

Coming to a doxastic agent¹

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Abstract. Fillmore (1975) proposes that using the English deictic motion verb *come* to describe a motion event is acceptable if some contextually given individual is present at the destination of the motion event. In this paper, I show that the individual must only believe herself to be located at the destination. I argue that the meaning of *come* thus includes a doxastic, modal component, and develop an analysis in the dynamic semantics of AnderBois et al. (2015).

Keywords: Deictic motion verbs, deictic center, doxastic state, dynamic semantics, *de se*.

1. Introduction: The anchoring of *come*

Deictic motion verbs such as *come* denote motion on a path that is related to the location of a specific individual, typically a discourse participant (Nakazawa, 2007, 2009), as illustrated in (1).²

- (1) [Context: A is in Cleveland, OH, and B is in NYC. A says *Where is John these days?* B:]
- a. John is in Chicago. However, he is coming to New York tomorrow.
 - b. John is in Chicago. However, he is coming to Cleveland tomorrow.
 - c. #John is in Chicago. However, he is coming to Denver tomorrow.

In (1a) and (1b), *come* is used to describe John's motion to the locations of the interlocutors. In (1c), *come* cannot be used to describe John's motion to some other location. Following Fillmore (1975), the generalization is that *come* is used to describe motion ending at the location of a contextually given individual. I call this individual the **anchor** of *come*, (c.f. Levinson 2003 and Roberts 2014). I call the implication that the anchor is located at the destination the **anchoring conventional implicature** (anchoring CI) associated with *come*. Its CI (Potts 2005) status is motivated below.

Previous analyses of the anchoring of *come* assume that i) the anchoring CI is that the anchor is physically located at the destination and ii) the anchor is determined by the value of a contextual parameter. In this paper, I argue that i) the anchoring CI is that the anchor conceives of herself as being at the destination and ii) the anchor is an anaphorically retrieved discourse referent (dref). I propose an analysis of the meaning of *come* in the dynamic semantics of AnderBois et al. (2015).

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²There is also a non-deictic use of *come* in English (Radden, 1996) and *kommen* 'come' in German (Rauh 1981; Antje Roßdeutscher p.c.). This use is ignored here.

2. Previous accounts of the meaning of *come*

Deictic motion verbs have received considerable attention, following seminal work by Fillmore, most famously in Fillmore 1975. Cinque (1972), Gathercole (1978), Hockett (1990), Wilkins and Hill (1995), Oshima (2006a), Oshima (2006b) and Nakazawa (2007) all seek either to improve Fillmore's account or to test its applicability in other languages. Fillmore describes four relations between the anchor and the destination that license the use of *come*. The first is that the anchor is located at the destination at utterance time, as in (1). The other three relations are detailed in (2).

- (2) [Context: Ann lives in Gambier, a small town with 1 gas station. She is at the gas station talking on the phone to Beth, who is at her own home. Ann says:]
- a. **Destination is anchor's location at (motion) event time:**
I went to see Professor Smith in Lupton Hall during his office hours earlier today. While I was there, John **came to Lupton** to meet with Professor Rogers.
 - b. **Destination is anchor's home base:**
John **came {to my house/to Gambier}** earlier today, but I was not at home.
 - c. **Motion is with anchor:** John **came** to North Carolina **with me** last month.

If none of the relations noted in (2) hold, *come* is unacceptable (e.g. (1c)). Fillmore shows that either the speaker or the addressee is an acceptable anchor across all four relations, as in (1b) (below, for reasons of space, I ignore home base and accompaniment cases for the most part). Fillmore also demonstrates that, in general, the presence of someone other than the speaker or addressee at the destination is not sufficient to make the use of *come* acceptable, as shown in (3).

- (3) [Context: Ann and Beth are at the library chatting. Neither has been to the local gas station today, and neither works there. Neither has been to or works at Lupton Hall. Ann says:]
Fred is at the gas station right now. John came {there/to the gas station} earlier today.

(3) shows that anchoring of *come* requires something more than just the presence of a salient individual at the destination. Fred is salient by virtue of having been mentioned recently, but his being at the destination does not make *come* acceptable. (1)-(3) illustrate Fillmore's main empirical generalization: usually, the only acceptable anchors for *come* are speech act participants (SAPs).

Although Fillmore (1975) presents his generalization about the acceptability of different anchors in terms of the SAP/non-SAP distinction, he does not propose an analysis based on this distinction. This is due in part to examples in which the anchor of *come* is not an SAP but a "central character" (Fillmore 1975:67) in a narrative. Fillmore argues that such examples are acceptable when the SAPs do not figure in the events under discussion. To account for both the SAP generalization and central character examples, Fillmore argues, along with e.g. Talmy 1975, Wilkins and Hill 1995,

and Nakazawa 2007, 2009, that the anchor corresponds to the **deictic center**. The deictic center is either a contextually given space-time location, typically the utterance location, or an individual, typically the speaker, depending on the specific theory. On a deictic center analysis, the acceptable use of *come* requires the destination of the motion event to be the location of the deictic center.

One way to model the deictic center is as a contextual parameter in a Kaplanian (1989) context (Taylor, 1988). Though not all researchers make this move explicitly, they do assume that the value of the deictic center is fixed by the context. A non-indexical approach is taken by Sells (1987), who defines a distinguished role for a dref called the PIVOT. The PIVOT determines the anchor for deictic motion verbs and some spatial expressions. Thus Sells assumes that the anchor is anaphorically interpreted, as I do here. Without a precise definition of the deictic center, it is difficult to determine the predictions of deictic center analyses. However, Oshima (2006a) shows that deictic center analyses are empirically inadequate, regardless of the exact definition. First, he demonstrates that the speaker and addressee are not equally acceptable anchors in all contexts, an asymmetry not predicted by deictic center accounts. Second, he argues that deictic center analyses cannot account for examples with multiple anchors, e.g. (4) from Fillmore 1975:68.

