded clauses may be anchored to a subordinate  $\textcircled{C}^{\text{sub}}$ , if the embedding predicate is appropriate. Assume that by whatever mechanism a particular language uses, perhaps along the lines discussed earlier in this section, in (77) the subordinate center  $\textcircled{C}_i^{\text{tell}}$  corresponding to the subject of *tells* is the indexical anchor for the 1<sup>st</sup> person singular pronoun subject of the complement clause. And assume that in these languages, as in the English 1<sup>st</sup> person characterized in (82), a 1<sup>st</sup> person indexical is coreferential with its anchor, though now that anchor needn't be  $\textcircled{C}^*$ . This schema, then, is parallel to (76) in predicting the *de se* interpretation. Taking *tells* to implicate that its subject purports to believe the truth of the complement and assuming that the speaker is not rambling in an unconscious state, then the underlying accessibility relationship associated with 'tell' is arguably at least as likely to be transitive, Euclidean and serial as that associated with English *believes*. As with English doxastic predicates, because of the nature of the accessibility relationship, the agent of the attitude serves as center of the base-world and the centers of the derived worlds are its counterparts in those worlds. Thus, again by transitivity, we derive the *de se* logical form in (78):

(78)  $\text{Dox}(\langle \textcircled{C}_i, w \rangle) = \{ \langle g(d_i)(w'), w' \rangle : g(d_i)(w') \text{ is a pitcher in } w' \}$ , where for all CS-compatible  $g$ , for all CS worlds  $w'$ ,  $g(d_i)(w') = \text{Ernie Banks}$

In this way, the observed facts about the obligatorily *de se* interpretations of these pronouns falls out of the framework set up here without any stipulation whatsoever, because indexical anchoring is based on the same doxastic centers that play a role in the Lewis/Stalnaker account of *de se* interpretation. This result, plus the flexibility the framework permits for modeling the different systems attested across languages, strikes me as a strong argument for this general view of indexicality.

One might speculate that in languages like Amharic and Slave, one motivation for the ability of embedded indexicals to anchor to subordinate centers is because the resulting logical form guarantees the *de se* reading. Anand (2006, section 2.6.5, pp.112ff) discusses how this leads to obviation effects in those languages and in Navaho, so that embedded 3<sup>rd</sup> person pronouns cannot be understood to refer *de se* to the agent of the embedding attitude. But he tells us that this does not hold in Zazaki, where the 3<sup>rd</sup> person can take a *de se* interpretation with respect to the embedding agent.

Two other proposals about shifted indexicals warrant brief discussion. LaTerza et al. (2013) argue, on the basis of fieldwork on Amharic, that plural shifted indexicals in that language must be semantically plural, i.e. have non-atomic denotata. Their main evidence comes from examples where the plural shifted indexical serves as antecedent for a reflexive or reciprocal, or is the dependent plural in a cumulative reading. In such cases, the proper truth conditions cannot be obtained unless the indexical is assigned a non-atomic individual as its denotation under a given assignment function. I take this to be clear evidence that these indexicals *may be* assigned a non-atomic denotation. But the authors fail to consider whether Amharic speakers accept examples like (55) and (56) above, where both distributive interpretations quantify over atomic members

of the plural antecedent. These readings are what we would expect if plurality is fundamentally a syntactic feature, semantically unspecified for (non)atomicity. This is a common approach to the semantics of number in languages like English; see Roberts (1987), Krifka (1989), Sauerland (2003), Sauerland et al. (2005), and Spector (2007) for variations on this general approach, wherein singular nominals are marked for atomic denotata, plurals allowing either atomic or non-atomic, with pragmatic principles preferring plural denotata for plural NPs, all things being equal.<sup>30</sup> So far as I can tell, assuming that, like English, Amharic predication can involve implicit adverbial distributivity (Link’s 1979 <sup>D</sup> operator on predicates), and that the shifted plural indexical in that language is unmarked for the atomicity of its denotata, then it seems that all the readings they discuss can be derived, without further stipulation, under the type of account proposed here, i.e. permitting 1<sup>st</sup> person plural to take the shifted subordinate center ©<sup>say</sup>.

There is another lacuna in the data reported by LaTerza et al. All the Amharic examples they present involve distributive predicates (again, see Link 1979, Roberts 1987a,b,c). Their semantics, in fact, predicts that Amharic examples with the following meaning should fail to have a reading attested for the English:

‘the candidates said that they met in Zagreb’

The verb *meet* is a group-predicate; it can only be true of a non-atomic entity. But on their account, to determine the truth conditions of the example we must take the union of what each of the authors individually says—presumably including those cases where the “author” is a group of simultaneous speakers,<sup>31</sup> and then check in the shifted contexts that the relevant author met in Zagreb. This would be incompatible with atomic-author cases, since the predicate requires a non-atomic argument. It could only be true in cases where the candidates *spoke together*. On their account, this type of example could not report a situation where each of the candidates said independently that they met together in Zagreb. That seems like an implausible prediction. More generally, if Wechsler’s generalization about plural indexicals is correct, then given their associative character, *we* or its shifted counterparts only require that the author be part of a collective; i.e., its semantics is not necessarily coreferential with the anchoring antecedent. But the lack of associative reading for the plural is not an accidental feature of the LaTerza et al. interpretation, being necessary to guarantee the *de se*-ness of the examples they consider.<sup>32</sup>

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<sup>30</sup> See also Farkas & de Swart (2010), who offer arguments for a different account, in bidirectional optimality theory, one whose main empirical advantage seems to be improved coverage for Hungarian. However, they achieve their results at the expense of claiming that the plural is polysemous.

<sup>31</sup> They don’t mention the possibility of simultaneous group speakers, but I’m charitably assuming they would entertain that possibility.

<sup>32</sup> There are other problems with the theory proposed by LaTerza et al. They argue that attitude predicates quantify not over simple worlds, but over contexts, triples of a world, an agent (the “author/speaker”) and a time. Though they don’t note this, these contexts are very much like centered worlds. Suppose we modify the usual Hintikka semantics for attitude predicates (e.g., as in Heim 1992) roughly as suggested by Lewis (1979), taking the attitudes to quantify over centered worlds. LaTerza et al. take to this standard semantics to be “distributive”—quantifying over all the worlds compatible with the given agent’s relevant attitude. They argue that where obligatorily *de se* attitudes are involved, that quantification should instead be “collective”—predicating the truth of the complement sentence collectively of the entire group of contexts (~centered worlds) as a whole. But they say nothing about what is required for a proposition to be true in a collection of such worlds (“contexts”). How would we check the truth of the matrix clause containing the attitude predicate and its complement proposition? The whole point of collective predication is that we do not check its applicability point by point across the members of the collective. John, Paul,

Bittner (2012) offers another proposal for the treatment of shifting indexicals across languages. She argues for a dynamic approach to context shifting wherein there are different kinds of discourse referents, which can be independently re-ranked in a pair of centering preferences: individual type discourse referents (type x), situation discourse referents (type s) and event-type discourse referents (type e). Briefly, for each type there are rankings both for Topical and Background discourse referents, and in each ranking there is a most-topical discourse referent. Non-indexical, 3<sup>rd</sup> person anaphoric elements are associated with type x discourse referents, whereas indexicals, including both 1<sup>st</sup> and 2<sup>nd</sup> person pronouns, are treated as the functional dependents of the event associated with the current speech act, of type e. She argues that indexicals and utterance events are always topical. Moreover, in embedded contexts in certain languages interlocutors may track not only the matrix topic and topical event (utterance event), but one associated with the embedding predicate, e.g. ‘say’ introducing a subordinate speech act event. Then certain indexicals may require that they be understood as functional dependents of the topical utterance event of either the matrix context or the subordinate context. In this way, shifting occurs with some verbs in certain contexts in certain languages, partly as a function of the lexical semantics of the predicates, partly as a function of the semantics of the indexical itself. She shows in detail how this predicts the attested distribution of indexicals under embedding in Slavé, including the fact that in multiple embeddings the indexicals may “shift back” to the perspective of the speaker (a problem for Anand & Nevins, but not for the approach to Slavé indexicals I sketched above).

However, Bittner claims that in Slavé the 3<sup>rd</sup> person in a shifting embedded context must be disjoint in reference to the local anchor for ‘I’, a disjunction her account would predict; whereas that is not the characterization in Anand & Nevins (see the discussion of (48) above, where its Slave counterpart with 3<sup>rd</sup> person embedded subject would have the non-*de se* interpretation). Insofar as the coreference is possible, as I believe it is, then the present theory is empirically preferable for Slavé.<sup>33</sup> Also, Bittner doesn’t consider other languages with shifting indexicals. Her system, like the present one, is far more flexible than those of Schlenker or Anand & Nevins, so she may be able to use it to shape appropriate accounts. But it is questionable whether grammaticized centering principles of the sort she assumes for Kalaallisut and the Athabaskan languages, principles whose realization in her formal theory are central in her account of indexical shifting, are appropriate for languages like Amharic, Uyghur or Japanese, let alone English; see Roberts (2011) for a critical discussion of Centering principles and of cross-linguistic claims about topicalization generally.

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George and Ringo are a band, but none of them alone is a band. So collective predication of a set of worlds would presumably mean that the proposition needn’t be true in all of them. But then which of them, or what proportion, must verify the proposition in order for it to be true? I can’t make sense of this idea.

<sup>33</sup> Moreover, because Bittner treats indexical pronouns as a different type than 3<sup>rd</sup> person pronouns, it seems that she may fail to predict that the anchoring discourse referent for an indexical may be associated with a discourse referent introduced earlier in discourse by 3<sup>rd</sup> person pronouns—e.g. one interlocutor, addressing a second, uses *this guy* to refer to a third interlocutor standing nearby, whom the speaker turns to address with *you* or who then begins to speak, using the 1<sup>st</sup> person for self-locating reference. A similar problem occurs with the times and locations sometimes referred to indexically, others by non-indexical adverbials. But perhaps I have misunderstood her on this point.

In contrast, in the present account I assume only that in discourse we track those discourse referents which are understood to be *centers* at that point in the discourse, in the sense of agents whose doxastic perspective is immediately relevant, with the corresponding discourse referents logically accessible in the DRS sense. Different languages may, and certainly do, use different mechanisms to indicate which entities are taken to be centers in this sense. I assume that when multiple doxastic agents are under discussion, their relative salience is a function of general mechanisms for tracking relevance and salience, but more importantly, that grammatical factors, like the doxastic modal semantics of certain attitude predicates, play an overarching central role in determining which centers are available, relevant and preferred. All the pieces of the present account are independently motivated, and in the case of embedding contexts, lexically triggered—since the *de se* phenomena argue for the role of centers in these contexts. The account makes no appeal to grammaticized functional notions like *Topic*. This is not to say that such notions play no role—in fact, they most likely do in FID and other pragmatically triggered contexts where indexicals can shift. But they seem to be of a somewhat different nature than the shifting triggered by the semantics of embedding attitude predicates. And finally, the present account predicts that shifted indexicals will have a *de se* interpretation, whereas I do not see how Bittner’s approach offers a natural account of this important feature of their semantics.

