

## 1 Introduction

The notion of restrictivity has long been used in grammars of English (Jespersen 1927), though, as noted by many linguists, it has not always been precisely defined (Piñon 2005, Leffel 2014). Classically, the notion has been used to describe an interpretive distinction between grammatically distinct categories of relative clause in English and other languages (Jespersen 1927, Partee 1975, Heim & Kratzer 1998, Potts 2003, Wiltschko 2012):

1. *Two men stand outside a room. One has white hair, the other black.*
  - a. The man **who has the white hair** entered.
  - b. #The man, **who has the white hair**, entered.

The relative clause in (1a), which is prosodically integrated into its ANCHOR (the modified noun phrase), is used to distinguish between the two men in the context. The infelicity of the relative clause in (1b) is tied to its inability to serve this function. This kind of contrast has given these modifiers their widely used names: ‘restrictive’ and ‘non-restrictive’ relative clauses. I will call them, respectively, ‘integrated relative clauses’ (IRCs) and ‘appositive relative clauses’ (ARCs).

An early and influential semantic account for the difference in (1) is put forward in Partee (1975). Partee traces the contrast in (1) to the scope of the definite determiner. Integrated relative clauses and other nominal modifiers lie in its scope, and thus can subsectively compose with the noun’s denotation, serving a functional role in meeting the determiner’s uniqueness presupposition and allowing the expression to type-shift into a referential expression (type *e*) (2a). Appositive relative clauses and other appositives form a semantic dependency with the entire determiner-noun constituent and thus cannot play a role in this process (2b):

2.
  - a. (1a)  $t(\text{man} \cap \text{has-the-white-hair})$
  - b. (1b)  $\text{has-the-white-hair}(t(\text{man}))$

The semantic representation of (1b) is infelicitous in contexts like (1) where there are two men.

Partee’s theory ties the notion of restrictivity to subsection: only subsective modifiers have the ability to help determine reference, where reference is conceived semantically, as denoting an object of type *e* in a model. However, as discussed most clearly in Leffel (2014), the notion of restrictivity cannot be *defined as* subsection, since intuitions surrounding restrictivity revolve around speaker intentions. Modifiers are *used* restrictively when the speaker believes the reference of some expression would be unclear without the modifier. Modifiers are *used* non-restrictively when they serve other purposes. Say a teacher believes all of the students in his class are sick, and says “I sent the sick students home.” Our intuition is that “sick” here is used non-restrictively, to describe his reason for sending all the students home. However, say only half of the students in his class are actually sick, and thus, the modifier happens to be subsective in the actual world. In this context, despite the sentence still being true, there’s a sense in which the teacher is misguided, as their intention is not to refer to this smaller set of students. Restrictive modifiers are modifiers used by a speaker to help determine the

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reference of a particular expression. Non-restrictive modifiers are used for other reasons (c.f. Schlenker 2005).

This paper is primarily concerned with a class of prepositional phrases in English that modify expressions of type *e* (proper names, unique definite descriptions, etc.), but are used in the determination of reference, that is, restrictively:

3. a. Marie **here** is my best friend.
- b. Joan's mother, **with the white hair**, is coming over tomorrow.
- c. I was just talking to the CEO, **from the party yesterday**, who wanted us to come out with him tomorrow.

Just like the IRC in (1a), the bolded modifiers above may be used when the anchor on its own is not enough to pick out a particular entity in the context. For example, “here” in (3a) can be used if Marie is standing next to the speaker, and the speaker knows the addressee does not know her name: “here” helps the addressee know where to look to pick out Marie. The modifier “with the white hair” in (3b) can be used if the interlocutors are looking at a picture of a number of women, and the speaker knows the addressee does not know what Joan’s mother looks like. Under the assumption that only one woman in the picture has white hair, the modifier serves to help the addressee identify Joan’s mother as that woman. The modifier “from the party yesterday” in (3c) can be used if the interlocutors both met some salient individual at a party yesterday, but the speaker is unsure that the addressee knows that individual’s job. The modifier serves to connect the job description to the individual at the party.

Indeed, similar to restrictive modifiers, in some circumstances these modifiers have the ability to rescue the modified noun from “failing to refer”:

4. *Joe & Marta were at a party earlier where they met many people including Joe's dad, who has white hair. It never came up at the party that Joe's dad was Joe's dad.*
  - a. Joe: #Did you like my dad?
  - b. Joe: Did you like my dad, with the white hair?
  - c. Joe: #Did you like the person?
  - d. Joe: Did you like the person with the white hair?

Without the extra specification given by the modifiers in (4b) and (4d), it is entirely infelicitous for Joe to ask Marta about his dad (4a) or the person he has in mind (4c). However, since the modifier in (4b) modifies a unique individual, it poses a problem for the widespread assumption that only substantive modifiers can be restrictive.

Despite their restrictive use, these expressions’ ability to modify referential expressions and prosodic separation from their anchor (at least in the case of 3b-c) makes them look like grammatical appositives. Nevertheless, other formal properties (such as the prosodic integration of “here” into its anchor in (3a)) leaves the question open of whether they are somehow treated as regular restrictive modifiers, lying in the scope of the definite determiner.

In this paper, I provide a significant amount of evidence that these modifiers, including “here” in (3a), are appositives and lie outside of the scope of the anchor’s determiner. I will draw a close connection between these modifiers and other appositives and parentheticals that are involved in the determination of reference:

5.

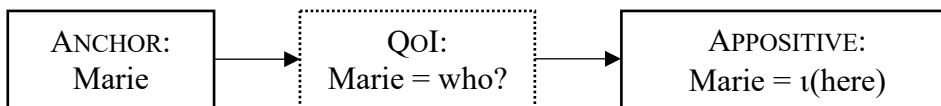
- a. *The addressee has met the speaker's roommate.* Marie – **my roommate** – is my best friend.
- b. Joan's mother, **the one with the blue hair**, is coming over tomorrow.
- c. I was just talking to the CEO, who wanted us to come out with him tomorrow. (That guy **from the party yesterday**.)

Since restrictivity can arise via grammatical mechanisms distinct from intersective modification, the notion should not be considered a grammatical phenomenon at all, but a pragmatic one concerning identification, or “speaker reference” (Strawson 1950, Clark & Wilkes-Gibbs 1986, Bach 2008). I call the modifiers in (3) and (5) IDENTIFICATIONAL APPOSITIVES.

This paper has two broad goals. The first is to present a linguistic analysis of these modifiers: how do they fit into the grammatical rules of English? What constraints are they subject to? This investigation will serve to highlight interesting interactions between components of the grammar as they apply to appositives, as well as detail the linguistic mechanisms that speakers of English use that allow appositives to act restrictively.

Towards the first goal, I argue, as mentioned above, that the PPs are a specific subtype of appositive. Specifically, my analysis assimilates these appositives to the analysis of *nominal* appositives (NAPs) in Onea & Ott (2018), which treats NAPs as fragment answers to implicit questions licensed by their anchor.<sup>2</sup> New to my analysis will be evidence that the modifiers in (3) have the specific structure of elided copular clauses, and that the implicit questions these expressions answer are Questions of Identification (QoIs) – e.g., “Who is Marie?” – which embed an equative semantics. I will thus analyze the appositives as having an equative semantics themselves: the PP has type shifted into the unique individual in its denotation.

6. “Marie here is my best friend.”



This analysis, broadly, treats the modifiers as having roughly the same syntax as a class of *predicative* nominal appositives (*p*-NAPs) discussed in Onea & Ott (2016) – they both involve ellipsis of subject and copula – but gives them a slightly different semantic analysis as equatives. Also new in this paper are a number of novel observations that support the overall analysis involving (i) constraints on the kinds of modifiers that can appear in this position and (ii) the interaction of these modifiers with other grammatical operations/constraints.

The second major goal of this paper is to use these modifiers to begin a deeper investigation into our theories of discourse reference and how definite expressions interact with the context. Indeed, that these modifiers can rescue ‘failed reference’, as shown in (4a/b) above, allows us to pinpoint exactly what is needed for ‘reference’ in the first place. The modifiers interact with constraints in certain contexts that can help us determine how reference is established and, by extension, what conventional requirements are encoded by a variety of referring expressions.

Towards this goal, I argue that, since appositives can be restrictive, the notion should not be tied to a particular sentential position. Restrictivity is best defined as the ability to rule out assignments of discourse referents to entities in a discourse model. A sample definition is below:

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<sup>2</sup> The same ideas are found in Ott (2016), Onea (2016), and AnderBois & Jacobson (2018).

7. A modifier is restrictive in context  $C$  if it maps  $C$  to  $C'$  such that  $\exists x \in \text{Dom}(C), \text{Dom}(C')$ :  
 $\{g'(x) \mid g' \in C'\} \subset \{g(x) \mid g \in C\}$

Subjective modifiers like IRCs are restrictive because subsection always rules out assignments of discourse referents to entities. If the anchor uniquely denotes in a given world (such as a proper name), it nonetheless may resolve to distinct referents *across* assignments and/or worlds, and therefore be further restricted.

I will, moreover, argue that the ‘end goal’ of restrictive modification is identity with some unique discourse referent in the context, rather than unique entity in the model. I thus use these appositives to argue for an operating requirement on definite expressions of INFORMATIONAL UNIQUENESS (Roberts 2003). Informational uniqueness is formally defined as identity with a unique WEAKLY FAMILIAR discourse referent across all assignments/worlds in the context, where weak familiarity is defined as the common ground entailing the existence of the referent (Roberts 2003). This is a novel *empirical* argument in favor of this requirement: I use constraints on the use of referring expressions, and the obligatory nature of these modifiers in certain contexts, to argue in favor of such a requirement.

Lastly, I show that this requirement can be causally related to the grammatical analysis of these appositives as answers to questions of identification (QoIs) by embedding the appositives into the formal dynamic system of AnderBois et. al. (2015), an extension of Dynamic Predicate Logic. Two properties of the system crucially play a role: (1) the use of an indeterminate assignment to the worlds in the common ground and (2) the encoding of associations between worlds in the common ground and assignments of drefs to entities. These two properties allow one to model how the introduction of a dref that is unique in any given world but has not met its requirement of *informational* uniqueness can lead to a partition on worlds in the common ground that corresponds to a QoI. I extend the system with a formal analysis of referring expressions, proposing that they both (i) introduce a new dref and (ii) require this dref to be associated with a previous one in the context across all worlds and assignments (informational uniqueness). When this requirement isn’t met and cannot be accommodated (for various reasons), the context is partitioned into a QoI. I, moreover, present a novel interpretation of this system in accordance with the overall project of Roberts (2003): drefs are allowed to persist throughout different conversations with the same interlocutors, and formal rules are defined for the introduction of different kinds of drefs, such as perceptually available ones.

The structure of the paper is as follows. In **section 2**, I discuss how identificational appositives bear on formal theories of reference in discourse, arguing for the conception of restrictivity and discourse reference outlined above. In **section 3**, I argue against alternative analyses that would treat the modifiers in (3) as (i) regular nominal modifiers or (ii) “corrective” / “reformulating” appositives, the latter having been proposed for similar expressions (AnderBois et. al. 2015, Schlenker 2015, Onea & Ott 2022). Instead, I provide evidence that the modifiers are appositives with an elliptical copular structure. In **section 4**, I motivate my final analysis: that the modifiers in (3) are fragment answers to questions of identification. In addition, I motivate generalizations about the contexts in which the use of a referring expression licenses one of these questions. In **section 5**, I outline my formal proposal of discourse that can model this process. In **section 6**, I discuss issues with the proposal. In **section 7**, I conclude.

## 2 Reference in Discourse

In this section, I discuss identificational appositives in the context of formal theories of discourse reference and definites more broadly. I show that capturing the behavior of identificational appositives poses issues for many of these theories. Throughout, I motivate the conception of definiteness and discourse reference advocated here, involving Roberts (2003)'s theory of weak familiarity and informational uniqueness. Of course, Roberts (2003) is not particularly concerned with discourses in which there is uncertainty of reference. To handle these contexts, I argue that in conjunction with Roberts' theory, one needs to (i) adopt the idea that referring expressions introduce new discourse referents at the same time as attaching to old ones and (ii) incorporate ideas from Aloni (2001)'s theory of CONCEPTUAL COVERS, which represents potential referents using sets of individual concepts. Indeed, I propose that we need insights from both theories to adequately handle the data: from Roberts' theory, the conventional requirements of weak familiarity/informational uniqueness, and from Aloni's theory, the idea that speakers explicitly represent and reason about dependencies between worlds and individuals in the model in order to establish reference. In **section 5**, I show how both of these ideas can be embedded into the dynamic system of AnderBois et. al. (2015).

All of the components of this view of discourse reference are drawn from previous literature. However, many of the theoretical and empirical arguments presented in this section are, as far as I know, new. First off, I present novel empirical motivation for the theory of Roberts (2003) using (i) the behavior of names + definite descriptions in cases of 'failed reference' and (ii) the behavior of identificational appositives. Secondly, I present a novel theoretical comparison / integration of discourse referents with conceptual covers.

In section **2.1**, I discuss familiarity-based theories of definites. Here I show that the idea of weak familiarity outlined in Roberts (2003) provides a natural way of understanding discourses with identificational appositives: identificational appositives are used when the *referent* of the anchor is weakly familiar, but the particular conceptualization of that referent introduced by the anchor is not enough to establish *which* weakly familiar discourse referent the anchor picks out.

In section **2.2**, I discuss uniqueness-based theories of definites. Here I argue that a certain notion of uniqueness is needed in addition to familiarity to account for a variety of data and motivate the use of informational uniqueness (Roberts 2003).

Lastly, in section **2.3**, I discuss the theory of conceptual covers in Aloni (2001), showing that it is a natural match for the data at hand, but that it has theoretical problems in its overall design and division between semantics/pragmatics. Here, I propose adopting the theories' insights surrounding uncertainty of reference into models of context.

### 2.1 Familiarity

Classic dynamic semantic models of natural language were particularly interested in understanding how assignments of variables to entities change over the course of a conversation, both within and across utterances (Kamp 1981, Heim 1982, Groenendijk and Stokhof 1991). These models were ultimately aimed at capturing a hypothesis about the difference between indefinites and definites in natural language: indefinite expressions introduce **novel** variables to the assignment function, while definite expressions (including pronouns) associate with **familiar** variables already present in the context.

Buried in these models are actually two questions, one about the representation of context, and one about the conventional meaning of (in)definites:

7. **The context question:** what discourse referents are included in the assignment function?
8. **The definiteness question:** are (in)definites conventionally associated with requirements surrounding discourse referents in the assignment function?

Of course, the answer to the context question informs the possible answers to the definiteness question, but it's useful to separate the questions in order to understand the space of possible analyses of definites/indefinites in natural language.

Heim (1982)'s File Change Semantics (FCS) explicitly takes the context to represent the common ground, which includes both referents introduced by linguistic expressions and those that are perceptually available. Thus, FCS captures the ability of both pronouns and definite expressions to be used deictically.

Whether discourse referents last *beyond* a single conversation is not clear in FCS, and many linguists take the conservative stance of associating discourse referents only with indices that are linguistically introduced in the course of a single conversation. In Roberts (2003) terms, these referents are called STRONGLY FAMILIAR.

Although pronouns are typically used to refer to strongly familiar referents, definite descriptions are often used to refer to individuals that have been introduced in past conversations or interactions between the interlocutors:

9. The professor who I was telling you about yesterday emailed me back!

Indeed, taking the input context to represent the common ground makes it theoretically simpler to include referents that are jointly known to exist by both interlocutors, as these individuals would presumably be represented in some way in the interlocutors' common ground. Roberts (2003) calls these referents WEAKLY FAMILIAR, giving a list of conditions under which they are available in the common ground. I list some of the conditions below, with my own understanding of how they relate to the general definition of weak familiarity:

10. WEAK FAMILIARITY: the common ground entails the existence of an individual. That is, both interlocutors know the other knows an individual exists via ...
  - a. (i) linguistic mention – both participants have discussed the individual.
  - b. (ii) perceptual experience – both participants have had joint perceptual experience with the individual and can assume each other were aware of the individual.
  - c. (iii) world knowledge – both interlocutors can assume the other is aware of the individual due to general facts known throughout the speech community.