- (4) [Context: A and B are talking on the phone.]
John will **come** to your house before he **comes** here.

In (4) each instance of *come* has a different SAP anchor. If the anchor of *come* corresponds to a deictic center contextual parameter, then examples such as (4) must involve shifted indexicals and the deictic center parameter must shift without a plausible shifting operator (e.g. an attitude predicate; see Schlenker 2003, Anand and Nevins 2004, a.o.). Examples such as (4) are less problematic for an analysis such as Sells' (1987), but would nevertheless require an account of how the PIVOT shifts from the addressee to the speaker over the course of interpretation.

To account for the speaker/addressee asymmetry and examples such as (4), Oshima proposes that the anchor is a member of a restricted set of individuals whose perspectives the speaker can adopt. He provides a contextual parameter corresponding to this set, the **reference point** (RP), and argues that the RP differs cross-linguistically. For English, the RP always includes the speaker, often includes the addressee, and may include other individuals. The asymmetry in the inclusion of speaker, addressee, and non-SAP in the RP is defined in terms of an implicational person hierarchy: 1st < 2nd < 3rd. The hierarchy encodes the claim that if a person is in the RP in a given context, so are all persons to the left of it. Informally, the hierarchy represents the degree to which a given perspective is available for adoption. The speaker can always maintain her own perspective, and can often adopt the addressee's perspective, accounting for the speaker-addressee asymmetry. The perspectives of other individuals are usually less salient and relevant, and therefore unavailable. Oshima proposes that an utterance with *come* is acceptable just in case some member of the RP is located at the destination of the motion path. One problem with this approach is the claim that different languages use different RPs, since not all languages allow 2nd and 3rd person anchors

(Gathercole, 1978; Nakazawa, 2007). For example, Oshima describes the RP in Sive being merely {speaker}. This makes the RP distinct from other contextual parameters such as speaker and addressee, which are assumed not to vary across languages.

Oshima's RP analysis accounts for Fillmore's standard examples, examples with two anchors, and the speaker-addressee asymmetry. It also accounts for examples noticed but not analyzed by Fillmore (1975) and Hockett (1990) that involve embedding *come* under an attitude predicate:

- (5) [Context: Ann and Beth are in Boston. Bob is in Denver. Ann says:]
- a. Bob believes that {John/you/I} **came** to Denver last week.
[adapted from Oshima 2006b: example (33)]
 - b. Bob said that {John/you/I} **came** to Denver last week.

In (5a), *Bob* is the subject of the attitude predicate *believes*. Motion to Bob's location, even an SAP's motion, can be described using *come*. Thus, Bob is the anchor. Similar facts obtain for a wide range of attitude and communication predicates, as in (5b). These data show that the speaker can adopt the perspective of an attitude holder even if an SAP figures in the events being discussed, contra Fillmore's claim about central characters. Oshima calls this **deictic perspective shift**.

To account for deictic perspective shift, Oshima (2006b,c) argues that attitude predicates manipulate the RP parameter. To accomplish this context change, Oshima assumes that attitude predicates are lexically ambiguous. One lexical entry does not manipulate contextual parameters. The other shifts the RP parameter from e.g. {speaker, addressee} in a matrix clause to the subject of the attitude predicate in an embedded clause. These "shifty" attitude predicates are thus "monsters" in the sense of Kaplan 1989. Oshima argues that *come* is also lexically ambiguous. It has a pure indexical version anchored to the context of utterance and a shifted indexical version anchored to the most local context, i.e. the one created by the attitude predicate that most closely precedes it. Oshima recognizes that this system predicts that it should be possible for e.g. a shifty attitude predicate to combine with the pure indexical version of *come*, yielding readings that never arise. Therefore, Oshima (2006c) proposes that both shifty attitude predicates and deictic motion verbs have a syntactic feature linking them to a particular RP, either the RP in the context of utterance or the RP in a particular embedded context. He posits a syntactic rule requiring the RP feature index of *come* to match the RP feature index of the closest c-commanding attitude predicate. This syntactic constraint blocks unattested readings. Given these assumptions, Oshima's analysis of the anchoring implication accounts not only for Fillmore's data, but also for deictic perspective shift.

Oshima's analysis significantly improves previous accounts. It suggests that a unified account of SAP and non-SAP anchoring can be developed in terms of perspective taking, which I will further motivate below. Even so, Oshima's account raises a number of theoretical questions. First, it posits an otherwise unmotivated contextual parameter, the RP, and syntactic feature, the RP

feature. Second, it assumes that English has indexical shifting, but only for the RP parameter. Finally, it requires systematic ambiguity in the meanings of attitude predicates and motion verbs.

3. The perspectival anchoring of *come*

Oshima argues that the meaning of *come* is perspectival. When a speaker uses *come*, she implicitly adopts the perspective of an individual located at the destination. However, the examples above do not directly motivate this intuition, and Oshima's analysis does not represent it, except by saying that the RP is a set of available perspectives. Rather, Oshima, like deictic center analyses, represents the anchoring of *come* as a set of conditions on the actual location of the anchor. These conditions can be met without making reference to the anchor's perspective at all. In contrast, in this section, I present evidence that the anchoring of *come* is perspectival because it involves the anchor's self-conceived location, not her actual location. When a speaker uses *come* to describe motion to the location of an anchor, she adopts the anchor's perspective by implicitly representing things as they are according to the anchor's conceptualization. To distinguish between these hypotheses, consider examples involving false belief, where the anchor's actual location and self-conceived location are distinct (in contrast to the examples above, where they are the same; thanks to Carl Pollard for suggesting examples similar to these).