I have argued that the effect of both direct reference and *de se* interpretation in English is due to anchoring to ©\*, not to a Character-Content distinction, with once-and-for-all Character resolution at the outset of interpretation. In the examples considered in this section, the shifting was a reflex of the conventional content of attitude predicates. Additional evidence for this account comes from *de re* belief attributions, to which we turn in §6. But first, let us turn to a brief consideration of a general question implicitly raised by the phenomenon of shifting indexicals.

### 5.3 Bound indexicals

If indexical anchors can be shifted under attitudes and other intensional operators (implicit or explicit, semantic or pragmatic), this raises a more general question: Can indexical anchors be bound, i.e. serve as values of quantificationally bound “variables” (discourse referents)? There are three kinds of cases that I know of which bear on this question; I discuss two of them in this section, so-called fake indexicals, and the possibility of quantificational antecedents for indexicals. I must postpone discussion of Anand’s (2011) work on inner vs. outer anchors for *de se* interpretation to another occasion, as it would take us too far afield.

#### 5.3.1 Fake indexicals

There is a thread in the literature on indexicals which argues that indexicals may have a bound variable interpretation. Partee (1989) noticed examples like (79), which display a strict/sloppy ambiguity:

- (79) I won’t vote for myself unless John does.  
       ‘if John votes for himself then I may vote for myself’ (sloppy)  
       ‘if John votes for me then I may vote for me’ (strict)

And Heim (2008) noticed a related phenomenon which arises when an indexical is the focused argument of a focus-sensitive operator such as *only*:

(80) Only I did my homework.

‘the only person who did her own homework was the speaker’ (sloppy)

‘the only person who did the speaker’s homework was the speaker’ (strict)

Sloppy readings are usually taken to involve lambda abstraction over the two NPs in question—in these examples *I* and *myself/my*. But that would assume that these arguments could have a variable interpretation, incompatible with the standard treatment of indexicals. The phenomenon has been addressed by a number of authors (Kratzer 1998b,2009—who introduced the term *fake indexicals*; von Stechow 2003; Rullmann 2004; Cable 2005; Maier 2009,2009b; Jacobson to appear), as summarized and discussed in detail in Sudo (2012:144ff). Above, in §4.1, we saw a similar phenomenon, where *we* and *you* may be bound by lambda abstraction when they occur in a distributive predicate.

Sudo argues that those proposals which attempt to treat such cases by taking indexical pronouns to introduce a variable in LF would incorrectly predict that a 3<sup>rd</sup> person pronoun could bind a 1<sup>st</sup> or 2<sup>nd</sup> person pronoun, as in (81) (his (417)):

(81) #Exactly one student did my homework(, namely me).

where *my* has only a free reading, but the variable semantics would predict it could be bound by *exactly one student*. And similarly with *you* (his (423)):

- (82) a. Exactly one student did your homework, namely you.  
b. \*Exactly one student likes yourself.  
c. #Exactly one student bought lunch with you today.

He concludes that “first and second person pronouns cannot be bound by quantificational noun phrases like *exactly one student*”, ruling out a simple variable semantics account of 1<sup>st</sup> and 2<sup>nd</sup> person pronouns.

Indexical anchoring, as defined herein, isn’t coreference, so the account proposed in the preceding section isn’t precisely the kind of variable semantics that Sudo talks about. But it does look much like it in the LFs for the relevant examples—the proffered content of a center-anchored pronoun is a DRef corresponding to the agent of the center at the time of utterance. What prevents this DRef from being introduced by a 3<sup>rd</sup> person quantificational NP?

Recall Wechsler’s (2010:348) *self-ascription monopoly*, which stipulates that only 1<sup>st</sup> and 2<sup>nd</sup> person pronouns can be used to “knowingly” refer to speaker/addressee: “Only as a consequence of grammatically specified self-ascription can a pronoun be knowingly used to refer to a speaker or addressee.” The self-ascription monopoly would preclude binding of the variable corresponding to a 1<sup>st</sup> or 2<sup>nd</sup> person pronoun by the operator introduced by a 3<sup>rd</sup> person quantificational NP (DP). On the theory proposed here, 1<sup>st</sup> and 2<sup>nd</sup> person presuppose anchoring to one of the distinguished centers corresponding to the discourse interlocutors. Given that

centers are centers in a quasi-doxastic state (the CG of presumably self-aware interlocutors), as noted above this anchoring entails the self-ascription stipulated by Wechsler, and hence the *de se/de te* character of their use. On this approach, there is no need to stipulate a self-ascription monopoly. Given that a speaker who self-ascribes *knows* that s/he self-ascribes, and that this is important to the addressee in retrieving the intended anaphoric content, then failure to signal self-ascription implicates that the speaker does *not* take the referent to be self. This being the case, utterance of a 3<sup>rd</sup> person pronoun cannot felicitously be taken as intended to refer to the speaker *de se*.<sup>34</sup> Hence, it cannot “bind” a 1<sup>st</sup> person pronoun (serve as its indexical anchor), avoiding Sudo’s “overgeneration problem” for a variable account of indexical pronouns.

As we saw above for plural indexicals bound by lambda abstraction, the present proposal also makes available an alternative, simple account of cases where 1<sup>st</sup> and 2<sup>nd</sup> person pronouns *do* apparently yield a bound variable interpretation, including the examples above and cases like the following, which are ambiguous in the relevant fashion:

- (83) Only [I<sub>7</sub>]<sub>F</sub> liked my<sub>k</sub> first grade teacher.  
 a. ‘I am the only one who liked their own 1<sup>st</sup> grade teacher’ (sloppy)  
 b. ‘I am the only one who liked Miss Tilly, my 1<sup>st</sup> grade teacher’ (strict)

As background, here are my basic assumptions about the semantics of *only*, and hence the logical form of examples like (83): *Only* has two implications, the prejacent implication (basically, the sentence without *only*) and an exclusive implication. For simplicity, take the prejacent to be presupposed.<sup>35</sup> The exclusive implication is derived by abstracting on the focused constituent in the prejacent to form a property, which then serves to define the domain of *only* (the alternative-set of Rooth 1984): of all the contextually relevant entities, none other than the value of the focused constituent has the property so-derived. So, e.g., *Only [John]<sub>F</sub> came* presupposes that John came and entails that of all the contextually relevant individuals, none of them came other than John.

Applying this to (83), both pronouns in this example are presuppositionally anchored to (the agent of) ©\*, whether or not index  $k = 7$ . But this presuppositional anchoring leaves open the possibility that the indices might be distinct. Thus, we have two possible logical forms for the prejacent of *only* in (83):

- |  |                  |
|--|------------------|
| $x_7$ liked $x_7$ 's teacher                   | (same DRef)      |
| $x_7$ liked $x_k$ 's teacher, where $k \neq 7$ | (distinct DRefs) |

In the second case, assuming there is only one speaker throughout and so only one value for ©\*, the indexical anchoring of the two DRefs  $d_7$  and  $d_k$  to ©\* guarantees that they will have the same indexical anchor, and hence, under the semantics for *I* given above, the same proffered content; that is, though not co-indexed, they will be coreferential. Hence, the ordinary (non-

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<sup>34</sup> If it were deemed preferable to make the condition conventional (cf. Condition C of the Binding Theory), all that would be needed would be a prohibition against taking the DR for a 3<sup>rd</sup> person pronoun to be the agent of the current ©\* or ©@.

<sup>35</sup> I don't really think it is. For extended discussion of the extensive literature on this subject and presentation of subtly different accounts see Beaver & Clark (2008), Roberts (2011).

focused) proffered content of the prejacent of *only* would be truth conditionally equivalent in the two cases. But the LFs are crucially different for the purposes of determining the domain of *only*: Association with focus works by abstracting on the focused constituent in the proffered content of the operator's prejacent. In (83) this is the subject *I*, yielding one of the following by abstraction on that argument:

$\lambda_{x_7.x_7}$  liked  $x_7$ 's teacher (yields the sloppy reading)  
 $\lambda_{x_7.x_7}$  liked  $x_k$ 's teacher, where  $k \neq 7$  (yields the strict reading)

The second case, where  $k \neq 7$ , will yield the "free" interpretation, where the relevant others didn't like Miss Tilly.

To see how this works technically, recall the semantics for *I* in (52). Ignoring case, I assume that *my* has the same conventional content:

(52) **Conventional content of English *I*:**

Given a context  $K = \langle CS_K, DR_K, \odot_K \rangle$ , with  $\odot^* = \langle d_k, t \rangle$  a distinguished element of  $\odot_K$ :  
 Use of  $I_i$  is felicitous in  $K$  at time  $t$  just in case  $d_i \in DR_K$  and for all CS-consistent assignments  $g$ ,  $g(d_i) = g(d_k)$ .  
 Where felicitous, for all CS-consistent assignments  $g$ ,  $|I_i|^{K,g} = g(d_i)$ .

Below are DRSs for (83a) and (83b), uttered at time  $t$ ; each is the ordered pair of a set of DRefs (the Universe) and a set of conditions. Each DRS is delimited with labeled square brackets for perspicuity. In both of these representations, the last condition in  $K1$  is a complex condition consisting of two sub-DRSs related by quantification. :

(83a') with restriction on *only*:  $\lambda_{x_7.x_7}$  liked  $x_7$ 's teacher

$[^{K1} \{ x_7, x_{17}, \odot^* \} ;$   
 $\{$   
 $x_7 = \text{Craig Roberts} ,$   
 $\odot^* = \langle x_7, t \rangle ,$  [satisfying presupposition of *I*]  
 $1^{\text{st}} \text{ grade teacher}(x_{17}, x_7) ,$   
 $x_7 \text{ likes } x_{17} ,$   
 $[^{K2} \{ x, y \} ; \{ 1^{\text{st}} \text{ grade teacher}(y, x) , \text{like}(x, y) \}^{K2}] \Rightarrow_{\forall} [^{K3} \emptyset ; \{ x = x_7 \}^{K3}]$   
 $\}^{K1}]$

(83b') with restriction on *only*:  $\lambda_{x_7.x_7}$  liked  $x_{11}$ 's teacher

$[^{K1} \{ x_7, x_{11}, x_{17}, \odot^* \} ;$   
 $\{$   
 $x_7 = \text{Craig Roberts} = x_{11} ,$   
 $\odot^* = \langle x_7, t \rangle ,$   
 $1^{\text{st}} \text{ grade teacher}(x_{17}, x_{11}) ,$   
 $x_7 \text{ likes } x_{17} ,$   
 $[^{K2} \{ x, y \} ; \{ 1^{\text{st}} \text{ grade teacher}(y, x_{11}) , \text{like}(x, y) \}^{K2}] \Rightarrow_{\forall} [^{K3} \emptyset ; \{ x = x_7 \}^{K3}]$   
 $\}^{K1}]$

The felicity condition on the use of  $I_7$  and  $my_{11}$  then requires that all CS-consistent assignments  $g$  give the same value to  $x_7$  and  $x_{11}$  as that assigned to the agent of  $\odot^*$ ,  $x_7$ . In (83a'), this is guaranteed by co-indexation of the two pronouns with the agent of  $\odot^*$ , so that all will correspond to the same DRef,  $d_7$ . Then the last condition requires that in any case in which someone likes their first grade teacher, that person is the value of  $x_7$ , Craige Roberts; this is the sloppy reading. For (83b'), the felicity of the two non-coindexed indexicals is guaranteed by the first condition, which requires that  $x_7$  and  $x_{11}$  have the same value, Craige Roberts; again, this guarantees that they will have the same value as that of the agent of  $\odot^*$ ,  $d_7$ . Then the last condition in this K1 requires that the only individual who likes  $x_{11}$ 's (Craige Roberts') teacher—Miss Tilly—has the same value as  $x_7$ . So Craige is the only person who likes Miss Tilly, yielding the non-sloppy interpretation. (83b') illustrates the utility in (52) of requiring that the DRef corresponding to  $I/my$  have the same value under assignments as the agent of  $\odot^*$ , rather than requiring that they have the same index.

