Salience and Deixis in the Anaphoricity of Demonstratives and Definite Descriptions

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Abstract

In this paper, I provide a formal semantics for demonstratives and definite descriptions that sheds new light on their similarities and differences. I focus on underappreciated contrasts in which demonstratives but not definite descriptions are felicitous, and show how extant approaches struggle to make sense of this data. I then refine the approach to definite descriptions that combines familiarity and uniqueness (Roberts 2003, Barker 2004), and fit demonstratives into the picture, within a dynamic semantics framework from Bittner (2009, 2011). The resulting view thus extends familiar aspects of the dynamic treatment of definite descriptions—in particular, anaphoricity and existential main content—to theorize demonstratives. Accordingly, I propose that both demonstratives and definite descriptions have the same existential main content. The semantic difference between these expressions lies in their presuppositions, which is to say their anaphoricity is constrained in different ways. Crucially, I show how their presuppositions correctly constrain their anaphoricity given a distinction between two types of discourse referents: salient and deictic.

Keywords: Demonstratives, Definite Descriptions, Dynamic Semantics

Contents

0 Introduction

This paper is about the formal semantics of demonstratives, e.g. "that man," and definite descriptions, e.g. "the man." My main goal is to account for how demonstratives are sensitive to demonstrations in a way that definite descriptions are not. This difference in demonstration-sensitivity is illustrated by what I call the "deictic contrasts" (Maclaran 1982).

(1) *Context: John and Mary are in an art gallery with a number of paintings in front of them.*
   a. That painting [pointing at a painting] is beautiful.
   b. #The painting [pointing at a painting] is beautiful.

(2) *Context: John is directing Mary as they are working together rearranging his living room.*
   a. You will take that chair [pointing to one chair] and I will take that chair [pointing to another chair]
   b. #You will take the chair [pointing to one chair] and I will take the chair [pointing to another chair].

In (1), a demonstrative may be used alongside a demonstration to pick out one of the paintings. But a definite description leads to infelicity (with or without the demonstration). Relatedly, in (2) type-identical demonstratives within a single sentence may be used, alongside multiple demonstrations, to talk about one and then another chair. But not so type-identical definite descriptions.

Alongside the deictic contrasts, consider what I call the "anaphoric contrast" (Roberts 2002).

(3) A woman entered from stage left. Another woman entered from stage right.
   a. ...This woman was carrying a bouquet of flowers.
   b. ...#The woman was carrying a bouquet of flowers.

The demonstrative continuation here is felicitous but not so the descriptive one.

The main contribution of this paper is thus a treatment of definite descriptions and demonstratives that makes sense of the deictic and anaphoric contrasts—a task which also involves accounting for the semantics of demonstrations. A good place to start is with the two main ap-

proaches to definite descriptions. One of them emphasizes uniqueness: as a first gloss, a definite description "The *F*" presupposes that there is a unique *F*, and so may be used to say something about the unique *F*. The other approach emphasizes familiarity: as a first gloss, a definite description "the *F*" presupposes that there is some *F* that is familiar to the conversational participants, and so may be used to say something about the familiar *F*. I begin in §1, however, by showing that both approaches fail to account for how definite descriptions behave in the contrasts above.

Fortunately, there is an alternative to these main camps, which combines uniqueness and familiarity (Roberts 2003, Barker 2004). This hybrid approach does account for the relevant behaviour of definite descriptions. Here is its central tenet.

Definite Descriptions Definite descriptions, like indefinites, e.g. "a man," have existential main content. But they differ in their presuppositional content (indefinites have no presuppositions). A definite description "the *F*" presupposes that there is a unique familiar *F*, and if defined helps update the information about the unique familiar *F*.

With an account of definite descriptions in place, we may then ask how it may be extended to capture the meaning of demonstratives. I show that Roberts's (2002) way of doing so fails to capture the behaviour of demonstratives in the anaphoric contrast, and I conclude §1 by arguing that the proper way forward involves providing a new theoretical understanding of the notion of familiarity, as well as an improved semantics for demonstratives and demonstrations.

Accordingly, in §2 I refine and extend the hybrid approach along those lines. So, in addition to the thesis in the previous paragraph, my overall proposal includes the following.

Familiarity A FAMILIAR *F* is a discourse referent that is salient or deictic. Roughly, a salient discourse referent is one established by an overt indefinite, and a deictic one by the interlocutors' mutual perceptual environment.

Demonstratives A demonstrative "that *F*" presupposes that there is at least one familiar *F*, and if defined helps update the information about the most recently established familiar *F*. (Demonstratives also have the same existential main content as definite descriptions and indefinites.)

Demonstrations A demonstration presupposes that there is at at least one deictic discourse referent, and establishes one of the deictic discourse referents as the most familiar.

The four theses just presented—between this paragraph and the previous one—represent in broad strokes the view I propose in this paper. The way in which the proposal is filled in draws upon a dynamic semantics in the style of Bittner (2009, 2011); accordingly, my appeal to discourse referents, as in Familiarity, is refined as the paper proceeds.

For the central applications of my proposal, intensional resources are not required. But, in §3, I address two intensional phenomena. First, demonstratives do not only differ from definite

descriptions with regard to demonstration-sensitivity, but also in that the former have deictic features: "that," for instance, has the the deictic feature of distality; "this" the deictic feature of proximality. Drawing on Roberts (2020), I account for how deictic features are perspective-sensitive in that they typically help locate the referent's position relative to the speaker: the distal demonstrative "that" is typically used to talk about objects relatively far from the speaker; the proximal demonstrative "this" to talk about objects relatively close. This perspective-sensitive content, however, is not-at-issue in that it is similar to the effect, for instance, of non-restrictive relative clauses. To capture this not-at-issueness, I draw on Murray's (2014) account of appositives, which itself builds on Bittner's dynamic system and crucially relies upon intensional resources.

The second intensional phenomenon I address is rigidity. The present focus on differences between demonstratives and definite descriptions might bring to mind, for a seasoned reader, Kaplan's (1989) influential insight that they differ with regard to rigidity. But I argue that such considerations should not be given a central role in the study of the semantics of demonstratives and definite descriptions. And I use that point as an opportunity to discuss more broadly the relationship between a dynamic semantics treatment of context-sensitive referential expressions such as demonstratives and definite descriptions, and the more traditionally philosophical notion of reference.

After the conclusion, there is an appendix containing a formal system.

1 Familiarity and Uniqueness

The two main views of definite descriptions emphasize either their implications of uniqueness or of familiarity, giving one or the other presuppositonal status. I show in §1.1 and §1.2 that both these views fail to account for the infelicity of definite descriptions in the deictic and anaphoric contrasts. In §1.3, I consider a third, hybrid view that combines familiarity and uniqueness.

1.1 Presupposing Uniqueness

As initially glossed, the uniqueness view holds that a definite description "the F" presupposes that there is a unique F, and if defined denotes the unique F.[1] This proposal can be implemented with a static, extensional semantics. Here is the lexical entry for the definite determiner.

(4) $[\![the]\!] = \lambda P_{et}.\exists!x(P(x)).\iota x((P(x))$

The definite determiner's meaning takes in a property P, presupposes that there is a unique object that is P, and if defined denotes the unique object that is P.

[1]Prominent versions of the uniqueness view are from Russell (1905), Strawson (1950), Evans (1977), Heim (1990), Kadmon (1990), King (2001), Elbourne (2005), and Elbourne (2013). I group together here authors who disagree about whether uniqueness is asserted or presupposed, which is roughly the distinction between E- and D-type variants of the view. The version I present here section is E-type, where uniqueness is presupposed, but my criticism applies equally well to the D-type variant.

This lexical entry is correct for present purposes, but the initial gloss that motivated it is not the whole story. Consider (5).

(5) *Context: A student makes a comment to another at the beginning of class.*
The teacher is happy today.

Here the definite description is felicitous, even though there is manifestly more than one teacher in all of existence. But, if the definite determiner's meaning takes as argument a single property, how can that be?

Following the influential insight of Stanley & Szabó (2000), we may take a cue from the fact that definite descriptions may be bound, as in (6).

(6) Every rich person's house has sleeping pills in the master bathroom.

In order to make sense of how "the master bathroom" may co-vary with "every rich person's house," Stanley & Szabó posit covert variables in a definite description's logical form, as follows.

(7) [the [NP $f\,x$]]

In (7), "x" is an individual variable of type e, and "f" a relation variable of type eet. In (6), "x" is bound by the higher quantifier, and "f" may be assigned by a contextually given assignment function the relation y is a room in x. The meaning of the nounphrase ("NP"), a property, and the meaning of "$f\,x$," also a property, compose via predicate modification, an operation which intersects two property arguments to provide a new property.[2]

Returning to the unbound case of (5), both covert variables are determined by a contextually determined assignment function. Perhaps "x" is assigned the particular teacher in the class, and "f" the identity relation. Here again the value of the variables combine to form a property, which is intersected via predicate modification with the overt NP property, and the resulting property is the one the use of the definite description presupposes is uniquely satisfied. Hence, the property P that the definite determiner's semantic value takes as argument is the overt NP potentially restricted in a contextually given way. This restriction is what is called the "implicit domain restriction" of definite descriptions.

There is much to be said for the uniqueness view and its appeal to implicit domain restriction. Let me present a recent argument for it from Blumberg (2020), since working though his argument leads naturally to how the uniqueness view may be extended to demonstratives.

To begin, consider the following contrast.

(8) *Context: It is common knowledge that there was exactly one witch at a Halloween party last night.*

[2] See Heim & Kratzer (1998: 65) for more on predicate modification. The implicit domain restriction modeled here may be represented with only the traditional compositional rule of functional application, but doing so involves complicating the type of the variable "f" in a way that is needless for present purposes.

a. The witch left early.
b. ??The tall witch left early.

What is the source of (8-b)'s oddness? Consider the following pragmatic principle (Schlenker 2005).

(9) Minimize Restrictors!: Relative to a context c, a use of a definite description of the form $\ulcorner the\ \psi\ \phi \urcorner$ is infelicitous if ψ is redundant, i.e. if:
   a. $\ulcorner the\ \phi \urcorner$ is grammatical and ϕ (plus implicit domain restriction) denotes a singleton set in c; and,
   b. ψ does not serve another purpose, i.e. it is pragmatically irrelevant.

According to this principle, if additional predicative material is added to a definite description—which is not required to make the overall predicative component denote a singleton set, and which does not serve any other pragmatic purpose—then the definite description is marked. In (8), "witch" plus the plausible implicit restriction of y was a person at x, where x is the party, contributes a singleton set. So adding the further predicate "tall" is redundant. Hence, the use of "the tall witch" is marked.

In light of Minimize Restrictors!, consider the following contrast between demonstratives and definite descriptions, first noticed by Wolter (2006).

(10) a. The author of *Blood Meridian* is a genius.
   b. ??That author of *Blood Meridian* is a genius.

Blumberg's insight is that the infelicity of the demonstrative (10-b) may be explained by Minimize Restrictors!, given the uniqueness account of definite descriptions, and the following simple and orthodox account of demonstratives.

Interpreting Kaplan (1989) loosely, as must be done and as many have, we get the following picture of the relationship between demonstratives and definite descriptions.[3]

(11) That man = The *actual* man *being demonstrated*

Rigidity is not of central concern in this paper, so I ignore here the rigidifying operator "actual." What is crucial here is the proposal that a demonstrative has additional covert material, provided by a demonstration, which effects the uniqueness presupposition. Accordingly, here is the lexical entry for a demonstrative, as well as the syntactic structure of its phrase.[4]

(12) a. $[\![that]\!] = \lambda Q_{et} \lambda P_{et}.\exists!x(Q(x) \wedge P(x)).\iota x(Q(x) \wedge P(x))$
   b. [That g [NP $f\,x$]]

[3]Prominent views of this type are from King (2001), Schlenker (2005), and Elbourne (2008).
[4]I leave the treatment of deictic features to §3.1.

The demonstrative's meaning takes in two properties: Q and P. The second, P, is supplied in the same way as the definite description's argument, by implicit domain restriction of the overt NP. In addition, Q is supplied by the contextual assignment to a covert property variable "g," which represents the semantic effect of a demonstration. So, for instance, a use of "that table" may be used to talk about the table *to the right* (demonstration) *in this room* (implicit domain restriction).

Minimize Restrictors! does not mention demonstratives, but, given the uniqueness treatments of definite descriptions and demonstratives, Blumberg derives from it an explanation of the oddity of the demonstratives in Wolter's contrasts. Given the proposed semantics, a use of a demonstrative $\ulcorner \textit{that } \phi \urcorner$ is equivalent to a use of a definite description $\ulcorner \textit{the } \psi \ \phi \urcorner$, where ψ is a predicate that denotes a property equivalent to the property supplied by the demonstration. Since, by Minimize Restrictors!, $\ulcorner \textit{the } \psi \ \phi \urcorner$ is in competition with a use of $\ulcorner \textit{the } \phi \urcorner$, it follows that $\ulcorner \textit{that } \phi \urcorner$ is also in competition with $\ulcorner \textit{the } \phi \urcorner$. Thus, in a situation where ϕ denotes a singleton, both $\ulcorner \textit{that } \phi \urcorner$ and $\ulcorner \textit{the } \psi \ \phi \urcorner$ will be infelicitous, and $\ulcorner \textit{the } \phi \urcorner$ preferred (unless the ψ serves some other pragmatic purpose).

The second condition of Minimize Restrictors!—that the additional restrictor material may serve some other pragmatic purpose—is important to note. For there are felicitous uses of demonstratives where the overt material is semantically unique, as in the following.

(13) That US president is at it again!

These uses of demonstratives have been said to partake in the phenomenon of "emotional deixis" (Lakoff 1974, Acton & Potts 2014), since there is an emotive ring to them.[5] I return to this phenomenon in §2.3. For present purposes, note that the current appeal to Minimize Restrictors! should explain emotional deixis as follows: the additional restriction "g" of the demonstrative is supplied an expressive property, such as the overt "stupid" would. So the demonstrative is felicitous, since the redundant restrictor is serving some other pragmatic purpose.

But we can immediately see that something has gone wrong with the uniqueness approach. Consider the following in contrast with (13).

(14) The US president is at it again!