- (6) [Context: Mark and Jeremy are in San Diego. Mark mistakenly believes that he is Louis XIV and that they have just arrived in Berlin after visiting Prague. He says:]
- a. i. Mary **is coming** to Berlin shortly.
ii. # Mary is coming to San Diego shortly.
 - b. i. Isn't it wonderful that Mary **came** to Prague last week.
ii. #Isn't it wonderful that Mary came to San Diego last week.

In (6), when Mark describes motion to a location where believes himself to be or have been, *come* is acceptable. When he describes motion to his actual location, it is not. These examples show that in order for *come* to be acceptable in a matrix clause, the destination of the motion event must be the anchor's self-conceived location. The same pattern is seen with deictic perspective shift in (7).

- (7) [Context: Identical to (6), except that Mark has already told Jeremy (6a-i) and (6b-i). Later, Jeremy is in San Jose, where he tells Amy about Mark's delusion. Then he says:]
- a. i. Mark believes that Mary **is coming** to Berlin soon.
ii. #Mark believes that Mary is coming to San Diego soon.
 - b. i. Mark believes that Mary **came** to Prague last week.
ii. #Mark believes that Mary came to San Diego last week.

(6)-(7) show that it is the anchor's self-conceived location, not her actual location, that must be the destination for a motion event described using *come*. However, in (6)-(7), the anchor and the

speaker/attitude holder are identical. Thus, the data in (6)-(7) are compatible with the competing hypothesis that it is the person whose views are being represented, i.e. the speaker or attitude holder, who must locate the anchor at the destination. (8), adapted from Oshima (2006b:177), shows that when the attitude holder and the anchor are distinct, it is the anchor's beliefs that matter.

- (8) [Context: Bob is in NYC and believes that Mary is too. However, Mary is actually in LA. Over the phone, Bob tells Mary that John flew to LA. Mary calls another New Yorker:]
Bob believes that John **came** to LA two days ago.

In (8) the anchor, Mary, but not the attitude holder, Bob, believes that Mary is located in LA.

(6)-(8) demonstrate that the anchoring implication of *come* involves the anchor's self-conceived location, not her actual location. (9) shows that the anchor's conceptualization of her location must be *de se* (Antje Roßdeutscher p.c. observes that the same requirement exists for the anchoring of *kommen* 'come' in German and is discussed in Roßdeutscher 2000). For the implication to be *de se*, the anchor must believe of herself that she is located at the destination of the motion event, and she must know that she believes this of herself (c.f. Morgan 1970).

- (9) [Context: Last week, Chicago baseball player Ernie Banks was injured and became a lucid amnesiac. Ernie was transported to Boston for care. For all he knows, he has never been to Chicago. He has read about the baseball player Ernie Banks, but does not realize that he is Banks. He reads that President Obama was in Chicago 3 weeks ago and met Ernie Banks.]
a. #[Ernie tells his doctor]: President Obama came to Chicago three weeks ago.
b. #[The doctor later tells her friend]: Ernie believes that President Obama came to Chicago.

In these examples, the anchor, Ernie Banks, believes of the individual Ernie Banks that he is located at the destination of the motion event. Nevertheless, the examples are unacceptable because Ernie does not realize that he believes this about himself. His belief is not *de se*. However, in a minimally different context in which Ernie regains his memory and his belief is *de se*, the examples in (9) are good. (9b) presents a problem for Oshima's account. To see why, assume that (9b) involves Oshima's shifty *believe*, which shifts the RP to {Ernie Banks}. On Oshima's account *come* triggers the presupposition of *come* that a member of the RP is located at the destination. This presupposition is satisfied in the embedded context. Since Oshima assumes that shifty predicates are freely available, the example is predicted to be acceptable on the shifted reading.³ In addition to proving problematic for Oshima's analysis the unacceptability of (9b) shows that the locational self-conception must be encoded in the meaning of *come*. The obligatoriness of the *de se* interpretation cannot arise simply because *come* is embedded under an attitude predicate. In general, attitude predicates such as *believe* allow for both *de se* and non-*de se* readings within their scopes.

³To solve this problem, Oshima might propose a contextual restriction to certain attitude predicates in certain kinds of contexts. However, it is hard to see how this restriction would be formulated.

4. The anchor is anaphorically interpreted

(10)-(11) provide evidence that the anchor argument is interpreted anaphorically rather than given indexically, i.e. as the value of a contextual parameter. They show that the anchor can be quantificationally bound and participate in donkey anaphora.

- (10) a. Every mother believes that her wayward child **is coming** to Christmas dinner.
 b. Every man **came** to his wife's surprise party.
- (11) If a man has a child, he **comes** to her room every night to check on her.

In (10a), for each child's motion event, the anchor is her mother. In (10b), for each man's motion event, the anchor is his wife. These anchors are quantificationally bound. (11) demonstrates that the anchor of *come* can participate in donkey anaphora. Donkey anaphora is an anaphoric relationship in which an indefinite inside the scope of an operator introduces a referent which is the antecedent for an expression that is not c-commanded by the indefinite but is within the scope of the operator. In (11), for each man's motion event, the anchor is his child, introduced by the indefinite *a child* in the antecedent of the conditional. Both quantificational binding and participation in donkey anaphora are tests for anaphoricity, following Partee 1984, 1989 and Condoravdi and Gawron 1996. Thus, these data suggest that the anchor of *come* is an anaphorically interpreted implicit argument. On this approach, the analysis of examples involving more than one anchor falls out.