Pronouns' preference for strongly familiar referents, Roberts argues, stems from conditions on *salience*. In fact, pronouns can refer to weakly familiar individuals so long as the individual is salient enough and identifiable by the rest of the material in the utterance:

11. [*In November, 2022*] He tweeted again. [*he = Elon Musk*]

Since Elon Musk's tweets in November, 2022 (after purchasing Twitter) were particularly salient for people that use Twitter, interlocutors would presumably have been able to use a pronoun in the sentence above to refer to Elon Musk without explicitly introducing him in the conversation.

Indeed, associating definite expressions with a requirement of strong familiarity has led to a lack of clarity surrounding the status of proper names, which are easily novel in a conversation (“discourse-new”) (12) but not easily novel to the addressee (“hearer-new”) (13b):

12. Guess what? Marie is coming over tomorrow.

13. [*Marie is Joe's old friend from childhood. Joe knows Marta has never heard of her.*] Joe: Guess what?
- An old friend is coming over tomorrow.
  - #Marie is coming over tomorrow.

Like indefinites, names can easily introduce new entities into a conversation (12). Unlike indefinites (13a), a name is only felicitous when the addressee knows its referent exists (13b). Theories that only encode strong familiarity are unable to model this dual behavior.

In addition, proper names have been shown to fall into the grammatical class of definites crosslinguistically: they are unique, referential, and co-occur with definite determiners in many languages (Matushansky 2008). Thus, grammatical analyses should aim to group them with other definites.

We can use another property of names to understand why they are more easily discourse new than definite descriptions: names' inherent or “semantic” uniqueness, which I take to be the lack of any extra slot for pragmatically supplied domain restriction. Definite descriptions may require this additional domain restriction to achieve uniqueness:

- 14.
- #[*Out of the blue*] The dog is outside.
  - My neighbor has a dog. The dog is outside.

Above, “the dog” is not semantically unique, and thus needs some prior context to supply it with an additional restriction (e.g. “the dog <of my neighbor>”) that helps it meet uniqueness. Names, in contrast, are inherently unique, and thus are easily used in the absence of context so long as they satisfy weak familiarity. Uniqueness of definites will be discussed in the next section.

Before moving on, one last point: Roberts models weak familiarity as the conditions under which discourse referents are present in the context. From a different perspective, however, one can interpret the notion as describing the pragmatic conditions under which part of Frege's theory of definiteness – presupposition of existence of the referent – is satisfied, under the assumption that presupposition targets the common ground. That is, the conditions in (10) describe contexts where the worlds in the common ground are constrained to only those in which certain individuals exist. These are the contexts in which definite expressions can be used.

Certain arguments in the literature against a requirement of weak familiarity miss this crucial point. Consider the following example from Elbourne (2013) (via Hawkins 1978):

15. What's wrong with Bill? Oh, **the woman he proposed to last night** said no.

The bolded definite description above is most likely not weakly familiar – a speaker can easily utter (15) when the addressee has not heard of the particular woman described. In order to handle such examples, Roberts would have to argue that the weakly familiar referent is accommodated. However, Elbourne (2013) argues that Roberts' approach would require the accommodated material to not only include the existence of the woman, but the addressee's knowledge of that existence. This particular

attitude is clearly not accommodated: the addressee does not have to act as if they already knew of the existence of the woman in question after the speaker's use of (15).

This argument fails to understand the point above – that weak familiarity is ultimately a pragmatic theory about how a presupposition of existence might be satisfied. Consider (16) below:

16. What's wrong with Bill? Oh, he stopped smoking yesterday and is having trouble adjusting.

The sentence “he stopped smoking yesterday” presupposes that Bill used to smoke: in most situations, one would use this sentence only when the common ground entails that Bill used to smoke (compare Roberts' “the common ground entails the existence of the referent”). But of course, a speaker can utter (16) even if the addressee doesn't know this, and that presupposition will be accommodated. Let's say, for example, the addressee just met Bill, the speaker's friend, and Bill is acting irritable. After the speaker says (16), the addressee does not have to act as if they already knew that Bill smoked prior to the speaker's utterance; in fact, it would be strange to act in this way since they just met Bill. The process of accommodation does not require one to additionally accommodate the assumption of addressee knowledge that has been violated in the first place.

Of course, there is a significant empirical difference between unfamiliar definite descriptions such as in (15) and unfamiliar names such as in (13b). Example (13b) shows that if speakers know a name is unfamiliar to their addressee, they cannot use it.<sup>3</sup> Example (15) shows that a speaker can easily use an unfamiliar description and expect it to be accommodated. Such a clear distinction in felicity deserves an explanation, and more importantly for my purposes, tracks empirical facts surrounding when identificational appositives are required.

Note that although this hard constraint usually applies to names, definites in certain contexts show the same behavior, such as (4a) from the introduction:

4a. [repeated] *Joe & Marta were at a party earlier where they met many people including Joe's dad. It never came up at the party that Joe's dad was Joe's dad, and Joe knows that Marta doesn't know which person was his dad.*  
Joe: #Did you like my dad?

Joe cannot use the description “my dad” in this context and expect some new discourse referent to be accommodated. I take this example to show us that there is something fundamental to the semantics of names that is, nonetheless, able to surface in descriptions in certain circumstances. That is, I don't take this to be a distinction in a familiarity requirement (in Roberts' terms, a presupposition of existence), but in the ability for this presupposition to be accommodated or not due to additional facts about their semantics.

Indeed, I believe this difference can be explained using an analysis of names that treats them as semantically encoding a *naming convention* between speaker and addressee (Matushansky 2008). To give a broad outline of the logic: in (15), since the speaker can presume the addressee doesn't know either way about the existence of the woman in question, the speaker can presume that the addressee admits that some new woman exists is a possibility. Accommodation in this case is uncontroversial, in the sense that it costs nothing for the addressee to accommodate some new discourse referent corresponding to the woman. In contrast, in order to share in a naming convention, the addressee and the speaker must both know the referent. Therefore, the name can *only* range over discourse referents that already exist, and no new discourse referents can be accommodated.<sup>4</sup>

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<sup>3</sup> Without additional material disambiguating reference, as section 4 will show.

<sup>4</sup> This analysis of names will not be explicitly formalized and developed in this paper, but I plan on pursuing it in the future.



Little discussed in this literature is the fact that the reference of a definite expression is not always clear after the initial noun phrase, in many cases requiring a back and forth between interlocutors to determine exactly to whom the speaker intended to refer. This point was most forcefully made in Clark & Wilkes-Gibbs (1986):

17. Clark & Wilkes-Gibbs (1986)

S. Take the spout-the little one that looks like the end of an oil can-

J. Okay.

S. -and put that on the opening in the other large tube. With the round top.

18. Clark & Wilkes-Gibbs (1986)

A. . . . well I was the only one other than than the um . . . Fords? Uh Mrs. Holmes Ford? You know uh, the the cellist?

B: Oh yes. She's she's the cellist.

A. Yes. Well she and her husband were there.

The spout, the large tube, the Fords, and Mrs. Holmes Ford are all weakly familiar: the speaker assumes the addressee knows that the referents exist either via current perceptual experience (17) or prior knowledge (18). However, the initial noun phrase is not enough to make it clear exactly *which* weakly familiar discourse referent the noun phrase is intended to pick out. Further expressions, such as identificational appositives (*the little one...*, *With the round top.*) and follow up questions (*the cellist?*) can be used to make the reference clear. I will analyze all these follow up expressions as statements of identity (equative copular clauses). Some just involve ellipsis.

Indeed, the empirical terrain this paper covers shows that definite noun phrases can be used when their reference is weakly familiar, but the precise referent with which they are associated is unclear in the conversation. In these cases, a question may be raised about the identity of the referent, or the speaker can pre-empt this question via adding clarifying material after the noun phrase is expressed, such as an identificational appositive.

Note that weak familiarity is the operative notion here: if “the spout” or “the Fords” did not correspond to some weakly familiar referent, then these expressions would not be able to be used. This data motivates the use of weak familiarity in describing the *ultimate* constraint that definites need to satisfy, even if it is not immediately satisfied by the initial DP.

Dynamic theories that stipulate familiarity requirements may have trouble with this data. In some dynamic theories, definite noun phrases are associated with a familiar referent via a formal constraint on their indices: that is, indices on definite noun phrases must be in the domain of the assignment function (Heim 1982, Dekker 1994). If definite expressions are associated with a formal constraint on their indices, then what's going on here is uncertainty with respect to the actual logical form of the expression. The clarifying material makes the logical form (with the correct index) precise:

19. Take the spout<sub>1?</sub>/<sub>2?</sub> - the little one<sub>1</sub> that looks like the end of an oil can...

However, since these theories only allow us to assign dynamic interpretations to a single logical form with a single index, it is not immediately clear how to model this kind of uncertainty. Indeed, depending how the familiarity requirement is implemented, the theories discussed above may fail to predict the data in (17)-(18) at all, since the initial noun phrase may not be familiar when it first updates the discourse model.

In other theories, definite noun phrases introduce a novel index, but this index is associated via some secondary mechanism (usually some equative statement) with a familiar one (van der Sandt

1992, Kamp & Reyle 1993, Beaver 2001, Beaver & Coppock 2015). These ‘two-step’ theories allow us to model temporary discourse referents that are unresolved to an actual one in the context, but they are not equipped to handle the data in (18)-(19), as they either predict the referent is familiar and connected to a prior discourse referent, or not familiar, and a new discourse referent is accommodated/introduced. Again, there is no room for the possibility that the referent is familiar but has not been identified yet.

In the proposed dynamic model in section 5, I follow Roberts (2003) in having weak familiarity be the relevant notion deciding whether a discourse referent is in the context, and moreover be part of the condition imposed on definite expressions. However, this is not encoded via a formal constraint on indices nor a two-step indexing mechanism. In my model, definite noun phrases introduce new variables. Rather than moderating familiarity using indexing, I take familiarity to be moderated through a presupposition encoded in the *iota* operator that states that there should be some discourse referent in the context that the variable associated with the definite can be identified with across all assignments. Similar to the two-step theories, this theory involves both a new index and a previous index to which the new one is equated. Different from these theories is the following three components: (i) the new index never really ‘goes away’ in the assignment function – one can tell whether two drefs are ‘the same individual’ or not by looking at their possible mappings across assignments; (ii) there are discourse rules that may block the accommodation of this presupposition, leading to a state where the new index is not equated with any old one across assignments; (iii) the new index thus can serve as an antecedent to subsequent anaphora in a conversation where interlocutors are trying to determine the correct antecedent for the initial referring expression.

Specifically, when the requirement fails and accommodation is not possible, the context is “split” into different assignments where the condition is met – that is, a question is raised – forcing interlocutors to resolve this question and therefore meet the requirement collaboratively.

## 2.2 Uniqueness

Many linguists associate definite expressions with uniqueness requirements, which either accompany (Roberts 2003, Schwarz 2009), or derive (Beaver & Coppock 2015) the familiarity requirements seen above. Some theories of this sort are posed in a static semantics, and thus are not able to capture how information about reference may change over the course of a conversation. I will not discuss these static theories, as ultimately the phenomena I’m interested in are (i) cross-sentential, in the sense that appositives are in important ways bifurcated from the matrix sentence (Potts 2003, Koev 2013, AnderBois et. al. 2015, Onea & Ott 2022), and (ii) introduce clarifying information about the reference of expressions throughout discourse, that is, explicitly update the assignment function.

Other theories, however, embed these uniqueness requirements in a dynamic system. As I will show throughout the paper, associating definite expressions with conventional uniqueness requirements explains a wide variety of generalizations surrounding identificational appositives and their differences from regular nominal modifiers.

Uniqueness with respect to what, exactly? Many theories (Heim 1990, Elbourne 2005) take uniqueness as being relative to a particular situation; the situation itself is a semantic object contributed by material within the sentence or present in the context. Since most theories that use situations do so in a static semantics, I will refrain from using them, although I believe a fleshed-out dynamic theory of how situations are tracked across discourse may be able to capture the same empirical phenomena.

Other theories take uniqueness to be defined relative to some context. The first class of theories I will consider of this variety (Farkas 2002, Bumford 2017) propose that some definites

introduce new variables, but all definites are required to resolve a unique entity across assignments. Examples of such a requirement is modeled in (20) below:

20. Unique Entity Across Assignments (Farkas 2002, Bumford 2017)

	$x$
$g_1$	$a$
$g_2$	$a$
$g_3$	$a$

✓

	$x$
$g_1$	$a$
$g_2$	$a$
$g_3$	$b$

✗

These theories cannot handle cases where the variable may resolve to distinct referents across worlds, or there is uncertainty with respect to *actual reference* in the context. Consider the description below:

21. *Joe and Marta are invited speakers at a university and invited to a welcome party. They know that there is a single syntax professor in the department who is at the party, but they don't know what she looks like.*  
Marta: By the way, the syntax professor is driving us home.

This sentence can, of course, lead to the question “do you know which one the syntax professor is?”, but it doesn't need to. That is, English speakers may be satisfied with having a context where in some worlds/assignments the definite resolves to one individual  $a$  and on others it resolves to another individual  $b$ , so long as it isn't currently needed for any interlocutor's goals to resolve reference to either  $a$  or  $b$ . Of course, the failure to account for cases like (21) may be an artifact of these theories' focus on extensional and not intensional phenomena; still, one cannot use these theories to understand the phenomena I am interested in.

What I will take from these theories is the idea that one can have definites introduce new variables and have *the context* constrain whether or not uniqueness has been met.

The second theory I will consider is that of informational uniqueness (Roberts 2003). I will ultimately adopt the major proposal of this theory: that definites are required to be identified with some weakly familiar discourse referent that is unique in being contextually entailed to satisfy the requirements of the definite's restriction. I will, however, not adopt Roberts' explicit formalism in my proposal in **section 5**, as I will discuss below, some of the specifics of the theory must be changed with the assumption of a novel index being introduced. Nevertheless, I will show below how Roberts' proposal on its own can account for example (21).

As stated above, Roberts' theory requires definites to resolve to some weakly familiar referent that is unique in being contextually entailed to satisfy the requirements of its restriction. Her formal definition of this requirement is below:

22. Familiarity and Uniqueness Presuppositions of Definite NPs (Roberts 2003, pp. 310)

For context  $C = \langle \text{Dom}, \text{Sat} \rangle$ , a definite  $\text{NP}_i$  with descriptive content  $\text{Desc}$  is felicitous in  $C$  only if:

- a.  $i \in \text{Dom} \ \& \ \forall \langle w, g \rangle \in \text{Sat}[\text{Desc}(w)(g(i))]$
- b.  $\forall k \in \text{Dom}[\forall \langle w, g \rangle \in \text{Sat}[\text{Desc}(w)(g(k))]] \rightarrow k = i]$

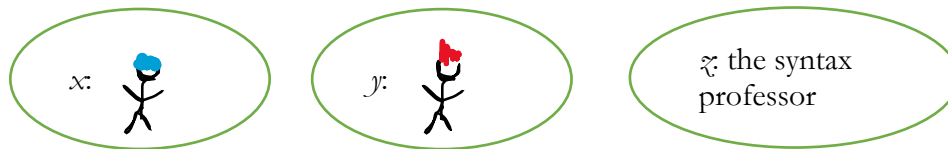
where  $\text{Desc}(w)(g(i))$  is true iff the individual assigned to  $i$  by  $g$  has the property denoted by  $\text{Desc}$  in world  $w$ .