Hence, we can derive both interpretations without special stipulations or the need for special focus variables, etc. A similar derivation yields the strict/sloppy ambiguity for Partee's (79).

### 5.3.2 Quantificational anchors for indexicals

As noted above, bound pronouns can have *de se* interpretations:

(84) Every sailor who thinks he's ready should report for duty immediately.

though they need not:

(85) Every amnesiac tends to find his own biography intriguing, even though he doesn't recognize that it's him he's reading about.

The existence of examples like (84) argues that doxastic centers can be bound variables.

But preliminary evidence suggests that shifted indexicals may not take quantificational nominals as anchors in some, if not most languages that permit shifted interpretations.<sup>36</sup> This is not to say that the relevant antecedent NP and indexical cannot be bound by lambda abstraction, as was discussed in sections 4.1 and 5.1 above and, independently, in LaTerza et al. (2013) for the derivation of the Amharic plural shifted indexical examples. What doesn't seem to be possible in most languages is that the antecedent itself include a non-existential quantificational element.

To clarify what's at issue, here is an example from the one language where I find that such a construction *is* reported, LSC:

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<sup>36</sup> Unfortunately, the data on this matter seem to be preliminary in most cases except Nez Perze and LSC. A lot more fieldwork is needed before any clear pattern emerges.

- RS-i
- (86)  $\frac{\text{PUPIL ALL}_i \text{ THINK}^{\wedge \text{SEE.refl}} \text{ IX-1}_i \text{ INTELLIGENT SUPERLATIVE}}{\text{t} \quad \text{eg:1} \quad \text{eg:front}}$   
 ‘Every pupil thinks that he is the most intelligent.’
- RS-i
- (87)  $\frac{\text{NOONE}_i \text{ SAY IX-1}_i \text{ AGR-1 SCARED DARKNESS}}{\text{RS-i}}$   
 ‘Noone says he’s scared of darkness.’

Each of these involves RS over the complement. In (86), this is accompanied by shifted eye gaze. While uttering the embedded 1<sup>st</sup> person pronominal IX-1, gaze is shifted away from the addressee downward toward the chest of the signer; then back to the front.

But so far as I have been able to discover, this type of example is unattested in any of the other relevant languages in which shifted indexicals have been studied. Deal (2013) claims that such a construction is not grammatical in Nez Perze. In Tamil, a language spoken in south India and Sri Lanka, while the 1<sup>st</sup> person subject agreement marker on an embedded verb may take as anchor the 3<sup>rd</sup> person subject of an embedding verb ‘say’ (with the usual grammatical evidence from extraction that this is not direct quotation), this shifted reading is not possible if the matrix subject antecedent is itself quantificational as in (47) and (48) (B. Chandrasekaran, p.c.). Even if it turned out that anchoring an indexical to a quantificational antecedent in shifted contexts is possible in some languages, it would still have to be explained why it is not generally possible.

All the theories of shifted indexicals cited above, including the present proposal, make such binding possible in principle, though this has not been generally recognized. For example, consider the “shift-together” accounts in Anand & Nevins, Deal and Sudo; in these, the shift promoted by an intensional predicate is not sensitive to whether the subject of the shift-triggering attitude is itself quantificational. Then in examples like (47), since under any assignment  $g$  of values to the arbitrary pupil  $x_i$ , and in any CS-compatible world  $w$ ,  $g(x_i)(w)$  is the agent of the shifted center, nothing would block the interpretation suggested.

Note that in English, we see evidence of the prohibition against quantificational antecedents for shifted indexicals in those that *can* be shift away from the perspective of the actual speaker in FID contexts. Consider:

- (88) [context: The character John has committed a crime in Portsmouth. He is ruminating about his situation:] John worried that the police would find him here at the scene of the crime, before he could escape and set up an alibi.
- (89) Every criminal worried that the police would find him there at the scene of the crime, before he could escape and set up an alibi.
- (90) Every criminal worried that the police would find him here at the scene of the crime, before he could escape and set up an alibi.

In (88), FID makes possible an interpretation of *here* where it is understood to be John’s location in Portsmouth. In (89), *there* is understood to be the scene of the crime, wherever that might be. In (90), *here* can only be taken to be the utterance location, not that of the arbitrary criminal’s

crime and rumination. I do find it difficult to give the complement of (90) an FID interpretation. I think that perhaps in (89)/(90) adding the emotive Conventional Implicature trigger *fuckin'* before *police* can be understood to reflect not the actual speaker's view of the police, but that of the arbitrary criminal, an FID-like shift. Still, it doesn't seem to improve (90) much unless we take all the crimes to have been committed at the utterance location.

How can this constraint be explained? This question is especially pressing if it does turn out to hold across many, or even most languages.

It is not clear to me how one might implement such a constraint on indexical shifting, nor why it should hold in some languages but not others (LSC). And one might ask why indexicals cannot be so-anchored but *de se* pronouns can. Since the cross-linguistic evidence is still not available in sufficient detail to be clear about the exact nature of the phenomenon, I won't invest in further speculation at this point.

#### 6. Perspectival anchoring in *de re* belief attribution

Problems of *de re* belief attribution include Quine's (1956) puzzle about Ortcutt, Kripke's (1979) puzzling Pierre (considered in (6) above), Kaplan's (1969) shortest spy, Richards' (1993) phone booth example, and a variety of others closely related to these. They have been the subject of extensive investigation in linguistic semantics and the philosophy of language. The problem is illustrated in examples like the following, after Quine (1956):

- (93) [context: Mary doesn't know that the man she's looking at is Ortcutt, whom in another guise she knows as the upstanding, patriotic mayor of the city. He's currently slinking around a dingy part of town at night, wearing a slouch hat and a trench coat:]  
Mary thinks Ortcutt is a spy.

How do we interpret *Ortcutt* in (93) in such a way as to convey the intended truth conditions, without attributing to Mary contradictory beliefs about Ortcutt?

Most of the examples in the literature trade in proper names. But the examples (45) – (47) we considered in §1.5 above involved other kinds of NPs taken (in a given context) to denote constant functions—indexical *I* and demonstrative *this guy*—and arguably raise the same kinds of problems. Recall the context, where Stalnaker is confused about the identity of the fellow he's talking to at the APA:

- (45) [Perry by bystander:] This guy thinks I might be Fred Dretske.  
(46) [spoken *sotto voce* by an amused savvy bystander to someone who joins the group]:  
Stalnaker thinks Perry might be Dretske.  
(47) [aside by Stalnaker to someone else standing nearby:] This guy [indicating Perry] might be Dretske, or he might be Perry.

In the context given for each of (45), (46) and (47), the individual whom Stalnaker intends to refer to via his use of *this guy* or *Perry* or *I* happens to be the actual John Perry, so the underlined

NP has a *de re* interpretation. But because Stalnaker is unaware that the referent is Perry, taking the NPs to denote constant functions whose value is always Perry would either attribute to Stalnaker a belief that the two philosophers are the same individual or make the reported belief irrational. Yet that belief does not strike us as either conflatory or irrational. Similarly, we saw in §4 that a similar problem arises on the amnesiac scenario involving Ernie Banks, who incorrectly concludes:

(53) I know now who I am! I'm James McCawley!

This, too, seems to reflect a problem involving a *de re* attitude of Banks toward himself.

Among the contenders for an account of *de re* belief attribution, the most promising is a recent approach due to Aloni (2001), in which she proposes that we understand such *de re* terms (she focuses on proper names) *under a conceptual cover* that is related to the doxastic ground (belief state) of the relevant agent. In this section I will briefly sketch Aloni's account and illustrate how it sheds light on these problems. Then I will offer a modest modification, anchoring her perspective shifting operator  $\wp$  to a discourse center, to result in a more constrained account of when shifting is possible and of which agents the perspective on the *res* may be shifted to center on.

### 6.1 Aloni's account of *de re* belief attribution

Aloni's theory is intended to offer a unitary account of several phenomena simultaneously:

- puzzles about *de re* belief,
- puzzles about what it means to know who someone is, and
- issues in dynamic quantification

She investigates a general approach to the first two problems which several others have explored before her (including Hintikka 1967,1969; Kraut 1983; Gerbrandy 1997; and van Rooij (1997)). As in the standard Hintikka-style approach to propositional attitudes, belief is modeled as involving quantification over possible worlds which reflect the belief state of the relevant doxastic agent. The underlying intuition is that when we have two epistemic agents A and B (or one agent on two occasions) considering one and the same entity, the agents may have different perspectives on that entity. For example, if both have perceptual access to the object, they may actually see different aspects of it—A recognizing it as 'the house I'm facing', B as 'the building viewed on my left from the side'. Or A may have solely perceptual access to some individual, and hence be able to recognize him as a visual object, while B may know of him by reputation or hearsay, perhaps by name, or know about some of his purported properties. It is easy to see that in some sense both agents are familiar with this individual, but that this sense differs across the agents. Suppose I show A, with her merely perceptual access, a photo of the individual and ask if she knows him; she can truthfully say *yes, that's him*, pointing out the actual individual on the other side of the room, say the one we know as John Perry. On the other hand, if I ask B if he knows who John Perry is, he can truthfully say *yes, he's a philosopher at Stanford*. But it may be that neither agent has access to both kinds of information about that object: B can't point out John Perry in the room full of people at the APA party, A can't tell us what that guy's name is or what he does. Hence both can be said to have merely partial information about Perry, even

though both intuitively answered truthfully when they said they knew who he was.<sup>37</sup> We might loosely say that A knows Perry in his guise as an object of perception, while B knows Perry in his onomastic and professional guises. As has often been argued (e.g. Boër & Lycan 1985), knowing who someone is is always partial—there's always more to know. So it shouldn't be surprising that two agents might know the same individual under distinct guises, which are not obviously or necessarily *a priori* guises of the same individual. That is, the two agents might be said to have different doxastic perspectives on the individual in question.

And A and B may even be the same individual. Stalnaker is both A and B in his story about the APA party. Thus, though Aloni's work focuses on examples with proper names, it is natural to extend it to address problems of *de re* attribution involving indexicals, as well, as in the examples considered in §1.5.