5. Anchoring is conventionally implicated

The data in this section show that the anchoring CI is neither proffered nor presupposed. Here, pre-suppositions are assumed to be conditions on the state of the common ground, following Stalnaker 1978. The fact that the anchoring CI is distinct from the proffered contents of *come* is demonstrated in (12) and (13). (12) demonstrates that the anchoring CI cannot be challenged directly, and (13) demonstrates that it cannot be targeted by entailment canceling operators such as negation.

- (12) [Context: Anna is at a call center talking to Belinda, who called on a land line:]
 Belinda: President Obama is coming to Chicago today.
 a. Anna: No, that's not true. He's not coming to Chicago until Friday.
 b. #Anna: No, that's not true. I can tell by your phone number that you're in Phoenix.
- (13) [Context: Al and Betty live in New York and have been there for the past 5 days. Al says *President Obama is coming to Chicago today*. Betty replies:]
 #President Obama is **not** coming to Chicago today.

In (12b), Anna attempts to contradict Belinda's assertion by contradicting the anchoring CI that Belinda is (technically, believes herself to be; this simplification is made throughout this section)

in Chicago. However, unlike the proffered content related to Obama's travel, the anchoring CI cannot be challenged directly. (13) illustrates another distinction between the anchoring CI and the proffered contents of *come*. Only the proffered contents can be targeted by entailment canceling operators. In (13), the possible anchors are Al and Betty, who are in NYC. The anchoring CI, in contrast, is that the anchor is Chicago. If the anchoring CI could be targeted by negation, then (13) would be acceptable and true, because the anchoring CI is false. Following Potts (2005), AnderBois et al. (2015), and others, the inability to be directly challenged or targeted by entailment canceling operators are diagnostics for differentiating CIs from proffered contents.

In (14) the anchoring CI contributes new information to the common ground. This provides evidence that it is a CI, not a presupposition.

- (14) [Context: Al and Betty live in New York, and are there today. Betty says:]
- a. #President Obama is **coming** to Chicago today.
 - b. I met this guy Ron on the internet last night. He told me that President Obama is **coming** to Chicago today.

In (14a), the available anchors are the interlocutors, who are not in Chicago. If either is taken to be the anchor, the anchoring CI—that the anchor is in Chicago—conflicts with the common ground. In the minimally different example (14b), Ron is a possible anchor due to deictic perspective shift. Nothing about Ron's location is entailed by the common ground. Nevertheless, the example is acceptable. Thus, (14b) shows that the anchoring CI is not required to be entailed by the common ground before an utterance with *come* is made. Instead, in (14b), the use of *come* contributes to the common ground the information that Ron is (or was) in Chicago. In light of this evidence, I analyze the anchoring CI as a CI. However, it might be possible instead to develop an analysis based on the assumption that the anchoring CI is an easily accommodated presupposition. Nothing about the content of the anchoring CI or its anaphoricity hinges on this distinction.

6. A dynamic analysis of the perspectival anchoring of *come*

In this section, I develop an analysis of *come* in the dynamic semantics of AnderBois et al. (2015) (henceforth ABH). One motivation for proposing a dynamic analysis is the observation that the anchor is anaphorically interpreted. Following Kamp (1981) and Heim (1982), one of the principle purposes of dynamic semantics is analyzing anaphora, and the ABH framework is designed to handle anaphora in CI contents. However, nothing here hinges on the choice of this framework.

Following Heim 1982, the meaning of an expression is a context change potential. For any utterance ϕ , the meaning of ϕ is a function from an assignment function to an assignment function. All assignments of values to variables in g are compatible with the information in the context prior to the utterance of ϕ . All assignments in h are compatible with the context after it is updated by interpreting ϕ . As a result, interpretation is relative to a pair of assignment functions: $\llbracket \phi \rrbracket^{(g,h)}$.

Among the variables that g and h assign values to is a propositional variable p^{cs} . p^{cs} stores the current context set (CS), i.e. the intersection of the propositions in the common ground, and all of its non-empty subsets. For example, if the current CS is $\{w_1, w_2, w_3\}$, p^{cs} ranges over $\{\{w_1, w_2, w_3\}, \{w_1, w_2\}, \{w_1, w_3\}, \{w_2, w_3\}, \{w_1\}, \{w_2\}, \{w_3\}\}$. An assertion constitutes a proposal to update the common ground. This is equivalent to a proposal to restrict the possible values that h , the output assignment function, assigns to p^{cs} . In other words, an informative assertion of ϕ is a proposal to shrink the CS. For example, take the common ground above a starting point. Assume that some proposition p is false in w_1 and true in w_2 and w_3 . A proposal to update the common ground with p is a proposal to restrict the values that h assigns to p^{cs} to $\{\{w_2, w_3\}, \{w_2\}, \{w_3\}\}$. Thus it is a proposal to restrict CS to $\{w_2, w_3\}$.