The first part of condition (a) states that the index of the NP should be in the domain of the assignment function ( $i \in \text{Dom}$ ). As I argued above, this requirement is too strong since participants

can keep referring to an individual that has yet to be identified with some dref. There needs to be a new index that is introduced in order for people to adequately converse about it.

Besides this component, I will adopt the first half of condition (a). Below, I will walk through an example of how it can be used to understand the felicity of (21).

Consider the context of (21) above. If we take weak familiarity seriously, there are multiple discourse referents in the common ground: (i) the people that the interlocutors jointly perceive at the party – let’s say there’s currently two,  $x$  and  $y$ ; (ii) the syntax professor  $z$ , since Joe and Marta are aware of her existence. Of course, Joe and Marta know that one of  $x$  and  $y$  may actually be the same individual as the discourse referent corresponding to the syntax professor ( $z$ ), but they cannot be sure at this point. So, there are multiple weakly familiar discourse referents that could correspond to “the syntax professor”, but crucially, only *one* of them resolves to the syntax professor across all assignment/world pairs:  $z$ . We can show this representationally below:



		$x$	$y$	$z$
$w_1$	$g_1$	a	b	a
$w_2$	$g_2$	a	b	b
$w_3$	$g_3$	a	b	c

Let’s say the descriptive content of the noun in (21) is “syntax professor in this department”, where “in this department” is added in via covert domain restriction. Let’s assume that this descriptive content resolves to a single person in each world of the context, since both interlocutors know that there’s only one syntax professor in the department:  $a$  in  $w_1$ ,  $b$  in  $w_2$ , and  $c$  in  $w_3$ .

Only  $z$  fulfills the conditions in (22) because it meets the definite’s descriptive content across all assignments and worlds. Although on some assignments,  $x$  and  $y$  resolve to the syntax professor, on others it does not, and therefore is not a competitor to meet the presupposition described above. If Joe and Marta knew there were two syntax professors in the department, then multiple discourse referents could possibly meet the descriptive content, and the presupposition would not be met.

This theory also provides a neat explanation how an identificational appositive can render an otherwise infelicitous sentence felicitous:

23. *The individual with the blue hair ( $x$ ) is named Marie. Joe knows Marta has not heard of Marie.*
- #Joe: Marie is coming over tomorrow.
  - Joe: Marie, with the blue hair, is coming over tomorrow.

Let’s say Joe and Marta are in the same situation as (21). In (23), since Joe and Marta have not discussed that some individual with name “Marie” exists before, there is **no weakly familiar referent** that corresponds to “Marie” across all assignments and worlds in the context. Although both  $x$ ,  $y$ , and  $z$  above can be associated with the name, they will not be associated with it across all assignments and worlds. However, once the appositive associates Marie with the person with the blue hair, there *will* be exactly one weakly familiar discourse referent ( $x$ ) that is associated with the name across all assignments/worlds.

What about condition (b)? This is where *uniqueness* comes in, as there has to be exactly one discourse referent that meets the descriptive content of the definite. I will ultimately choose not to adopt it in the proposal here, since it is made extraneous by our assumption that definites introduce new indices. Specifically, if definites introduce new indices, then the definite will automatically be assigned to all potential individuals that meet the content of the restriction. In a case where there are *multiple* weakly familiar drefs that fit the descriptive content, there will be no unique dref that can be identified with the new variable across all assignments.

As an explanation, consider the following identificational appositive used in the context above:

24. *Both  $x$  and  $y$  are women. Joe gestures in the direction of both of them.*
- a. Joe: #The woman<sup>*i*</sup> is coming over tomorrow.
  - b. Joe: The woman<sup>*i*</sup>, the one with the blue hair, is coming over tomorrow.

In (24), there are two weakly familiar referents ( $x$  and  $y$ ) that fit the description of the anchor. The new variable  $i$  will thus resolve to entities assigned to *both* of them:

		$x$	$y$	$i$
W <sub>1</sub>	g <sub>1</sub>	a	b	a
W <sub>1</sub>	g <sub>2</sub>	a	b	b
W <sub>2</sub>	g <sub>3</sub>	a	b	a
W <sub>2</sub>	g <sub>4</sub>	a	b	b

Above,  $i$  can neither be identified with  $x$  nor  $y$  across all assignments/worlds. All we need is condition (a) to make sure informational uniqueness is met. This is what I do in my proposal in **section 5**.

I encode this requirement in the semantics of the *iota* operator ( $\iota$ ), which is formally defined in **section 5.3**.<sup>5</sup> This requirement will also explain how a question of identification is raised – one can think of the question as a partition over discourse referents, and answering the question picks out the unique one to satisfy the requirement.

Of course, relying on the context to determine what counts as unique or not crucially relies on the assumption that we can individuate discourse referents in the way modeled above. For example, it is not at all clear yet why  $x$  and  $y$  above resolve to one entity ( $a$  and  $b$  respectively) across assignments, nor why they necessarily resolve to distinct entities. Weak familiarity gets us part of the way by providing a certain theory of which discourse referents are included in the assignment function, but it doesn't help us in thinking about reasoning surrounding the *representation* of these discourse referents, and how one can determine given a particular context whether they are possibly identical or distinct. To this end, I will rely on insights surrounding epistemic reasoning about identity that were introduced in the theory of CONCEPTUAL COVERS in Aloni (2001).

### 2.3 Uncertainty of Reference

In this section, I discuss Aloni (2001)'s theory of CONCEPTUAL COVERS and show that it provides a natural perspective on identificational appositives. However, I argue that it has certain problems in (i) its particular use of *domains* and (ii) its divide between semantics/pragmatics. I argue

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<sup>5</sup> This will be a 'null' operator. It also could be the spell out of the definite determiner "the", or, following Coppock & Beaver (2015), we could take the definite article to encode a weaker requirement of *at most one* entity, and only encode uniqueness in *iota*.

for encoding similar kinds of representations, encoding epistemic information about identity/non-identity, in how we understand how discourse referents are represented in a model of context.

Standard views of the semantics of questions (Hamblin 1976, Groenindijk & Stokhof 1984) – encoding them as denoting sets of propositions corresponding to their answers – makes identity questions containing names somewhat mysterious. Consider the following sentence:

25. Who is John?

Given the standard assumption that names denote rigidly across worlds, most semantics for questions would predict that this sentence is trivial, that is, has only one answer. And indeed, there is an answer to this question that's trivial (26):

26. John is John.

However, there are also many non-trivial answers to this question as well:

27. John is the guy with the blue hair/the violinist/Marco/...

Moreover, consider a situation where Marta is looking for a person named John at a party and asks the question in (25) to Joe. In this situation, there seem to be better and worse answers for Joe to offer Marta. For example, even if Joe knows John is the only violinist at the party, answering (26) with “the violinist” is quite weird (if John doesn't have a violin), since it doesn't give Marta a way to pick out which person is John.

These considerations (and many others) led Aloni (2001) to posit that (i) names are *epistemically* non-rigid and (ii) *wh*-questions are interpreted relative to a formal object called a CONCEPTUAL COVER:

28. CONCEPTUAL COVER: A set of individual concepts that exclusively and exhaustively covers the domain of individuals/worlds such that the following condition holds:

$$\forall w \in W: \forall d \in D: \text{there is exactly one } c \in CC: c(w) = d$$

This condition has two important properties: (i) in each world, every concept refers to a different individual: therefore, we can treat each concept as a single individual in a given world; (ii) across worlds, concepts can refer to distinct individuals: therefore, we can model uncertainty of reference from an epistemic perspective. For example, in a model with two worlds ( $w_1, w_2$ ) and two individuals ( $a, b$ ) (29a) and (29b) are possible conceptual covers, (29c) is not:

29. Conceptual Covers

- a.  $\left\{ \begin{pmatrix} w_1 & a \\ w_2 & a \end{pmatrix}, \begin{pmatrix} w_1 & b \\ w_2 & b \end{pmatrix} \right\} \checkmark$
- b.  $\left\{ \begin{pmatrix} w_1 & a \\ w_2 & b \end{pmatrix}, \begin{pmatrix} w_1 & b \\ w_2 & a \end{pmatrix} \right\} \checkmark$
- c.  $\left\{ \begin{pmatrix} w_1 & a \\ w_2 & a \end{pmatrix}, \begin{pmatrix} w_1 & b \\ w_2 & a \end{pmatrix} \right\} \times$

The set of concepts in (29c) is out because there is a world ( $w_2$ ) where two concepts are mapped to the same referent  $a$ .

These different covers model different *modes of identification*. In Aloni (2001), three modes are discussed: *ostension/perceptual* (rigid), *naming* (non-rigid), and *description* (non-rigid). The cover in (29a),

assigning the same referent to each concept across all worlds, corresponds to the *ostension/perceptual* cover: the mode of identification that corresponds to individuals that are perceptually available in the context. cover is rigid because there is no uncertainty surrounding reference: if the perspective holder perceives an entity in the actual world, there are no worlds epistemically accessible to them where that particular entity could be anyone else. This is the kind of cover that would be relevant in the party situation described above. *Naming* and *description* correspond to covers that look more like (29b), where each concept (corresponding to a particular name or description) may pick out different entities across worlds, if the given perspective holder is uncertain about their reference.

Aloni (2001) models *wh*-words as variables over concepts in a pragmatically supplied conceptual cover, proposing an optimality-theoretic based pragmatic calculation for choosing the conceptual cover in a given context.

On the face of it, this is exactly the kind of theory needed to understand what's going on in identificational appositives: they are triggered by exactly the same questions of identification that Aloni's theory handles (albeit implicit in these cases), and the modifiers seem to be used to take a different epistemic perspective on the individual referred to by the anchor:

- 30.
- a. John, the cellist, is my best friend.
  - b. John, with the white hair, is my best friend.
  - c. *The addressee knows Marie.* The cellist, Marie, is super good.

In the sentences above, it seems as if the speaker is shifting between two different conceptual covers in order to clarify reference.

Ultimately, my theory of the dynamics of referring expressions takes Aloni's individual concepts to correspond to weakly familiar definite discourse referents such as the ones discussed in last section and uses the way questions are constructed to explain why *wh*-questions quantify only over a subset of these referents with the property in (28). Below, I discuss two problems with taking Aloni's theory at face value and applying it to these expressions: the first I call the "domain problem", and the second "the pragmatic problem".

Conceptual covers (CCs) represent domains of quantification – since *wh*-words are variables over concepts in a CC, they range over only and all concepts in the supplied conceptual cover. This leads to the following question: exactly what in the examples in (29) quantify over this kind of domain? One such answer would be the same as Aloni (2001)'s: the question of identification. However, since this question is **implicit** in the context above, there is no *formal* trigger for a conceptual cover, such as a *wh*-word, in the context. Thus, there is no direct link from updating a context with a referring expression to triggering one of these domains. One has to assume some implicit question construction algorithm that makes use of such domains. It is theoretically simpler at this point to assume that conceptual covers correspond to subsets of weakly familiar discourse referents in the assignment function, which we already need to track in order to describe constraints on definite expressions. Questions of identification arise when it is unclear which weakly familiar discourse referent a given definite expression refers to.

On the other hand, one may take the anchor's determiner (i.e.,  $\iota/\exists$ ) to quantify over concepts in a contextually given conceptual cover: that is, the quantificational domain is associated with the anchor. Such a move could explain the use of an identificational appositive as helping meet the anchor's uniqueness requirement: e.g. in (29b), *John* is not unique with respect to the *ostension* cover (the one needed in the context), so the appositive *with the white hair* helps restrict this domain to meet the requirement of uniqueness contributed by *iota*.

In the next section, I will provide a large body of evidence that quantificational element(s) in the anchor do not scope over these modifiers – that is, these modifiers are full clauses that contribute their own quantificational operators, like so:

- (30b) [Logical Form] John, with the white hair, is my best friend.  
 $\iota x[\text{John}(x)] \wedge \iota y[\text{John}(y)] \wedge \iota z[\text{white-hair}(z)] \wedge y = z \wedge \text{my-best-friend}(x)$

The appositive (in blue) is an equative copular clause that equates John with the individual with the white hair. There are three *iotas* here, not one. We shouldn't take the conceptual cover to be associated with a quantificational element inside the initial noun phrase.

Lastly, what if we took conceptual covers to be domains associated with *both* noun phrases: the anchor and the identificational appositive? This is close to what I do, by associating each *iota* above with a presupposition that it needs to be identified with a unique weakly familiar discourse referent (which themselves map to individual concepts). However, I don't explicitly encode this as a conceptual cover: there is no explicit requirement such as the one in (28). There is no need to posit an extra domain separate from the one already tracked by the assignment function.

Indeed, examples already discussed at length pose problems for tying conceptual covers to domains quantified over by elements like *wh*-words. Consider (4a) again:

- 4a. [repeated] *Joe & Marta were at a party earlier where they met many people including Joe's dad. It never came up at the party that Joe's dad was Joe's dad, and Joe knows that Marta doesn't know which person was his dad.*  
 Joe: #Did you like my dad?

In (4a), the infelicity of 'my dad' is clearly tied to the fact that it doesn't give Marta a good way to identify which person at the party Joe is talking about – in Aloni's terms, the cover needed to determine reference is a perceptual one, but the speaker uses a descriptive one. However, there is no *wh*-word in the context above. This kind of 'cover' like effect should not be tied to a particular domain formally indicated by elements in the sentence, but the fact that the discourse referent corresponding to 'my dad' must be (i) informationally unique and (ii) someone Marta knows she met at the party. These two components are incompatible unless Marta knows which person they met at the party was Joe's dad.

The second problem with applying Aloni's theory directly to identificational appositives is the "pragmatic" problem. Aloni's pragmatic theory is associated with a number of constraints that help predict when particular conceptual covers are chosen. Some constraints are put below:

31. Pragmatic constraints:
- a. ANCHOR: conceptual covers should be anchored to at least one concept in the context.
  - b. STRENGTH: prefer stronger covers, where strength is defined via the number of other possible covers that include the same concepts in an information state.
  - c. \*ACCOMODATION: do not accommodate!
  - d. \*TRIVIAL: do not choose covers that would result in under-informative interpretations.
  - e. ...

Note that in order to define this pragmatic theory, Aloni posits that (i) concepts are made available in the context and that (ii) covers are relativized to particular information states where certain covers (via the concepts in them) are identified with each other. In order to fully implement such a theory, something like the system I will propose is needed, where assignments track relevant concepts in context, and these concepts can be associated with each other. Once such a system is developed, there



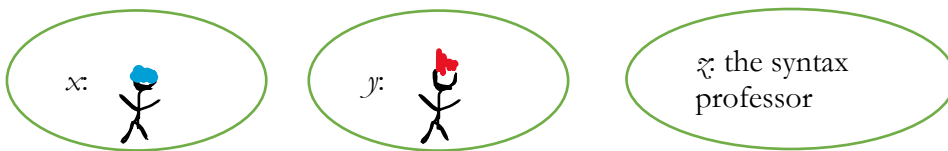
is no need to posit an extra pragmatic calculation that is performed on top of it over and above normal pragmatic calculations such as those related to Gricean maxims.

Indeed, the hope I have is that the analysis proposed here will lead to a more constrained theory of the pragmatics of definite reference by explicitly stating conditions under which certain kinds of individual concepts are available: namely, when those concepts are weakly familiar.

What I adopt from this theory is its insights into epistemic reasoning about identity. I use these insights to better understand how weakly familiar discourse referents should be represented in the discourse model. Take example (21) from last section:

21. [repeated] *Joe and Marta are invited speakers at a university and invited to a welcome party. They know that there is a single syntax professor in the department who is at the party, but they don't know what she looks like.*

Marta: By the way, the syntax professor is driving us home.