Crucial to Aloni's success in formally realizing this idea is a different view of cross-world identity than is commonly assumed in possible worlds-based semantic models. Much work in semantics assumes (if only for simplicity) either that there is a single domain of individuals—which do or do not exist at various times in various worlds in the model, in which worlds they may have different properties—and that cross-world identity is identity *simpliciter*; or else if individuals are world-particular, that there is a single cross-world counterpart relation given by the model. In either case, there is a single, privileged counterpart relation across worlds.

But if we are to realize the intuition that agents can only identify individuals relative to guises, those guises themselves reflecting the agent's limited doxastic perspective, we must give up this simplistic assumption about counterpart relations. Gerbrandy and Aloni both put the matter clearly:

Instead of modeling identity across possibilities by taking it to be given by the objects that constitute the domains of the possibilities, we assume that some equivalence relation R over the objects in different possibilities is given, and say that an object *d* in one possibility is identical to an object *d'* in another possibility just in case  $dRd'$ . . . Asking what the identity relation is presupposes that there is only one such a relation, one single way to identify objects....[But] quantification into modal contexts presupposes a given 'mode of individuation', which may vary in different contexts. [To realize this idea,] the only assumption we need to give up is that there is one fixed individuation scheme relative to which the quantifier  $?x$  is interpreted....[That is:] identity across possibilities should be taken as a non-primitive notion. [Gerbrandy 1997]

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<sup>37</sup> In this connection, see the very recent work by Genone (2014) on evidential constraints on singular thought. Genone argues that what's required for singular thought, wherein an expression is used to refer to a particular object, and hence for the felicitous use of singular terms, is not something like Russell's *acquaintance*, but instead a certain kind of evidential relation to the referent: appropriate defeasible evidence of its existence. I think it might be argued that Genone's evidential relation is essentially the weak familiarity constraint that I have argued to be required for felicitous use of definite NPs—including all the singular terms usually considered to be referential, and in particular all those considered in the *de re* belief examples above. Some entity may be weakly familiar to one and the same agent under different conditions, and hence under different *guises*, with different properties in the different conditions.

There is no one direct way of looking at the universe of discourse that characterizes the domain of quantification once and for all; instead **different perspectives seem to supply different sets of ultimately partial objects over which we can quantify**. [Aloni 2001, my emphasis (CR)]

Here's how we might grasp this way of conceiving of counterpart relations: Even if we assume that there's actually a fixed set of individuals in our domain, human agents never have complete information about those individuals. All they have is partial information. As their information grows, they may "know" an individual under richer and richer guises, but never be able to completely distinguish that individual from all others with respect to all the properties that the individual might have. That is, the process of individuation is never complete. So in a sense, all we know—and thus all we can quantify over—are partial individuals. This leads to one way of understanding problems of *de re* belief attribution.

Consider again our two agents A and B, just above: Each applies a different mode of individuation to the entity we call John Perry. If A is Stalnaker at the APA party, the guise under which he is acquainted with Perry *in that situation* is one of visual appearance and evident interests. In the individual concept that reflects that perspective on Perry, the fellow actually standing in front of him at the party may be any mature American male analytic philosopher, perhaps the person commonly known as Fred Dretske, or John Perry, or Richmond Thomason. That is, the individual concept reflecting this mode of individuation is not onomastically constant—bearing the same name in all possible worlds in Stalnaker's belief-state, contra theories which assume a single cross-world identity relation that underlies both the direct reference of indexicals and the rigidity of proper names. This is one way to understand what Aloni means by telling us that the object in Stalnaker's doxastic state is partial: Stalnaker has insufficient evidence to clearly identify the fellow-in-front-of-him with respect to his other properties, in particular with respect to his name. And this despite the fact that from a different perspective—that of their names and reputations—Stalnaker is quite familiar with all the philosophers in question and with their work.

So individuals are complex, with some properties evident from one perspective, others evident from a different point of view. How we identify an individual we encounter depends on the perspective evident in that encounter.

To make the account Aloni proposes intuitively plausible, start by assuming a model  $\langle W, D \rangle$ , where  $W$  is the set of possible worlds =  $\{w_1, w_2, w_3\}$ , and  $D$  is the domain of "thin" particulars, the single domain of individuals across worlds. Take icon size to differentiate the individuals in the domain:

$$D = \{\square, \square, \square\}$$

Thin individuals have no inherent properties apart from being (a) self-identical, and (b) distinguished from all other individuals, as represented by their different sizes.<sup>38</sup> Here's a useful

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<sup>38</sup> Cf. the thin particulars of Armstrong (1978), adopted by Kratzer (1989). My use of thin particulars in this illustration should not be attributed to Aloni; however, she does assume a single domain across worlds.

way to understand the distinction captured by size here, suggested by Zsófia Zvolenszky (p.c.). Imagine you have a standard deck of cards, but all you can see is the back of the cards. You know there are a certain number of distinct cards, and if they are all laid out face-down, you can distinguish them each from the other. But you have no way of knowing anything about any given card except that it is distinct from the others. This is all that the sizes tell us in this model: each entity is somehow different from the others.

In actual situations in possible worlds, it may be apparent that these individuals are differentiated by other properties. In Zvolenszky's example, you know that the cards whose backs you see have other properties: each is exactly one of the four suites and has exactly one either numeric or face value. If you have just three of these cards, there are a number of possibilities for the combination of values of those cards. The sum of these possibilities characterizes your doxastic state with respect to those three individuals. In Stalnaker's story, the "cards" are the three senior male philosophers other than Stalnaker who are at the APA party. The size in the model only serves to indicate that they are distinct.

Now consider how Stalnaker might understand the proper names *Dretske*, *Perry* and *Thomason*. We'll characterize the meaning of each name with an individual concept (IC)—a function from worlds to individuals. There's a sense in which Stalnaker knows who Perry is, in that he knows that he bears the name *Perry*. Let's associate the relevant names with a set of functions over the thin individuals in our model:

$$\begin{array}{ll}
 (94) & \{ \langle 1, \blacksquare \rangle, \langle 2, \blacksquare \rangle, \langle 3, \blacksquare \rangle \} & \textit{Dretske} \\
 & \{ \langle 1, \blacktriangle \rangle, \langle 2, \blacktriangle \rangle, \langle 3, \blacktriangle \rangle \} & \textit{Perry} \\
 & \{ \langle 1, \blacklozenge \rangle, \langle 2, \blacklozenge \rangle, \langle 3, \blacklozenge \rangle \} & \textit{Thomason}
 \end{array}$$

Choose any row in (94). This is a constant function in that in each world the value of the function is the individual with a particular name: All the values in row 1 are bearers of the name *Dretske*, those in row 2 bear *Perry*, etc. Take the worlds over which the individual constants are defined to be those in Stalnaker's belief-state. Then we might say that each row corresponds to a partial individual whom Stalnaker knows, the onomastic sense in which he knows who Dretske, Perry and Thomason are. All Stalnaker knows is that there are three individuals, associated with three different names. But he doesn't know which is which. This is represented by mapping different thin particulars to different names in the worlds 1, 2, and 3 that are compatible with Stalnaker's belief state.

But there's also a sense in which Stalnaker knows each of the individuals denoted by the definite descriptions *the philosopher talking with me*, *the philosopher who just left the room*, and *the philosopher standing by the bar*. We can represent this by using, for each description, a particular icon to represent the unique individual in the world who has the corresponding property:

$$\begin{array}{ll}
 (95) & \{ \langle 1, \text{☺} \rangle, \langle 2, \text{☹} \rangle, \langle 3, \text{☺} \rangle \} & \textit{the senior male philosopher talking with Stalnaker} \\
 & \{ \langle 1, \text{☠} \rangle, \langle 2, \text{☠} \rangle, \langle 3, \text{☠} \rangle \} & \textit{the senior male philosopher who just left the room} \\
 & \{ \langle 1, \text{★} \rangle, \langle 2, \text{★} \rangle, \langle 3, \text{★} \rangle \} & \textit{the senior male philosopher standing by the bar}
 \end{array}$$

Again, Stalnaker may assume that each of these individuals maps onto one of the thin particulars in the restricted domain, but he doesn't know which is which. Each individual concept in (95) is constant in a different sense than those in (94): with respect to one of the locative properties in question.

(94) and (95) are different ways of carving up the world into individuals, a mode of individuation over the domain of this small model, each reflecting partial information about the entities in question. Stalnaker's lack of information about Perry in this story amounts to an inability to accurately map between these two modes of individuation, to relate the two sets of uniquely identifying properties so as to correctly capture which locative property goes with which name.

In (94) and (95), size may vary across the values in a particular row—but that's just to say that there is *no uniquely privileged way of individuating the thin particulars in the model*. In other words, in a model where individuals may have a rich set of properties, no one mode of individuation is sufficient to tell us who a given individual is. However, (94) and (95) reflect a model where in each world there is exactly one individual (thin particular in the domain) with each of these properties, and where each individual has exactly one of the properties in a given world. This is why they reflect different modes of individuation over the domain: (94) and (95) are what Aloni calls conceptual covers. Informally:

- A **conceptual cover** is a set of individual concepts  $Z$  that satisfies the following two conditions, which are required in order to yield an appropriate domain of quantification:
- existence:** for each individual  $d$  in the domain and each world  $w$ ,  $Z$  must contain a concept which identifies  $d$  in  $w$ , i.e. whose value in  $w$  is  $d$ .  
[i.e., the CC includes at least one “way” (an IC) of characterizing each individual in  $D$  in each world in  $W$ ]
  - uniqueness:**  $Z$  cannot contain overlapping concepts, i.e. concepts standing for one and the same individual in one world and for two different individuals in another.  
[i.e., for any given individual  $d$  in  $D$  in a given world  $w$  in  $W$  the CC includes no more than one “way” (an IC) of characterizing  $d$  in  $w$ ]

Thus, a CC is a way of individuating all the objects in the (possibly pragmatically restricted) domain of a model, across all worlds.

Formally:

**Conceptual covers:** Given a set of possible worlds  $W$  and a domain of individuals  $D$ , a conceptual cover  $CC$  based on  $(W, D)$  is a set of functions  $W \rightarrow D$  such that:

$$\forall w \in W \forall d \in D: \exists ! IC \in CC: IC(w) = d$$

If we take ICs, equivalently, to be sets of ordered pairs in  $W \times D$  such that each  $w \in W$  occurs in exactly one pair, then we can restate this as follows:

$$\forall w \in W: \forall d \in D: \exists ! IC \in CC: \langle w, d \rangle \in IC$$

In a CC, each pair consisting of a world and an entity must occur exactly once. Checking (94) and (95) above, we see that each is a CC.

CCs correlate with counterpart relations over individuals in the model. Aloni tells us that a **method of cross-identification is proper** if it satisfies (i) and (ii):

- (i) R is an equivalence relation:
  - (a) R is reflexive; [‘in each world, each individual is identical with itself’]
  - (b) R is symmetric;
  - (c) R is transitive.
- (ii) Each individual has one and only counterpart in each world:
  - (a)  $\forall w, w', d : \exists d' : \langle w, d \rangle R \langle w', d' \rangle$ ;
  - (b)  $\forall w, w', d, d', d'' : \langle w, d \rangle R \langle w', d' \rangle \ \& \ \langle w, d \rangle R \langle w', d'' \rangle \Rightarrow d' = d''$ .