The first step in the interpretation of an utterance, ϕ , is the introduction of a novel propositional dref, p , to store the content of a new proposal to update the common ground. In order to ensure monotonicity in the common ground, p is required to be a subset of p^{cs} . As interpretation proceeds, the content of p is developed. Assuming ϕ contains no CI content, p is the interpretation of ϕ , the dynamic conjunction of ϕ 's contents. As an example consider (15). In (15), the notation $[p]$ indicates the introduction of the propositional dref p . That is to say, $[p]$ represents the update from an assignment function g to an assignment function h such that g and h differ only in the value they assign to p . The $[\]$ notation is used to indicate dref introduction in this way regardless of the type of dref. \wedge represents dynamic conjunction. The second conjunct is a test on p requiring it to be a subset of p^{cs} . These are standard elements of every update proposal associated with an assertion.

$$(15) \quad \llbracket \text{Jerry sneezed} \rrbracket^{(g,h)} = [p] \wedge p \subseteq p^{cs} \wedge [x_p] \wedge x = \text{JERRY} \wedge \text{SNEEZE}_p(x)$$

The third and fourth conjuncts represent the interpretation of the proper name *Jerry*, following ABH's treatment of proper names. The third of these introduces a dref, x . The subscript p on x relativizes x to p . In other words, it says that the partial individual concept x (of type $\langle s, e \rangle$) is defined over all of the worlds in p . In addition, ABH require that whenever a dref is introduced as part of an at-issue update proposal, as x is here, it is defined over p^{cs} worlds as well. This makes drefs introduced in proffered contents available as antecedents for CIs, which are updates to the worlds in p^{cs} . Predicates such as *sneeze* are also relativized to worlds. For a predicate to compose with its argument, the domain over which the predicate is defined must be a subset of the domain over which the argument is defined. For details, see ABH 2013:17-18; 31ff. If the utterance of *Jerry sneezed* is accepted, the common ground is updated by setting it equal to its subset p . This results in the addition of a final conjunct to (15): $[p^{cs}] \wedge p^{cs} = p$. With this introduction, it is possible to model the proffered component of an utterance with *come* in ABH's framework.

To model the denotations of spatial expressions, I adopt the simplified version of Kracht's (2002; 2008) framework provided in Barlew 2015:45-47. This includes a type for regions, ranged over here by the variables r and s . Following Kracht (2002), the denotations of locative spatial expressions such as *in the park* are sets of regions. AT is a simplification of Kracht's (2002:189) at'

with no time argument. For any individual, x , $AT(x)$ denotes the set of regions touching the region occupied by x , roughly the meaning of English *at*. I also assume a Davidsonian event semantics, and use the variable e for events. Following Zwarts (2005), a path is a directed set of locations, represented by bold-faced variables \mathbf{p} or \mathbf{q} . Technically, a path \mathbf{p} is a function from an interval of reals, $[n, \dots, m]$ to locations in space, where $\mathbf{p}(n)$ is the start-point and $\mathbf{p}(m)$ is the end point. Following Talmy (1985), *MOVE* is a basic motion predicate. Following Zwarts (2005), for every motion event, e , there is a function $TRACE(e)$ that yields the path of the theme of e .

Utterances with *come* typically involve prepositional phrases (PPs). Following Zwarts (2005), the meaning of a path-PP is a set of paths. The denotation of *through the tunnel*, for example, is the set of paths that begin outside the tunnel, move into the tunnel, and then exit the tunnel on the other side. *To Denver* denotes the set of paths that begin outside Denver, make exactly one transition to being at Denver, and end at Denver (see Zwarts 2005 for details). The meanings of path-PPs are represented as in 16, where the translation of *to* is assumed to be $\lambda x \lambda \mathbf{p} . \text{TO}(x, \mathbf{p})$.

(16) *to Denver* = $\lambda \mathbf{p} . \text{TO}(\text{DENVER}, \mathbf{p})$; the set of paths to Denver

This characterization of the meanings of path-PPs holds in general, but there is a relevant class of exceptions. Following Kracht (2002), when a predicate selects for a particular type of path-PP as its complement, the PP denotes merely a set of regions. The path preposition itself serves a case marking function. Semantically, such PPs have denotations equivalent in to the denotations of static locative PPs. For example, if it is selected for by a predicate, *to Denver* is translated as $\lambda r . \text{AT}(\text{DENVER}, r)$, the set of regions in or at Denver. Kracht handles the translation between path and static meanings with a specific proposal about the syntactic structure of path-PPs and the principles governing the syntax-semantics interface. However, it could also be handled by assuming lexical ambiguity in the meaning of prepositions. Nothing here hinges on this choice. However, the assumption that path-PPs sometimes denote merely locations is necessary to account for idiosyncratic selection properties of both motion and non-motion related predicates crosslinguistically. Assuming that in some cases path-PPs such as *to Denver* denote merely locations makes it possible to account for otherwise puzzling selectional properties of *come*. In addition to path-PPs *come* often combines with merely location denoting PPs or location denoting adverbs, as in (17).

- (17) a. Ron came in the room.
b. Leslie came here two hours ago.

In (17), the PP argument of *come* denotes a location, technically a set of regions, rather than a path. This location is required to be the location of the anchor. The same requirement holds of locations denoted by *to*-PP arguments of *come*. For an utterance of *John came to Denver* to be acceptable, Denver must be the anchor's location. However, this restriction does not apply to PPs with prepositions other than *to* (and its variants such as *into*), as shown in (18a).

- (18) a. [Context: The interlocutors are in Salt Lake City.]
Tom came through Denver on his way here.
b. Tom came through Salt Lake City today, so we had lunch while he was here.

In (18a), the anchor (the speaker) is not in Denver, but *Tom came through Denver* is acceptable. This example thus differs from examples with *to*-PPs or locative PP. Here, the location involved in the denotation of the PP is not required to be the anchor's location. Furthermore, when *come* combines with a *from* PP, the location involved in the PP denotation cannot be the anchor's location.