		$x$	$y$	$z$
$w_1$	$g_1$	a	b	a
$w_2$	$g_2$	a	b	b
$w_3$	$g_3$	a	b	c

Note that both  $x$  and  $y$  rigidly designate across all worlds/assignments. I represent the context in this way because of Aloni's insights surrounding *ostension*: if you and your interlocutor can point at an individual, there are no worlds in the context where that individual could be anyone else.

Moreover, imagine Joe and Marta know that there are two syntax professors in the department. In such a context, the sentence in (21) is infelicitous. As discussed above, it's not obvious how to individuate these professors among the discourse referents. Knowing that there are two syntax professors means that in each world, the property resolves to two distinct individuals, but nothing in Roberts (2003)'s theory is explicit about how the two discourse referents should be represented. We can take the condition on conceptual covers in (28) and have it hold for discourse referents that the interlocutors *know* are distinct from each other:

		$x$	$y$	$z^1$	$z^2$
$w_1$	$g_1$	a	b	a	b
$w_2$	$g_2$	a	b	b	a
$w_3$	$g_3$	a	b	c	a

Above,  $z^1$  and  $z^2$  (the two syntax professors) satisfy the condition on conceptual covers in (28) with respect to *each other*, but not  $x$  and  $y$ .

### 3. Alternative Analyses

In this section I shift to my empirical focus: PP modifiers of referring expressions, such as the ones in (3) (repeated below):

3. [repeated]
  - a. Marie **here** is my best friend.
  - b. Joan’s mother, **with the white hair**, is coming over tomorrow.
  - c. I was just talking to the CEO of WhatsApp, **from the party yesterday**, who told me they are getting acquired by Apple.

This section begins to motivate my ultimate analysis by arguing against possible alternatives. In section 3.1, I argue from a variety of evidence that the PPs in (3) are appositives and not regular nominal modifiers. In section 3.2, I consider and reject possible analyses for these PPs that have been proposed for other appositives based on mechanisms of “corrective specification” (AnderBois et. al. 2015, Schlenker 2015) and “reformulation” (Onea & Ott 2022). Instead, I provide some evidence in this section that the modifiers come with an elided copular structure.

#### 3.1 The Modifiers are Appositives

The PPs in (3) share some key properties with prototypical appositives (NAPs, ARCs): they modify referring expressions like names, and can be parenthetically separated from their anchor. However, both their restrictive use and certain formal properties of the modifiers may lead one to wonder whether the modifiers are regular nominal modifiers, or at the very least lie in the scope of the anchor’s determiner. Below, I present three arguments that these modifiers are appositives and lie outside the scope of the determiner in their anchor.

The first concerns interpretive differences between PPs and IRCs. Unlike the PP modifiers under investigation, IRCs give rise to anti-uniqueness implications with respect to the denotation of the noun phrase they modify:

32. a. The president of South Sudan that has the huge hat is a good friend of mine.  
b. The president of South Sudan, with the huge hat, is a good friend of mine.  
c. [*The speaker points at a man.*] The president of South Sudan here is a good friend of mine.

Example (32a) implies there have been at least two presidents of South Sudan; a speaker can use this sentence if they know the addressee is aware of the existence of multiple presidents. This implication suggests that the IRC is playing a role in meeting a uniqueness requirement imposed by the definite determiner – a speaker would not use the IRC if the anchor was already unique.<sup>6</sup> In contrast, examples (32b) and (32c) do not give rise to any implication about how many presidents of South Sudan there have been; a speaker can use these sentences even if there has only been a single president.<sup>7</sup> The differences between implications in (32) provides evidence that the PP modifier sits outside of the domain in which uniqueness is calculated – i.e. sits outside of the scope of the definite determiner.

The second argument that shows these modifiers are not regular nominal modifiers concerns NP ellipsis and *one*-anaphora. The PP modifiers in (3) are invisible to these grammatical processes:

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<sup>6</sup> This implication would presumably follow from a rule such as “Minimize Restrictors!” from Schlenker (2005).

<sup>7</sup> In fact, there has only been a single president of South Sudan.

33. a. Sam caught the first train **with the big engine**, and Bill caught the second (one)  
b. Sam caught the first train, **with the big engine**, and Bill caught the second (one).

There is an interpretation of (33a), a sentence with a regular nominal modifier, where the speaker is asserting that Bill caught the second train *with the big engine*. That is, there may have been many trains, but there were at least two with big engines, and Bill caught the latter of those two. In contrast, (33b), a sentence with a parenthetical version of the same modifier, does not allow this interpretation. These examples entail that Bill caught the second train overall. In other words, in (33a), the relevant anaphor involved in NP ellipsis and one-anaphora is allowed to target some constituent containing the regular nominal modifier, but in (33b), these anaphors are disallowed from targeting any constituent containing the parenthetical PP modifier.

The contrast above shows that grammatical processes that target regular nominal modifiers do not target these PP modifiers, providing additional evidence that they are grammatically distinct. Moreover, NP-ellipsis and *one*-anaphora have been shown to target the material in the restriction of the determiner – e.g., NP or NumP (Llombart-Huesca 2002). The fact that the PP modifiers in (3) are invisible to these processes provides more evidence that they lie outside of the scope of the anchor’s determiner.

The last argument I will make concerns a pragmatic distinction between appositives and presuppositional material that was noted in Potts (2003). Appositives, unlike presuppositional material, are subject to an *anti-backgrounding* requirement: they must not be redundant in a context.

34. [Potts (2003)] Lance Armstrong survived cancer...  
a. And most riders know that Lance Armstrong is a cancer survivor.  
b. #And when reporters interview Lance, a cancer survivor, he often talks about the disease.

In (34a), the information in the initial sentence can be repeated in presuppositional material (the complement of *know*). In (34b), the same information sounds redundant when repeated in apposition.

Since modifiers in the scope of a definite determiner are, by hypothesis, presuppositional, they should similarly differ from identificational appositives in being allowed to be trivial. Before understanding how we can show this difference, though, I should describe exactly what it means for identificational appositives and regular restrictive modifiers to be “trivial” and “non-redundant”, as it is slightly more complex than the contrast in (34).

Regular restrictive modifiers in definite descriptions are presuppositional insofar as their material is used in a presupposition of existence: the expression “the dog with the blue eyes” presupposes that there is a dog with blue eyes. Granted, the modifiers are non-redundant relative to the noun: they allow the speaker to pick out exactly which individual they are talking about. Notice, however, that the same modifier can be used over and over again to pick out the same individual:

35. A: You see the dog with the blue eyes? Do you like him?  
B: Yes, I like the dog with the blue eyes.

Due to their presuppositional character, B can felicitously use the same description to refer to the same individual without sounding particularly redundant.

The PP modifiers in (3) are non-redundant in the first sense – they help narrow down exactly which individual the speaker intends to pick out. Unlike regular modifiers, however, they cannot be repeated ad nauseum throughout a conversation:

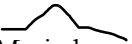
36. A: You see the dog, with the blue eyes? Do you like him?  
 B: #Yes, I like the dog, with the blue eyes.


In contrast to (35), B's response in (36) sounds redundant enough to make the entire expression infelicitous. The antibackgrounding requirement on appositives explains this distinction – A's statement already made the connection between “the dog” and the individual with blue eyes clear, so the material in the appositive is redundant. Since appositives cannot be redundant, B's statement is infelicitous.

The three properties discussed above show that the PP modifiers fall into the class of appositives and lie outside the scope of the anchor's determiner.

This appositive analysis, however, does not explain why certain PP modifiers like “here” in (3a) are pronounced in the same intonational phrase as their anchor. This is quite different from the prosody of prototypical appositives (NAPs, ARCs) which are pronounced in a separate intonational phrase. Below, I draw the general contours of the pitch tracks of the anchor + modifier as I hear them, and mark pauses with double lines “||”:

37. *Marta taps Marie's back, who is standing right next to her.*

Marta:  Marie here went to a concert yesterday.


38. a.  Marie, my roommate, went to a concert yesterday.

- b.  Marie, who is my roommate, went to a concert yesterday.

Above, there is no “comma intonation” (Potts 2003) between “Marie” and “here”, unlike the appositives.

The modifier's prosodic integration into the intonational phrase of its anchor may lead one to argue that it should be grouped in with regular nominal modifiers, not appositives.

However, note that “here” is only prosodically integrated in this position when it is *deaccented*. Unlike regular restrictive modifiers, the nuclear accent of the intonational phrase (H\*) appears on the noun (37), and cannot appear on the modifier (39):

39. ??Marie  here went to a concert yesterday.

Under an appositive analysis, one can explain both the modifier's prosodic integration and its obligatory deaccenting via the interplay of prosody and information structure in English. First off, indexicals like “here” in English are, in many contexts, considered “given” for the purposes of deaccenting (Wagner 2006):

40. a.  I used to work at Lowes.  
 b.  *The speaker stands in front of Lowes, and points at it.* I used to work here.

Standard accentuation rules in English place the nuclear accent on the rightmost constituent in a sentence (40a). However, when that rightmost constituent is “here”, the accent shifts left to the verb

(40b). This is due to a regular prosodic rule regarding information structure, which requires “given” constituents – roughly, constituents that refer to objects in the context – to be deaccented (Schwarzschild 1999). Since indexicals are generally given, they are subject to this rule.



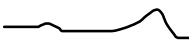
Constraints on prosodic structure require every intonational phrase to contain a nuclear accent, the phrase’s “head” (Selkirk 2005, Féry & Samek-Lodovici 2006). These prosodic constraints mean that deaccented expressions cannot exist on their own in an intonational phrase. From this conclusion, we can explain appositive “here”’s non-standard intonational properties: when “here” is given, it is deaccented, and when it is deaccented, it has to incorporate into the intonational phrase of its anchor, since it cannot exist on its own. The appositive analysis thus gives a natural explanation for the properties of “here” that make it look *least like* an appositive.<sup>8</sup>

Indeed, deaccentuation only occurs when the location denoted by “here” is already attended to. If the speaker has to direct the addressee to look at the location, “here” can bear an accent:

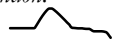
41. *The addressee is not looking at Lowes. Speaker points at it in order to direct the addressee’s attention.*

I used to work  here.


<sup>8</sup> In sentences containing modal quantification, PP modifiers can be prosodically integrated into subject NPs and bear focal (nuclear) accents. These PP modifiers are interpreted as restrictors on the quantificational adverb/generic operator/modal:

- A.
- i.  Marie *here* is lovely; back home, she’s insufferable.  
→ *Whenever Marie is here, she’s lovely.*
  - ii.  Marie *in California* will not be affected by the hurricane.  
→ *Since/while Marie is in California, she will not be affected by the hurricane.*
  - iii.  Marie *in California* always went to concerts.  
→ *When Marie was in California, she always went to concerts*

On their surface, the modifiers in (Ai-iii) provide counterexamples to our generalization surrounding PP modifier incorporation and deaccentuation. However, due to their semantics as modal restrictors, I believe these modifiers are sentential adjuncts, not nominal modifiers. In particular, evidence points to them being the “free adjuncts” of Stump (1981), who explicitly mentions a post-subject position in which free adjuncts can sit. Evidence for this analysis comes from their distribution: unlike the PP modifiers under investigation, these modifiers are unable to appear after nouns in indirect object position (Bi)/(Bii):

- B. *Marie lived in California for three years, then moved to London.*
- i. [*Speaker gestures to Marie*] John would  send Marie here letters.
  - ii. \*John would send Marie *in California* letters.



In addition, unlike PP appositives, these modifiers cannot appear in past episodic sentences (Ci)/(Cii):

- C. i. [*Speaker gestures to Marie*] Marie  here went to the concert.
- ii. ??Marie *in California* went to the concert.

These distinct distributional properties provide evidence that they are not in the same grammatical class as the PP modifiers under investigation. Therefore, they are not counterexamples to my claim about “here” above.

PP modifiers show the same sensitivity to hearer attention. If the addressee is not attending to the individual denoted by the anchor, “here” may be set off via an intonational boundary like a prototypical appositive:

42. *The addressee is not looking at Marie.*

Marta: [*taps Marie on the shoulder*] Marie,  Marie,  here, || went to a concert yesterday.

I assume that these cases are prosodically separated because the location denoted by “here” is not given: since the location denoted by “here” has vague boundaries, if the speaker can’t readily assume the hearer is already aware of these boundaries (through their eye gaze or other evidence), it should not be considered given. Thus, “here” is new and is not deaccented when the addressee is not looking at the location.

This discussion shows that certain appositives may be prosodically incorporated into their anchor for phonological/information structural reasons. Therefore, one should not take lack of comma-intonation to necessarily indicate lack of appositive status.

### 3.2 Identificational appositives are not always “corrective” or “reformulating”

Last section I provided a wide variety of evidence that these PPs are appositives. In this section, I will consider and reject analyses for these appositives that have been proposed for other identificational appositives – specifically, definite nominal appositives containing *one*-anaphora. The analyses I will argue against specifically encode the hypothesis that the appositives are inherently “corrections” to or “reformulations” of the anchor. The “correction” analysis is that these appositives are an instance of a basic linguistic process, whereby a speaker messes up during the course of their initial utterance and offers the hearer another expression that is intended to be the *actual* constituent interpreted by the hearer (AnderBois et. al. 2015, Schlenker 2015). The “reformulation” analysis is proposed as a syntactic process of copying/ellipsis in the appositive of the structure surrounding the anchor (Ott 2016, Onea & Ott 2022). These theories are related to each other insofar as the reformulation analysis can be accompanied by a corrective intention.

I will show that neither of these processes can account for the PPs in question, since not all uses of identificational appositives are corrective, and the ellipsis process proposed for reformulating appositives cannot apply to the PPs. Against this latter analysis, I provide some evidence that the PPs are elliptical copular clauses.

Appositives containing *one*-anaphora have been discussed at length in the literature since they sometimes lack the typical projection behavior of appositives (Wang et. al. 2005, Nouwen 2014, AnderBois et. al. 2015, Schlenker 2015):

43. a. It’s not the case that a boxer, **a famous one**, lives on this street.  
       = *It’s not the case that there is a boxer who is famous and lives on this street.*  
 b. ??It’s not the case that a boxer, **who is famous**, lives on this street.

Unlike the ARC in (43b), the appositive in (43a) takes scope inside clausal negation – it does not project. AnderBois et. al. (2015) and Schlenker (2015) argue that these appositives are “corrective”, involving a distinct pragmatic/grammatical process from typical appositives like ARCs. Schlenker (2015) gives a model of what this process may look like, involving some kind of restructuring of the syntactic or semantic structure of the preceding constituent:

44. If constituent  $C'$  is a correction of constituent  $C$ , interpret the string  $a C C' b$  as  $a C' b$ . (Schlenker 2015)

Schlenker calls this process “corrective specification.” The idea is that the sentence in (43a) that is actually interpreted by the addressee is of the following form: “It’s not the case that **a famous boxer** lives on this street.” This process explains why these appositives do not project: during interpretation, the appositives take scope under the same operators as the matrix sentence.

What’s important for our discussion is that definite *one*-appositives are particularly good identificational appositives, as the sentences below show:

- 45.
- a. You see the dog, the one with the blue eyes?
  - b. Marie, the one on the far left, is an incredible swimmer.

Just like the PPs in (3), *one*-appositives can be used to clarify reference. They can even be subsective: the question in (45a) is felicitous in a context with two dogs.

Such an analysis may also seem natural for identificational appositives as they can be used “correctively”: for example, the appositive in (45a) can be used when a speaker did not realize there were two dogs in the context as a way to “correct” their initial description.

However, the “correction” analysis is not comprehensive. Identificational appositives can also be used when the speaker wants their addressee to understand that the referent fits *both* descriptions – the description in the anchor and the description in the appositive.