There simply is not a use of (14) in which the definite description has the emotive ring of the demonstrative in (13); the sentence cannot mean something such as the *stupid* US president is at it again. But, if there is an expressive property that can be assigned to the covert restriction "g" of the demonstrative, then in principle something similar could be assigned to the covert "x" and "f" of a definite description's implicit domain restriction.

It might be possible to draw upon a semantic difference between expressive and non-expressive properties, and allow that expressive properties may be assigned to "g" but may not be the result

[5]Note that, regardless of the subtle emotive ring, their mere felicity poses a problem for the accounts of demonstratives from Hawthorne & Manley (2012) and Nowak (2018) that claim demonstratives presuppose that their overt NP component, plus implicit domain restriction, does not generate a singleton set.

of combining what is assigned to "x" and "f." But the uniqueness view of definite descriptions falters for similar reasons on the deictic contrasts (1) and (2), where no expressive properties are involved. In the attempted deictic uses of definite descriptions, why cannot the covert restriction allow one to talk about the painting being pointed at, yet the demonstrative's further restriction can? Or to talk about the different chairs in turn? If there are general pragmatic principles at work in determining what "x" and "f" are assigned in context, then it is a mystery why these cannot be determined in such a way as to make the definite descriptions in (1-b) and (2-b) felicitous. So, the defender of uniqueness faces the following difficult question: Given that implicit domain restriction for definite descriptions must be made sense of, why is it that such restriction cannot occur in their attempted deictic uses? I take the difficulty of this question to indicate that we should look elsewhere for an account of the semantics of definite descriptions.[6]

Finally, it is worth mentioning that King (2001: 126–139) hits upon the problem for the uniqueness view that is here raised by the deictic contrasts. In response, he suggests that something about the structural location of demonstratives' additional implicit restriction may explain how they can be restricted in certain ways that definite descriptions cannot. That is, the implicit domain restriction of definite descriptions occurs via their noun phrase complements; whereas, the

[6]There is another extant way of making sense of implicit domain restriction, not discussed in this section, which employs situation variables (Heim 1990, Elbourne 2005, Wolter 2006, Ahn 2019). This treatment of implicit domain restriction holds that a definite description's uniqueness presupposition is assessed relative to a situation, which is a part of a possible world. A situation includes a limited domain of individuals and properties. So, for instance, there may be a unique teacher in a given situation, but not in all of existence; thus, the definite description "the teacher" does not need further covert restriction in order for its uniqueness presupposition to be met: there may be a unique teacher in the relevant situation.

Crucially, Wolter (2006) develops the situation-theoretic account of implicit domain restriction in order to explain the infelicity of definite descriptions in the deictic contrasts. She distinguishes between default and non-default situations, where the former are ones that correspond to what is naturally given by the overall discourse context, and the latter are any others. So, for instance, if we are looking at several teachers standing in a row, the default situation will include all those teachers, but a non-default situation may be given by "zooming in" on the default situation, and thus include only one or the other of those teachers. She then holds that both definite descriptions and demonstratives have uniqueness presuppositions assessed relative to a single given situation, but that in addition demonstratives presuppose that the relevant situation is a non-default one. Thus, by a form of pragmatic competition between demonstratives and definite descriptions, definite descriptions are infelicitous when attempting to use them with non-default situations, as is the case in their uses in the deictic contrasts.

Wolter's proposal relies upon claims about the nature of situations, which are crucial in allowing them to play the right pragmatic. She appeals, in particular, to the notion of a default situation, which, in order to account for anaphoric definite descriptions, must be understood generally enough to include default *discourse* situations, which she claims correspond to the "entire discourse context" (75). She also relies on the claim that a situation itself can be emotively charged, in order to account for emotional deixis. I wish to note that, generally, the pragmatics of situations is a generally underdeveloped topic. I do not mean to suggest here that it is not worth developing; I have simply chosen to take another route. It must be said, however, that an anonymous referee provides data that supports Wolter's overall approach—though not the details of how she spells it out. The referee notices that, if there is a group of men standing in front of you, you cannot point at a smaller group of them and utter "Every man went to college," thereby meaning that all of the smaller group went to college. This observation is explained if quantifiers like "Every," alongside definite descriptions, receive implicit domain restrictions via situations that must be default ones (in contrast, I say nothing in this paper to account for the referee's observation on my proposal). But note that the way that Wolter explains how definite descriptions behave similarly is because they are in competition with demonstratives, and it is unclear what expressions universal quantifiers would be in analogous competition with. Thus, there should be some other reason why universal quantifiers require default situations for their restriction—which calls into question the competition-based explanation Wolter gives for why definite descriptions do so.

demonstrative itself combines with the variable that provides its additional restriction (recall the logical forms in (7) and (12-b)). But it is unclear how the mere structural placement of variables should make the relevant difference. On the present view, the contextual resolution of free variables is up to general pragmatic mechanisms, which should presumably act in such a way as to bring about felicity. But, again, it is unclear why the implicit domain restriction cannot then be resolved in such a way as to bring about the felicity of the definite descriptions in the deictic contrasts.

1.2 Introducing Familiarity

I turn now to the second main approach to definite descriptions, which foregrounds familiarity.[7] As glossed in the introduction, the view holds that a definite description presupposes that there is a familiar F, and accordingly may be used to say something about that F. The notion of familiarity is typically understood in terms of discourse referents, so that there is a familiar F, at a given point in a discourse, just in case there is discourse referent for something F present at that point in the discourse. Discourse referents are, in turn, typically elaborated within a dynamic semantics. I do not lay out a dynamic semantics in this section, since there is considerable technical sophistication in doing so, and I develop one later for my own proposal in §2. A relatively informal discussion will suffice for present purposes.

Talk of discourse referents informally captures how there is semantic machinery that coordinates information at the discourse level with the aid of indices on expressions such as indefinites and definite descriptions. It is crucial to note that specifying this semantic machinery does not require adding entities, the alleged discourse referents, to the model as potential referents. A discourse referent is paradigmatically introduced by an indefinite, so let me say a few words about the dynamic treatment of indefinites. An indefinite semantically introduces a discourse referent associated with a given index, but this is simply to say that an indefinite "an F^n" may be coordinated semantically with, say, a definite description "the F_n," despite the fact that the definite description may be outside of the indefinite's syntactic scope. Thus, the coordination is at the discourse level in that a definite description in one sentence may be coordinated with an indefinite in an earlier sentence. More specifically, for example, a sentence "An F^n is G" may be followed downstream in a discourse by a sentence "The F_n is H," and as a matter of semantics the discourse may thereby make the existential claim that there is something that is F, G, and H.

So our informal grasp of the dynamic semantics of indefinites is that they introduce discourse referents associated with indices. Let me now informally elaborate the semantics of definite descriptions. We may retain the basic structure of the uniqueness approach, but with the modifications that uniqueness is assessed among discourse referents, and that implicit domain restriction is provided by an index. Hence, a definite description "the F_n" presupposes uniqueness among F dis-

[7] Prominent views of this type are from Heim (1982), Szabó (2000), and Ludlow & Segal (2004). This type of view also includes the recent proposals of Coppock & Beaver (2015) and Köpping (2020).

course referents initiated with the index "*n*," and if defined helps elaborate the information about that discourse referent. On the present treatment of definite descriptions, the uniqueness presupposition is trivialized, since a definite description may be subscripted in one way or another in order pick up one or another discourse referent. Assuming that there cannot be distinct discourse referents associated with the same index, the present way of stating the familiarity view—by appeal to a trivialized uniqueness presupposition—is equivalent to a more traditional version of the view, according to which definite descriptions simply presupposes that there is some F discourse referent under a given index (Heim 1982). But the way of stating it that I have chosen is helpful because it clarifies the familiarity approach's relationship to the other views of definite descriptions covered in this section.

Furthermore, the present version of the familiarity view vivifies the problem that the deictic and anaphoric contrasts pose, since the contrasts show that a definite description's uniqueness presupposition is not trivialized by anaphoricity (Roberts 2003, Wolter 2006). Consider first the use of a definite description in the anaphoric contrast, elaborated in (15). The first two sentences introduce discourse referents for women, each associated with distinct indices, and the familiarity view predicts either of the continuations should be acceptable to elaborate the information about one or the other woman.

(15) A woman^1 entered from stage left. Another woman^2 entered from stage right.

a. ...#[The woman]$_1$ was carrying a bouquet of flowers.

b. ...#[The woman]$_2$ was carrying a bouquet of flowers.

But neither continuation is felicitous; when a definite description is anaphoric to an indefinite, a uniqueness effect nonetheless remains.[8]

So the anaphoric contrast poses a clear problem for the familiarity view, and consider in that light the attempted uses of definite descriptions in the deictic contrasts, repeated here.

(16) *Context: John and Mary are in an art gallery with a number of paintings in front of them.*

a. #The painting [pointing at a painting] is beautiful.

(17) *Context: John is directing Mary as they are working together rearranging his living room.*

a. #You will take the chair [pointing to one chair] and I will take the chair [pointing to another chair].

[8]An anonymous referee mentions (i-a), which supports the familiarity view in that it suggests that a uniqueness effect does not remain with anaphoricity. And note that that the "bishop sentence" (Heim 1990), with definite descriptions, in (i-b) poses a similar problem.

(i) a. A woman$_1$ met another woman$_2$. The woman$_{1,??2}$ was wearing a red coat.

b. If a bishop meets a bishop, the bishop blesses the bishop.

I return to the issue raised by this data in the conclusion, after I have gotten some aspects of my own proposal on the table in the next section.

Suppose, as is plausible, that a demonstration is similar to an indefinite in that it introduces a discourse referent. According to the familiarity theory, in (16-a) and (17-a) the definite description should thus be able to be co-indexed with the demonstration. Yet there is infelicity, which also seems to result from a violation of a uniqueness presupposition, for there are multiple paintings/chairs around the interlocutors.

Before moving on, I wish to note that the main traditional motivation for the familiarity approach over the uniqueness one is the phenomenon of donkey anaphora. I leave discussion of that phenomenon to §2.2. But this point about donkey anaphora is part of a larger observation about definite descriptions and demonstratives, and saying a few words about the larger observation now will help bring about some terminological clarity.

The larger observation is that both definite descriptions and demonstratives satisfy what is called the "anaphoric paradigm" (Heim 1982, Partee 1984, Roberts 2002). What this means is that they both occur (a) without and (b) with overt linguistic antecedents, where in some of the latter cases (c) the linguistic antecedent has the demonstrative or definite description within its syntactic scope. (Donkey anaphora are cases that vividly illustrate uses of type (b) that are not also of (c), in which an indefinite binds a definite description or demonstrative outside of its syntactic scope.) Cases of each these types are discussed in the paper, but here is some simple data to illustrate the taxonomy.

(18) a. *Context: A dog walks into the room.*
The/that dog is beautiful.
b. A woman walked in. The/that woman was happy.
c. Every guilty senator testifed to congress before the/that senator was harangued.

In this paper, I have adopted the common terminology of calling type (a) cases "deictic," type (b) cases "anaphoric," and type (c) cases "bound."

The main virtue of dynamic semantics, with regard to referential expressions such as definite descriptions and demonstrations, is in uniformly treating all of these uses. In each case, the referential expression is anaphoric to a discourse referent. So note that the common terminology just highlighted is ultimately misleading in the present theoretical context, since all uses of these referential expressions are anaphoric (which is why the three types of uses together are said to constitute the *anaphoric* paradigm). But I retain the common terminology because it is intuitively satisfying.

In this section, I am focused on how the various extant theories of definite descriptions and demonstrations account for deictic and straightforward anaphoric uses of those expressions. In the next section, where I develop my own view within a dynamic semantics, I discuss how the present considerations are related more complex anaphoric data, such as donkey anaphora and cases where there is syntactic binding. Before turning to my own view, however, let me now discuss the final extant view of definite descriptions and demonstratives.

1.3 The Hybrid Approach

Having considered the two main views of definite descriptions, we may turn to a third view, which combines familiarity and uniqueness, but without trivializing uniqueness (Roberts 2003, Barker 2004). On this view, a definite description "the *F*" presupposes that there is a unique *F* discourse referent (regardless of index), and if defined helps elaborate the information about that discourse referent. Recall that the familiarity view of the previous section holds that a definite description "the *F*"'s uniqueness presupposition is that there must be a unique *F* discourse referent *associated with a given index*, hence this trivialized uniqueness presupposition may be satisfied while there are multiple *F* discourse referents. That is, a definite description "the *F*" presupposes that there is a familiar *F*, and so may be used to elaborate the information about this or that familiar *F*. But the hybrid holds that the presupposition is that there is a unique familiar *F*, and so a definite description "the *F*" must be used to elaborate the information about the unique familiar *F*. So the present view draws from the uniqueness view since it does not trivialize the uniqueness presupposition in the way that the familiarity view does. But the present view is also distinct from the uniqueness view, since on that view the definite description presupposes that there is a unique thing, satisfying some property, in all of existence. On the present proposal, in contrast, uniqueness is assessed among what is familiar in discourse.

The hybrid view explains the infelicity of the definite description in the anaphoric contrast, since the two indefinites introduce two woman discourse referents. In order to make sense of the infelicity of the attempted deictic uses of definite descriptions, we must broaden our understanding of how discourse referents may be initiated. As mentioned above, a use of an indefinite is the paradigm case of initiating a discourse referent. But it is plausible that, when an object is mutually taken to exist in the interlocutors' perceptual environment, there is thereby a discourse referent for it initiated. So in the deictic contrasts there are multiple paintings/chairs, which leads to the failure of the definite descriptions' presuppositions. Thus the hybrid view provides an elegant account of the infelicity of the definite descriptions in the cases at hand. For this reason, I take the view to be correct. But there are two issues that I wish to raise with the main way in which the view has been developed, in the work of Roberts (2002, 2003).

The first issue stems from the fact that the appeal to a nonparadigmatic way in which discourse referents may be introduced raises the question of how exactly the deictic discourse referents—those introduced on the basis of the interlocutors' perceptual environment—may be considered alongside the paradigm salient discourse referents—those introduced by an indefinite. Roberts's (2003) answer relies on the notion of the COMMON GROUND: the information mutually accepted by the interlocutors for the purposes of conversation (Stalnaker [1978] 1999, 2002). For her, a discourse referent may be initiated on the basis of INFORMATIONAL EXISTENCE, when the existence of an object can be inferred on the basis of the common ground. Thus when something is perceptually recognized by the interlocutors, the common ground is appropriately updated, and a corresponding discourse referent is thereby initiated. So the present proposal is that deictic discourse

referents are subtype of MERELY INFORMATIONAL ones: those not introduced by an indefinite but instead in virtue of information in the common ground.