No individual ceases to exist when we move from one world to another, and one individual cannot become two.<sup>39</sup>

In (94), if we take the individuals in a given row to be each others’ counterparts, this will be a proper method of cross-identification in the model in question. It is an equivalence relation which is constant in that individuals who bear a given color are related only to themselves. (95) also corresponds in this way to a natural counterpart relation, also constant, but in this case over shape. Note that this relation would no longer be proper if it included, say, both  $\langle 1, \odot \rangle R \langle 1, \ominus \rangle$  and  $\langle 1, \odot \rangle R \langle 1, \otimes \rangle$ . But the definition of a CC guarantees that this will not occur if we build the counterpart relation across rows. The requirement that in a CC each world/entity pair must occur exactly once and the fact that each row is a function over W guarantees that the corresponding counterpart relationship will yield for each individual exactly one counterpart in each world.

In the same APA scenario, a philosopher who was better informed about these individuals, say Janice Dowell, might take the meanings of these NPs to be (96) and (97), enrichments of (94) and (95) to map colors to shapes:

- |      |  |  |
|------|--|--|
| (96) | $\{ \langle 1, \odot \rangle, \langle 2, \otimes \rangle, \langle 3, \ominus \rangle \}$<br>$\{ \langle 1, \otimes \rangle, \langle 2, \odot \rangle, \langle 3, \star \rangle \}$<br>$\{ \langle 1, \star \rangle, \langle 2, \star \rangle, \langle 3, \otimes \rangle \}$   | <i>Dretske</i><br><i>Perry</i><br><i>Thomason</i>  |
| (97) | $\{ \langle 1, \ominus \rangle, \langle 2, \odot \rangle, \langle 3, \ominus \rangle \}$<br>$\{ \langle 1, \otimes \rangle, \langle 2, \otimes \rangle, \langle 3, \otimes \rangle \}$<br>$\{ \langle 1, \star \rangle, \langle 2, \star \rangle, \langle 3, \star \rangle \}$ | <i>the philosopher talking with Stalnaker</i><br><i>the philosopher who just left the room</i><br><i>the philosopher standing by the bar</i> |

In Dowell’s representation of these meanings, the individuals realizing the proper names have gotten thicker—dressed up in shape-property clothing; and the individuals realizing the

<sup>39</sup> Of course, this doesn’t rule out the possibility that there are other, non-proper counterpart relations of linguistic interest. I might have been twins.

descriptions have taken on color—gotten names. And this is what it means for Dowell to be better informed: She can map the “partial individuals” (ICs) in (94) onto the “partial individuals” in (95), correlating color to shape. Assuming she realizes that the philosopher actually talking with Stalnaker is Perry, then she also realizes that  $w_2$  is the actual world: the world where ■ is ☺, i.e. the world with ☺.

(96) and (97) are compatible with Dowell’s information about the situation if she not only knows who’s who in the room, but also has heard one of (45) – (47):

- (45) [Perry aside to Dowell:] Stalnaker thinks I might be Dretske.
- (46) [fellow bystander Kepa Korta to Dowell:] Stalnaker thinks Perry might be Dretske.
- (47) [Stalnaker aside to Dowell:] This guy [indicating Perry] might be Dretske, or he might be Perry.

Privy to the information in (47), Dowell also knows that DOX(Stalnaker) includes worlds with ☺ and worlds with ☹, but no worlds with ☺ (all this modulo size); this is compatible with all the worlds in our model. Suppose it becomes evident that Stalnaker has made up his mind about who he’s talking with. Perry might tell Korta (98), and Korta might tell Dowell (99):

- (98) Stalnaker thinks I’m Dretske.
- (99) Stalnaker thinks Perry is Dretske.

At that point, Dowell knows that DOX(Stalnaker) no longer includes the actual world  $w_2$ . So far as she knows, it may include  $w_1$  or  $w_3$ , depending on his beliefs about who’s standing by the bar and who has left.

Notice that if we consider only the shapes in (97), that CC is still constant. But if we consider instead only the colors of the entities, (97) is not constant. Nonetheless there’s still a proper cross-world identification/counterpart relation corresponding to (97), built across ICs on the basis of the entity’s color:

<1,■>R<1,■>	<2,■>R<2,■>	<3,■>R<3,■>
<1,■>R<2,■>	<2,■>R<1,■>	<3,■>R<1,■>
<1,■>R<3,■>	<2,■>R<3,■>	<3,■>R<2,■>
<1,□>R<1,□>	<2,□>R<2,□>	<3,□>R<3,□>
<1,□>R<2,□>	<2,□>R<1,□>	<3,□>R<1,□>
<1,□>R<3,□>	<2,□>R<3,□>	<3,□>R<2,□>
<1,△>R<1,△>	<2,△>R<2,△>	<3,△>R<3,△>
<1,△>R<2,△>	<2,△>R<1,△>	<3,△>R<1,△>
<1,△>R<3,△>	<2,△>R<3,△>	<3,△>R<2,△>

This same counterpart relationship can be characterized instead using our metalanguage names for the individuals in the model (the same as in the object-language meanings in (94)/(96)):

<1,Dretske>R<1,Dretske>	<2,Perry>R<2,Perry>	<3,Thomason>R<3,Thomason>
<1,Dretske>R<2,Perry>	<2,Perry>R<1,Dretske>	<3,Thomason >R<1,Dretske >

<1,Dretske>R<3,Thomason>	<2,Perry>R<3,Thomason>	<3,Thomason>R<2,Perry>
<1,Perry>R<1,Perry>	<2,Dretske>R<2,Dretske>	<3,Dretske>R<3,Dretske>
<1,Perry>R<2,Dretske>	<2,Dretske>R<1,Perry>	<3,Dretske>R<1,Perry>
<1,Perry>R<3,Dretske>	<2,Dretske>R<3,Dretske>	<3,Dretske>R<2,Dretske>
<1,Thomason>R<1,Thomason>	<2,Thomason>R<2,Thomason>	<3,Perry>R<3,Perry>
<1,Thomason>R<2,Thomason>	<2,Thomason>R<1,Thomason>	<3,Perry>R<1,Thomason>
<1,Thomason>R<3,Perry>	<2,Thomason>R<3,Perry>	<3,Perry>R<2,Thomason>

But just as (97) is not color-constant, this counterpart relation is not constant in the sense that each individual is related only to itself. For example, the counterpart of ■/Dretske in  $w_1$  is ■/Perry in  $w_2$ ; that of ■/Thomason in  $w_3$  is ■/Perry in  $w_2$ , etc.

Consider again what Dowell understands when she hears one of (45) – (47). She knows that Stalnaker is rational and that he takes Dretske and Perry to be different men. How then can she understand Korta’s *Perry*, Stalnaker’s *this guy*, or Perry’s *I* in such a way as to be consistent with her information? It seems clear that she understands the speaker in uttering the NP to intend to refer to an entity, the *res*—one with which Dowell presumably would be familiar in the way suggested by the NP—and to predicate possibly being Dretske of that *res*. This is the *de re* interpretation. By (47), Stalnaker clearly means ‘this guy, whoever he may be’, not ‘this guy, who is Perry’. So Dowell does something quite close to what Stalnaker’s (1979) diagonalization operator would have her do: She takes Stalnaker to be ignorant of crucial information that she herself has about the *res* in the actual situation of utterance, and accordingly takes the intended sense of the NP to be **the IC which captures Stalnaker’s presumed mode of individuation of that *res***, i.e. the shape-only (95), a less property-rich version of her (97). She takes the same interpretive tack when she grasps Korta’s *Perry* (46) or Perry’s *I* (45). She knows who’s talking with Stalnaker, and in those cases knows that the speaker knows as well, in a way that’s more informed than Stalnaker. But since the attitude report is about Stalnaker’s relation to the *res*, she naturally interprets the NP from Stalnaker’s doxastic perspective, by giving it that content which reflects *his* presumed information about the *res*. On this interpretation, then, the identification reported in (46) of Perry *qua* individual perceived with Dretske *qua* famous philosopher named *Dretske* is not irrational. It is just wrong—DOX(Stalnaker) so reported does not include the actual world as the interlocutors know it ( $w_2$ ).

This, in a nutshell, is Aloni’s proposed treatment of *de re* belief attributions using a given NP. The meaning of the NP is shifted: the IC the interlocutors jointly take the NP to denote is mapped to a possibly different IC corresponding to the doxastic agent’s presumed mode of individuation of the *res*. Aloni argues that this is a pragmatic process like Stalnaker’s diagonalization. The crucial difference between Aloni’s account and diagonalization or the other approaches to *de re* cited above, is that Aloni requires that the shifted interpretation be an IC in a CC, satisfying the existence and uniqueness constraints on CCs. This permits her to give a satisfactory account of a broad range of examples involving puzzles about belief, including all the ones noted above and more besides.

Modes of individuation, Aloni’s CCs, thus capture different ways of mapping cross-world identity (or counterpart) relations. This realizes the idea that “identity across possibilities should be taken as a non-primitive notion” (Gerbrandt 1997). Aloni (2001) tells us: “There is no one direct way of looking at the universe of discourse that characterizes the domain of quantification

once and for all; instead different perspectives seem to supply different sets of ultimately partial objects over which we can quantify.” Aloni proves that the cardinality of the ICs in a CC equals the cardinality of the domain  $D$  over which the CC is defined. Since each individual occurs as the value for any given world only once per CC and each  $IC \in CC$  gives a value for each world, the CC effectively offers one way of individuating all the entities in a given domain (the model or some pragmatically given sub-domain), e.g. distinguishing them onomastically, or by location, or under some set of descriptions, or.... Call an IC in a CC a **guise**.<sup>40</sup> In a given CC in a given world, an individual  $x$  has the property corresponding to exactly one of the ICs, that IC being  $x$ 's guise in that world under that mode of individuation. Then we might say that the **counterparts of  $x$  under that guise** are those entities which bear the same guise (are values of that function) in other worlds for which the function is defined. Thus, given  $x, y, z \in D$  where  $y \neq z$ , worlds  $w$  and  $w'$ , and two distinct CCs  $\gamma$  and  $\delta$  with corresponding counterpart relations  $R_\gamma$  and  $R_\delta$ , it is possible that  $\langle w, x \rangle R_\gamma \langle w', y \rangle$  but  $\langle w, x \rangle R_\delta \langle w', z \rangle$ . I.e.,  $x$  in  $w$  under different guises corresponding to the two CCs may have distinct counterparts in a given world  $w'$ .