46. *Marta and Joe look at a picture of a bunch of people and discuss who will be at a gala they are attending.*  
Marta: My husband, the one with the white hair, will be there.

Above, Marta uses the identificational appositive to clarify exactly which person in the picture is her husband. Crucially, she also intends to let Joe know that that *her husband* will be attending the gala. It’s not as if she should have only used the appositive on its own.

Ott (2016)’s analysis of “reformulating nominal apposition” may allow *one*-appositives to serve this double purpose: as both corrections of and extensions to the material in the anchor. Ott (2016) argues from case data in German that a major use of nominal appositives involves copying + ellipsis of the entire structure surrounding the anchor:

47. Ich habe **einen** alten Freund, **den** Peter, in der Kneipe getroffen.  
I have **an.ACC** old friend, **the.ACC** Peter, in the pub met  
“I met an old friend, Peter, at the pub.”

The appositive noun’s case matches that of the anchor – it is accusative. Importantly, accusative case in German requires a case licenser; however, other evidence suggests that the appositive is syntactically disconnected from its containing clause, so its case licenser cannot be the overt verb *habe* in the matrix clause. This reasoning suggests that there is elliptical syntactic structure in the appositive that includes some accusative case licenser. This elliptical material, moreover, cannot be copular, as copulas assign nominative case to their arguments in German. Ott (2016)’s analysis gives the appositive in (45) the following structure:

48. I met an old friend, ~~I met Peter at the pub~~, at the pub.

An analysis in which the all the material in the containing clause is copied/elided in the appositive explains how and why the appositive's case has to match that of the anchor. Moreover, like the analysis in Schlenker (2015), the nominal appositives take scope under the same operators as the matrix sentence, explaining their projection characteristics. Unlike Schlenker (2015), however, this analysis can explain cases like (46) in which the anchor "survives" interpretation, since both the clause containing the anchor and clause containing the nominal appositive are asserted.

Below I argue that Ott's analysis of "reformulating nominal appositives" cannot work for the PP appositives we are interested in. First off, the PPs are ungrammatical in regular argument positions:

49. a. You see the dog, with the blue eyes?  
b. \*You see the dog, ~~you see~~ with the blue eyes?

One cannot analyze the PP as filling the same syntactic position as the anchor, since PPs are not available in such positions in English.

One may go further in wondering whether these appositives involve the process above plus additional ellipsis of a nominal constituent like "the one" or the anchor itself. This analysis would allow us to conserve grammaticality in the elliptical clause:

50. You see the dog, ~~you see the one/dog~~ with the blue eyes?

This analysis is ultimately untenable. Besides the fact that such a grammatical process is unattested in English, ellipsis of a nominal constituent would fail to account for why IRCs are unavailable as identificational appositives:

51. a. \*Marie that has the big hat is a good friend of mine.  
b. \*You see the dog, that has the blue eyes?

Unlike PP modifiers, IRCs are ungrammatical when modifying names (51a) and when prosodically separated from their anchor (51b). Ellipsis of a constituent like "the one" would predict that these structures are OK:

52. a. Marie ~~the one~~ that has the big hat ~~is a good friend of mine~~ is a good friend of mine.  
b. You see the dog, ~~You see the one~~ that has the blue eyes?

Since IRCs can felicitously modify such structures, such an analysis would predict that IRCs could be used as identificational appositives. However, as (51) shows, they cannot.

Analyzing these modifiers as involving a copular structure explains IRCs' ungrammaticality, as IRCs are ungrammatical after copulas:

53. a. \* ~~Marie is~~ that has the big hat.  
b. \* ~~The president of South Sudan is~~ that has the big hat.

Prepositional phrases, in contrast, are grammatical:

54. a. ~~Marie is~~ here.  
b. ~~Marie was~~ from the party yesterday.



Of course, possessive “with” PPs are ungrammatical after copulas (55a). This ungrammaticality is crucially different from that of IRCs, however, as it can be explained via morphological blocking: many linguists have argued “have” is the spell out of the copula + possessive “with” (55b) (Kayne 1993, Harley 2002, Levinson 2011):

55.

- a. \*The president of South Sudan is with the big hat.
- b. The president of South Sudan has ( $\rightarrow$ *is with*) the big hat.

Since the copula is elided in our analysis, the spell out of the copula + possessive “with” as “have” is unable to proceed, and the preposition is not blocked from surfacing in its normal form. This differs from IRCs, which are presumably disallowed after copulas for syntactic or semantic reasons, and thus can never surface as an identificational appositive. **Section 4** will present more evidence for this copular analysis and include a discussion of what kind of copular clause the appositives are.

In conclusion, although a linguistic mechanism like “reformulating nominal apposition” is most likely one use of nominal apposition, identificational appositives – and specifically the PPs in which I am interested – do not always involve this mechanism.

## 4 Analysis

Now that I’ve set aside these other analyses, I’m going to advance my analysis of the PPs in (3): that these expressions are fragment answers to what I call “questions of identification” (QoIs) licensed by their anchor. I develop this analysis for two reasons: (A) to motivate the idea that material outside the scope of and conversationally subsequent to a referring expression can be used to restrict its reference and (B) to give a broad idea of what is grammatically and pragmatically involved in this process of restriction.

This analysis follows in the footsteps of a variety of analyses of **nominal appositions** in the literature, which have been analyzed as short answers to implicit questions (Onea 2016, AnderBois & Jacobson 2018, Onea & Ott 2022). My analysis ultimately argues that the PPs are in the same grammatical class as the *predicative* nominal appositives (*p*-NAPs) of Onea & Ott (2022), which are analyzed as elided copular clauses. In contrast with *p*-NAPs, however, I show that the PPs encode the essential semantics of *equative* copular clauses, as they denote a unique entity, although I do not commit to a *syntactic* analysis of them as equative or predicative. Overall, my investigation broadens and deepens the analysis in Onea & Ott (2022) by (i) assimilating PP modifiers of referring expressions to the same overarching analysis and (ii) providing a theory of a certain class of questions – questions of identification – that license such appositives. The latter, as I hope to show, can tell us a significant amount about discourse reference.

In section 4.1, I provide evidence that the PPs are fragment answers to QoIs. In section 4.2, I motivate the generalization that the PPs have to denote uniquely and show that this generalization follows from them being subject to answerhood constraints on QoIs. I also show how these answerhood constraints explain a particular interesting data pattern exhibited by the modifier “here”. In 4.3, I investigate how and when referring expressions license QoIs, showing that these appositives are licensed in exactly the same situations as overt QoIs, and developing generalizations that I will seek to explain in my formal proposal in section 5.

#### 4.1 The Modifiers are Fragment Answers

I analyze the PP modifiers in (3) as elided full clauses, fragment answers to implicit questions of identification raised by their anchor. This analysis predicts that such expressions can be answers to *overt* questions of identification, and indeed they can:

56. *Joe and Marta are at a party. Marie is across the room.*

Joe: Marie is so cool.

Marta: Who is Marie?

Joe: [*pointing*] Oh, **with the blue hair**.

57. *Joe and Marta are looking at pictures of their classmates.*

Joe: Marie is so cool.

Marta: Which one is Marie?

Joe: [*taps on Marie in the picture*] Oh, **here**.

Above, we see that the same linguistic expressions can be used as answers to overt questions of identification. My analysis treats the modifiers as *grammatically identical* to the answers above, just interpolated into a speaker's utterance.

The answers above serve the same discourse use as the modifiers: they are used to uniquely identify the referent for the addressee. My analysis thus provides a natural explanation for the pragmatics of the modifiers.

Moreover, under the assumption that fragment answers are elliptical, if one takes the appositives to be fragment answers, then one should analyze them as elliptical as well.

Indeed, the questions above can be answered by unelided, full copular clauses<sup>9</sup> containing the PP modifiers as their predicates (58)/(59).

58. *Joe and Marta are at a party. Marie is across the room.*

Marta: Who is Marie?

Joe: [*pointing*] Marie has the blue hair.

59. *Joe and Marta are looking at pictures of their classmates.*

Marta: Which one is Marie?

Joe: [*taps on Marie in the picture*] Marie is here.

Similarly, identificational appositives do not have to be elliptical; they can also take the form of full overt clauses (60):

60.

a. Marie – [*tapping on Marie*] Marie is here – is really nice.

b. Marie – [*pointing to Marie*] Marie has the blue hair – is really nice.

The fact that both answers to QoIs and the identificational appositives are allowed to be pronounced in the same alternating ways – as full copular clauses and PPs – signals that the same grammatical and discourse rules are involved in both structures.

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<sup>9</sup> Under our analysis in which “has” is underlyingly copular.

## 4.2 The Modifiers must Denote Uniquely

Last section, I showed clear interpretative and distributional parallels between the PP appositives and answers to overt questions of identification. In this section, I will argue that an analysis that treats the appositives as subject to answerhood constraints on these questions explains a strong empirical generalization about the appositives: they have to denote a singleton set. I will use this uniqueness requirement to provide additional evidence that the appositives are answers to QoIs in particular.

Evidence for this uniqueness requirement comes from identificational PPs that can host an internal definite determiner: in this use, this determiner is required or at least greatly preferred to the corresponding appositive without the determiner. For example, the modifier “with **the** blue hair” is a much better identificational appositive than “with blue hair”:

61. *Marta is a new PhD student who is assigned Joe to show her around. Marta and Joe just went to a party and met Marie (who has blue hair) together, but Marta never learned her name. Marta asks Joe: “I loved that party. Who should I be friends with?”*
- Joe: Marie, **with the blue hair**, is really nice.
  - Joe: #Marie, **with blue hair**, is really nice.

In the context of (61), Joe cannot identify Marie using the PP “with blue hair”, even though such a property applies to Marie. One can explain this infelicity using a requirement of uniqueness in conjunction with Maximize Presupposition, a pragmatic principle (Heim 1991). Maximize Presupposition requires speakers to use items with the strongest possible presuppositions in contexts where those presuppositions are met; not using such an item signals to interlocutors that the presupposition is not met. Since “the” has a uniqueness presupposition, then not using the determiner when it’s available can signal that the predicate is non-unique. The infelicity of (61b) thus suggests that these modifiers are required to be unique.

We can explain this uniqueness requirement by analyzing the modifiers as subject to answerhood constraints on QoIs. Although my proposal will be more fully developed in section 5, it is useful to give a schematized version of how the logic works in order to develop this particular argument.

I rely on assumptions that are widely adopted in the literature: (i) there is a semantic distinction between predicative and equative copulas (62) (Mikkelsen 2005); (ii) *wh*-questions denote a partition on logical space constructed from the internal proposition + the *wh*-word replaced by an element from some domain (63a); (iii) polar questions denote their internal proposition along with its complement (63b) (iv) an answer to a question picks out a cell in the partition denoted by the question (64) (Groenindijk & Stokhof 1984).

### 62. Copulas

- $[[ \text{be}_{\text{pred}} ]]$  :=  $\lambda P_{\langle e,t \rangle} . P_{\langle e,t \rangle}$
- $[[ \text{be}_{\text{eq}} ]]$  :=  $\lambda x_e . \lambda y_e . x = y$

### 63. Questions

- $[[ \text{wh-question} ]]$  :=  $\{ P(x) \mid x \in \text{Domain} \}$
- $[[ \text{polar-question} ]]$  :=  $\{ p, \neg p \}$

64. **Answerhood:**  $p$  is an answer to  $Q$  iff  $p \in Q$ .

Above, I define the equative copula “be<sub>eq</sub>” as taking two *e* typed arguments and stating that they are equivalent. I analyze questions of identification (QoIs) as *wh*-questions or polar questions that involve an equative internal proposition. Examples of QoIs in English are below:

### 65. Questions of Identification

- a. “Who/which one is Marie?”  $\approx \{ \text{Marie} = x \mid x \in D_e \}$
- b. “Is Marie that person?”  $\approx \{ \text{Marie} = \text{that person}, \text{Marie} \neq \text{that person} \}$

Answers to these questions have to pick out a single member of these sets.

Consider the case where a statement contains a predicate that applies to more than one individual, that is, denotes a set that is larger than one. For example, let’s say there are two people *a* and *b* in the domain who are known to have blue hair. In this model, a QoI like “Who is Marie?” would denote propositions including the statements  $\{ \text{Marie} = a, \text{Marie} = b, \text{Marie} = c \dots \}$ . In this case, the sentence “Marie has blue hair” is true in worlds where  $\text{Marie} = a$  and  $\text{Marie} = b$ . Therefore, such a sentence can never denote a answer to the question since it corresponds to multiple partitions in the denotation of the question rather than a single one. The same logic applies to the polar case: let’s say a speaker points to *a* and asks the question “Is Marie that person?”: this question denotes the following set:  $\{ \text{Marie} = a, \text{Marie} \neq a \}$ . Here, the statement “Marie has blue hair” cannot denote a full answer to the question, since it includes worlds where  $\text{Marie} = a$  and  $\text{Marie} \neq a$  (in the latter worlds,  $\text{Marie} = b$ ). So long as the predicate in a copular clause denotes a non-singleton set, the entire clause cannot be a full answer to a QoI.

Now, consider the case where a statement contains a predicate that applies to exactly one individual. For example, let’s say there is only one person in the domain – *a* – who is known to have blue hair. In this case, “Marie has blue hair” is true *only* in worlds where  $\text{Marie} = a$ . In this information state, this statement entails a full answer to a QoI of the form “Who is Marie?” since the statement picks out the answer  $[\text{Marie} = a]$ . In addition, it entails a full answer to a QoI of the form “Is Marie that person?”: if “that person” is *a*, the statement picks out the same worlds as the full answer  $[\text{Marie} = \text{that person}]$ , and if “that person” is not *a*, the statement entails the full answer  $[\text{Marie} \neq \text{that person}]$ .

From the logic above, it follows that in copular structures, only predicates that denote uniquely can serve as full answers to QoIs. As we showed in (61), identificational appositives must denote uniquely. Thus, analyzing them as subject to these answerhood conditions provides a natural explanation for this particular generalization.

The discussion above raises the question: are the appositives equative or predicative copular clauses? Since the predicate denoted by the PP has to be unique, does the grammar require it to be type-shifted via *iota* into the unique individual in its denotation?

I do not present any evidence distinguishing the two analyses in this paper. I assume only, from the comparison to IRCs and full copular clauses, that the appositives are underlyingly copular clauses, with the subject and copula elided (Onea & Ott 2022). Indeed, regardless of whether the appositives are grammatically equative or predicative, the semantics are the same – singleton predicative copular clauses and equative copular clauses denote the same propositions. To explicitly show the uniqueness requirement discussed above at work, I will analyze the appositives as equative:

66. Marie [~~Marie is here~~] is my best friend.

~~Marie is here~~

Marie = *t*(here)

Of course, the same analysis could work using singleton predicative copular clauses. Ultimately, what's important for my analysis is that the uniqueness requirement follows from answerhood requirements that apply to these appositives.

#### 4.2.1 QoI-Answerhood requirements on “here” explain its restriction to a deictic use

The answerhood requirements discussed above can also explain an interesting data pattern with the modifier “here”. This modifier can only be used as an identificational appositive when it is used “deictically”, or together with pointing. I will show below that this interpretive constraint follows from the answerhood requirements discussed above.

Deictic uses of demonstratives (and other expressions) are accompanied by a gesture involving hand movement or some other attention direction mechanism such as eye gaze (Kaplan 1989). As we've seen in (3a), the deictic use of “here” is a quite natural identificational appositive:

67. *Joe & Marta are at a conference with a phonologist Marie. Joe knows who Marie is and Marta does not.*  
[*Marie is next to Joe. Joe taps her on the shoulder.*] Marie here is staying at my hotel.

When Marie is standing next to Joe, Joe can use “here” to establish to Marta who the name “Marie” refers to.