The issue, however, is that deictic discourse referents do not behave like other members of the alleged type of merely informational discourse referents. As the deictic contrasts show, deictic discourse referents are relevent for a definite description's uniqueness presupposition in that they can bring about the presupposition's failure. But not so for merely informational discourse, as the following data from Mandelkern & Rothschild (2020) show.

(19) a. Sue bought a sage plant and bought eight others along with the sage plant. (Based on Heim 1982)

b. Several couples came in today. There was one, a man and a woman. The man was being so annoying.

Both these sentences are felicitous. Hence the definite description at the end of (19-a) does not have its uniqueness presupposition violated, despite the fact that many sage plants can be inferred to exist on the basis of the mention of eight sage plants earlier in the sentence—which should have updated the common ground before the definite description at the end of the sentence is considered. Similarly, the definite description in the final sentence of (19-b) does not have its uniqueness presupposition violated, despite the fact that multiple men can be inferred to exist on the basis of the first sentence's update to the common ground. So I conclude that the category of merely informational discourse referents is not a genuine category, in that such alleged discourse referents do not genuinely enter in the context when they can be established on the basis of the common ground. They are not antecedantly present, like deictic discourse referents are, in such a way as to lead to the infelicity of a definite description.

Before moving on to the second issue, it must be noted that Mandelkern & Rothschild take their data in (19) to in fact help support the familiarity view of definite descriptions. Their argument for the familiarity involves considering minimal pairs such as (19-a) and (20-a), and (19-b) and (20-b).

(20) a. ??Sue went to the store and bought eight sage plants along with the sage plant she bought.

b. ??Several couples came in today. The man was being so annoying.

The argument goes as follows. The felicity of (19-a)/(19-b) is supposed to support the claim that definite descriptions do not have any uniqueness presupposition, as maintained by the familiarity view. And then the reason they suggest that there is infelicity in (20-a)/(20-b) is that a discourse referent for the definite description must be accommodated,[9] since the definite description has no indefinite as antecedent, and there is something about that process of accommodation that

[9]Accommodation is a process whereby a presupposition is not met by the prior context, yet it is smoothly accepted by the audience, and hence there is felicity. See von Fintel (2008) for a recent overview.

triggers a uniqueness requirement—where, finally, that uniqueness requirement is violated by the merely informational discourse referents.

The main issue with this argument is that it requires that the (putative) merely informational discourse referents both are and are not genuine discourse referents. If, for instance, it is claimed that there is no discourse referent antecedently present for the definite description in the second sentence of (20-b)—despite the fact that the first sentence mentions several couples—then it cannot also be held that the felicity of (19-b) supports the view that definite descriptions have no uniqueness presupposition—since it cannot also be claimed that the first sentence does initiate a number of discourse referents that *would* violate a uniqueness presupposition.

Again, I take (20-b) and (19-a) to show that merely information discourse referent are not genuine discourse referents, so those sentences are not problems for the present version of the hybrid view. But there is an open question about the source of infelicity in (20-b)/(20-a), though something like the answer that Mandelkern & Rothschild propose is consistent with the present proposal: since there is no prior discourse referent for the definite description in (20-b)/(20-a), one must be accommodated, and it may be that something about that process of accommodation triggers a uniqueness requirement that concerns merely informational entities (but this triggered uniqueness requirement is not the same as the definite description's uniqueness presupposition). That feature of accommodation—if it is in fact one—is consistent with definite description's having their own semantic uniqueness presupposition, and explains the relevant infelicity. I think, however, that the relevant facts about accommodation that are hereby revealed about accommodation are more subtle than Mandelkern & Rothschild suggest, but I relegate a brief discussion of the matter to this footnote.[10]

The second issue that I wish to raise is with the way that Roberts (2002) extends the approach to treat demonstratives. On her account, a demonstrative "that *F*" presupposes that there is a uniquely demonstrated familiar *F* discourse referent. So demonstratives presuppose demonstrations, which restrict the domain of discourse referents among which the uniqueness presuppo-

[10] First, it seems that the infelicity of (20-a) arises because the sentence is claiming that Sue simultaneously bought eight and nine sage plants. Consider the sentence as clarified so that it is clearly saying that Sue bought nine.

(i) Sue went to the store and bought eight other sage plants along with the sage plant she bought.

In (i) there is felicity. And note that there is a definite description that requires accommodation, yet the mention of eight other sage plants does not lead to infelicity.

With regard to (20-b), I suspect that the problem is two-fold: (a) a discourse referent for a man is unable to be accommodated in such a way that it is one of the men of the several couples; and (b) it is unclear how some other man discourse referent could be accommodated. Note that if the example is modified slightly to make it more clear how there is some other man being talked about, there is felicity.

(ii) Several couples came in today. The man was being so annoying by asking each of the couples where they met.

The felicity of (ii) shows that the mere accommodation of a discourse referent for a definite description does not lead to a uniqueness requirement violated by merely informational discourse referents. The problem with (20-b), I stress, seems be to that a discourse referent cannot be accommodated *that is one of the men in the couples mentioned in the first sentence*. I propose further that a similar explanation holds for the other data Mandelkern & Rothschild provide.

sition must hold. In this way, the felicity of the demonstratives in the deictic contrasts follows: the demonstration satisfying a demonstrative "that *F*"'s presupposition helps picks out one or another of the *F* discourse referents. But, if demonstratives presuppose the existence of demonstrations, then all of their uses require demonstrations. Intuitively, however, it does not seem that anaphoric or bound demonstratives are accompanied by demonstrations of any kind, or even that a demonstration must be accommodated.

In addition to this intuitive issue, the proposal—packing demonstrations into the presuppositions of demonstratives—makes incorrect predictions. For the parallel between deictic and anaphoric demonstratives is not exact. Consider again the behaviour of demonstratives in those contrasts.

(21) *Context: John and Mary are in an art gallery with a number of paintings in front of them.*
That painting [pointing at a painting] is beautiful.

(22) *Context: John is directing Mary as they are working together rearranging his living room.*
You will take that chair [pointing to one chair] and I will take that chair [pointing to another chair]

(23) A woman entered from stage left. Another woman entered from stage right. This woman was carrying a bouquet of flowers.

In the deictic (21) and (22), a demonstrative, alongside a demonstration, is used to pick out one or the other deictically given painting or chair. In contrast, the anaphoric demonstrative in (23)—even if the distal form "that woman" is used instead—must be anaphoric to the second mentioned woman.[11] Furthermore, in contrast with (22), the setup of the first two sentences of (23) does not allow one to follow with two demonstratives—type identical or not, no matter distal or proximal—to talk about one and then the other woman in turn.

(24) A woman entered from stage left. Another woman entered from stage right.

a. ...#This woman was taller than this woman.
b. ...#This woman was taller than that woman.

Thus, it is hard to see how anaphoric demonstratives may be accompanied by demonstrations in

[11] An anonymous referee reports that the use of the distal demonstrative in (23) would be infelicitous.

(i) A woman entered from stage left. Another woman entered from stage right. ??That woman was carrying a bouquet of flowers.

My judgment is that the use of the distal demonstrative in (i) is degraded compared to the use of the proximal one in (23), but I do not agree that it is infelicitous, in the same way, for instance, as is the use of the definite description. I suggest that the reason the distal demonstrative seems somewhat odd is that the interpretation of its deictic feature of distality suggests that the speaker is attempting to talk about the first mentioned woman, since that woman is farther away in the discourse than the second mentioned one, but that continuation is not possible, as I am arguing here. I discuss deictic features in more detail in §3.1.

such a way as to make the anaphoric case parallel with the deictic. Bound cases are similar to anaphoric ones in this respect, and I discuss them as well in the following section.

In sum, the problem is that Roberts treats the anaphoric behaviour of demonstratives as too similar to deictic ones. Despite the fact that those environments are similar with regard to the demonstratives but not definite descriptions being felicitous, it is not the case that demonstrations are present in both. Rather, it is plausible that there are simply no demonstrations present in the anaphoric case, and in the deictic case demonstrations are playing a role similar to indefinites.

2 Salience and Deixis

The view I am about to develop retains the semantics of definite descriptions given by the hybrid view: a definite description "the *F*" presupposes that there is a unique familiar *F*, and if defined helps update the information about the unique familiar *F*. Yet, as has emerged from the previous section, the path ahead revises the notion of familiarity and the semantics of demonstratives and demonstrations. I also refine the talk of discourse referents and the semantics of the relevant expressions by drawing upon a dynamic semantics.

2.1 Core Proposal

Let me begin with the notion of familiarity. Roughly, I propose that familiarity is constituted by salience and deixis. Recall that talk of familiarity lines up with talk of discourse referents: to say that there is a familiar *F* is to say that there is an *F* discourse referent. So, my proposal about familiarity is that all discourse referents are either salient or deictic. As a first gloss, a salient discourse referent is one established by an overt indefinite, and a deictic one the interlocutors' mutual perceptual environment.

In order to elaborate my notion of familiarity, I develop some formal machinery to refine the talk of discourse referents, in such a way that respects the distinction between salient and deictic ones. As was hit upon in the previous section, talk of discourse referents recapitulates how chunks of discourse have existentially quantified truth-conditions, in which indefinites may coordinate information with definite expressions outside of their syntactic scope. Making sense of truth-conditions within a dynamic framework involves some subtlety, so I leave it to §3.2. What matters for present purposes is that the introduction of discourse referents occurs via dynamic existential quantifiers and, with the help of a dynamic context, such quantifiers may thereby semantically bind expressions outside of their syntactic scope.

A CONTEXT, or information state, c is a set of information points. I represent formally the distinction between salient and deictic discourse referents with two stacks in the dynamic context. So each INFORMATION POINT i is an ordererd pair of sequences. More specifically, each point i is the ordered pair $\langle \sigma_s, \sigma_d \rangle$, where the first sequence σ_s^i helps represent the salient discourse referents and the second sequence σ_d^i the deictic ones. I emphasize though that discourse referents are not

elements of any sequence: they are not posited by the formal model as potential referents of definite expressions. Instead, insofar as it is ultimately necessary to talk about discourse referents as existing in the formal model, they correspond to positions among a set of information points that is a context. See Table 1 for further illustration.

c	c'	c''	c'''
$\{\ \langle\langle a\rangle,\emptyset\rangle,$	$\{\ \langle\langle c,a\rangle,\emptyset\rangle,$	$\{\ \langle\emptyset,\langle a\rangle\rangle,$	$\{\ \langle\emptyset,\langle c,a\rangle\rangle,$
	$\langle\langle d,a\rangle,\emptyset\rangle,$		$\langle\emptyset,\langle d,a\rangle\rangle,$
$\langle\langle b\rangle,\emptyset\rangle$	$\langle\langle c,b\rangle,\emptyset\rangle,$	$\langle\emptyset,\langle b\rangle\rangle$	$\langle\emptyset,\langle c,b\rangle\rangle,$
$\}$	$\langle\langle d,b\rangle,\emptyset\rangle\ \}$	$\}$	$\langle\emptyset,\langle d,b\rangle\rangle\ \}$

Table 1: Discourse Referents. Assume in the background model that only objects a and b are F, and only c and d are G. In context c, there a single discourse referent, for an F object, and it is in the salience stack. In c' that same discourse referent is present, but there is another, for a G object, that is in the top position of the salience stack. The same situation is then illustrated in the deictic stack. In c'', there is a single discourse referent and it is in the deictic stack. That same discourse referent is present in c''', but there is another in the top position of the deictic stack.

The bidimensional structure of contexts here is taken from the work of Bittner (2001, 2009). She distinguishes between the center and periphery of discourse attention with two stacks she labels top "$\top$" and bottom "$\bot$." I have however relabeled them the salience stack "s" and the deictic one "d." Given the two stacks in the context, we may introduce two types of dynamic existential quantifiers. These existential quantifiers are the following update boxes, which appear in logical form, and influence either stack as a matter of their semantics.

(25) a. $[dx|Fx]$
b. $[sx|Fx]$

As for their semantic interpretation, both boxes are assigned functions from contexts to contexts. In each case a discourse referent that is indefinite between the individuals that are F is added to the context. For (25-a), the DEICTIC EXISTENTIAL, the discourse referent is added to the top of the stack of deictic discourse referents. For (25-b), the SALIENCE EXISTENTIAL, it is added to the top of the stack of salient discourse referents. See Table 2 for further illustration.

Here is quick note on the syntax that I use throughout this paper. On the left-hand side of an update box "$[\alpha v,\ldots,\alpha v'|C]$" are variables, where "$\alpha$" stands for either "$s$" or "$d$," and which initiate discourse referents. On the right-hand side there is a condition "C," which may include referential expressions, "αv_n," which pick up the n back value, in the α sequence, at each point in the input context. Note, however, that when these referential expressions pick up values introduced by variables in the left-hand of their own box, I simply write "x." There also may appear referential expressions representing definite descriptions and demonstrations, but before getting to those here is a bit more about the existential quantifiers.

c_o	$c_o[\![\,[dx\|Fx]\,]\!]$	$c_o[\![\,[sx\|Fx]\,]\!]$
$\{\ \langle\emptyset,\emptyset\rangle$	$\{\ \langle\emptyset,\langle a\rangle\rangle,$	$\{\ \langle\langle a\rangle,\emptyset\rangle,$
	$\langle\emptyset,\langle b\rangle\rangle,$	$\langle\langle b\rangle,\emptyset\rangle,$
	$\langle\emptyset,\langle c\rangle\rangle,$	$\langle\langle c\rangle,\emptyset\rangle,$
$\}$	$\langle\emptyset,\langle d\rangle\rangle\ \}$	$\langle\langle d\rangle,\emptyset\rangle\ \}$

Table 2: Basic Existential Updates. Here is the effect of each existential updates on the open context $c_o = \{\langle\emptyset,\emptyset\rangle\}$. In the background model, only objects a, b, c, and d are F, so the discourse referent introduced is indefinite between those four objects. I follow the convention of providing the semantic value of for an expression e, $[\![e]\!]$, its context argument on the left hand side, $c[\![e]\!]$, to represent how the semantic value takes in a context and updates it to a new one.