Arguably, another function which needn't be constant from the onomastic point of view is the IC modeling the cross-world self-identification function for a given individual. Such an IC reflects a counterpart relationship between the centers of a centered-world belief state; call this a *de se* counterpart relationship. There is a tight correlation between that counterpart relation under DOX and the denotation of  $I$ , given the semantics for  $I$  in (52). This correlation follows from the requirement that the assignment functions  $g$  be CS-consistent and from how CS-consistency is constrained by any information in the Common Ground about the speaker's beliefs. Consider the IC corresponding to  $I_i$  in context  $K$  with  $\odot^* = \langle d_i, t \rangle$ , where the value of  $d_i$  in all CS-consistent worlds  $w$  is an agent  $a$ . Any  $CS_K$ -consistent assignment  $g$  to  $d_i$  must reflect all the information the interlocutors share about  $a$ , hence for all CS worlds  $w$  their information about  $DOX(\langle \langle a, t \rangle, w \rangle)$ . I take it that a centered belief state only includes worlds where the center has a *de se* counterpart: I am, therefore my counterpart exists. Then correspondingly,  $[[I]]^{K,g}$  will be an IC which is only defined for worlds which are in  $a$ 's belief state at  $t$ . Since  $a$  is the speaker, is thereby an interlocutor (and presumably is sincere), and thereby her beliefs are reflected in the Common Ground, the CS worlds will all be worlds for which that IC is defined; but presumably there may also be non-CS worlds in  $a$ 's belief state, reflecting some non-shared beliefs of which the interlocutors are all aware. For any world  $w'$  in which it is defined,  $[[I]]^{K,g}(w') = \lambda x. \langle \langle x, t \rangle, w' \rangle \in DOX(\langle \langle a, t \rangle, w \rangle)$ , i.e. the agent of that centered world in  $DOX(\langle \langle a, t \rangle, w \rangle)$ .<sup>41</sup> I.e., in any world of evaluation, the IC assigned to  $I$  will always yield the speaker's 'who I think I am' in that world, and the IC as a whole characterizes 'who I think I might be'. If the individual in question knows, or thinks he knows his name, and the interlocutors know this, then that IC would be onomastically constant. E.g., at the actual world  $w^*$  and time  $t^*$ , all the centers in  $DOX(\langle \langle \text{Craig Roberts}, t^* \rangle, w^* \rangle)$  are named Craig Roberts. And because, it seems, this belief is appropriately causally grounded, it's the general consensus among those acquainted with me.

But consider again the amnesiac Ernie Banks' incorrect conclusion, reported in (53):

(53) I know now who  $I_i$  am!  $I_i$ 'm James McCawley!

<sup>40</sup> This is not Aloni's terminology, but I think it maps well onto the intuitive notion as it functions in the literature.

<sup>41</sup> Note how important Stalnaker's condition (\*) is in guaranteeing the uniqueness of this center in  $w'$ .

Though amnesiac, Banks does know a great deal about himself—what he looks like from his origin in actual space, what things taste like, how confused he is, etc. His *de se* counterparts share all these concrete properties.<sup>42</sup> But prior to the epiphany that led to his uttering (53), Banks might have truthfully said *I don't know my name*. At that point his *de se* counterparts wouldn't all be named *Ernie Banks* or play baseball. Because the CS cannot reflect more information than any of the interlocutors has, Banks' counterparts in the CS-consistent worlds wouldn't all be individuals who bears that name, either. Under the proposed semantics for *I*, what values will CS-consistent *g* assign to  $d_i$  in Banks' belief worlds after he asserts *I am James McCawley*? Supposing that the addressees are better informed than he about his true name, they don't add the proposition that the individual speaking is McCawley to the CG. But assuming they take him to be telling the truth so far as he knows, then the CG contains the proposition that that individual is someone who *thinks* he's McCawley. Thus, any CS-consistent assignment *g* will map  $d_i$  to an IC s.t. its extension in all the worlds in Dox(Ernie Banks) is the famous linguist James McCawley *and is so-named*. But that same assignment will still yield counterparts in the CS worlds who bear the name *Ernie Banks*, as well as those who bear *James McCawley*; i.e., none of us now believes he might be named *John Doe*, but there's still no consensus.

Aloni's characterization of counterpart relations helps us understand how this interpretation of *I* needn't correlate with the onomastic rigidity of the names *Ernie Banks* or *James McCawley*, solving the puzzle of how Banks knows what he means in uttering *I* even if he isn't entirely sure about who he is.<sup>43</sup> There is no one privileged counterpart relation. Instead, there are different guises tracking different aspects of *the actual res*. The denotation of a proper name tracks one guise. But one's self-location can track quite another, those counterparts distinct in a given world from the onomastic counterparts of the same *res*. In (53), Banks is simply asserting his new belief about who he is from an onomastic point of view, a perfectly felicitous assertion because he knows that in the CG theretofore there was no consistent onomastic guise for his doxastic counterparts. This is compatible with the meaning of *I* and captures the sense in which his assertion is about a particular *res*, reporting a reflexive belief because it is about he himself.

The well-known problems of *de re* belief attribution all arise, as the name suggests, when the NPs in question fall under doxastic modality, the modality suggesting a corresponding shift in mode of individuation of the individuals under discussion to a mode consonant with the doxastic state of the agent of the attitude as the interlocutors know it, i.e. consonant with the agent's information about the *res* in question as this is evident to the interlocutors. But no perspective shift is required to capture what's going on in examples like (53), where Banks reports his false epiphany. The parallel with the classic cases embedded under attitude predicates arises because just as in those cases it's the agent of the attitude whose doxastic perspective is relevant, in direct speech the value of *I* is always dependent on the doxastic perspective of the speaker, reflected in the shared information of the interlocutors associated with the discourse center. The amnesiac

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<sup>42</sup> In (53), Banks' self-identity function may be one of the set of ICs reflecting the self-identification functions for the entities in a model, and this would arguably constitute a CC. If you and I both believe we're Napoleon, still there must be differences in the centered worlds in our belief states. Assume that at time *t* we are in the same room, me in location A and you at B, and that we both recognize that we are distinct individuals. Then in your belief worlds at *t* Napoleon is at A, while in mine Napoleon is at B. Etc.

<sup>43</sup> Which of us is? I think the rigid designator story about proper names over-emphasizes the value of knowing-one's-name in knowing who one really is.

situation described is compatible with Banks being able to individuate everyone he encounters, including himself—to recognize them as distinct thin particulars, yet not knowing who is who from an onomastic point of view. He wouldn't think that the great baseball player and the famous linguist were the same person, but the self-identity guise differs from the onomastic guise. The fact that identity statements like this fall out naturally on this account supports the self-attributive semantics for *I* and the characterization of self-attribution in terms of doxastic centers proposed here.

Summarizing: I have suggested how Aloni's proposal about counterpart relations in epistemic modality can be used to model the evolving information interlocutors share about a given individual. I think we can understand this process by analogy with Stalnaker's characterization of the role of assertion in possible worlds semantics. Possible worlds are ways things might be. But we don't know which world we're in. An assertion is a proposal about what things are like, a way of cutting out candidate worlds so we get closer to figuring out which is the actual world. Then the evolution of the Context Set over the course of a discourse models the interlocutors' evolving grasp of what's what. Similarly, if we knew enough to clearly individuate all the entities in the world, to individuate each thin particular from all the others, we would know who's who. Short of that, we know individuals merely partially, under various guises, each reflected in counterpart relations across the corresponding possible worlds in the CS. The richer the guises under which we know some entity, the fewer the distinct possibilities for who that individual might be—i.e. the more restricted its counterpart relations. Then the evolving counterpart relations in a discourse, reflecting this gradual restriction of the possibilities about who a given individual might be, model the interlocutors' evolving grasp (right or wrong) of who's who.

## 6.2 Anchoring pragmatic perspective

The account of perspective shifting Aloni (2001) offers is essentially pragmatic. In an intensional context, a contextually given perspective shifting operator  $\wp$  takes the standard meaning of a proper name, a rigid designator, to yield the IC which reflects the evident guise under which the agent of the attitude is familiar with the *res*.

I think we can say something more. Here, I (a) modify her theory to make the perspective shifter  $\wp$  a function of a contextually available discourse center, and (b) show its applicability to another type of NP whose denotation (in any given context) is purportedly a constant function, indexicals, as in (45), (47) and (98). Accordingly, to the framework sketched in §3, we add a contextually given parameter of interpretation for all NPs, the perspective-shifting function  $\wp$ , which takes the contextual information CS shared by the interlocutors, a relevant center ©, and a familiar DRef *d* and returns a shifted interpretation of *d*, reflecting the relevant guise of *d* from the perspective of ©:

- (100) A **perspective shifting function**  $\wp$  is a function which takes as arguments a **context**  $K = \langle QUD, CS, DR, \odot_K \rangle$ , a discourse **center**  $\odot \in \odot_K$ , and a  $d \in DR$ . Then for some  $d' \in DR$ ,  $\wp(K)(\odot)(d) = d'$ , where for all CS-consistent assignments  $g$ ,  $g(d')$  is an individual concept (IC)  $m$  which satisfies the following conditions:
- (i)  $\exists CC: m \in CC$  & [  $m$  is a guise in a CC... ]
  - (ii)  $\forall w \in CS [m(w) = g(d)(w)]$  & [which is anchored to the value of  $d$  in the CS, so that  $g(d')$  is a guise of  $g(d)$  from the interlocutors' perspective, ...]
  - (iii)  $\forall w \in Dox_{CS}(\odot) [g(d')(w) = m(w)]$  & [  $g(d')$  is entailed by CS to be familiar to  $\odot$  under the guise  $m$ , and ]
  - (iv)  $\forall CC \forall n \in CC: [n \text{ satisfies (i) – (iii)}] \rightarrow \text{Relevance}_{QUD}(m) > \text{Relevance}_{QUD}(n)$   
[  $m$  is the most Relevant such guise of  $g(d)$  ]

A perspective shifting function  $\wp$  takes as argument a context, a center and a familiar discourse referent  $d$ . In the context given, the center is the agent-at-a-time whose doxastic perspective is brought to bear, and the discourse referent will be coindexed with the NP whose interpretation is being shifted.  $\wp$  then maps  $d$  onto a possibly distinct  $d'$ , whose value under CS-consistent assignments is an IC  $m$  subject to four conditions:  $m$  must be an element of a CC (and so satisfy Aloni's requirements) which is anchored in the CS to the value of the familiar DRef  $d$ , be such that it is known by the interlocutors that this is a guise of  $d$  from the perspective of  $\odot$ , and be the most relevant such guise.

In (100), think of the value of  $m = g(d)$  in any of the CS-worlds in the context of utterance as the *res* (in that world) to which the perspective is anchored, so that the anchoring requirement (ii) is effectively **de re anchoring**: This constraint requires  $m$  to be the same individual as picked out by  $g(d)$  in any world in the CS; but it leaves open the possibility that  $\odot$  might be a subordinate center with a different perspective on that *res* than that of the interlocutors, i.e. s.t.  $DOX(\odot) \neq CS$ .<sup>44</sup>

Condition (iii) is a **retrievability** requirement: In *de re* belief attribution bearing on an NP<sub>*i*</sub>, if the interlocutors do not take  $m$  to be a guise of the *res* associated with  $d_i$  from the perspective of  $\odot$ , it would be difficult or impossible for them to interpret NP<sub>*i*</sub> as the speaker intends. This condition guarantees that the counterpart of that *res* in all the worlds in  $\odot$ 's belief state bears the guise  $m$ . This, of course, does not require that  $\odot$  be familiar with the *res* under the guise associated (from the interlocutors' perspective) with the original DRef  $d$ . In fact,  $\odot$  may unwittingly associate incompatible guises with the same *res*, as does Kripke's (1979) Pierre with *London vs. Londres*.