(18b) demonstrates another important point about the relation between the anchor's location and the motion path. Contrary to previous claims (Oshima 2006a,b,c; Nakazawa 2007, 2009, a.o.), the meaning of *come* does not require the final destination of the motion path to be the anchor's location. In (18b), Tom's motion path both enters and exits Salt Lake. This is encoded in the meaning of the utterance due to the composition of *through Salt Lake City* with *come*. Similar observations apply to utterances in which *come* composes with PPs with *around*, *by*, *past*, etc.

What all of the examples have in common is that in every case there is motion path with a subpath that that ends at the location of the anchor but begins elsewhere. In other words, there is a subpath of the motion path that is 'to' the anchor's location. In many examples, that subpath is a final subpath of the larger motion path. However, (18b) shows that this is not required. In (18b), the subpath ending at the anchor's location is not a final subpath of Tom's motion because he leaves Salt Lake. With this background, we can express the proffered contents of an utterance with *come*:

- (19) $\llbracket \text{John came to Denver} \rrbracket^{(g,h)}$ (proffered contents)=
a. Static version: $\exists e \exists \mathbf{p} \exists r. \text{MOVE}(\text{JOHN}, e) \wedge \mathbf{p} \leq \text{TRACE}(e) \wedge \text{TO}(r, \mathbf{p}) \wedge r \in \text{AT}(\text{DENVER})$
b. Dynamic version: $[p] \wedge p \subseteq p^{cs} \wedge [x_p] \wedge x = \text{JOHN} \wedge [e_p] \wedge \text{MOVE}_p(x, e) \wedge [\mathbf{p}_p] \wedge \mathbf{p} \leq \text{TRACE}_p(e) \wedge [r_p] \wedge \text{TO}_p(r, \mathbf{p}) \wedge [y_p] \wedge y = \text{DENVER} \wedge \text{AT}_p(r, y)$

The first conjuncts in (19b) introduce a proposal to update, p , and a dref x for the subject John. Then, the interpretation of *come* introduces a dref for an event, e , and requires this event to be an event of John's motion. The interpretation of *come* also introduces a dref for a path, \mathbf{p} , which is required to be a subset of John's motion path, $\text{TRACE}(e)$. It introduces a dref for a region, r , and requires \mathbf{p} to be a path to r . The interpretation of *Denver* introduces the dref y and sets it equal to DENVER. The interpretation of *to Denver* contributes the set of regions at Denver. The composition of the meaning of *come* with this set of regions yields the final conjunct stating that r is at Denver.

Setting aside the doxastic component of the anchoring CI, the CI can be incorporated into the translations in (19) by adding $\text{LOC}(z, t) = r$, where LOC is a function from an individual and a time to that individual's location at that time (see Wunderlich 1991; Zwarts and Winter 2000; Kracht 2002, 2008; Barlew 2015 for variations on the LOC function), z is an anaphorically retrieved

dref corresponding to the anchor, and t ranges over utterance time and event time. This conjunct captures none of the generalizations developed above, but it provides starting point.

First, to capture the fact that the anchoring implicature is CI content, I follow ABH and analyze CIs as impositions on the common ground. This means is that unlike all of the content in (19b), CIs do not contribute to the update proposal, p . Rather they update the common ground automatically by restricting the context set directly. They are tests on the p^{cs} , the variable storing the context set. Thus, on this system, CIs are elements of a single dimension of content, allowing for anaphoric dependencies between CI and proffered contents. However, they contribute to the common ground in a different way than proffered contents. A translation of *John came to Denver* that continues to ignore the doxastic components of the meaning of *come* is given in (20), where the new CI content is underlined, and t_u is utterance time and t_e is event time.

$$(20) \quad \llbracket \text{John came to Denver} \rrbracket^{(g,h)} \text{ Dynamic version (first pass):}$$

$$\underline{[p] \wedge p \subseteq p^{cs} \wedge [x_p] \wedge x = \text{JOHN} \wedge [e_p] \wedge \text{MOVE}_p(x, e) \wedge [\mathbf{p}_p] \wedge \mathbf{p} \leq \text{TRACE}_p(e) \wedge [r_p] \wedge [t_{p^{cs}}] \wedge t \in \{t_u, t_e\} \wedge \text{LOC}_{p^{cs}}(z, t) = r \wedge \text{TO}_p(r, \mathbf{p}) \wedge [y_p] \wedge y = \text{DENVER} \wedge \text{AT}_p(r, y)}$$

In (20), the CI content is distinct from the proffered content in that it contributes directly to p^{cs} , not p . The anchoring CI can refer to the dref r introduced in proffered content and defined relative to p because all drefs introduced as part of a proposal to update are defined not only in p worlds but also in p^{cs} worlds, as discussed above. z remains free because it is anaphorically retrieved.

(20) incorrectly predicts that z can take as its value any anaphorically accessible dref. However, Fillmore and Oshima show that the value of z must be restricted to range over drefs corresponding to individuals whose perspectives are salient and relevant enough to be adopted by the speaker. To limit the antecedents for the anchor argument of *come*, I borrow the independently motivated notion of a **discourse center** from Roberts (2014). Informally, a discourse center is a Stalnakerian (2008) subject, an agent capable of belief, whose doxastic state is relevant in the discourse. At any given point in time, the interlocutors keep track of a limited number of such discourse centers. Minimally, this set includes drefs corresponding to the speaker and the addressee, because their doxastic states are always relevant to the construction of the common ground. In addition, Roberts describes a limited number of ways in which a discourse center corresponding to an individual can be activated. For example, the agents of attitude predicates and main characters in Free Indirect Discourse (FID) contexts correspond to discourse centers (for perspective taking in FID, see Doron 1991 and Eckardt 2011, 2014). Following Roberts, a discourse center is represented as an ordered pair consisting of a dref corresponding to a doxastic agent, written d_i , and a time, t_j : $\langle d_i, t_j \rangle$. The ordered pair can be abbreviated $\odot_{i,j}$, or just \odot where subscripts are unnecessary. Saying that $\odot_{i,j}$ is a discourse center is equivalent to saying that d_i corresponds to an individual whose beliefs at t_j are relevant in the discourse, where relevance is defined as in Roberts (2012).