The salient existential quantifier (25-b) represents in logical form an indefinite "an F." For the purposes of this paper, I assume a simplistic model of salience: a SALIENT discourse referent is one introduced by an overt indefinite, and once a discourse referent is established as salient it remains so. This model is overly simplistic, as stressed for instance by Roberts (2003), but the general notion of salience I am appealing to here is fairly uncontroversial, despite the fact that details must be filled in. I return to this point in the conclusion.

In contrast, the introduction of deictic discourse referents and the corresponding deictic existential might seem questionable. A DEICTIC discourse referent is one appropriately related to the interlocutors' perceptual situation. I do not here dwell on the question of in what exactly the "appropriate relation" appealed to consists. Roughly, it has to do with an object's existence being recognized or taken to hold by the interlocutors on the basis of their mutual cognitive grip on their perceptual environment. So, for instance, when John and Mary are facing a wall of painting in an art gallery, those paintings have corresponding deictic discourse referents in the discourse. But not so the paintings in the room adjacent. Moreover, I am suggesting that a deictic discourse is initiated by an element of logical form: the deictic existential quantifier in (25-a). This way of implementing how deictic discourse referents are initiated might seem implausible, but I adopt it here because it provides a simple resolution of the issue, raised in §1.3, concerning how it is that deictic discourse referents are genuine aspects of context, and also account for why they must be initiated in a stack distinct from the salient discourse referents. Let me explain.

The upshot of the relevant discussion in §1.3 was that deictic discourse referents are not akin to (putative) merely informational discourse referents, since the latter are not genuinely present in context prior to the use of a definite description and instead must be accommodated. In order to intuitively illustrate this difference, compare the following.

(26) *Context: A dog walks into the room and the interlocutors notice.*
The dog is so cute!

(27) The tallest man on earth must have serious back pain.

There is, I claim, an intuitive difference with regard to how the antecedents of each definite description here are established. With regard to (27), it may be antecedantly part of the common ground that there is a tallest man on earth, but nonetheless a discourse referent for that man must be accommodated in order to fix an antecedent for the definite description. But, in (26), it seems odd to require that there must be a similar accommodation of a dog when the definite description is interpreted. The dog is clearly present to the interlocutors before the speaker comments on it.

Reflection upon contrasts such as the one between (26) and (27) is admittedly a subtle matter, and very different proposals have been made as to what the difference is. In her seminal work on dynamic semantics, Heim (1982: §2.2) considers a view according to which the discourse referents for the definite descriptions in both (26) and (27) must be accommodated. But I reject that suggestion. The main reason I instead include deictic discourse referents, such as the one in (26), on a par with salient ones—in that they are not accommodated—is that it helps explain the otherwise mysterious infelicity of the attempted deictic uses of definite descriptions in (1)/(16) and (2)/(17). Given that a definite description "the *F*" presupposes that there is a unique *F* discourse referent, the infelicity in those attempted deictic uses requires that there be multiple *F* discourse referents present. So, despite the fact that deictic discourse referents are not introduced by overt indefinites, they must not be such that they are simply accommodated when needed. For it is unclear why a number of discourse referents would be accommodated in a way that leads to the *in*felicity of a definite description.

Heim (1982: §2.3), moreover, also ultimately endorses a view according to which the discourse referent in (27) is accommodated, but not so the one in (26). She claims, however, that, while the latter discourse referent is not accommodated, it is also not initiated by an element of logical form. But I have chosen here to model in a simple way how deictic discourse referents are be introduced into the dynamic context other than via accommodation: initiation by a covert element of logical form. Furthermore, providing an element of logical form, the deictic existential quantifier, also helps represent how such discourse referents must be initiated in a stack that is seperate from the salience stack, since the update of the deictic stack is encoded in the formal semantics of the deictic existential. But I set aside the question of whether the present approach or Heim's view—that deictic discourse referents are neither accommodated nor initiated by an element of logical form—is ultimately correct.

Let me point out that I have not yet provided motivation for the view that salient and deictic discourse referents must be distinguished by two stacks in the context. The empirical motivation for this aspect of my proposal is the dissimilarity in the behaviour of demonstratives between the deictic and anaphoric contrasts, touched upon at the end of §1.3. I show how my proposal explains that behaviour in §2.2. The parts of my proposal relevant for the explanation are the semantics of demonstrations and demonstratives, which I turn to now.

I treat demonstrations as elements of logical form akin to indefinites; demonstrations are a special type of existential quantifer.[12] What is special about demonstrations is that they introduce

[12]Here is a brief comparison of my account of demonstrations to two other recent and similar proposals. First,

discourse referents to the deictic stack in a relational way: the new discourse referent stands in some relation to an existing deictic discourse referent. Basic demonstrations, which will only concern us for now, employ the identity relation: the new discourse referent is identified with an earlier discourse referent in the deictic stack. So, a demonstration may select one or another deictic referent and raise it to deictic prominence. The form of a basic demonstration is as follows (the squiggly arrow represents abbreviation).

(28) $\Delta_n \rightsquigarrow [dx|x = dx_n]$

In (28), the referential expression "dx_n" picks out the nth discourse referent back in the deictic stack of an input context (where counting starts at 0). So, a demonstration "Δ_n" bumps up the nth back deictic discourse referent to the top of the deictic stack. See Table 3 for further illustration. Note that not every gesture that might accompany a demonstrative or definite description counts as a demonstration: the simple demonstrations that are the present focus are contrastive in that they select one or another deictic discourse referent, and establish it as the highest ranked deictic discourse referent.[13]

$c_o[\![\,[dx\|Fx]\,]\!]$	$c_o[\![\,[dx\|Fx];[dx\|Gx]\,]\!]$	$c_o[\![\,[dx\|Fx];[dx\|Gx];\Delta_1\,]\!]$
$\{\ \langle\emptyset,\langle a\rangle\rangle,$	$\{\ \langle\emptyset,\langle c,a\rangle\rangle,$	$\{\ \langle\emptyset,\langle a,c,a\rangle\rangle$
	$\langle\emptyset,\langle d,a\rangle\rangle,$	$\langle\emptyset,\langle a,d,a\rangle\rangle,$
$\langle\emptyset,\langle b\rangle\rangle,$	$\langle\emptyset,\langle c,b\rangle\rangle,$	$\langle\emptyset,\langle b,c,b\rangle\rangle,$
$\}$	$\langle\emptyset,\langle d,b\rangle\rangle\ \}$	$\langle\emptyset,\langle b,d,b\rangle\rangle\ \}$

Table 3: Basic Relational Update. Here is the effect of a demonstration: first there are two deictic discourse referents added to the open context, then a demonstration bumps up the first one introduced. The semi-colon stands for dynamic conjunction. In the background model, *a* and *b* are the only objects that are F, and *c* and *d* are the only objects that are G.

The dynamic effect of demonstrations works in tandem with the meaning of demonstratives to allow demonstratives to pick out one or another of the deictic discourse referents. But the same does not hold with the meaning of definite descriptions, since definite descriptions presuppose discourse uniqueness. Let me now present my account of the meanings of those expressions.

I propose that a demonstrative "that *F*," as a matter of its meaning, helps elaborate the information about the highest ranked *F* discourse referent, considering the deictic stack first. In

my account is very similar to that of Ebert et al. (2020), since they also use relational discourse referents with the identity relation; however, they do not implement a deictic dimension in the way I do. Second, my account is in starker contrast with that of Stojnić et al. (2013), since for them demonstrations simply introduce discourse referents non-relationally, and also they do not implement different stacks of discourse referents all.

[13]An anonymous referee points out the following issue for the present treatment of demonstrations: there are demonstrations that seem to introduce a discourse referent into context, and not simply highlight an existing one; hence, a demonstration need not be relational in picking out an object that is already familiar to the interlocutors. I suggest, in response, that the present account of demonstrations can handle such cases, since in the referee's cases the deictic discourse referent that the demonstration highlights may be first accommodated.

contrast, definite description "the F" requires that there is a unique F discourse referent, considering both the salient and deictic stack. More formally, here are the update boxes associated with uses of demonstratives and definite descriptions used in simple sentences.

(29) The/That F is G.

a. $[G(the_F)]$

b. $[G(that_F)]$

The update of (29-a) that the definite description contributes to is defined just in case there is a unique F discourse referent. If defined, the update eliminates all points where that unique object is not G. The update of (29-b) that the demonstrative contributes to is defined just in case there is some F discourse referent. If defined, all points are eliminated where the highest ranked F object, considering the deictic stack first, is not G. See Table 4 for further illustration.

$c_o[\![[sx\|Fx]]\!][\![[sx\|Fx]]\!] = c'$	$c'[\![[G(the_F)]]\!]$	$c'[\![[G(that_F)]]\!]$
$\{\ \langle\langle a,a\rangle,\emptyset\rangle,$	#	$\{\ \langle\langle a,a\rangle,\emptyset\rangle,$
$\langle\langle b,a\rangle,\emptyset\rangle,$		
$\langle\langle a,b\rangle,\emptyset\rangle,$		$\langle\langle a,b\rangle,\emptyset\rangle$
$\langle\langle b,b\rangle,\emptyset\rangle\ \}$		$\}$

Table 4: Demonstrative and Definite Description Updates. Given the introduction of two salient F discourse referents in c', the definite description's uniqueness presupposition is violated; thus, the update is undefined, which results in the context crashing (represented by "#"). The demonstrative, however, picks up the top ranked salient F discourse referent, since there are no deictic discourse referents (if there were any deictic F discourse referents, the demonstrative would pick up the highest ranked of them, regardless of what is in the salient stack). In the background model, a and b are F, and only a is G.

I have thus presented the core elements of my proposal: a formal semantics of definite descriptions, demonstratives, and demonstrations. See the appendix for the nuts and bolts. I turn in the next subsection to accounting for the data discussed in the introduction and §1, but note that I ultimately hold that demonstratives have additional presuppositions and dynamic effects—based upon their deictic features—than those covered already. I cover this additional content in the next section, where I introduce intensionality into my system (the appendix contains the full system).

2.2 Application

I begin with the deictic contrasts. Here is the first.

(30) *Context: John and Mary are in an art gallery with a number of paintings in front of them.*

a. That painting [pointing at a painting] is beautiful.
b. #The painting [pointing at a painting] is beautiful.

Logical forms for these two sentences are as follows.

(31) a. $[dx|P(x)]; [dx|P(x)]; \Delta_1; [B(that_P)]$
b. $[dx|P(x)]; [dx|P(x)]; \Delta_1; [B(the_P)]$

The first two boxes of each logical form represents that two painting discourse referents are in the deictic stack. The demonstration in (31-a) bumps one of them up for the demonstrative to pick up. In (31-b), on the other hand, the third box will crash the update because the uniqueness presupposition of the definite description is not satisfied.

Here is the second deictic contrast, where there are multiple demonstrations and intrasentential shift of reference.

(32) *Context: John is directing Mary as they are working together rearranging his living room.*
a. You will take that chair [pointing to one chair] and I will take that chair [pointing to another chair]
b. #You will take the chair [pointing to one chair] and I will take the chair [pointing to another chair].

Logical forms for these two sentences are as follows.

(33) a. $[dx|C(x)]; [dx|C(x)]; \Delta_1; [L(j, that_C)]; \Delta_0; [L(b, that_C)]$
b. $[dx|C(x)]; [dx|C(x)]; \Delta_1; [L(j, the_C)]; \Delta_0; [L(b, the_C)]$

The first two boxes in (33-a) and (33-b) represent that there are two chair discourse referents are deictically present in the context. In (33-a), the demonstrations bump one and the other of these background discourse referents to the top of its stack for the demonstratives in turn to pick up. In (33-b), however, the update will crash when processing the fourth box because there is more than one chair discourse referent in the context. Note that, for the uses of definite descriptions here and in the case (31-b), the update with the definite description will crash even if there is no demonstration update. That result is welcome, since in both cases the definite descriptions are infelicitous even if no demonstration is used.

We may now consider the anaphoric contrast.

(34) A woman entered from stage left. Another woman entered from stage right.
a. ...This woman was carrying a bouquet of flowers.
b. ...#The woman was carrying a bouquet of flowers.

In the first two sentences, two salient discourse referents for women are established by the indef-

inites. The demonstrative felicitously picks up the second mentioned women (and must do so), while the definite description has its uniqueness presupposition violated.

Now, recall the claim from the end of 1.2 that in dynamic semantics a treatment of bound uses of context-sensitive referential expressions falls out of a treatment of their anaphoric uses. The standard treatment of universal quantification in dynamic semantics relies upon indefinites introducing discourse referents within the scope of conditionals, where a conditional is understood in terms of dynamic conjunction and negation (Groenendijk & Stokhof 1991). Let me begin illustrating this approach with the simple universally quantified sentence "Every man runs," which can be glossed as *every man is such that he runs*, where in the following translation scheme the predicate "man" is the restrictor "F" of the universal quantifier, and the sentence "he runs" the scope "ψ."

(35) $\quad \forall F : \psi \dashrightarrow [sx|F(x)] \rightarrow \psi$

So the translation scheme in (35) says that "Every man runs" is equivalent to a conditional, whose antecedant is a salience existential initiating a discourse referent for an arbitrary man, and whose consequent says of the arbitrary man that he runs. A conditional, then, is equivalent to the negation of the conjunction of the antecedant and negation of the consequent.