Finally, if we left out the requirement (iv) that this be the maximally relevant guise of  $d$  from  $\odot$ 's perspective,<sup>45</sup> this would make  $\wp$  merely a relation, rather than a function. E.g., in the APA story, there are at least two guises under which Stalnaker is familiar with Perry. In the onomastic guise he does not identify Perry with Dretske; and since no one at the APA believes he does, or

<sup>44</sup> Ultimately I think it probable that perspective shifting under  $\wp$  is applicable to NPs whose contents are non-constant, like (in)definite descriptions on *de re* interpretations. Hence, nothing in (100) requires that  $m$  have the same value for all CS-worlds. That is to say, the anchoring "*res*" may vary in those worlds, so that it is actually an arbitrary object (one way of understanding discourse referents that instantiate quantificational NPs).

<sup>45</sup> I have in mind the notion of Relevance in Roberts (1996/2012).

believes that Perry believes he does, that guise wouldn't yield a relevant interpretation of Perry's utterance *Stalnaker thinks I'm Dretske*, one that made a consistent contribution to the question under discussion (roughly, 'what Stalnaker thinks'). But from the less informed acquaintance Stalnaker has with Perry *qua* fellow he's talking to at the APA—a guise which is evident to the interlocutors—he has drawn the conclusion that the fellow *is* Dretske. So in interpreting Perry's utterance, they take the most relevant interpretation to be one where Stalnaker has an attitude towards Perry under the APA-guise, rather than the onomastic guise.

Conditions (ii) – (iv) suggest that  $\wp$  may best be understood as a reflection of information in the interlocutors' CG. The final interpretation of any  $NP_1$  will be a function not only of its own conventional content, but of the contextually given perspective from which it is interpreted. Thus, perspective is an essentially pragmatic phenomenon, as in Aloni's account. Normally, especially in unembedded use, this is the speaker's perspective—the only perspective which is consistently relevant. Thus, in a matrix clause which is not in Free Indirect Discourse style, since  $\wp$  is a function of the relevant centers and  $\odot_K = \{\odot^*, \odot^\oplus\}$ , this effectively guarantees that  $m = g(d)$ , reflecting the joint perspective of the interlocutors in CS. But when other perspectives are relevant, as when an NP is embedded under an attitude predicate or there is an extended passage in FID, so that other centers are in  $\odot_K$ , the choice of both the anchoring center and the relevant perspective of that center on the *res* is pragmatic, rather like anaphora resolution: Addressees understand which perspective is intended as a function of relevance and plausibility.

Now consider the application of  $\wp$  to the NP *I* in (98), uttered by Perry:

(98)  $Stalnaker_k$  thinks  $I_i$ 'm Dretske.

Interpretation of (98):

1. The presupposition of *I* is satisfied by the familiar discourse referent  $d_i$ , known by the interlocutors to be Perry, and serving as the agent of the relevant center  $\odot_i^* = \langle\langle d_i, t \rangle, w \rangle$  for the time of utterance  $t$ , any  $w \in CS$ . The interlocutors' knowledge of the speaker's identity is reflected in the second IC in the CC (96), repeated below.
2. The propositional attitude predicate *thinks* introduces a subordinate center  $\odot^{\text{think}}$ , the agent of the attitude, such that for the time of utterance  $t$ , any  $w \in CS$ ,  $\odot^{\text{think}} = \langle\langle d_k, t \rangle, w \rangle$ , and for all CS-consistent  $g$ ,  $g(d_k) = Stalnaker$ .
3.  $\wp$  takes the context  $K$ ,  $\odot^{\text{think}}$  (in 2 above) and  $d_i$  (in 1) to yield the shifted interpretation of the embedded subject *I*. To satisfy (100), the result must be a guise in a CC, *de re* anchored by  $\odot^*$  across all the CS-worlds, contextually entailed to be a guise under which  $g(d_k)$ , i.e. Stalnaker, is familiar with the *res* who is the value of  $\odot^*$  in all the CS-worlds. The context suggests that Stalnaker at the APA is able to individuate Perry *qua* perceived interlocutor, but not *qua* well-known philosopher named *Perry*. Thus, he knows Perry not under the second guise in (96), one available to the interlocutors, but under the first guise in the less-informed individuation in (95). So  $\wp(K)(\odot^{\text{think}})(d_i) = \{ \langle 1, \odot \rangle, \langle 2, \odot \rangle, \langle 3, \odot \rangle \}$ ; and as we saw above, with respect to onomastic identity (color), this cross-world identity relation is non-constant. I.e. the resulting guise of Perry is distinct from the IC  $\{ \langle 1, \blacksquare \rangle, \langle 2, \blacksquare \rangle, \langle 3, \blacksquare \rangle \}$  the usual constant function denoted by the name *Perry*.

4. The resulting meaning of the embedded clause is roughly ‘the person Stalnaker is talking with is Dretske’, reflecting Stalnaker’s incorrect belief that he is in world 1 or 3. The actual world is 2.

- (95)            {<1, ☺>, <2, ☹>, <3, ☺>}        *the philosopher talking with Stalnaker*  
                   {<1, ☠>, <2, ☠>, <3, ☠>}        *the philosopher who just left the room*  
                   {<1, \*>, <2, \*>, <3, \*>}        *the philosopher standing by the bar*
- (96)            {<1, ☹>, <2, ☠>, <3, ☺>}        *Dretske*  
                   {<1, ☠>, <2, ☹>, <3, \*>}        *Perry*  
                   {<1, \*>, <2, \*>, <3, ☠>}        *Thomason*

In summary, in (98) we saw both the conventional content of *I* itself depending on ©\*, hence essentially indexical, and the resulting content shifted to a contextually available perspective, that of the subordinate center ©<sup>think</sup> = Stalnaker. Thus, this example illustrates two distinct ways in which centers can bear on NP interpretation, besides *de se* interpretation: (i) conventional, presuppositional anchoring lexically triggered by *I*, and (ii) pragmatically triggered perspective shift enabled by embedding under an attitude but driven by making sense of what’s being attributed to the relevant agent.

Perspective shift also accounts for the interpretation of demonstratives in Heim’s (42) - (44), repeated below, on the assumption that the epistemic character of the modals *might* and *would* anchors their interpretations to the intended doxastic agent at different moments (looking in different directions).

- (42) [Context: The speaker sees two images of chairs in the room where she sits, one to her left, the other image to her right. The image to the right is either a reflection in a mirror or else behind a piece of clear glass.  $\delta_1$  is a pointing by the speaker to the image to her left,  $\delta_2$  is a pointing to the image to her right:] That [ $\delta_1$ ] is that [ $\delta_2$ ].
- (43) That [ $\delta_1$ ] might well be that [ $\delta_2$ ].
- (44) If that [ $\delta_1$ ] were that [ $\delta_2$ ], there would be only one chair in the house.

This yields two distinct centers (with the same agent at different times), and thence  $\wp$  yields two distinct guises available from her distinct perspectives in actual space. The only significant difference between these examples and (98) is that here the perspectives associated with the demonstratives are canonically correlated with the vectors represented by the speaker’s demonstrative gestures.

## 7. Conclusions and prospects

The theory proposed here uses doxastic centers in three ways, not previously (to my knowledge) connected in this way:<sup>46</sup>

- i. as in Lewis' work, they facilitate *de se* interpretation.
- ii. they serve as anaphoric anchors for the expressions classically viewed as indexicals and demonstratives
- iii. they play a crucial pragmatic role in capturing the notion of *de re* belief attribution, anchoring the perspective operator  $\wp$ .

I have focused here on (ii). But there is much more to say about the rich set of issues that this opens up. For example, in connection with (i), I think the theory presented above affords a simple account of Anand's (2011) inner and outer anchors for *de se* interpretation. And I think that the utility of the perspective operator (iii) goes beyond its use in the type of *de re* attributions considered here, to help capture the role of descriptive content in *de re* interpretation where the speaker doesn't agree that the description in the NP correctly attributes a property to the intended *res*. Consider, for example, the use of explicit *so-called* by a speaker to imply that she doesn't agree that the NP's descriptive content holds of the *res* in question, as well as the so-called "referential" use of definite descriptions (Donnellan 1966, Kripke 1977). And the characterization of onomastic counterpart relations sketched in §6.1 has important implications for the theory of proper names. But space precludes discussion of these and many other matters here. In conclusion, I'll only offer a brief note about some additional implications for the semantics of indexicality and the prospects for a broader theory of perspectival content in natural language.

### 7.1 Indexicality

Given our trust in our perceptual capacities, it is quite reasonable to assume that if an individual is standing in front of us, then the same individual will be standing in front of us in all our epistemic alternatives. So demonstrative identification, as opposed to descriptive identification, is suggested as the unique correct method of cross-identification, and direct reference, that is, reference to the 'objects themselves', is specified as reference under such a perspective. The problem with this characterization is that it fails to account for phenomena of identity and identification in situations of partial or mistaken information, that are precisely the kind of phenomena that quantified epistemic logic should account for.

(Aloni 2001:99-100)

Here is the story I have tried to tell about indexicality: It is a conventional sensitivity to point of view. In unembedded contexts (root or matrix clauses), the default point of view assumed is that of the speaker. Accordingly, in the information that the interlocutors share about a discourse there is always information about the speaker at the time of utterance, including information about her (purported) doxastic state. That state is taken to be consistent with the interlocutors' doxastic Common Ground, on the assumption that the speaker is sincere, cooperative and rational. In this formal pragmatic framework, we represent this information as a distinguished

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<sup>46</sup> Though see intuitions along similar lines in Mitchell (1986), Moltmann (2012), Pearson (2013), *inter alia*, which also consider connections between the *de se* and some of the types of expressions discussed just below.

discourse center ©\* (an agent at the time of utterance) and, in the Common Ground, information about the doxastic state of the agent of the center. A similar mechanism captures the global availability of a center ©<sup>®</sup> for the addressee. Use of an indexical presupposes anchoring to a center, so it is not surprising to find that indexicals in languages like English are by default associated with the speaker (addressee). But at some points in discourse, explicitly or implicitly, a subordinate center may be introduced—say, that of the agent of an attitude predicate at the time of evaluation. The introduction of the subordinate center triggers the potential for a shift in perspective of the sort reflected in puzzles about *de re* belief like those illustrated in the previous section. And accordingly, we are not surprised to find that shifts of doxastic agent, associated with the introduction of a subordinate center, may also be brought to bear conventionally on the possible interpretations of some indexicals in a broad variety of otherwise unrelated languages. This is quite similar to the way that even in English more flexible indexicals like *now* and *here* can be shifted under the assumption of the point of view of some reported agent in Free Indirect Style. More generally, whenever the perspective of some doxastic agent plays a role in interpretation, we can use the notion of a doxastic center to ground that interpretation. This whole apparatus, and its foundation on the Quine/Lewis notion of a center in a centered world, is independently motivated by the phenomenon of *de se* interpretation, and using centers in this way correctly predicts that like pure indexicals, shifted indexicals inevitably yield *de se* interpretations.