With discourse centers, the anaphoric presupposition of an utterance with *come* can be stated as the

presupposition that there is a salient discourse center, ©. Limiting the antecedents of the anchor argument of *come* in this way accounts for the limited range of available anchors. The speaker and the addressee are the anchors most often available because they always correspond to discourse centers. The speaker and addressee are asymmetrically available because, in any given context, one or the other is more salient or relevant. A non-SAP individual is available as an anchor when a drefs corresponding to that individual is the agent component of a discourse center. This happens when the agent's beliefs are under discussion, as in deictic perspective shift. Discourse centers thus serve the same purpose as Oshima's RP but allow for quantificational binding.⁴ To represent the anaphoric retrieval of the anchor in the semantics, I assume a function, AGENT, from discourse centers to their first elements. The conjunct of (20) that defines the location of the anchor can thus be modified by replacing z with the underlined material: $LOC_{p^{cs}}(\underline{AGENT_{p^{cs}}(\text{©})}, t) = r$.

The final step is to account for the doxastic component of the meaning of *come*, i.e. the fact that it is the anchor's self-conceived location that matters for anchoring, not her actual location. To do this, I adopt Stalnaker's (2008) modification of Lewis's (1979) theory of *de se* belief, which models belief states as sets of centered worlds. A centered world consists of the interpretation of a discourse center, i.e. a doxastic agent and a time, plus a world: $\langle\langle g(d_i), g(t_j) \rangle\rangle, w$. Belief is modeled using a doxastic accessibility relation on centered worlds, R, defined informally in (21).⁵ The doxastic state of an individual at a time in a world is the set of R-accessible worlds, as in (22). Following Roberts (2014), the doxastic accessibility function, Dox, takes a centered world and returns a doxastic state. This function is similar to a modal accessibility relation, and is given in (23). I define the function DOX to return only the worlds, i.e. a traditional doxastic state.

- (21) Given a dref, d_i , corresponding to an agent of belief, a time, t_j , and a base world w , and the base centered world, $\langle\langle g(d_i), g(t_j) \rangle\rangle, w$
 $\forall d' \forall t' \forall w'. \langle\langle g(d_i), g(t_j) \rangle\rangle, w \mathbf{R} \langle\langle d', t' \rangle\rangle, w'$ iff it is compatible with what $g(d_i)$ believes at $g(t_j)$ in w that she is d' at t' in w' .⁶
- (22) The doxastic state of $g(d_i)$ at $g(t_j)$ in $w = \{ \langle\langle d', t' \rangle\rangle, w' \mid \langle\langle g(d_i), g(t_j) \rangle\rangle, w \mathbf{R} \langle\langle d', t' \rangle\rangle, w' \}$
- (23) Accessibility: $\text{Dox}(\langle\langle g(d_i), g(t_j) \rangle\rangle, w) = \{ \langle\langle d', t' \rangle\rangle, w' \mid \langle\langle g(d_i), g(t_j) \rangle\rangle, w \mathbf{R} \langle\langle d', t' \rangle\rangle, w' \}$
- (24) As uncentered worlds: $\text{DOX}(\langle\langle g(d_i), g(t_j) \rangle\rangle, w) = \{ w' \mid \langle\langle g(d_i), g(t_j) \rangle\rangle, w \mathbf{R} \langle\langle d', t' \rangle\rangle, w' \}$

⁴As pointed out by Regine Eckardt (p.c.), the level of activation required for discourse center status appears to be relaxed in examples involving quantification. For example, in 10b, the quantificationally bound anchor does not have the agent of an attitude predicate as its antecedent. I have no explanation for this observation.

⁵Carl Pollard (p.c.) points out that modeling attitudes as accessibility relations on sets of worlds causes problems such as requiring attitude holders to have consistent beliefs and to believe all necessary truths. I take these to be general problems for the technology in use in the field, and leave the development of an alternative to future work.

⁶Stalnaker requires R to be transitive, Euclidean, and serial. This has the following consequences. First, whatever $g(d_i)$ believes in her belief worlds, she also believes in the base world (transitive). Second, whatever she believes in one belief world she also believes in the others (Euclidean). Finally, she has beliefs in every world (serial). To these conditions, Stalnaker adds the * condition. * requires that ignorance of where in the world one is is a type of ignorance about which world one is in. For discussion, see Stalnaker 2008 and Roberts 2014.

With these definitions in place, it is possible to write a static version of the anchoring CI as in (25). Here, LOC is intensionalized and takes a world argument as well as a time.

(25) **Anchoring CI** of *John came to Denver* (static version):

$\exists w' \in \text{DOX}(\langle \textcircled{C}, w \rangle). \text{LOC}(\text{AGENT}(\textcircled{C}), t, w') = r$, where w is the world of evaluation, t ranges over event time and utterance time, and r is the location introduced in the proffered content of *come*.