In addition to its deictic use, “here” can also be used “non-deictically”, to refer to some location larger than but including the context of utterance:

68. [*Same context as (67), but Marie is not around.*] The phonologist here is staying at my hotel.

In (62), “here” can refer to the location of the conference which Joe and Marta are attending. Since this location is larger than the context of utterance, “here” is not accompanied by any deictic gesture. Note that “here” is allowed to be used in this way to pick out which phonologist Joe is referencing, that is, Marie.

In contrast, “here” cannot be used non-deictically when modifying a referring expression like a name:

69. [*Same context as (67), but Marie is not around.*] #Marie here is staying at my hotel.

Non-deictic “here”, referring to the conference that Joe and Marta are attending, cannot serve to restrict the reference of the name “Marie”. The same pattern applies to all unique referring expressions, including unique definites (70) and unique possessives (71):

70. *The Pope is visiting the conference that Joe and Marta are at. Joe says:*  
The Pope here is staying at my hotel [✓*The Pope is next to Joe*; #*The Pope is not around.*]

71. *Joe's mother is visiting the conference that Joe and Marta are at.*  
My mother here is staying at my hotel [✓*Joe's mother is next to Joe*; #*Joe's mother is not around.*]

The difference between (68) and (69)-(71) is that only in the noun phrase in (68) (“the phonologist”) is non-unique and available for regular intersective nominal modification. Since the nouns in (69)-(71) are all unique, the modifiers have to be interpreted as appositives, and thus are subject to constraints on appositives that do not apply to regular nominal modifiers. In particular, the answerhood

constraints on identificational appositives discussed above explains the infelicity of non-deictic “here” in this position, since non-deictic “here” cannot denote uniquely, as I will explain below.

The relevant semantic property that distinguishes deictic from non-deictic “here” is the following: the speaker has to be inside of the location referred to by non-deictic “here”, while the speaker may be outside of the location referred to by deictic “here”. Imagine Joe and Marta are riding an elevator in the Salesforce Tower. Without pointing, Joe can felicitously say the following:

72. [*Inside Salesforce Tower*] I used to work here, you know. (*here = the Salesforce Tower*).

While Joe is inside the location denoted by “here”, he does not need to accompany the expression with pointing. However, let’s say Joe and Marta are standing outside of the Salesforce Tower. In this situation, Joe can point at the Salesforce Tower, and say the same sentence felicitously:

73. [*Outside Salesforce Tower, pointing*] I used to work here, you know. (*here = the Salesforce Tower*)

Due to the pointing gesture, “here” can denote a location that does not include Joe in it. Crucially, Joe is not allowed to use “here” in the latter context if he is not able to draw the hearer’s attention to the building. Let’s say a large structure obstructs Marta’s view of the building. It is infelicitous for Joe to use the same sentence without the pointing gesture:

74. [*Outside Salesforce Tower, not pointing*] #I used to work here, you know. (*here = the Salesforce Tower*)

The contrast in (72)-(74) shows that without demonstrative gesture, “here” must denote a location that contains the speaker. With demonstrative gesture, “here” can denote a location outside of (but proximal to) the speaker. If the speaker has to be in the location denoted by non-deictic “here”, then the location can never be used to uniquely pick out some *other* individual from the speaker. In contrast, the location denoted by “deictic” here is allowed to correspond to the spatial extent of a single person separate from the speaker. Thus, non-deictic “here” can never be used as an identificational appositive, while deictic “here” can.

### 4.3 When do referring expressions license questions of identification?

In the last two sections, I used a variety of linguistic evidence to show that the PP modifiers in (3) are fragment answers to implicit questions of identification. This analysis raises an issue for theories of discourse and discourse reference: how and when are questions of identification licensed?

This section investigates this question empirically: I examine a variety of referring expressions in contexts to uncover generalizations surrounding when they license overt QoIs or further expressions (such as identificational appositives) that point to implicit QoIs being present in the context. This investigation will show that in exactly the same situations that overt QoIs can be raised, identificational appositives can be used, drawing additional support for a connection between the two. More importantly, however, this investigation will motivate and provide empirical desiderata for the proposal I put forward in the next section. In particular, I will motivate the following empirical generalization surrounding QoI licensing:

75. QOI LICENSING: A referring expression *R* associated with the discourse referent *x* licenses a QoI if *x* may or may not be identical with another weakly familiar discourse referent in the common ground.

As discussed in section 2.1, weakly familiar drefs are those individuals whose existence is presupposed in the context, via linguistic mention, perceptual grounding, or some other means. The generalization in (75) states that QoIs are licensed by a referring expression *R* when identity between the discourse referent introduced by *R* and some other weakly familiar discourse referent is not entailed by the context. I will show that QoIs are **optional** when the condition in (75) holds but it is not necessary for conversational purposes to equate the two discourse referents. On the other hand, I will show that QoIs **required** when the dref introduced by *R* does not meet its own requirements of weak familiarity/informational uniqueness but identifying it with some other discourse referent allows it to meet this requirement.

### 4.3.1 Optional QoIs

In some contexts, a referring expression can satisfy weak familiarity but nonetheless may not be presupposed to be identical or non-identical with some other weakly familiar discourse referent. In these contexts, QoIs (and by extension, identificational appositives) are licensed, but these QoIs do not need to be raised or resolved in context.

Take the case of names. Let's say Marta knows Joe has a friend named Marie, but she doesn't know what Marie looks like. Let's say that Joe and Marta are at a party and Marie is standing across the room from them. Joe can say:

76. Joe: By the way, Marie is driving us home.  
Marta: Which one is Marie? / Cool.

In the context above, the dref corresponding to "Marie" is weakly familiar since Marta has heard of Joe's friend Marie before. The woman standing across the room – actually Marie – is also weakly familiar, since both Joe and Marie can see her. But it is not presupposed in this context that that woman is Marie. Therefore, if Marta suspects identity between the two drefs she can raise a QoI ("Which one is Marie?"), but she doesn't have to ("Cool").

Moreover, Joe can use an identificational appositive to circumvent Marta's question in (76). This identificational appositive signals the presence of an implicit QoI:

77. Joe: By the way, Marie (with the blue hair) is driving us home.

So long as Joe knows that Marta doesn't know what Marie looks like, Joe can use an identificational appositive to assert identity between the discourse referent corresponding to Marie and the one corresponding to Marie. Importantly, these QoIs, both overt (76) and implicit (77), are not required to be answered in the context. All that needs for QoIs to be licensed is a lack of presupposed identity between two individuals in the context.

The same holds for definite and possessive descriptions. So long as there is another weakly familiar referent that the definite or possessive description may or may not be identical with, overt QoIs and identificational appositives are licensed:

78. a. Joe: By the way, my dad/the host is driving us home.  
Marta: Which one is your dad/the host? / Cool.
- b. Joe: By the way, my dad/the host, with the blue hair, is driving us home.  
Marta: Cool.

Presumably, both Joe's dad and the host are weakly familiar: one can generally assume people have dads and parties have hosts. In the situation above, in addition to these two discourse referents, there are many other weakly familiar discourse referents that are in the common ground due to joint perceptual experience of Joe and Marta at the party. So long as it's not entailed in the common ground that Joe's dad/the host are identical to any specific one of these weakly familiar discourse referents, questions of identification are licensed. Again, these QoIs are not required to be answered – Marta does not have to raise the questions in (78a), nor does Joe have to use the identificational appositives in (78b).

#### 4.3.2 Required QoIs

In other situations, QoIs are required to be raised and/or answered. One such situation is when names' requirement of weak familiarity is not satisfied. Take (13b), repeated below:

- 13b. [*Marie is Joe's old friend from childhood. Joe knows Marta has never heard of her.*]  
Joe: #Guess what? Marie is coming over tomorrow.

As discussed in section 2.1, if a speaker knows a name is unfamiliar to the addressee, they generally cannot use it. This infelicity, however, can be rescued by an identificational appositive:

79. [*Marie is standing across the room. Joe knows Marta has never heard of her.*]  
Joe: Guess what? Marie, with the blue hair, is coming over tomorrow.

So long as the speaker follows up the name with material that establishes the individual as identical to a referent that *is* weakly familiar, the expression will be felicitous. The appositive helps the anchor meet its requirement of familiarity.

The contrast of (13b) and (79) above shows that speakers cannot use a name if they know it is unfamiliar without providing additional material that clarifies reference. On the other hand, if the speaker *believes* a name is familiar, but it isn't actually, then the requirement to resolve this unmet requirement shifts to the addressee:

80. *Joe thinks Marta knows Marie. Marta doesn't know her.*  
Joe: Guess what? Marie is coming over tomorrow.  
a. Marta: Who is Marie?  
b. Marta: #Cool.

There's a clear intuition that if Marta does not raise an overt QoI as in (80a), she will (i) erroneously signal to Joe that she actually is familiar with Marie and (ii) does not want to fully understand Joe's utterance. Thus, in conversations where a name's weak familiarity requirement isn't satisfied, the difference between cases where an identificational appositive is used and cases where overt QoIs are used is speaker belief regarding the common ground. If a speaker believes that weak familiarity isn't satisfied, they are required to accompany unfamiliar names with clarifying material in order to make sure the condition is met. If the speaker believes it is satisfied, and the addressee wants to be cooperative, the addressee will be forced to make the lack of satisfaction clear to the addressee.

On the other hand, unfamiliar definite and possessive descriptions do not share this requirement:



18. [repeated] *The addressee knows Martha.*

A: What's wrong with Bill? Oh, the woman he proposed to last night (– Martha –) said no.

B: Oh no!

The speaker can make it clear who the woman is to the addressee, but they don't have to. In the next section, I will attribute this flexibility to a fact I mentioned in section 2.1: unlike names (and dummy pronouns), definite descriptions easily allow accommodation of hearer-new referents. Since the addressee has the option of accommodating a truly novel referent, an unfamiliar description does not require raising and/or answering a question of identification about the anchor.

Other requirements unmet by the anchor may cause QoIs to be required in a context. Consider example (4) from section 1:

4. [repeated] *Joe & Marta were at a party earlier where they met many people including Joe's dad, who has white hair. It never came up at the party that Joe's dad was Joe's dad.*

a. Joe: #Did you like my dad?

b. Joe: Did you like my dad, with the white hair?

Joe cannot use the description “my dad” to refer to the man at the party, since he knows Marta isn't aware of which man was his dad. We can explain this requirement as imposed by a combination of various facts about the containing sentence and context, such as the fact that it is a (i) question posed to the addressee that includes (ii) the addressee as the subject and (iii) includes the verb “like”, which presupposes the subject to have some experience with the object. Although “my dad” may be weakly familiar in the context – Marta may know that Joe has an dad – clearly the question is intended to range over the specific weakly familiar referents that correspond to the people that Marta met at the party. None of these weakly familiar discourse referents meet informational uniqueness across all worlds/assignments.

### 4.3.3 Dummy Pronouns

Licensing of QoIs by names and definite descriptions happens pragmatically – that is, only in certain contexts can overt QoIs be raised or clarifying material be added to the expression to help in the process of identification. This section discusses a subclass of referring expressions that I will analyze as *conventionally* raising an implicit QoI – Clark & Wilkes-Gibbs (1986)' “dummy pronouns” (e.g., “whats-her-face”).

Descriptively, these expressions signal speaker uncertainty surrounding how to identify a particular referent, and are thus often followed by an identificational appositive (81) or a dialogue that serves to clarify reference for the addressee (82):

81. Oh wow. I just got a text from **what's-her-face**, Marie.

82. A: Oh wow. I just got a text from **what's-her-face**.

B: Marie?

A: Yeah.

Uncertainty around identification seems to be built into the actual semantics of these items. Although polar QoIs can be raised after such expressions (B's response in (83)), *wh*-QoIs sound redundant when following the expressions:

83. A: I just got a text from **what's-her-face**.  
B: #Who?

We can take this redundancy to suggest that dummy pronouns conventionally encode that a *wh*-question of identification is present in the context.

Despite being conventionally associated with a *lack* of certainty surrounding identification, these expressions are referential. Like typical referential expressions (names, definite descriptions, pronouns), dummy pronouns license subsequent anaphora:

84. a. **What's-his-face**, **who**<sub>i</sub> I hate, tweeted five times in the last hour.  
b. I just got a text from **what's-her-face**. **She**<sub>i</sub> is so annoying.

These expressions license subsequent relative pronouns (84a), and cross-sentential pronominal anaphora (84b).

Moreover, like other referential expressions, dummy pronouns are required to be weakly familiar:

85. [*Joe went to a party without Marta yesterday and met Marie, who he knows is Marta's friend.*]  
Joe: At the party last night, I met what's-her-face. Your friend, Marie.
86. [*Joe went to a party without Marta yesterday and met Marie, who he doesn't think Marta knows.*]  
#Joe: At the party last night, I met what's-her-face. This woman, Marie.<sup>10</sup>

In (85), since Marta knows Joe is aware of the existence of Marie, she can use the expression “what's-her-face”. In (86), on the other hand, since Marta cannot be sure that Joe knows that Marie exists, she cannot use the expression.

This last requirement proves that even natural language *semantics* cares about the distinction between referentiality – which I analyze as the common ground entailing existence and uniqueness of the referent – and identification – which I analyze as the common ground entailing identity with a specific weakly familiar discourse referent. These expressions are simultaneously conventionally referential *and* unidentified.

In most contexts, dummy pronouns pattern with names: they require follow up material to determine reference. Consider (87) below:

87. Joe: Wow. I just got a text from what's-her-face.  
Marta: [*Doesn't know who Joe is talking about.*] Your friend Marie? / #Cool.

We can explain this requirement by appealing to an unsatisfied requirement of weak familiarity: since these expressions are conventionally unidentified, if the addressee is not able to determine who the speaker is talking about, then they cannot assume that the individual *is* weakly familiar in the first place.

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<sup>10</sup> The prosody here matters, as these expressions can also be used as self-addressed questions, in which case the requirement of weak familiarity is not present:

- A. At the party last night, I met... what's her face ... this woman named Marie.

Example (86) is only infelicitous with default sentential and nominal intonation – without a pause prior to the nominal expression.

In these cases, a dialogue surrounding identification has to be initiated for the addressee to fully understand the speaker's utterance.

In cases where the addressee can figure out this connection, however, no QoI needs to be raised or answered:

88. *Joe has been waiting from a reply from a date and talking non-stop to Marta about it.*

Joe: Wow. I just got a text from what's-her-face.

Marta: Oh finally! What does it say?

From the content of Joe's sentence, and the fact that Joe has been talking to Marta non-stop about this particular person, Marta can figure out which weakly familiar referent Joe is referencing, and thus that the referential expression *is* weakly familiar in the first place.

In the next section I will finally put forward my proposal of a discourse model that encodes some of the properties discussed in this section. I will show that a discourse model in the vein of AnderBois et. al. (2015), integrated with the theory of Roberts (2003) / Aloni (2001) discussed in section 2, can account for the generalization discussed at the beginning of this section.

## 5. The Proposal

Above, I have shown that material outside the scope of and conversationally subsequent to a referring expression can be used to restrict its reference. In some cases – such as with unfamiliar names – this material may be necessary for the expression to refer *at all*, as without the subsequent material the referring expression does not meet its requirement of familiarity. In other cases – specifically those in which all the requirements on the referring expression are satisfied in the context – this subsequent material is merely used to draw an identity relation between the referring expression and some other discourse referent known by the addressee. In both cases, however, this material is intuitively *restrictive*, in the sense that it removes possible referents the expression could pick out.

I argued that this restriction comes about via a linguistic process of licensing and answering implicit questions of identification. In this section I propose a formal theory of discourse dynamics that models this process, drawing on the theories surrounding discourse reference discussed in section 2 (Roberts 2003, Aloni 2001), how appositives interact with the context (AnderBois et. al. 2015, Koev 2013, Onea 2016), and how implicit questions are licensed/raised in context (Onea 2016).