(36) $\quad \phi \rightarrow \psi \dashrightarrow \neg(\phi; \neg\psi)$

Hence, in general, given the standard dynamic treatments of negation and conjunction, the translation schemes of (35) and (36) work together to provide universal quantification the following semantics.[14]

(37) $\quad c[\![\forall F : \psi]\!] = \{i \in c|$ Every $j \in \{i\}[\![[sx|F(x)]]\!]$ is s.t. $\{j\}[\![\psi]\!] \neq \varnothing\}$

Less formally, a universally quantified sentence updates an input context c as follows: a new context is returned containing every information point i in c such that every information point j in the result of adding an appropriate discourse referent to $\{i\}$ is such that $\{j\}$ survives update by $[\![\psi]\!]$. But note that every i in any context c is such that the result of adding some discourse referent to $\{i\}$ survives pointwise update by $[\![\phi]\!]$ just in case the result of adding that same discourse

[14]Here is in some detail how (37) is arrived at.

$$
\begin{aligned}
c[\![\forall F : \psi]\!] &= c[\![\neg([sx|F(x)]; \neg\psi)]\!] && (1)\\
&= \{i \in c|\{i\}[\![[sx|F(x)]; \neg\psi]\!] = \varnothing\} && (2)\\
&= \{i \in c|\{i\}[\![sx|F(x)]]\!][\![\neg\psi]\!] = \varnothing\} && (3)\\
&= \{i \in c|\{j \in \{i\}[\![[sx|F(x)]]\!]|\{j\}[\![\psi]\!] = \varnothing\} = \varnothing\} && (4)\\
&= \{i \in c|\text{ There is no } j \text{ s.t. both } j \in \{i\}[\![[sx|F(x)]]\!] \text{ and } \{j\}[\![\psi]\!] = \varnothing\} && (5)\\
&= \{i \in c|\text{ Every } j \in \{i\}[\![[sx|F(x)]]\!] \text{ is s.t. } \{j\}[\![\psi]\!] \neq \varnothing\} && (6)
\end{aligned}
$$

Step (1) appeals to (35) and (36). Steps (2) and (4) appeal to the semantics of negation: $c[\![\neg\phi]\!] = \{i \in c|\{i\}[\![\phi]\!] = \varnothing\}$. Step (3) appeals to the semantics of conjunction: $c[\![\phi; \psi]\!] = c[\![\phi]\!][\![\psi]\!]$. Steps (5) and (6) appeal to only standard logic and set theory.

referent to $\{i'\}$ does as well, where i' is any other member of c. Thus, more intuitively, universal quantification *tests* an input context, instead of updating it, since either the entire input context or the empty set is returned. So, even less formally, our running example, "Every man runs," tests an input context c as follows: Is every man that could be spoken of one that also runs? If so, c is returned; if not, the empty set.

Now that the standard treatment of universal quantification in dynamic semantics is on the table, it can be seen how the treatment of bound context-sensitive expressions falls out of the account of their anaphoric uses. A bound expression is anaphoric to an indefinite, but in a local context set up by a universal quantifier: the semantics of the conditional, appealed to in the account of universal quantification, sets up a series of updates, but only to ultimately test the overarching input context; those updates do not have a permanent effect on the discourse context. What is crucial here is that the bound expression is anaphoric to an indefinite within its local context, where the formal machinery connecting the anaphor with its antecedant is similar to the (pre-theoretically) anaphoric case.

Given the similarities that the dynamic approach draws between bound and anaphoric uses of expressions such as demonstratives and definite descriptions, we should expect, on the present approach, that the way in which those expressions behave in their anaphoric uses—as revealed by the anaphoric contrast—rearises in a quantificational environment. And, in fact, we do observe an analogue of the anaphoric contrast in such an environment. Let me consider an instance of donkey anaphora, where there are multiple indefinites in the antecedant of a conditional.

(38) a. Every poor farmer who has befriended a rich farmer asked that farmer for a loan.
b. #Every poor farmer who has befriended a rich farmer asked the farmer for a loan.

In order to account for this data on the present approach, the translation scheme in (35) must be generalized to account for restrictive relative clauses. I suggest the following, where "ϕ" represents a restrictive relative clause that may be present.

(39) $\forall F; \phi : \psi \dashrightarrow ([sx|F(x)]; \phi) \rightarrow \psi$

Thus the logical form (38-b) may be represented as follows.

(40) $([sx|PF(x)]; [sx|RF(x)]; [B(sx_1, sx_0)]) \rightarrow [AL(x_1, the_F)]$

Here the universal quantifier contributes a salient discourse referent for a (poor) farmer in the quantificational context. And the indefinite "a rich farmer" also contributes a salient discourse referent for a (rich) farmer in that context, so the definite description in (38-b) has its uniqueness presupposition violated. But if a demonstrative is used instead, as in (38-a), the demonstrative may pick up the rich farmer, since the discourse referent for a rich farmer is highest ranked. And the demonstrative in (38-a) *must* pick up the rich farmer. Thus, the quantificational and anaphoric environments are in fact similar in that the demonstration-sensitivity had by deictic use

of demonstratives, shown by the deictic contrasts, does not rearise in either there quantificational or anaphoric uses.

I am going to conclude this subsection by discussing a way in which anaphoric and bound demonstratives can be influenced by demonstrations. Before doing so, however, let me make a general comment about the present treatment of universal quantification. I have only glossed here the standard dynamic treatment of universal quantifiers, and I do not return to it in the appendix. This is so because in the version of dynamic semantics I am drawing upon in this paper, universal quantifiers and conditionals are treated in a much more complex way, as constructions consisting of multiple genuine updates—instead of a single test—where characterizing those updates requires introducing discourse referents for possible worlds and propositions (Stone 1999, Bittner 2009, 2011). In the next section, I do introduce intensional discourse referents into the present system, and provide a treatment of negation in that vein. I do not, however, return to the universal quantification. I hope that the present approximation makes it clear how a dynamic semantics approach can account for the relevant similarities between bound and anaphoric demonstratives.

To conclude, here is the way in which something close to their deictic behaviour rearises for anaphoric and bound demonstratives.

(41) A man [the speaker points to a spatial location on her left] entered from stage left. Another man [the speaker points a spatial location on her right] entered from stage right. This man [pointing again the location on her left] was happier than this man [pointing again to the location on her right] (Charlow p.c.)[15]

(42) *Context: A developer and her assistants are inspecting a house constructed as a model for a subdivision project. They are standing in the living room.* (Roberts p.c.)

a. Every house will have a light by that door [pointing to one of the doors].

b. Every living room will have that shelf [pointing to a shelf] closer to that shelf [pointing to another shelf].

Upon some reflection, it should be apparent that in (41) and (42) what is occurring is deferred ostension. In both there is required some kind of deictic basis for the demonstrations: a position in front of the speaker in (41), or a door or shelf that is an instance of the type that many more will be made of in (42). As is more commonly discussed in the literature, deferred ostension occurs as well in deictic uses of demonstratives (Elbourne 2008).

(43) *A farmer looks out over his land. To his left is a field where a certain donkey, Dim, usually grazes, and to his right is a field where another donkey, Dull, usually grazes.*

a. That donkey [pointing to the left field] is not too bright.

b. But, that donkey [pointing to the left field] is smarter than that donkey [pointing to

[15]This data is an imitation of the linguistic means of tracking discourse referents in American Sign Language. See Schlenker (2011).

the right field].

Though I do not extend it in this way here, my view can treat deferred ostension by generalizing the account of demonstrations given above in (28). On this generalization, relations other than that of identity may feature in the demonstration's relational update. So, for instance, a demonstration may introduce a discourse referent based on the relation *x is the inhabit of field y*, where there is an earlier deictic discourse referent for a field.

2.3 Maximize Presupposition! and Emotional Deixis

Recall that in §1.1 I presented an argument from Blumberg (2020) for the uniqueness view of definite descriptions. The argument relied upon the pragmatic principle Minimize Restrictors!, which is that redundant restrictive material in a definite description leads to infelicity. Crucially, Blumberg applied this principle to demonstratives, by treating them as definite descriptions with additional covert restrictive material. I concluded discussion of Blumberg's argument there by noting a problem, based upon emotional deixis, for Minimize Restrictors! and the background uniqueness view of definite descriptions and demonstratives. The plan for the present subsection is to wrap up the development of my main proposal by first showing how we may appeal to a related pragmatic principle to retain the insight behind Blumberg's argument. I also show how this alternative pragmatics fares better with emotional deixis.

Consider the following contrast (Percus 2006).

(44) a. Both of John's eyes are open.
b. ??All of John's eyes are open.

Note that (44-b) is odd, even if it may be strictly speaking true. Given that John is a regular human being with two eyes, why not say the stronger (44-a) instead? But (44-a) is only stronger than (44-b) with regard to its presuppositions. So the following pragmatic principle seems to be at play sustaining the competition between "all" and "both."[16]

Maximize Presupposition! Take sentences $\ulcorner\phi[a]\urcorner$ and $\ulcorner\phi[b]\urcorner$, where a and b are lexical alternatives and where $\ulcorner\phi[a]\urcorner$ has strictly stronger presuppositions than $\ulcorner\phi[b]\urcorner$. In a (local) context c where $\ulcorner\phi[a]\urcorner$ and $\ulcorner\phi[b]\urcorner$ are equivalent and both have their presuppositions satisfied, $\ulcorner\phi[b]\urcorner$ is infelicitous.

Roughly, with alternative expressions that are equivalent in content, where one has stronger presuppositions that are satisfied, a speaker should use the alternative with stronger presuppositions. If a speaker uses the expression with weaker presuppositions, then that use implicates that the speaker is at least uncertain about whether the stronger presuppositions are satisfied (Sauerland

[16] I set aside the question of how Maximize Presupposition! may be derived from deeper pragmatic principles (Schlenker 2012). See Singh (2011) for the importance of assessing the principle relative to local contexts.

2008). Hence, if the stronger presuppositions are certainly met, then oddness results. Another way this point may be put is that the use of the weaker expression ANTI-PRESUPPOSES the stronger presuppositions of the alternative expression (Percus 2006).

Maximize Presupposition! was first introduced by Heim (1991) in order to explain contrasts involving indefinites and definite descriptions.

(45) a. The Sun is shining.
b. ??A Sun is shining.

If both definite and indefinite descriptions have the same existential content, and the latter have no presuppositions while the former presuppose uniqueness, then Maximize Presupposition! applies. Accordingly, an indefinite anti-presupposes uniqueness. In (45-b), this anti-presupposition is violated because we are all aware that there is a unique Sun. On my semantics for indefinites and definite descriptions, the conditions apply Maximize Presupposition! to this case are satisfied. Hence, the current proposal follows Heim's (1991) explanation of (45-b)'s oddness.

Now compare definite descriptions and demonstratives. I repeat Wolter's contrast, the explanation of which was a part of Blumberg's argument from 1.1.

(46) a. The author of *Blood Meridian* is a genius.
b. ??That author of *Blood Meridian* is a genius.

Again, Blumberg explains this contrast by appeal to Minimize Restrictors! and a uniqueness semantics for both definite descriptions and demonstratives, where the latter have additional covert restriction. Presently, however, we may appeal to Maximize Presupposition to explain Wolter's contrasts. Demonstratives have the same existential content as definite descriptions. Furthermore, they have strictly weaker presuppositions than definite descriptions: a unique F discourse referent entails at least one F discourse referent, and not vice-versa. Hence, since both of these presuppositions are satisfied in (46-a) and (46-b), the latter is infelicitous because an alternative with a strictly stronger presupposition is not being used.

So, there are two plausible explanations of Wolter's contrasts on the table. But recall the problem noted earlier with Blumberg's use of Minimize Restrictors! alongside the uniqueness-based semantics for demonstratives and definite descriptions. The problem was that demonstratives but not definite descriptions participate in emotional deixis, yet this fact is mysterious if demonstratives differ from definite descriptions simply in having additional covert restrictive material. Here is the relevant contrast from before.

(47) a. That US President is at it again!
b. The US President is at it again!

On the view developed in this section, there is no covert restrictrive material in definite descriptions (or demonstratives). So, even given Minimize Restrictors!, (47-b) is not predicted to have an

interpretation where covert material plays a special pragmatic purpose.

So the present proposal explains the definite description's lack of emotive flavour in (47-b). But there are two questions that (47-a) raises for the present approach. First, given that (47-b) is felicitous, how is it that (47-a) is also felicitous, and not a violation of Maximize Presupposition!? Second, what is the source of the emotive flavour of the demonstrative in (47-b)? Let me begin with the first question.

The reason that one might think that (47-b) is a violation of Maximize Presupposition! is that there must be a discourse referent accommodated for the demonstrative, but, if there is only one relevant discourse referent accommodated, then the stronger uniqueness presupposition of the definite description in (47-b) is satisfied. In response, I suggest that for the demonstrative's felicity in (47-a) there are two relevant discourse referents accommodated. Accommodating more than one relevant discourse referent creates a context for the demonstrative in which Maximize Presupposition! does not predict its infelicity. This additional accommodation is possible in the case at hand, since there are multiple US Presidents (who held tenure at different times). And note how the use of the demonstrative is degraded if the overt material approximates semantic uniqueness, as in the following.

(48) ??That current US President is at it again!

It is an odd suggestion that there are multiple *current* US Presidents, but that suggestion arises from the attempt to accommodate here multiple relevant discourse referents in order to avoid violating Maximize Presupposition! (a similar point holds for (46-b) above).[17]

[17]In this footnote, let me mention a couple brief issues with the point just made about how accommodation can help make demonstratives felicitous by altering the context so that Maximize Presupposition! does not apply. First, demonstratives may be felicitously used in a double possessive construction, as in (i-a).

(i) a. That mother of John's is a real piece of work!
b. ??That mother of John is a real piece of work!

It is hard to see how it may be reasonably accommodated that John has multiple mothers. In response, however, I simply note that the double possessive is a strange construction, and I do not have anything to say about it here. And note how the felicity of (i-a) does seem to depend on that construction, since (i-b) is degraded.

The second issue is raised by an anonymous referee, and concerns demonstratives and definite descriptions in bridging. The referee suggests that definite descriptions but not demonstratives may be used in bridging, on the basis of the following.

(ii) I just bought a truck. The/#that hood was scratched.

Given the present considerations, the issue that this data raises is that it seems that the demonstrative should be felicitous, since multiple discourse referents for hoods could be accommodated. In response, however, I suggest that there may be something about bridging that does not allow multiple relevant discourse referents to be accommodated, thus making it that the demonstrative in (ii) must violate Maximize Presupposition!. Though it must be noted that the data is more complex than what (ii) suggests, since it seems that demonstratives can be used in bridging, as the following examples show.

(iii) a. Gentian jerked the plug out of the drain and climbed into the tub. The cat leapt into the sink and began biting at *that plug*. (Wolter 2006)
b. Yesterday I saw a busker playing a drum set made of pots and pans. That snare was fantastic.

An anonymous referee raises the point that there are other cases where both demonstratives and definite descriptions are felicitous, and where the demonstrative does not give rise to emotional deixis. Here are two such cases.

(49) a. *Context: A dog struts in front of the interlocutors.* The/that dog has tiny boots on.
b. A dog chased a cat. The/that cat was very big.