The existential quantification over worlds in (25) predicts that it must merely be compatible with the anchor's doxastic state that she is located at the destination of the subpath, **p**. The doxastic state need not entail that she is there. Another way to describe this claim is to say that the anchoring CI has the force of a weak possibility modal. (26) show that this is correct.

(26) [Context: The speaker and addressee are in New York.]

I might be in France next summer. Are you **coming** to France then?

Representing doxastic possibility in the ABH framework is accomplished by creating a DOX-POSS operator, based on ABH's denotations for entailment canceling operators NOT and MIGHT. Each such operator is defined relative to a propositional variable, here the update proposal p . In addition it introduces a new propositional dref, p' , written in superscript. The material within the scope of the operator, ϕ , determines what set of worlds p' ranges over. The meaning of the operator is to define a relation between p' and p . The nature of the relation determines how the content of p' impacts the update proposal. This kind of meaning is most easily illustrated using a one-place operator, such as ABH's sentential negation operator, NOT. In an utterance with the denotation $\text{NOT}_p^{p'}(\phi)$, the set of p' worlds is the set of worlds in which ϕ holds. NOT introduces the condition $p \cap p' = \emptyset$. As a result, the update proposal made by e.g. an utterance of *John did not fall* is to set the common ground equal to p worlds, i.e. to remove all p' worlds: the worlds in which John did fall. Things are a bit more complicated in the case of DOX-POSS due to its additional argument, the discourse center $\textcircled{C}_{i,j}$, but it works in essentially the same way. It is defined in (27).

(27) $\llbracket \text{DOX-POSS}_p^{p'}(\textcircled{C}, \phi) \rrbracket^{(g,h)} = \top$ iff

- $\llbracket \mathbf{max}^{p'}(\phi) \rrbracket^{(g,h)} = \top$ and
- for all $\mathbf{w} \in h(p)$, $\text{DOX}_p(\textcircled{C}_{i,j}, w) \cap h(p') \neq \emptyset$

(27a) requires p' to be the maximal set of ϕ worlds. (27b) requires that in p worlds, the intersection of the doxastic state of $\textcircled{C}_{i,j}$ and p' is non-empty. In other words, for any world \mathbf{w} assigned to p by h , ϕ must be compatible with what d_i believes at t_j in \mathbf{w} . When the DOX-POSS takes the anchor's conceptualization of her own location as its argument, the result is (28). DOX-POSS is relativized to p^{cs} , not p , the proposed update, because the anchoring CI is a CI rather than proffered content.

- (28) The implication that the anchor believes herself to be located at r :
 $\text{DOX-POSS}_{p^{cs}}^{p'}(\text{C}, \text{LOC}_{p'}(\text{AGENT}_{p'}(\text{C}), t) = r)$

(28) requires that the agent of the center believes that she is located at r at t . This content is conventionally implicated, so (28) directly restricts p^{cs} to worlds in which she does. The translation of *John came to Denver* incorporating (28) is given in (29). The anchoring CI is underlined.

- (29) $\llbracket \text{John came to Denver} \rrbracket^{(g,h)}$ Dynamic version (final):

$$\frac{[p] \wedge p \subseteq p^{cs} \wedge [x_p] \wedge x = \text{JOHN} \wedge [e_p] \wedge \text{MOVE}_p(x, e) \wedge [\mathbf{p}_p] \wedge \mathbf{p} \leq \text{TRACE}_p(e) \wedge [r_p] \wedge [t_{p^{cs}}] \wedge t \in \{t_u, t_e\} \wedge \text{DOX-POSS}_{p^{cs}}^{p'}(\text{C}, \text{LOC}_{p'}(\text{AGENT}_{p'}(\text{C}), t) = r) \wedge \text{TO}_p(r, \mathbf{p}) \wedge [y_p]}{\wedge y = \text{DENVER} \wedge \text{AT}_p(r, y)}$$

Providing a compositional fragment that generates (29) is beyond the scope of this paper. However, the discussion of (19b) indicates of how elements of an utterance with *come* compose. For reasons of space, representing quantificationally bound and embedded examples is also left to future work.

7. Extending the data set

The analysis of *come* presented here accounts for the data in Sections 2 and 3. However, these data do not include accompaniment or home base cases, or attitudes other than belief, as in (30).

- (30) [Context: A, B, and Fred are in Columbus. Fred sits with his eyes closed. A asks why.]
 B: Fred is imagining that he is in France and that you are coming to France soon.

In (30), Fred imagines but does not believe that he is in France. Such examples suggest that the anchoring implication of *come* must be revised to include a wider range of attitudes. Determining which attitudes, how they are related to doxastic states, and how they are to be represented in the translation of *come* is a task for future work. With respect to home base cases, one option is to define a function, HOME that returns the home base of an individual at a time in a world, and then to include in the anchoring CI a disjunct setting r equal to the home base (c.f. Oshima 2006c). Another option, based on the independent need to account for additional cognitive states, is to assume that individuals can always imagine their home bases and treat home base cases as a subset of imagination cases. Data distinguishing these two approaches has yet to be gathered.

8. Conclusion

In this paper, I have demonstrated that an utterance with *come* gives rise to an anchoring CI. The content of the anchoring CI is that the anchor, a doxastic agent whose beliefs are relevant in the discourse, believes herself to be located at the destination of a subpath of the path of the

motion event described using *come*. Previous accounts do not recognize this doxastic, or modal, component of the meaning of *come*, and cannot account for the data presented here. In contrast, the current analysis represents the doxastic component in the lexical semantics of *come* and accounts for the data involving false belief and the *de se/non-de se* ambiguity.

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