My main claim in this proposal is that the question is implicitly raised due to the failure of satisfaction of the definite presupposition – informational uniqueness (Roberts 2003) – in such cases where this presupposition cannot be accommodated. In this section I show how this presupposition can be embedded in the system of AnderBois et. al. (2015) and trigger a question of identification that the appositive can answer.

In 5.1, I discuss the basic contours of the formal system in Anderbois et. al. (2015). In 5.2, I present a novel interpretation of the representation of discourse referents in the theory, drawing together the insights from Roberts (2003) and Aloni (2001) discussed in section 2. I also discuss how we can use this model to understand how and when questions of identification are licensed. In 5.3, I provide the semantics of the dynamic system, introducing new rules for definite descriptions, and showing how the definite presupposition might lead to a situation where a QoI needs to be raised and answered by subsequent expressions. In 5.4 I show how the system accounts for regular cases of restrictive modification (subsecutive modification).

## 5.1 Formal System

The meaning of sentences in dynamic semantics is modeled as information update: a mapping from contexts to contexts. In the proposed model, contexts are represented as sets of variable assignments, where each variable is a distinct discourse referent in the context. Two types of variables will be used: nominal variables that range over individual concepts  $\langle s, e \rangle$  and clausal variables that range over propositions  $\langle s, t \rangle$ .

Following AnderBois et. al. (2015), I assume there are at least two relevant propositional variables that are evaluated in the course of interpretation of a sentence: the **proposal**, constituting the at-issue information in a given utterance, and the **context set**, or the global possibilities which are at this point jointly committed to by the speaker and hearer (the intersection of worlds in the propositions in the common ground). I represent the proposal with a propositional discourse referent  $p$  and the context set with a distinguished propositional discourse referent  $p^{cs}$  that lasts throughout the course of a conversation. At the end of an utterance, the addressee(s) can accept the proposal either silently or via overt discourse particles such as “OK”. Acceptance of the proposal constitutes resetting  $p^{cs}$  with the worlds in the proposal  $p$ .

Possible assignments to propositional variables like  $p$  and  $p^{cs}$  track the current maximal set of worlds in the variable as well as all of its subsets. These different assignments consist of all of the “live options” of assignments to the variable that could survive after update. In the case of  $p^{cs}$ , we take these live options to model the different possible sets of worlds that are compatible with the information that has been agreed upon so far. Upon acceptance, informative expressions such as assertions and appositives rule out certain assignments to  $p^{cs}$ , essentially restricting the maximal set of worlds in the context set. Let’s say, for example, that three worlds are in the context set:  $w_1$ ,  $w_2$ , and  $w_3$ . This context can be visualized as the table below:

	$p^{cs}$
$g_1$	$w_1, w_2, w_3$
$g_2$	$w_1, w_2$
$g_3$	$w_1, w_3$
$g_4$	$w_2, w_3$
$g_5$	$w_1$
$g_6$	$w_2$
$g_7$	$w_3$

Let’s say the proposition denoted by the sentence “Marie is driving us home” is true only in  $w_2$  and  $w_3$ . If a speaker proposed that sentence, and it was accepted by the addressee, the new context would include only assignments like  $g_4$ ,  $g_6$  and  $g_7$  that assign  $p^{cs}$  to some combination of the worlds  $w_2$  and  $w_3$ .

	$p^{cs}$		$p^{cs}$	
$g_1$	$w_1, w_2, w_3$	Marie is driving us home. (OK) →	$g_4$	$w_2, w_3$
$g_2$	$w_1, w_2$		$g_6$	$w_2$
$g_3$	$w_1, w_3$		$g_7$	$w_3$
$g_4$	$w_2, w_3$			
$g_5$	$w_1$			
$g_6$	$w_2$			
$g_7$	$w_3$			

I signal silent acceptance of the proposal with “(OK)”.

AnderBois et. al. (2015) argue from a variety of evidence that appositives are *impositions* on the context set, directly updating  $p^{cs}$  without mediation through the proposal  $p$ . This hypothesis allows

them to explain how information in appositives can project but still interact with information in the main clause. They implement this distinction by indexing each predicate in logical form  $R$  with a propositional dref  $p'$  to interpret the predicate against. Predicates in the main clause are interpreted with respect to the proposal  $p$  ( $R_p$ ); predicates in the appositive are interpreted with respect to  $p^{cs}$  ( $R_{cs}$ ). I will use the same indexing mechanism.

Using these ingredients, we can start to model the logical form of discourses. For the purposes of this initial demonstration, I will not explicate what is going on in definite descriptions or names: the logical forms presented below are only an initial attempt to show the outline of how the system works and will be amended throughout the following sections.

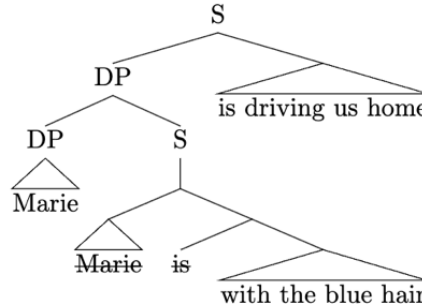
The LF of “Marie is driving us home. (OK).” looks somewhat like the following:

89. Marie is driving us home. (OK). **[to be revised]**  
 $\exists p \wedge p \subseteq p^{cs} \wedge \exists x \wedge \text{MARIE}_p(x) \wedge \text{DRIVING-US-HOME}_p(x) \wedge \exists p^{cs} \wedge p^{cs} = p$

First, a new propositional discourse referent  $p$  is introduced that corresponds to the proposal ( $[p]$ ). This dref is required to be a subset of the worlds in the common ground ( $p \subseteq p^{cs}$ ). Then, a new nominal discourse referent  $x$  is introduced, and both its restriction (MARIE) and scope (DRIVING-US-HOME) are applied to  $x$  in the worlds of the proposal  $p$ . Finally, acceptance of this proposal consists of resetting  $p^{cs}$  with  $p$  ( $\exists p^{cs} \wedge p^{cs} = p$ ).

Now consider a sentence including an identificational appositive, like “Marie, with the blue hair, is driving us home.” I analyze the structure of this sentence (and all sentences containing identificational appositives), as below:

90. [Structure] Marie, with the blue hair, is driving us home.



I take the appositive to be a full root clause adjoined to the anchor.<sup>11</sup> The subject and equative copula of this root clause are elided (unpronounced) at the surface but survive in the logical form.

Using this structure, we can interpret the sentence left-to-right, as is standard in dynamic frameworks. The logical form of this sentence looks somewhat like the following:

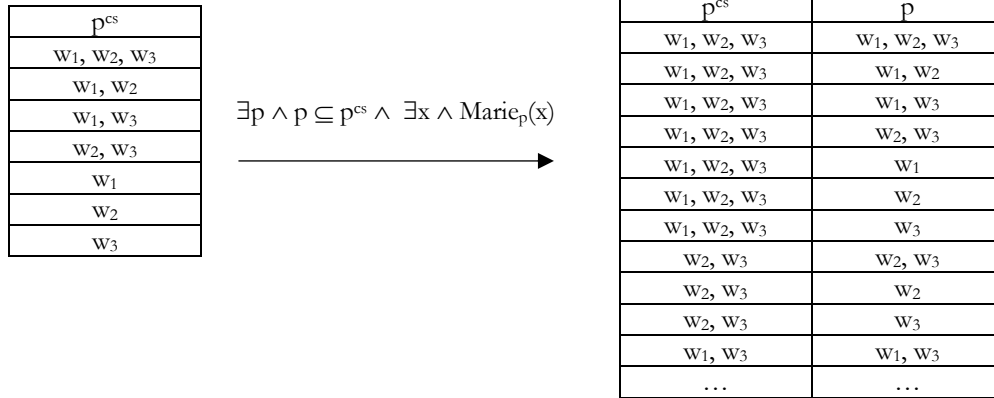
91. Marie, Marie is with the blue hair, is driving us home. (OK). **[to be revised]**

$$\exists p \wedge p \subseteq p^{cs} \wedge \exists x \wedge \text{MARIE}_p(x) \wedge \exists y \wedge \text{MARIE}_{cs}(y) \wedge \exists z \wedge \text{BLUE-HAIR}_{cs}(z) \wedge y =_{cs} z \wedge \text{DRIVING-US-HOME}_p(x) \wedge \exists p^{cs} \wedge p^{cs} = p$$

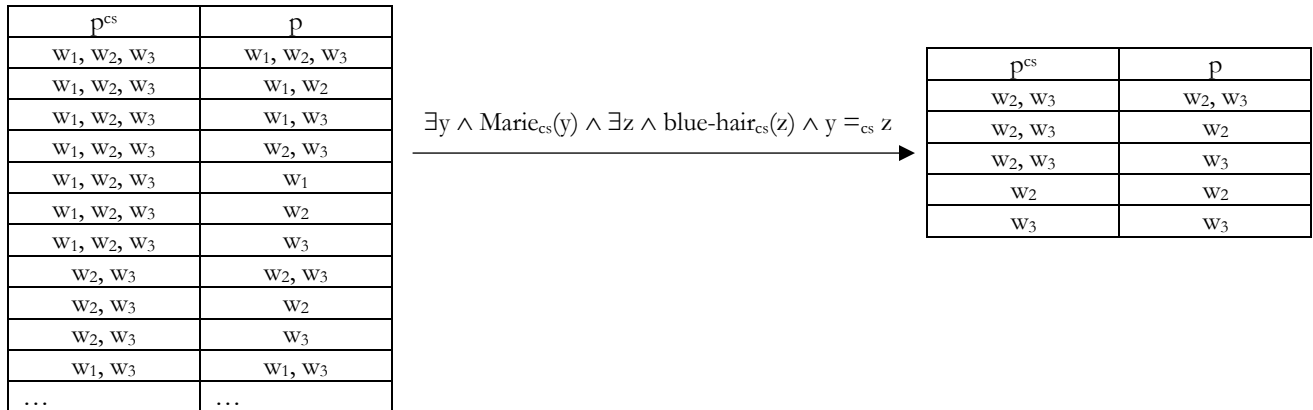
<sup>11</sup> I label this root clause “S”, but an analysis of the appositive as a ForceP as in Koev (2013) is natural for my proposal.

The difference between the two logical forms in (89)/(91) is the appositive update in bold: in this update, Marie is equated with the individual that has blue hair. This update crucially applies directly to the context set – the predicates in the appositive (including the equative statement) only index  $p^{cs}$ .

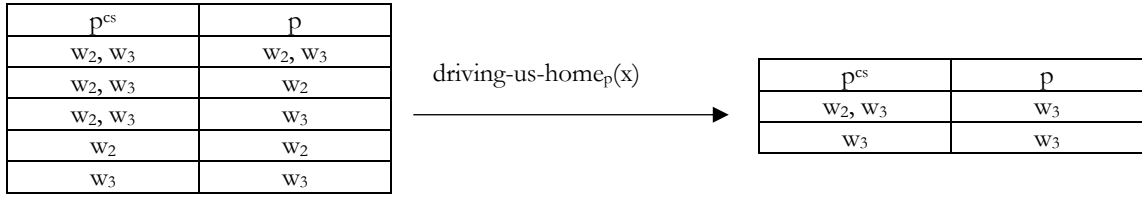
We can go through this update step by step (ignoring the nominal drefs, as they will be discussed later). Assume Marie is identical with the individual that has the blue hair in  $w_2$  and  $w_3$ , and Marie is driving the speaker and addressee home in  $w_1$  and  $w_3$ . First a proposal is introduced that's required to be a subset of  $p^{cs}$ :



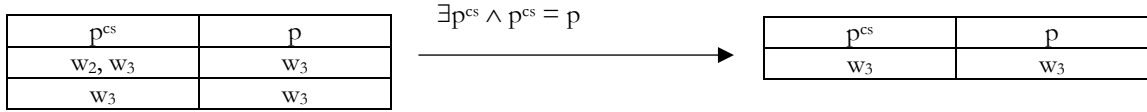
Then, the appositive reduces  $p^{cs}$  to only assignments where Marie has the blue hair, the worlds  $w_2$  and/or  $w_3$ . Since  $p$  is already restricted to be a subset of  $p^{cs}$ , this step indirectly restricts  $p$  to also include only those worlds:



Then, the matrix predicate “driving-us-home $_p(x)$ ” reduces the proposal  $p$  to only include at most the worlds  $w_1$  and  $w_3$ . Since the proposal has already been reduced to a set that does not contain  $w_1$ ,  $p$  will only include  $w_3$  at this time.



Finally, upon acceptance,  $p^{cs}$  will be reduced to  $p$ , i.e.  $w_3$ :



This sequence of updates models how information in the appositive and matrix clause are both separate but can depend on each other.

We can also use this system to understand what it means for a question to be licensed in a context. I will take this to mean that there is some non-trivial partition on the context set ( $p^{cs}$ ) that correspond to the exhaustive answers to that question.

Consider the question below:

92. “Is Marie the person with the blue hair?”

Let’s say the maximum set of worlds in the context set is the following  $p^{cs} = \{w_1, w_2, w_3\}$ . Let’s say Marie is identical to the person with the blue hair in  $w_2$  and  $w_3$  and identical to someone else in  $w_1$ . The question in (92) corresponds to the set of propositions  $\{\{w_1\}, \{w_2, w_3\}\}$ . In this context, the question in (92) is licensed.

When are questions not licensed in a context? The first case is when their presuppositions are not yet met (Onea 2016). For example, let’s say that Marie doesn’t exist in  $w_4$ , and the context set includes that world (maximum  $p^{cs} = \{w_1, w_2, w_3, w_4\}$ ). Then there is no partition on the worlds in the context set that corresponds to the question above, because the context set includes worlds that are not included in the partition of the question ( $[[[92]]] = \{\{w_1\}, \{w_2, w_3\}\}$ ).

The other case where a question is not licensed is when the question is already answered by information in the common ground, and thus there is no *non-trivial* partition on the context corresponding to the answers to the question. Let’s say, e.g., that the context only includes the worlds  $w_2$  and  $w_3$ . Then, enough information is included in the context set to answer (92) – the partition induced by the question corresponds only to  $\{\{w_2, w_3\}\}$ .

We can start to define this condition on question licensing by defining the *informative content* of a question – all the worlds in any proposition in the denotation of the question (Koev 2013):

93. Informative content of a question  $Q$

$$\mathbf{info}(Q) := \{ w \mid \exists p \in Q: w \in p \}$$

Second, we need all the possible assignments to  $p^{cs}$  in order to get all possible worlds that are available in the context. We can do this by defining the notion of an *assignment-set* of a discourse referent, which includes all the possible values that the referent resolves to under some assignment in the context:

94. Assignment set of a discourse referent  $x$  in a context  $c$

$$\text{assign-set}(x, c) := \{ g(x) \mid g \in c \}$$

The informative content of a context  $c$  is then  $\mathbf{info}(\text{assign-set}(p^{\alpha}, c))$ . I will label this  $\mathbf{info}(c)$ . We can then define the licensed questions in a context  $c$  as the set of questions that have the same informative content as the context, but crucially (i) include more than one alternative (are non-trivial) and (ii) do not overlap in worlds (are a proper partition) (Groenindijk and Stokhof 1984).