Following the suggestion in the previous paragraph, I suggest that in both these cases the demonstrative is felicitous because an additional relevant discourse referent is accommodated. But what these cases also show is that the additional accommodation that is responsible for the felicity of demonstratives in cases that would otherwise violate Maximize Presupposition! is not itself responsible for the phenomenon of emotional deixis. So let me turn now to the second question, which concerns the emotive flavour the demonstrative in (47-a)—a task that will take us through the next subsection.

It is worth laying out first some more instances of emotional deixis.

(50) *Context: A mechanic is assessing the state of a customer's car.*
a. That left front tire is pretty worn.
b. The left front tire is pretty worn.

(51) *Context: A nurse is speaking to a patient.*
a. How's that throat?
b. How's the throat?

One way we might go is in locating the source of the phenomenon in the demonstration-sensitivity of demonstratives. On the recent conception of demonstrations from Roberts (2020), a paradigmatic demonstration locates the referent in physical space, relative to the interlocutors. Yet Roberts argues that that same structure may be abstracted to other types of space. With an anaphoric demonstrative, for instance, one might be locating the relative distance of the antecedant in textual space; and it may be that epistemic modals are accompanied by something like a demonstration: when one says it must be raining one is in part sharing a perspective that locates the proposition that it is raining in epistemic space. So, in the cases of emotional deixis, it may be that the speaker signals the relative location of the referent in emotive space.

It is unclear, however, how my account of the semantics of demonstrations can be related to this conception. I do not represent semantically different types of space and indications of relative position through them. And I do not think that anaphoric demonstratives may be accompanied by demonstrations. On my view, demonstrations simply raise a deictic discourse referent to deictic

c. Every professor remembers that first publication. (based on King 2001)

Note that, given the standard treatment of universal quantification in dynamic semantics, the bridging in (iii-c) is occurring in the local context of the universal quantifier.

prominence. Though it is not implausible that my view could make sense of how emotional deixis arises from demonstrative-sensitivity. It may, for instance, be that the speaker, in bringing one deictic discourse referent to prominence, indicates how emotively charged things are.

The proposal that the demonstration-sensitivity of demonstratives is responsible for emotional deixis has some initial plausibility, despite the fact that much more must be done to refine it. But, even at the impressionistic level, it faces the following problem. Pronouns with gender features are demonstration-sensitive in the same way as demonstratives, as the following shows (Maclaran 1982).

(52) *Context: John and Mary are looking at an old class photo, and John is sharing his memories.*
He [pointing to one kid] was my best friend, and he [pointing to another kid] was my mortal enemy.

But third-person pronouns with gender features do not give rise to emotional deixis, which suggests that demonstration-sensitivity is not the source of emotional deixis. Thus, the deictic features of demonstratives play a crucial role in emotional deixis, since pronouns do not have deictic features. So far, however, I have only treated the demonstration-sensitivity of demonstratives. The semantic nature of their deictic features involves introducing intensionality into the core system presented in this section, and I do so in the next section.

3 Intensional Extensions

With the importance of treating the deictic features of demonstratives emerging from the previous section, I turn now to my account of them as contributing not-at-issue, perspective-sensitive updates. Doing so requires incorporating intensionality into the core system that is already on the table. I discuss afterwards the alleged difference between demonstratives and definite descriptions with regard to rigidity. The formal system in the appendix includes the intensional resources for the applications here as well as that of the previous section.

3.1 Deictic Features

Consider again a simple contrast between demonstratives and definite descriptions mentioned at the end of the previous section.

(53) *Context: A dog struts in front of the interlocutors.*
a. The dog has tiny boots on.
b. That dog has tiny boots on.

The present reason for mentioning this contrast is that illustrates that demonstratives but not definite descriptions have deictic features. The demonstrative "that" encodes distality, in contrast

to the proximal demonstrative "this."

Here are some empirical details concerning how demonstratives and definite descriptions differ with regard to deictic features (Diessel & Coventry 2020, Rubio-Fernandez forthcoming). Demonstratives appear in all known languages and are both ontogenetically basic and phylogenetically old: they are ancient and among the first words children learn. Furthermore, cross-linguistically definite descriptions arise from demonstratives through GRAMMATICALIZATION, a process of language change whereby a syntactic form changes or loses some of its meaning. Compare again the demonstrative and definite description in (53). Both have as a part of their meaning a QUALITATIVE FEATURE, contributed by the complement nounphrase "dog," which indicates what kind of thing the referent is. The semantic effect of this qualitative feature has been modeled in the system of the previous section as constraining the anaphoricity of each expression. In addition, however, the demonstrative in (53-b) has a DEICTIC FEATURE, which indicates the referent's location relative typically to the speaker. All known languages have a deictic system. In some languages, the system merely encodes the proximal/distal contrast. English is one such language, though we use to have an imtermediate "yon." More sophisticated deictic features are syntactically encoded in other languages: for instance, the relative elevation of the referent or whether it is within view of or hidden from the interlocutors (e.g. Khasi, West Greenlandic, Lahu, and Tauya).

My analysis of deictic features holds that they contribute dynamic updates as a part of the semantics of demonstratives. And their dynamic effect has two special aspects: perspective-sensitivity and not-at-issueness. Demonstratives, in virtue of having deictic features distinct from qualitative features, are perspective-sensitive expressions in they have content that specifies something's position relative to some agent, typically the speaker. I draw here upon Roberts's (2020) notion of perspective-sensitivity, according to which a perspective-sensitive expression is one that presupposes a DISCOURSE CENTER: an agent whose (doxastic) perspective is salient. Typically the discourse center is the speaker, and for the purposes of this paper I only consider the typical case.

Roberts's insight about perspectival presuppositions, however, only goes so far in accounting for the dynamic effect of demonstratives. A demonstrative, in virtue of its deictic feature, adds its own particular content to the context. But the special behaviour of this content does not seem to be fully a presuppositional matter, since the content is typically novel. The distal demonstrative "that," for instance, is typically used to help the audience identify an object as the one the speaker is talking about in virtue of its relative distance from the speaker. In this paradigm case, new information is being provided to the audience. Hence, it is unnatural to treat the overall content as presuppositional.

So, the content contributed by deictic features is dissimilar to presuppositional content in that it is typically novel. But, though typically adding information to the context, the content deictic features provide is NOT-AT-ISSUE: backgrounded relative to the main point of an uttered sentence containing them. In response to (53-b), for instance, it is much easier to deny that the dog in question has tiny boots on than that it is not relatively distant from the speaker. Thus the

deictic content of demonstratives seems similar to that of Potts's (2005) conventional implicatures, which suggests that deictic features are similar to non-restrictive relative clauses, or appositives, which are paradigm cases of expressions that generate conventional implicatures. Compare the following (Potts 2005).

(54) a. Chuck, who killed a coworker, is in prison.
b. Chuck killed a coworker and is in prison.

The non-restrictive relative clause in (54-a) contributes the same information as the first conjunct of (54-b), but in a way that is backgrounded from the main point of the utterance.

Murray's (2014) recent treatment of appositives within dynamic semantics treats them as contributing novel, not-at-issue content. I follow Murray in modeling the distinction between at-issue and not-at-issue content in terms of different ways of updating the CONTEXT SET: the information in the common ground. Hence, in order to present my account of deictic features, the dynamic system I have presented so far must be enriched to incorporate intensionality. Before turning to the formal details, however, here are a couple initial points about how I am drawing on Murray's treatment of appositives. First, there is another recent and similar dynamic account of appositives, from Anderbois et al. (2015). But Murray develops her account in the same background semantics from Bittner that I have used in the previous section, so that is why I take her account as my starting point. Second, and more pressingly, there are criticisms of the views of both Murray (2014) and Anderbois et al. (2015) on the basis that appositives may sometimes be at-issue, while both views predict that they cannot be at-issue. Syrett & Koev (2015) present compelling empirical evidence that relative clause appositives may in some cases be at-issue. The alternative view they outline, as well as the account of appositives in Martin (2016), allows for at-issueness. There are, therefore, genuine issues with the proposal I am drawing upon as it relates to relative clause appositives. But, I suggest, the deictic content of demonstratives is a kind of supplemental content that cannot be made at-issue. Hence, the application of Murray's proposal in this paper is not susceptible to those issues. And note that here is another point of contrast between the content of deictic features and presuppositions: presuppositional content may vary in its at-issueness (Simons et al. 2010), but not so the content of deictic features.

Moving on, I follow Bittner and Murray in incorporating intensionality by introducing worlds and propositions into the dynamic economy of discourse referents. Accordingly, a context is an "infotention" state that represents rankings of discourse referents, where some discourse referents track intensional information (Bittner 2009: 2). Hence, I introduce discourse referents for worlds and propositions, and with corresponding variables make updates sensitive to these discourse referents in various ways. For the at-issue content of a declarative sentence—the only type of sentence considered in this paper—a propositional discourse referent is initiated in the deictic stack, and it is then proposed to update the context set with the information in that initiated propositional discourse referent. Thus, it must be ensured that a context for processing a

sentence is set up with a discourse referent representing the context set. Following Bittner (2011), what ensures this setup is Stalnaker's ([1978] 1999) COMMONPLACE EFFECT: when a speaker begins speaking, the context relevant for processing the main content of the sentence will be guaranteed to include information and discourse referents that can be mutually inferred on the basis of recognition that a particular a speech act is taking place. So, when a speaker begins speaking, the context is updated with a discourse referent representing the context set, which may then be narrowed down in various ways by the uttered sentence.

An example of the addition of a context set and the simple effect of at-issue content is represented in the following series of updates, where the sentence providing the at-issue content is "John is happy."[18]

(55) $[s\omega|\omega \in CS]; [d\omega|H_\omega(j)]; [d\Omega|\Omega = d\omega_0||]; [s\omega_0 \in d\Omega_0]; [s\Omega|\Omega = s\omega_0||]; [s\omega|\omega \in s\Omega_o]$

The first update box represents the commonplace effect: a world discourse referent is introduced that is indefinite between the worlds in the context set, where the latter is for simplicity referred to with the constant "*CS*." In the second two boxes, world and propositional discourse referents are introduced, which work together to represent the main content of the uttered sentence. What happens is that a world discourse referent is introduced that is indefinite between all the worlds where John is happy, then in the next box a definite propositional discourse referent is introduced that stands for that entire set of worlds. Note that the way that definite propositional discourse referent is constructed is with a global update, which considers an entire input context. Crucially, a global update relies on a new kind of referential expression, "$\alpha\omega_n||$," that denotes all the different world values in the nth position back of the input context. In the final three boxes, which represent the speech act force associated with a declarative sentence, the main content of the sentence is added to the context set. The way it is added is that the world discourse referent representing the information in the context set, which was initiated in the first update box of the entire logical form, is narrowed down in such a way as to eliminate any worlds that are not consistent with the main content of the sentence, which again is represented by the definite propositional discourse referent initiated by the third box of the entire logical form. Then, in the final two boxes, a new definite propositional discourse referent is initiated that includes all the worlds in the original context set in which John is happy, and then a new world disourse referent is initiated so that a similar update process may be undertaken by a subsequent sentence.

So what the logical form in (55) does is construct a piece of information, the worlds in which John is happy, and then the last three boxes, again representing the speech act force, executes the proposal to update the context set with that piece of information. Since there is a proposal to add that information to the context set, it is possible for a hearer to reject that content in a way distinctive of at-issueness. In contrast, the way that not-at-issue content is modeled is in directly updating the context, and that is why it cannot so easily be challenged. In particular, demon-

[18]See Murray (2014: §3) for more detailed discussion of similar examples.

stratives supply a not-at-issue update in virtue of their deictic features. And given perspective-sensitivity, in order for that update to be defined there must be a discourse referent associated with the speaker—so that the perspectival presupposition is satisfied. So, with the background commonplace effect in place, before the main content of a sentence is processed, the context must be additionally updated with the appropriate deictic discourse referents, including at least the speaker. The speaker has a corresponding deictic discourse referent, since, at least in ordinary conversation, the speaker is an aspect of the interlocutors' mutual perceptual environment. So, the initial context for the processing of the main content of an utterance can be represented as follows, where $c_o = \{\langle \emptyset, \emptyset \rangle\}$ is the open context.

(56) $c_o[\![\,[s\omega|\omega \in CS];\,[dx|speaker_{s\omega_0}(x)];\,[dx...]\,]\!]$

The final update represents schematically how there may be deictic discourse referents in addition to the one for the speaker.

Let me now return to the simple sentence (53-b) containing a demonstrative with which this subsection began: "That dog has tiny boots on." First, for this sentence, the commonplace effect must be as follows.

(57) $c_o[\![\,[s\omega|\omega \in CS];\,[dx|speaker_{s\omega_0}(x)];\,[dx|D_{s\omega_0}(x)]\,[dx\ldots]\,]\!]$

Then, as the following shows, the logical form of the sentence constructs an at-issue-proposal, but, before updating the context set with that proposal, the context set is directly updated by the demonstrative's deictic feature.

(58) $[d\omega|TB_{\omega}(that_D)];\,[distal_{s\omega_0}(that_D, the_{speaker})];\,[d\Omega|\Omega = d\omega_o||];\ldots$

What is crucial here is that the second update box represents how the demonstrative "that" has the deictic feature of distality, which directly adds not-at-issue information to the context. I use the referential expressions "$that_D$" and "$the_{speaker}$" in the specifying the deictic feature to simply represent how the deictic update is perspective-sensitive in that it presupposes there is a speaker, and if defined contributes the content that the relevant thing is distal to the speaker. I do not hold that deictic features have demonstratives and definite descriptions as a part of their syntax. Note finally that the material I have elided in (58) is simply the addition of the at-issue context to the context set, which was shown in (55) in full.

In addition to being difficult to reject, not-at-issue content is also projective, as the following illustrates with regard to the content of deictic features.

(59) *Context: The interlocutors are arguing about the breed of the dog they see.*
That dog isn't a poodle.

The sentence (59) cannot be used to deny that the relevant dog is distal to the speaker, which is

to say that deictic content projects past operators such as negation. The way this projection is accounted for, in the case of negation, is that in negation the context set is updated to include worlds that are not a part of the at-issue information (Stone & Hardt 1999, Bittner 2011, Anderbois et al. 2015). This process is illustrated in the following logical form for (59) (which I assume has a background context with the commonplace effect and the introduction of speaker and dog discourse referents).