If something like this simple, general story is the right empirical and explanatory foundation of an account of both *de se* and *de re* interpretation and of indexical shifting, then it constitutes a strong argument against direct reference theories. The full range of data show that the direct reference or constant-function accounts, which assume a fixed notion of context interacting with Character, are neither sufficient nor necessary.

Fixed context and Character are empirically inadequate because changes in context in the course of interpreting an utterance can bear on the interpretation of an indexical. This was evident in the languages which permit semantically shifted indexicals. But also in the case of *de re* attributions, the introduction of an embedding doxastic center may play a crucial role in facilitating a pragmatic shift of embedded indexicals. The range of phenomena in which indexicals are interpreted as bound variables, discussed in §5.3, further undercuts the classical direct reference/constant function accounts. But I think the examples in §6, involving indexicals with a non-constant function interpretation, are especially damning. The direct reference account or a constant function account which assumes a single distinguished counterpart relation simply cannot explain how what Ernie Banks says in (53) is meaningful, sensible, and informative.

But just as important, the Character-based approach to the interpretation of indexicals is unnecessary. On the present approach, indexicality consists in presuppositional anchoring to a familiar antecedent discourse center. Recognizing the presuppositional nature of indexical anchoring, the default impression of wide scope falls out as a function of lexical presupposition satisfaction, i.e. it is a pseudo-scope phenomenon. We don't need Character, and the content of an indexical is a sense, contributing to compositional interpretation in the usual fashion, but potentially subject to both conventionally and pragmatically motivated perspectival shifts, depending on the language in question and the context of utterance.

But this is all exactly what we might expect from the theory of Aloni on which this proposal is partly based, as reflected in the quote at the beginning of this section. One-size-fits-all rigidity in counterpart relations (across different guises) is problematic and unnecessary. Singularity is pragmatic, not semantic. Conventionally triggered presuppositional anchoring to a doxastic state is the key to understanding indexicality.

I noted in the introduction that in some respects the account I am proposing is reminiscent of that of Perry (1979,2001). His central claim (in 2001) is roughly that an utterance containing an indexical contains two kinds of content, both of them truth-conditional: the *referential content*, which he takes to be the standard singular proposition derived on the direct reference accounts, and the *reflexive content*, which places “identifying conditions” that any referent for the indexical must satisfy, and is reflexive in that it makes reference to the utterance itself. Basically, the indexical must refer to the speaker of the utterance in which it occurs, and only if this is satisfied does the indexical refer, hence the utterance have referential content. One might take the reflexive content to be a lexically triggered presupposition of the indexical. Then his account is similar to my own in placing the indexicality *per se* in a presupposition, rather than in the proffered content of the utterance. However, there are at least two very important differences between the present account and Perry’s:

- a) On the present account, the proffered content of an utterance containing an indexical (or proper name) isn’t a singular proposition, nor does it necessarily derive from a constant function as the sense of the indexical. So on the day I’m writing this sentence, *I am here now* doesn’t have the same proffered content as *Craig Roberts is in Budapest on October 27, 2014*.
- b) The indexically triggered felicity condition of an indexical differs from Perry’s “reflexive content”. It does not refer to the utterance itself, but to utterance-determined features of the local context, the latter itself conceived of as the interlocutors’ common information about the discourse. Perhaps this strikes one as a minor difference, but it plays an important role with respect to the difference in (a). More to the point here, the felicity conditions on indexicals in §4 all require a relation to a particular discourse center; and the latter is tied to a doxastic center in Quine’s/Lewis’ sense. Through this relationship, the account extends naturally to a much broader class of problematic phenomena than obviously fall out from Perry’s conditions. In particular, we get (i) the connection to *de se*, (ii) a natural account of shifted indexicals, “fake” indexicals, and the universal associativity of plural personal indexical, and (iii) a straightforward connection to the account of *de re* belief attributions due to Aloni, with all that that implies for indexicals, both in attitude contexts and in doxastically odd contexts like that of poor Ernie Banks (or Perry’s (1979) own Rudolph Lingens).

At the same time, due to the centered character of self-attribution through *I* on this account, we would expect to derive all the consequences for the speaker’s beliefs, desires and intentions that are central features of Perry’s program, argued to be crucial for his essential indexicals. Doxastic self-location has consequences for action. Perry (p.c.) once pointed out that the problem with Lewis’ (1979a) famous story about the two propositionally omniscient gods on their separate mountains, neither supposedly able to say whether he was the manna-dispensing god or the thunderbolt-hurling god, is that it’s hard to understand what it would be to throw manna or thunderbolts without *knowing that one performed that action*. That is, Lewis’ story

implausibly ignores the connection between self-location, intention and action, while the Lingens story does not. I think the theory proposed here gets that right, insofar as one adopts some version of the Belief-Desire-Intention theory of action, since here indexicals are based on doxastic states in what is arguably the appropriate way to ground the connections in such a BDI account.

## 7.2 Perspective in human language

I have made a case that the interpretations of indexicals co-vary systematically with a certain kind of contextual factor, the doxastic perspective adopted by the speaker at that point in the discourse. But the proposed notion of perspective has much broader ramifications for natural language understanding and, hence, for semantics and pragmatics. A case can be made that a generalization of the notion of perspective plays a role in a large and superficially quite diverse class of expressions of which the indexicals are just a special subset: the **perspectival expressions**.

This essay is part of a larger project, wherein my colleagues and I are investigating linguistic expressions whose interpretation displays sensitivity to the point of view assumed by a speaker, in a more general sense of which the notion of doxastic perspective formalized here is an instance. The central thesis in all this work is that many diverse types of expressions in natural language are interpreted relative to the assumed point of view of some agent—typically the speaker, but not always so. This agent is understood to serve as origin in a specific kind of space subcategorized by the triggering perspectival expression—actual space modeled in Cartesian terms, temporal space modeled as the time line, the space of possibilities modeled via DOX, etc. That origin then serves to anchor perspectival locatives like *come* (Barlew 2014); indexical tenses like we find in English; the class of Conventional Implicature triggers discussed by Potts' (2005) (see also Amaral, Roberts & Smith 2008, Harris & Potts 2009); Predicates of Personal Taste like *tasty* (Snyder 2014; Barlew, Kierstead, Roberts & Snyder, in progress); and a variety of evidentials across languages (Kierstead & Martin 2012, Kierstead to appear), including English epistemic modals (Roberts 2014, building on von Stechow & Gillies 2010).

This basic idea grows out of a long tradition in linguistics, with roots in the ancient grammarians, known in contemporary literature as *localism*.<sup>47</sup>

[Localism is based upon] the hypothesis that spatial expressions are more basic, grammatically and semantically, than various kinds of non spatial expressions (...). Spatial expressions are linguistically more basic, according to the localists, in that they serve as structural templates, as it were, for other expressions; and the reason why this should be so, it is plausibly suggested by psychologists, is that spatial organization is of central importance in human cognition" (Lyons 1977:718).

Lyons' localism starts with the application of this concept to the semantics of deixis, locatives and tense, but extends it as well to what he calls the use of demonstratives in "empathetic deixis":

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<sup>47</sup>See Fortis (2012) for a nice history and overview of localism in linguistics, from which several of the references cited here were drawn.

The conditions which determine this empathetic use of the marked member of these deictically opposed demonstratives and adverbs are difficult to specify with any degree of precision. But there is no doubt that the speaker's subjective involvement and his appeal to shared experience are relevant factors in the selection of those demonstratives and adverbs which, in their normal deictic use, indicate proximity. At this point deixis merges with modality. . . (Lyons 1977:677)

A similar impulse can be observed in otherwise quite wide divergent modern approaches to semantics, from the functionalist work of Talmy, who extends localism to temporal and causative contexts: "Situations that involve state and change of state seem to be organized by the human mind in such a way that they can be specified by structures homologous with motion structures" (1975:234), through Fillmore's (1975) *Lectures on Deixis*, Langacker's *Space Grammar* (1978), Mitchell's (1986) ambitious attempt to provide a unified framework for the semantics of point of view, Sells (1987) on logophoric pronouns (and the more recent work on these due to Pearson 2013), Doron (1991) on point of view, Speas & Tenny's (2003) introduction into the Logical Form of sentences in Universal Grammar of a syntactic projection for Point of View, and the most recent work on perspective and the *de se* cited throughout, much of which hints at the general notion of perspective (especially that of Moltmann 2012 and Pearson 2013), and much more besides. But, instructive and insightful though all this work is, none of it quite captures the central notion of perspective in such a way as to found a satisfying general account. Why has this been so difficult to pin down?

I would argue that, as the range of expressions alluded to suggests, the semantics and pragmatics of perspective in human discourse is reflected throughout language, any language, but in so deep a fashion as to only rarely be truth conditionally evident: It is not generally part of the content that we proffer each other in our usual intercourse: what we talk about. Rather, it is a central supposition that grounds much of what we say and understand. That is, perspectival anchoring of interpretation is fundamentally presuppositional, and hence pragmatic, and only surfaces here and there in explicit truth conditional semantic content. But once we identify it for what it is, we see evidence of it throughout that content. All the authors cited just above have had a genuine intuition of this underlying unity.

The **perspectival expressions** are those constituents whose conventionally given content is sensitive to the perspective (within a given space) assumed by the speaker at the time of utterance. Here is a rough sketch of what elements of this class have in common:

Characteristics of perspectival expressions:

1. display general properties of anaphoric expressions, including:
  - Partee's (1984) paradigm, extended as in §1.1 above.
  - the usual scope constraints on antecedence (Kamp 1981, Heim 1982, Chierchia & Rooth 1983, Roberts 1996)
  - projection as a function of the satisfaction of the anaphoric presupposition: that is, the display of pseudo-scope behavior as defined above
2. share a particular pattern of restricted distribution of possible perspectival anchors, with corresponding constraints on interpretation:
  - the speaker and addressee are always available as perspectival anchors
  - the speaker is the default perspectival anchor

- the addressee is the pragmatic default in questions (“interrogative flip”)
  - the agent of an attitude predicate may serve as perspectival anchor
  - in Free Indirect Discourse (FID), the agent whose point of view is being represented may serve as perspectival anchor
  - in modal subordination (Roberts 1989) involving epistemic modality, across both modal auxiliaries and attitude predicates (Heim 1992, Roberts 1996), an agent whose views are serving as accommodated Modal Base may serve as perspectival anchor under the scope of the modal
3. the perspectival anchor displays *de se/de te* properties

The **indexical expressions** as characterized above, are dependent on a specifically *doxastic* perspective, and thus constitute a proper sub-class of the perspectival expressions:

Indexicals  $\subseteq$  Perspectival Expressions  $\subseteq$  Anaphoric Expressions

Of course, the evidence for these claims goes well beyond the purview of the current work. But though focused on the interpretation of indexical expressions, a deeper goal of this paper has been to offer a preliminary characterization of the essential features of the perspectival anchoring of interpretation and to offer some simple tools for modeling it and tracking how perspective changes in systematic ways across discourse. This brief and partial inventory of perspectival expressions is intended to sketch the cross-categorial, cross-linguistic vista which this work opens up. I hope this will help to stimulate further cross-linguistic investigation.

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