(60) $[d\omega|P_{\omega}(that_D)]; [distal_{s\omega_0}(that_D, the_{speaker})]; [d\Omega|\Omega = d\omega_0||]; [s\omega_0 \notin d\Omega_0]; [s\Omega|\Omega = s\omega_0||]$

In the first box, a world discourse referent is initiated that is indefinite between the worlds in which the dog discourse referent is a poodle. Then, in the second box, before a definite propositional discourse referent is constructed for that set of worlds in the third box, the dynamic effect of the demonstrative's deictic features takes place, directly updating the context set. In the penultimate box is the effect of negation: context set worlds are eliminated that are not ones in which the prejacent holds. In the final box, a new context set discourse referent is initiated.

Finally, with an account of deictic features in place, we may return to the phenomenon of emotional deixis. Crucially, observe that a deictic property is very general. What it means, for instance, for something to be distal is not semantically specified as involving, say, relative physical distance; rather, the property of distality only semantically specifies a very general property of distality in some type of space. This loose semantic content is enriched in more particular ways in particular contexts as a broadly pragmatic affair. That deictic features are semantically nebulous is supported by various empirical studies that illustrate how factors such as relative control, visibility, and ownership are relevant to how language users interpret distal and proximal demonstratives (Coventry et al. 2008, 2014, Peeters & Özyürek 2016, Caldano & Coventry 2019). Hence, what explains emotional deixis is that certain uses of demonstratives have their deictic updates pragmatically interpreted as concerning emotional distance. This type of enrichment occurs when the deictic content is not required to be interpreted in a way that helps identify the referent, for instance as involving physical distance, since the overt qualitative feature of the demonstrative phrase provides sufficient identifying information. This explanation of emotional deixis is similar to that given by Acton & Potts (2014), who provide the most thorough discussion of this generally underappreciated phenomenon. They hold that because demonstratives, as opposed to definite descriptions, are semantically perspective-sensitive, the use of a demonstrative signals that the addressee should consider the speaker's perspective, which in certain cases may give rise to a signal that the speaker is attempting to establish solidarity with the addressee. So, my view is a refinement of their suggestion: I hold that emotional deixis is a pragmatic phenomenon based on the semantic perspective-sensitivity of demonstratives. Note, however, that Acton & Potts' discussion is potentially misleading because they do not distinguish deictic features and their perspective-sensitivity from the demonstration-sensitivity of demonstratives. But, as we noted in §2.3, some third-person pronouns are demonstration-sensitive, yet they do not give rise

to emotional deixis.

3.2 Rigidity and Existentialism

Following Kaplan's (1989) seminal work, one might think that a discussion of demonstratives and definite descriptions should place, front and center, their differences with regard to rigidity. Kaplan's influence supports a picture on which (i) demonstratives are always rigid, (ii) definite descriptions never (unless special material is added), and (iii) definite descriptions can interact with intensional operators in ways that demonstratives cannot. But this picture is oversimplistic, and I have left this topic to the end because these alleged differences are not as robust as the traditional wisdom would have it.

Kaplan's master argument for (i) and (ii) relies upon intuitions about the truth-conditions of simple sentences in context. Compare the following.

(61) *Context: There is a man, m, wearing a hat in front of the interlocutors.*

a. That man [pointing at *m*] is bald.

b. The man wearing a hat is bald.

Consider a possible world *w* (distinct from the world in which the interlocutors are interlocuting) in which (a) instead of *m*, there is another man *m′* in front of the interlocutors wearing a hat, (b) *m′* is bald in *w*, and (c) *m* is present somewhere else in *w* (far away and not wearing a hat), and is not bald in *w*. The intuitive contrast is that what is said by (61-a), as uttered in its actual context, is false in *w*; whereas, what is said by (61-b), as used in its actual context, is true in *w*.

For a proposition expressed, or what is said, by a simple sentence to be RIGID, where the sentence contains a demonstrative or definite description, and is considered in a context *c*, is for the propositions truth at any possible world *w* to depend only on the properties at *w* of the individual picked out in *c*. So the proposition expressed by (61-a) is rigid, but not so the one expressed by (61-b). Kaplan proposes that in general the proposition expressed by a simple sentence in context containing a definite description is never rigid—except when special material is added, as with the actuality operator in the following.

(62) The *actual* man wearing a hat is bald.

Recall the Kaplanian "equation" (11) in §1.1 of the relationship between demonstratives and definite descriptions. On that view, demonstratives are rigidified versions of corresponding definite descriptions. Accordingly, on the view, the proposition expressed by a simple sentence in context containing demonstratives is always rigid.

It is worth mentioning that these intuitions about the different truth-conditions of (61-a) and (61-b) are subtle. Another perhaps more intuitive way of putting the difference is in terms of aboutness, or ways of referring. The demonstrative in (61-a) seems to be about the particular man

actually picked out in its context of use: it is *that* man's baldness (or lack thereof) relevant to the truth-value of what is said, even when assessed at other possible ways things might have been. In contrast, the definite description in (61-b) is about whoever is the man wearing a hat, which picks out *m* in the interlocutors' actual context, but which may vary from world to world. So with demonstratives there is direct reference; definite descriptions, reference via description.

But even granting that these intuitions are legitimate, similar ones can be harnessed to create problems for Kaplan's generalization. First, there are non-rigid uses of demonstratives, as noticed by King (2001).

(63) *Context: A group of corrupt senators are together at a bar. They learn that exactly one senator, though they do not know which, is going to testify the next day to an investigative committee and likely reveal their illegal activity. One of the senators says the following.*
I am going to kill that senator.

Intuitively, what is said by (63) is non-rigid. The speaker is talking about whichever senator is the one that is going to testify. Second, there are rigid uses of definite descriptions (without the aid of special material). Here is case noticed by Fara (2015).

(64) *Context: The conversational participants are discussing a party they all attended last night.*
Olga enjoyed the party.

Intuitively, the speaker of (64) is saying of the particular party that it was enjoyed by Olga. We should thus conclude that both definite descriptions and demonstratives partake in VARIABLE RIGIDITY: depending on the context, and without the aid of special material, both sometimes lead to rigidity and sometimes not.

The subtlety of the intuitions about what is said by simple sentences has also lead some to focus instead on comparing embedded cases of demonstratives, which is related to point (iii) of the Kaplanian picture limned at the beginning of this subsection. More thorough and recent work, however, has shown that demonstratives may interact with operators in ways similar to definite descriptions (Heim 1985, Nunberg 1993, Elbourne 2008). I set aside discussion of embedded cases, since what has been set forth is already enough to discuss the more radical way in which my proposal differs from the Kaplanian approach to the semantics of referential expressions.

The considerations just given with regard to rigidity involved appeal to the proposition expressed, or what is said, by a sentence in context. These notions are supposed to be equivalent for Kaplan, and both in line with the truth-conditions of a sentence in context. So, in his two-dimensional system, expressions are assigned CHARACTERS: functions from contexts to content. Given a context, CONTENTS compose to determine truth-conditions. A reader who has been deeply immersed in Kaplan's work may realize that—contrary to Kaplan's insistence otherwise—the content compositionally generated, on the one hand, and what is said in context, on the other, in fact cannot be equated. Partly for this reason, a more modern version of Kaplan's framework

has it that characters compose to determine a character for a sentence, which then may be combined with a context to determine a proposition.[19]

Thus, given that in Kaplan's considered system sentences are provided functions from contexts to propositions, there is in fact some formal similarity between it and the dynamic view developed in this paper. In both frameworks, sentences are semantically provided values more complex than propositions, and, in particular, these semantic values of sentences are functions from contexts to propositions. But there are crucial differences in the formal and conceptual nature of the input contexts. Setting aside differences in the elements of the information points, here is a high-level analysis of the formal differences (entities of type s are information points, which in both systems are ordered n-tuples; type t is that of the two truth-values).

(65) a. Kaplan: $s \rightarrow (s \rightarrow t)$
b. Dynamic: $(s \rightarrow t) \rightarrow (s \rightarrow t)$

In Kaplan's system, sentence meanings are functions from points to sets of points. In the dynamic system here, sentence meanings are functions from sets of points to sets of points.[20] So the formal difference between the input contexts allows that, for Kaplan, context supplies a fully determinate way things are as well as particular values for context-sensitive referential expressions. For dynamic meanings, in contrast, the input context is a set of points, so there may be many candidates for actuality, and it may be indeterminate which value a referential expression receives. The resulting conceptual difference is that a Kaplanian input context may be taken to be the actual determinate milieu of the interlocutors, so that the proposition determined may be reasonably taken to be a truth-condition. In contrast, the input context for a dynamic meaning, given its indeterminacy, is naturally taken to be a state of information had by the interlocutors: the context set. And it is strange for a truth-condition to be something relative to a state of information, since whether what is said is true or false does not depend on the information interlocutors happen to currently share (Stalnaker 2018). So the set of points output by a dynamic meaning conceptually should not be regarded as the truth-condition of the sentence in context.

Despite these differences, it is nonetheless possible to find truth-conditions of sentences in a dynamic semantic framework. Consider first how in static two-dimensional system such as Kaplan's, where sentence meaning's are of type $s \rightarrow (s \rightarrow t)$, there is the following notion of a diagonal proposition (Stalnaker [1978] 1999). Given that one element of the n-tuples of type s is a world, we may retrieve a non-context-sensitive proposition from a sentence's meaning by considering first the set S of all n-tuples such that, when that n-tuple is fed in *twice* to the sentence's meaning, the output is truth. The set of all worlds that appear in some element of S is the diagonal

[19] See Ninan (2010), Rabern (2012, 2013), Stalnaker (2014), and Yalcin (2014) for the motivation for modernizing Kaplan's view, though the core observation goes back to Lewis (1980). See also Glanzberg & King (2020) for a defence of classic Kaplan, but also Pickel & Rabern's (forthcoming) rejoinder.

[20] In Kaplan's terms, a sentence meaning is a character, which is a function from a context—an n-tuple containing a world, time, place, and agent—to a proposition—a function from such n-tuples to truth-values. For that reason, in the terms of the paragraph above, a character is a function of type $s \rightarrow (s \rightarrow t)$.

proposition.

We may employ a formally analogous tool with dynamic meanings.[21] Take a sentence S, which corresponds syntactically to a sequence of update boxes. Consider now the set TC_S consisting of worlds w which satisfy the following: if the singleton $\{w\}$ is taken as the initial context set in the commplace effect, the result of updating that context with the update boxes does not result in a crash or the absurd state $\emptyset$. The set TC_S is the truth-condition of S. Informally, this method works by feeding in fully determine context sets, and seeing which ones survive. Since the context sets are fully determinate—singleton sets of worlds—it is appropriate to speak of truth-conditions. This method of extracting a truth-condition provides a non-context-sensitive, existentialist propositional content for sentences containing referential expressions: for instance, a sentence involving a deictic demonstratives has the propositional content that there exists something with such-and-such properties. I call EXISTENTIALISM the view that referential expressions such as demonstratives and definite descriptions merely contribute, as a matter of their semantics, to claims that such-and-such properties are co-instantiated in the world.

Thus, returning to the considerations of rigidity, the existentialism of my current framework means that those Kaplanian considerations of reference are not in fact an aspect of semantics. This result should be welcome in light of how Kaplan's traditional generalizations (i) and (ii) do not in fact hold: there is not a robust difference betweeen demonstratives and definite descriptions with regard to rigidity. But existentialism also has troubling consequences, since we do use expressions such as demonstratives and definite descriptions to talk about particular objects in our world. So, the issue arises of how to account for the notion of reference that seems to outstrip what is represented in dynamic semantics. I now critically discuss two extant ways of avoiding existentialism before discussing how to deal with its consequences.

Following a natural suggestion, recently made explicit in Rothschild & Yalcin (2017), one might avoid existentialism about deictic demonstratives (and other context-sensitive expressions) by enriching the semantic types even further than the dynamic ones in (65-b). On this view, a sentence's meaning takes as input both a determinate Kaplanian context (type s) and an indeterminate dynamic one (type $s \longrightarrow t$), and given that input supplies a proposition (another indeterminate context). Accordingly, a deictic demonstrative may receive a determinate value from the determinate Kaplanian context, and thus be about some particular object. The problem with this proposal is that it must treat deictic and anaphoric demonstratives as ambiguous, since anaphoric demonstratives pick up an indeterminate value from the dynamic context. Consider the following.

(66) a. That man [pointing to a man] was happy.
b. A man came in. That man was happy.

Positing that the demonstratives in (66-a) and (66-b) are of different expression-types, however, is undesirable.

[21] This method is adapted from the work of Heim (1982), Starr (2010), Bittner (2011), Murray (2014), and Stokke (2014).

The second way of avoiding existentialism is from Stojnić et al. (2013, 2017), and does not require positing ambiguity or enriching dynamic meanings. They exploit a technical point to give a unified treatment of deixis and anaphora in which all of demonstratives are anaphoric to dynamic existentials, yet in which deictic ones contribute to singularist truth-conditions. The technical point is that existentially quantified sentences can have the same truth-conditions as ones only containing singular terms. Compare the following equivalent sentences of simple predicate logic.

(67) a. $\exists x(x = n \wedge Fx)$
b. Fn

In these sentences, "*n*" is a non-context-sensitive name. Hence, with the use of singular restrictors—or definite discourse referents, as they are called in dynamic semantics—Stojnić et al. succeed in treating deictic demonstratives as anaphoric, but at the same time contributing to singularist truth-conditions. But this way of avoiding existentialism is underexplanatory. The proposal seems to be that the source of context-sensitivity is in fact different covert constants (where there must be enough of such constants in order to refer to any object we could refer to with demonstratives). One might attempt to make this account explanatory by claiming that a demonstration really involves the coining of a new proper name. While such a proposal cannot be ruled out a priori, it is empirically implausible.

Given the issues with the two extant ways of avoiding existentialism, I suggest we learn to live with it. And, fortunately, the difficulty is dispelled by the distinction between sentence and utterance understanding: there is a difference between what is involved in understanding an uttered *sentence* and understanding an *utterance* of a sentence.[22] Now note that Bittner (2001, 2009), whose formal system I have relied on this paper, argues that there are semantic universals of discourse attention covering not only the individual domain, but also the temporal and modal ones. I thus take it that the instantiation of these semantic universals throughout the languages of the world arises from a semantic component of linguistic competence, in Chomsky's (1965) sense. In this paper, I am only concerned with the individual domain. But in investigating the deictic and anaphoric contrasts we have seen how one manifestation of the semantic universals of discourse attention is in a distinction between deictic and salient discourse referents. With this distinction, we have hit upon what may be called a GRAMMAR OF REFERENCE, since there are linguistic constraints governing deictic uses of demonstratives, which are analogous to the ones governing overt linguistic anaphora. Accordingly, I have modeled how various elements of logical form contribute semantic updates to context, as well as how a truth-conditional sentential content may be retrieved from such updates. So I suggest that what is required for understanding an uttered *sentence* is represented by the sentence's semantic content, which corresponds to an aspect of our linguistic competence. But these constraints do not determine, for instance, what particular object a demonstrative refers to. Accordingly, it is in utterance understanding that one must think

[22] Proposals with a similar structure go back to Strawson (1950), Grice ([1969] 1989), and Bach (1987). For more recent developments, see Schiffer (2003), Neale (2005), Pietroski (2006, 2018), Heck (2014), and Harris (2020).

of this or that object as referent. So, for utterance understanding one must go beyond semantic content and into pragmatics, broadly speaking. Here is not the place to begin explaining how reference may find a home in pragmatics, but there is no reason to think such a project is hopeless. One may happily look to Strawson's (1950) insight that reference is something people—not words—do.

4 Conclusion

This paper developed a treatment of demonstratives and definite descriptions within a dynamic semantics. The backbone of my account is a distinction between two types of discourse referents: deictic and salient. Given that the context keeps track of the different stacks of deictic and salient discourse referents, the semantic presuppositions and dynamic updates of context-sensitive referential expressions can be specified in a way that accounts for the similarities and differences in their behaviour between their (pre-theoretically speaking) deictic, anaphoric, and bound uses. See Tables 5 and 6 for a summary of my proposal, and the appendix for the nuts and bolts. One thing to note is that I have focused in this in this paper on COMPLEX demonstratives, which have a complement nounphrase. I have not mentioned SIMPLE demonstratives: ones without any nounphrase complement. I suggest, however, that simple demonstratives simply pick up the top-ranked discourse referent, with no conditions on what kind of thing it represents, considering the deictic stack first.

Looking ahead, the main upshot of this paper's treatment of demonstratives and definite descriptions is in formally elaborating the connection between the semantics of those expressions and discourse structure. But I have assumed in this paper an overly simplistic model of salience, according to which a discourse referent is added to the top of the salience stack by an overt indefinite, and never leaves the stack. Moreover, there can be no ties in ordering, and the ordering never changes unless a new salient discourse referent is introduced. This crude model of salience must ultimately be revised (and for similar reasons the dynamics of the deictic stack may end up being more complicated than I have modeled in this paper), and I conclude by discussing the importance of doing so with regard to the behaviour of definite descriptions.

Consider the following data.

(68) The cat is in the carton. The cat will never meet our other cat, because our other cat lives in New Zealand. Our New Zealand cat lives with the Cresswells. And there he'll stay, because Miriam would be sad if the cat went away. (Lewis 1979)

(69) A man in a dark suit was talking to a man holding a large envelope. After talking for about a minute they left the station going in opposite directions. Thirty seconds after they left, the man showed up and nervously looked around. (Szabó 2000)

In (69), one is able to accommodate a third man in order to felicitously utter the definite descrip-

Type	*How is it Introduced?*
Deictic	In virtue of the mutual perceptual environment of the interlocutors.
Salient	In virtue of an overt linguistic indefinite.

Table 5: Discourse Referents

Type	*Presupposition*	*Dynamic Effect*
Complex Demonstrative (e.g. "this man" and "that man")	There is a discourse referent for (e.g.) a male, and there is a discourse referent for the speaker.	Contributes to an atomic update concerning the top-ranked discourse referent whose value is (e.g.) male throughout the context, considering the deictic stack first, as well as a not-at-issue update relating that discourse referent to the speaker discourse-referent.
Simple Demonstrative ("this" and "that")	There is a discourse referent for the speaker.	Contributes to an atomic update concerning the top ranked discourse referent, considering the deictic stack first, as well as a not-at-issue update relating the top-ranked discourse referent to the speaker discourse-referent.
Demonstration (a pointing gesture)	There is some discourse referent in the deictic stack.	Bumps some selected deictic discourse referent to the top of the deictic stack.
Definite Description (e.g. "the man")	There is unique discourse referent whose value is (e.g.) male throughout the context.	Contributes to an atomic update concerning the unique discourse referent whose value is (e.g.) male throughout context.

Table 6: Semantic Entries

tion in the final sentence, despite the fact that there seems to be two discourse referents for men initiated by the first sentence. Thus, (69) seems to be a counterexample to the view that definite descriptions presuppose discourse uniqueness. In response, however, I suggest that the complexities of salience make it so that the context relevant the definite description in the final sentence does not include those initial two discourse referents. And I suggest that a similar point holds for (68): the discourse referent that the definite description's in the first two sentences are anaphoric to is no longer relevant in the final sentence.

Now, in light of these suggestions about how there is felicity in (68) and (69), I wish to consider the following data raised by an anonymous referee.

(70) A woman$_1$ met another woman$_2$. The woman$_{1,??2}$ was wearing a red coat.

The problem that (70) raises for the account definite descriptions I have here defended, on which they presuppose discourse uniqueness, is that the definite description in the second sentence can be felicitously used to elaborate the information about the first mentioned women in the first sentence, despite the fact that the second indefinite in the first sentence also introduces a discourse referent, which remains present for the context of the second sentence. The fact that the second indefinite in the first sentence introduces a discourse referent that remains present is supported by the felicity of the following.

(71) A woman$_1$ met another woman$_2$. That woman$_{\#1,2}$ was wearing a red coat.

In (71), the demonstrative may pick up the discourse referent introduced by the second indefinite of the first sentence, which means that it should still be present in the context.

Note furthermore that the following "bishop sentence" (Heim 1990), with definite descriptions, poses a similar problem to that raised by (70).

(72) If a bishop meets a bishop, the bishop blesses the bishop.

Here both definite descriptions are felicitous, despite the fact that there should be multiple bishop discourse referents in the local context of the second clause.

In response to the issues raised by data such as (70) and (72), I wish to say first and foremost that it is genuinely puzzling why the definite descriptions in those cases are felicitous, but not so the one in the anaphoric contrast, repeated here, that I have focused on in this paper.

(73) A woman entered from the stage left. Another woman entered from stage right. #The woman was carrying a bouquet of flowers.

I have followed Roberts (2003) in appealing to (73) in supporting the view of definite descriptions according to which they presuppose discourse uniqueness; however, data such as (70) and (72) is typically used to support the competing familiarity theory, covered in §1.2, according to which

definite descriptions simply presuppose there is some relevant discourse referent, and so can be co-indexed with this or that earlier indefinite. To my knowledge, however, there is existing account of the infelicity of the definite description in (73) on behalf of the familiarity theory, thus that approach has not resolved the present puzzle. Finally, I wish to suggest, on behalf the view that definite descriptions presuppose discourse uniqueness, that the felicity of (70) and (73) can be ultimately accounted for by appeal to the complexities of how the relative salience of discourse referents is introduced and maintained, along the similar lines as the suggestions above concerning (68) and (69).

A Formal System

A.1 Syntax

Singular Terms There are three types: variables (existential quantifiers) $v \in V$, referential expressions $r \in R$, and global referential expressions $g \in G$. The metalinguistic variable n is any natural number, and α is one of s or d.

1. $V = \{\alpha x, \alpha\omega, \alpha\Omega\}$
2. $R = \{\alpha x_n, \alpha\omega_n, \alpha\Omega_n, the_F, that_F, CS\}$
3. $G = \{\alpha\omega_n\|\}$

Predicates A basic predicate $b \in B$ may be an n-place relation. There are also the logical predicates in $l \in L$.

1. $B = \{F, G, R, \ldots, distal, speaker\}$
2. $L = \{=, \in, \subseteq\}$

Atomic Sentences Any basic n-place predicate with n referential expressions attached, the first one being $\alpha\omega_n$, is an atomic sentence: $F_{\alpha w_n}(r, \ldots, r')$. Where l is a logical predicate, r, r' referential expressions, and g, g' global referential expressions: rlr', rlg, and glg' are atomic sentences.

Well-Formed Formulas (WFFs) Any variable or atomic sentence is a WFF. The conjunction of any WFFs is a WFF: $\phi; \psi$.

DRT-Style Abbreviations I use DRT-style boxes as abbreviations for conjunctions of introducing discourse referents and imposing conditions on them. The general translation scheme is as follows, where v is a variable and $C, \ldots, C'$ are atomic sentences.

(74) $[\alpha v, \ldots, \alpha' v' | C, \ldots, C'] \rightsquigarrow \alpha v; \ldots; \alpha' v'; C; \ldots; C'$

A box may introduce no variables, so only consist of $C, \ldots, C'$. The referential expressions in C do not have any subscript or α if it is obvious that they correspond to ones that are introduced by variables in the left hand side of their box.

A.2 Semantics

Models A model M is a tuple $\langle D, W, I \rangle$. The first two members represent the basic entities of different types: D is the set of individuals; W, worlds. I is an interpretation function from n-place predicates to functions from worlds $w \in W$ to n-tuples of individuals in D.

Contexts A CONTEXT, or information state, c is a set of information points. An INFORMATION POINT i is a tuple $\langle \sigma_s, \sigma_d \rangle$, where the first sequence σ_s^i helps represent the salient discourse referents and the second sequence σ_d^i the deictic ones.

Operations on Sequences For a given sequence σ and natural number n: $n(\sigma)$ is the nth member of σ, where the counting starts at 0 and from the beginning of σ. For a given σ and set S, σ^S is the sequence containing elements of σ that are in S, and appearing in the same order as they appear in σ. Also, for a given σ and S, S^σ is the set of things occuring in σ that are S. Given sequences σ, σ': their amalgamation $\sigma \uplus \sigma'$ is the sequence formed by combining σ and σ' in order.

Static Interpretation Given a background model, there is a static interpretation function $[\![\,]\!]_s$ that assigns meaning, given an information point i, to referential expressions and atomic sentences. There is also a global static interpretation $[\![\,]\!]_{sg}$ that assigns meaning, given a context c, to global referential expressions.

1. $[\![the_F]\!]_s^i = \lambda w. \begin{cases} a & \text{If } a = \iota x(x \in I(F,w)^{\sigma_d^i \uplus \sigma_s^i}) \\ \text{Undefined} \end{cases}$

2. $[\![that_F]\!]_s^i = \lambda w. \begin{cases} a & \text{If } a = \iota x(x = 0((\sigma_d^i \uplus \sigma_s^i)^{I(F,w)})) \\ \text{Undefined} \end{cases}$

3. $[\![\alpha x_n]\!]_s^i = \lambda w. \begin{cases} d & \text{If } d = \iota x(x = n((\sigma_\alpha^i)^D)) \\ \text{Undefined} \end{cases}$

4. $[\![\alpha \omega_n]\!]^i = \lambda w. \begin{cases} w' & \text{If } w' = \iota x(x = n((\sigma_\alpha^i)^W)) \\ \text{Undefined} \end{cases}$

5. $[\![\alpha \Omega_n]\!]_s^i = \lambda w. \begin{cases} P & \text{If } P = \iota x(x = n((\sigma_\alpha^i)^{\wp(P)})) \\ \text{Undefined} \end{cases}$

6. $[\![F_{\alpha w_n}(r,\ldots,r')]\!]^i_s = \langle [\![r]\!]^i_s([\![\alpha\omega_n]\!]^i_s),\ldots,[\![r']\!]^i_s([\![\alpha\omega_n]\!]^i_s)\rangle \in I(F,[\![\alpha\omega_n]\!]^i_s)$
7. $[\![\alpha\omega_n||]\!]^c_{sg} = \{[\![\alpha\omega_n]\!]^i_s | i \in c\}$

Operations on Points Here is a type of operation underlying dynamic existential quantification.

1. $i \bowtie_\alpha o$ = the i' such that:
   (a) $0(\sigma^{i'}_\alpha) = o$,
   (b) for some n, σ^i_α has n members and $\sigma^{i'}_\alpha$ has $n+1$ members,
   (c) for all k s.t. $0 \leq k < n$, $k(\sigma^i_\alpha) = k+1(\sigma^{i'}_\alpha)$, and
   (d) For all $\beta \neq \alpha$, $\sigma^i_\beta = \sigma^{i'}_\beta$

Compositional Dynamics Given a background model and static interpretation functions, there is the following dynamic interpretation function $[\![\,]\!]$, which assigns WFFs functions from contexts to contexts. I assume that the metalanguage has weak kleene logic for dealing with undefinedness; hence, in the update for atomics in 1, if any $[\![F_{\alpha w_n}(r,\ldots,r')]\!]^i_s$ is undefined, then the entire update is undefined.

1. $c[\![F_{\alpha w_n}(r,\ldots,r')]\!] = \{i \in c | [\![F_{\alpha w_n}(r,\ldots,r')]\!]^i_s\}$
2. $c[\![\alpha x_\beta]\!] = \{i \bowtie_\alpha d | i \in c, d \in D\}$
3. $c[\![\alpha\omega]\!] = \{i \bowtie_\alpha w | i \in c, w \in W\}$
4. $c[\![\alpha\Omega]\!] = \{i \bowtie_\alpha P | i \in c, P \in \wp(W)\}$
5. $c[\![rlr']\!] = \{i \in c | [\![r]\!]^i_s l [\![r']\!]^c_s\}$
6. $c[\![rlg]\!] = \{i \in c | [\![r]\!]^i_s l [\![g]\!]^c_{sg}\}$
7. $c[\![glg']\!] = \{i \in c | [\![g]\!]^c_{sg} l [\![g']\!]^c_{sg}\}$
8. $c[\![\phi;\psi]\!] = c[\![\phi]\!][\![\psi]\!]$

Truth-Conditions Given a background model, we can take a proposition $P \in \wp(W)$ as the context set. The resulting initial context is as follows.

1. $c_P = \{\langle\langle w, P\rangle, \emptyset\rangle | w \in P\}$

Now, we can extract truth-conditions from a series of updates $U = u_1;\ldots;u_n$, which represents the logical form of a sentence, as follows.

1. $TC(U) = \{w | c_{\{w\}}[\![u_1;\ldots;u_n]\!] \neq \emptyset\}$

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