95. Questions that are licensed in a context  $c$

$$\text{Licensed-Questions}(c) := \{ Q_{\langle\langle s, t \rangle, t \rangle} \mid \mathbf{info}(Q) = \mathbf{info}(c) \wedge |Q| > 1 \wedge \forall p, p' \in Q [ p \cap p' = \emptyset ] \}$$

For example, in a context  $c_1$  where the informative content of  $p^{\alpha}$  is  $\{w_1, w_2, w_3\}$ , there are four licensed questions:

96. Licensed Questions( $c_1$ ) =

$$\text{Q1: } \{ \{w_1\}, \{w_2\}, \{w_3\} \}$$

$$\text{Q2: } \{ \{w_1, w_2\}, \{w_3\} \}$$

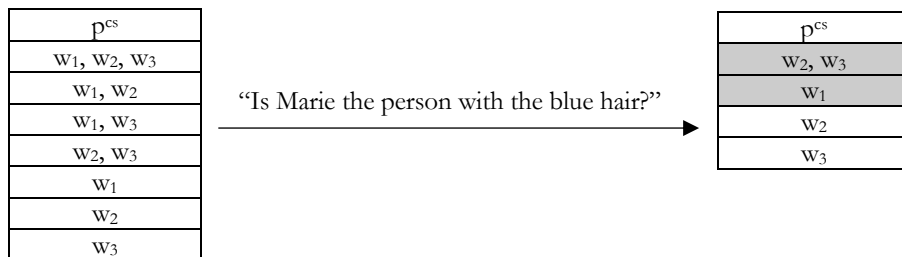
$$\text{Q3: } \{ \{w_1\}, \{w_2, w_3\} \}$$

$$\text{Q4: } \{ \{w_1, w_3\}, \{w_2\} \}$$

Note that the fact that a question is licensed does not mean that it is *raised*, i.e., does not mean that it is felicitous for any interlocutor to go ahead and answer it. What it means, rather, is that it meets the minimum requirements *to be raised* – an interlocutor can raise it, so long as it is relevant to the conversation to do so.

Indeed, the definition in (95) is a conjunction of conditions on questions that must apply for them to be raised in a context. Of course, these conditions may be relaxed in certain contexts, but crucially, I take them to be more stringently applied to the case of implicit questions, such as the QoIs that license our identificational appositives. That is, even though certain overt questions can be trivial – rhetorical questions – I assume that there is no such thing as an *implicit* rhetorical question.

Following Koev (2013), I assume raising a question divides the context into a state where the maximal assignments to  $p^{\alpha}$  correspond to the answers to the question. So, e.g., in our first context above, overtly asking the question (92) would shift the context in the following way:



In the output context of the question, there is no unique maximal assignment to  $p^{\alpha}$ . Rather, there are two maximal assignments (shaded) We can thus tell if a question is **raised** if the context set is in a state with multiple maximal alternatives.



## 5.2 Nominal Discourse Reference

In this section, I discuss the theoretical status of discourse referents in this formal system in light of the insights into discourse reference discussed in section 2. Specifically, I adopt Roberts (2003) view of weak familiarity, allowing drefs to persist throughout different conversations with the same interlocutors, and integrating Roberts' rules for the introduction of different kinds of drefs into the system. Moreover, I discuss how the representation of drefs as individual concepts allows us to model the same kind of data as the theory of conceptual covers in Aloni (2001) discussed in section 2.3, and moreover allows us to represent when a question of identification is licensed in a context.

In AnderBois et. al. (2015), nominal discourse referents are assumed to be partial individual concepts, or partial functions from worlds to individuals  $\langle s, e \rangle$ . They define nominal drefs in this way to capture facts surrounding anaphora between appositives and indefinite anchors in the scope of operators like negation:

97. John didn't read a book, which Mary had recommended to him.

The only interpretation possible for "a book" in (97) is wide scope, where there is a specific book discussed. Their analysis for this obligatory wide-scope interpretation proceeds as follows: if "a book" were narrow scope, it would have to be interpreted in a set of counterfactual worlds – call this  $p'$ . Since the predicates in the appositive directly update  $p^c$ , they require their arguments, including the dref introduced by "a book", to be defined in the worlds of  $p^c$ . However, since  $p'$  is counterfactual, it is disjoint from  $p^c$ . Therefore, "a book" cannot be narrow scope and serve as the argument to the predicates in the appositive. When "a book" is wide scope, however, it can be defined in the worlds of  $p^c$ , and therefore be targeted for anaphora in the appositive.

This logic leads them to posit that discourse referents introduced with respect to the main proposal (rather than some propositional discourse referent introduced by negation or a modal) are always defined in the worlds of the common ground. They encode this by indexing each nominal discourse referent  $x$  with the worlds in its domain ( $x_p$ ), where the nominal discourse referents introduced in the proposal are indexed with the context set ( $x_{cs}$ ). Although this last assumption is somewhat of a stipulation, the structure of the update system makes it so that eventually, discourse referents introduced in the proposal will be defined in all the worlds of the context set (i.e., when the proposal is accepted).

We can think of this process as fulfilling condition (i) in Roberts (2003)'s definition of Weak Familiarity, repeated below:

10. [repeated] WEAK FAMILIARITY: the common ground entails the existence of an individual. That is, both interlocutors know the other knows an individual exists via ...  
(i) linguistic mention – both participants have discussed the individual....

Once an individual (i.e. a discourse referent) is discussed, so long as they survive in the acceptance of the proposal, they are presupposed to exist in all the worlds of the common ground.

How do other discourse referents get into to the assignment function? The second condition in Roberts (2003) is the following:

- (ii) perceptual experience – both participants have had joint perceptual experience with the individual and can assume each other were aware of the individual.

Perceptual introduction of a discourse referent involves joint perceptual attention of speaker and hearer on the referent, such that both speaker and addressee are aware that the other is aware of the existence of the referent. Deictic introduction of a dref was discussed as early as Heim (1982), but in this framework it was not clear whether the dref *persisted* past a given conversation. In our framework encoding weakly familiar referents, we assume that this kind of introduction lasts into future conversations.

A clear parallel to this kind of dref introduction in the literature is the concept of Perceptual Grounding in Heller & Wolter (2014), used to account for similar puzzles surrounding questions of identification. This concept is defined as the joint ability of speaker and hearer to identify the referent via perceptual factors. Of course, this ability can only arise when there is some event in the past where this kind of grounding happened. Heller & Wolter (2014) analyze perceptually grounded referential expressions as directly referential in the sense of Kaplan (1989), but don't provide an explanation for this property, stipulating two different semantics for perceptually grounded and non-perceptually grounded definite descriptions. Our theory also analyzes these referents as rigid designators – denoting the same entity in all possibilities in the model – but follows Aloni (2001) in explaining their rigid reference as following from facts about the epistemic states of interlocutors. Namely, when a referent in the actual world has been jointly perceived by both interlocutors, there is no epistemic uncertainty about exactly which referent the given description picks out in context.

Thus, when an entity in the actual world is brought into the joint attention of interlocutors, I propose that a rigidly designating discourse referent enters the common ground, along with jointly accessible perceptually available information. We can define an event of perceptual grounding as adding to the context a new discourse referent  $u$  assigned to the same entity  $a$  in all assignments along with perceptually available information about  $u$ .

The last condition on weak familiarity is *world knowledge*:

- (iii) world knowledge – both interlocutors can assume the other is aware of the individual due to general facts known throughout the speech community.

I assume this is a special case of linguistic introduction, where a speaker has been made aware of a dref in one conversation, and also made aware that most people know of this specific dref, so they can reasonably be sure that even in contexts where this dref has not be explicitly mentioned it is present in the context.

The fact that certain discourse referents are defined relative to all the worlds in  $\mathcal{P}^{cs}$  makes it so that dependencies between worlds in the common ground and assignments of these referents to individuals are explicitly represented in the theory:

#### 98. Dependencies between $\mathcal{P}^{cs}$ and nominal drefs

	$x_{cs}$	$\mathcal{P}^{cs}$
$g_1$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$w_1, w_2$

Under assignment  $g_1$ ,  $x$  is  $a$  in  $w_1$  and  $b$  in  $w_2$ . Below, I will discuss the extent to which we can take this mapping to represent uncertainty of reference.

Consider a situation where there are multiple assignments where  $x$  resolves to distinct individuals in the same world. In this situation,  $x$  is what Aloni (2001) calls an “indefinite subject”:

### 99. Indefinite Subject

	$x_{cs}$	$p^{cs}$
$g_1$	$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$w_1, w_2$
	...	...
$g_4$	$\{w_1 \rightarrow b, w_2 \rightarrow b\}$	$w_1, w_2$
	...	...

Depending on the assignment,  $x$  can resolve to  $a$  or  $b$  in each world. One can see how this is indefinite by considering the sentence “a dog ate my homework”. This sentence may be true on assignments where the particular dog that ate my homework was  $a$  in  $w_1$  and on assignments where the particular dog that ate my homework was  $b$  in  $w_1$ . Since there are many dogs in each world of the common ground, any single one of those dogs could have eaten my homework in any world to verify the truth of the statement. In this context, there may be uncertainty surrounding which dog ate the homework, but there is no uncertainty surrounding whether any of these dogs fit the description “dog”. We can call this kind of potential uncertainty “uncertainty of semantic reference over assignments”.

On the other hand, consider a situation where on all assignments,  $x$  resolves to a unique entity in each world. In this situation,  $x$  is what Aloni (2001) calls a “definite subject”:

### 100. Definite Subject

	$x_{cs}$	$p^{cs}$
$g_1$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$w_1, w_2$
$g_2$	$\{w_1 \rightarrow a\}$	$w_1$
$g_3$	$\{w_2 \rightarrow b\}$	$w_2$

Above, we see that there are no assignments that associate the same world in  $p^{cs}$  with a distinct mapping to  $x$ . Across assignments  $x$  is assigned to the same entities in the same worlds. One can see how this is “definite” by considering the sentence “the biggest dog in the world ate my homework”. Let’s say that it’s not presupposed whether the biggest dog in the world is  $a$  or  $b$ , but it is presupposed that there is a unique biggest dog in the world. Then, the sentence “the biggest dog in the world ate my homework” could be verified if  $a$  ate my homework or  $b$  ate my homework, and this would also tell us something informative surrounding the description itself: whether  $a$  or  $b$  is the biggest dog in the world. We can call this kind of potential uncertainty “uncertainty of semantic reference over worlds”.

There is a sense in which both types of uncertainty represent uncertainty of reference in the common ground. However, in the phenomena we are concerned with here, the uncertainty of reference is not about which individual in the model is being referenced by a particular expression, but over *which discourse referent* is being signaled by the speaker. That is, the empirical domain we are treading in is *speaker reference*, or identification, not *semantic reference*.

We can only talk about uncertainty of identification with respect to *multiple* discourse referents. There are three cases to consider here. The first ( $x = y$ ) is when two discourse referents are identified with each other, as below:

101.  $x_{cs}$  is **identified** with  $y_{cs}$  under  $g$  iff  $\forall w \in g(p^{cs}) [g(x)(w) = g(y)(w)]$

	$x_{cs}$	$y_{cs}$	$p^{cs}$
$g_1$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$w_1, w_2$

If there is some  $y$  in the discourse that  $x$  is identified with across all assignments, then  $x$  and  $y$  are functionally the same discourse referent. This condition will serve an important role in defining what informational uniqueness is.

The second case ( $x \neq y$ ) is where two discourse referents are **distinct** in all worlds of the common ground:

102.  $x_{cs}$  is **distinct** from  $y_{cs}$  under  $g$  iff  $\forall w \in g(p^{cs}): [g(x)(w) \neq g(y)(w)]$

	$x_{cs}$	$y_{cs}$	$p^{cs}$
$g_1$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$\{w_1 \rightarrow b, w_2 \rightarrow a\}$	$w_1, w_2$

Above, even though  $x$  and  $y$  range over the same individuals, they are crucially presupposed to be distinct in all worlds in the context set. The situation above corresponds to an interesting biconditional statement:  $x = a$  iff  $y = b$ . Such discourse referents may correspond to “the winner of tonight’s boxing match” and “the loser of tonight’s boxing match”, assuming there are two competitors, and somebody has to win. Most weakly familiar referents are distinct in a simpler way: any dref corresponding to a dog will crucially never range over the same individuals in the domain as a dref corresponding to a human.

If  $x$  and  $y$  are distinct across all assignments, they may never resolve to the same individual in any future context.

The third case ( $x \neq y$ ) is where two discourse referents are distinct some worlds of the common ground, but identified with each other in others:

103.  $x_{cs}$  is **identifiable** with  $y_{cs}$  under  $g$  iff  $\exists w, w' \in g(p^{cs}) [g(x)(w) = g(y)(w) \ \& \ g(x)(w') \neq g(y)(w')]$

	$x_{cs}$	$y_{cs}$	$p^{cs}$
$g_1$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$w_1, w_2$

In  $g_1$ ,  $x = y$  in  $w_1$  and  $x \neq y$  in  $w_2$ .

Consider the case where both  $x$  and  $y$  are identifiable definite subjects – they both resolve to only one individual per world across all assignments:

104. **Identifiable Definite subjects**

	$x_{cs}$	$y_{cs}$	$p^{cs}$
$g_1$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$w_1, w_2$
$g_2$	$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow a\}$	$w_1$
$g_3$	$\{w_2 \rightarrow b\}$	$\{w_2 \rightarrow a\}$	$w_2$

This means that there are some worlds in the context set ( $w_1$ ) where the two drefs are the same and others ( $w_2$ ) where they are different. This represents a non-trivial maximal partition of worlds in the context set that correspond to the statements  $x = y$  and  $x \neq y$ . This situation formally fits the definition of a “Licensed Question” discussed in the last section, with the specific question being a question of identification.

Using this notion of identifiability, we can represent the state of the context that licenses a question of identification as the one in (104) above, where the question corresponds to the statements  $\{x = y, x \neq y\}$  and the partition on  $p^{cs}$   $\{\{w_1\}, \{w_2\}\}$ . Of course, I have yet to explain (i) how certain uses of referring expressions lead to a state like the one above, and (ii) what makes the QoI salient enough that it can be *implicitly* raised and license ellipsis in the appositive. In the next section, I will provide an initial attempt to model how this works. In order to do this, I will first have to introduce the semantics for expressions in AnderBois et. al (2015) and add definites to the model.

### 5.3 Definites in AnderBois et. al. (2015)

The system in AnderBois et. al. (2015) is an extension to Dynamic Predicate Logic, where meaning is conceived as a relation on assignments. A Model  $M = \langle D, W, T, \mathcal{I} \rangle$  consists of a set of individuals  $D$ , worlds  $W$ , truth values (0 or 1), and an interpretation function  $\mathcal{I}$  that returns the denotation of predicate constants in each world  $\mathcal{I}_w$ . We assume we can freely construct domains  $D_{\text{type}}$  for objects of any functional type constructed from  $e, s, t$ . Two functional types we will use often, as they are the values of drefs in the model, are propositions  $\langle s, t \rangle$  and individual concepts  $\langle s, e \rangle$ . I will call these respectively *pr*-drefs and *i*-drefs. We also have at our disposal a set of assignment functions  $G$  and variables  $V$ , where each assignment function maps some variable to some value.

Contexts are sets of assignments, and meaning is a relation on contexts. For example, the dynamic interpretation of a formula  $[[\varphi]]$  is true relative to an input context  $c$  iff there is some output context  $c'$  such that  $[[\varphi]]^{\langle c, c' \rangle} = T$ .<sup>12</sup> From this definition of truth, we can start to define the semantics for various expressions.

First, dref introduction rules. Assume  $g[u]h$  is the statement that the assignment  $h$  has the same domain as  $g$  besides an extra variable,  $u$ , and that  $h$  differs from  $g$  on at most the value of  $u$ :

$$105. g[u]h := \mathbf{dom}(h) = \mathbf{dom}(g) \cup \{u\} \wedge \forall v \in \mathbf{dom}(g): h(v) = g(v)$$

Then the addition of new propositional and nominal discourse referents can be defined as follows:

#### 106. Dref Introduction

- a.  $[[\exists x_p]]^{\langle c, c' \rangle} = T$  iff  $c' = \{ h \mid \exists g \in s: g[x]h \ \& \ \mathbf{dom}(h(x)) = h(p) \}$
- b.  $[[\exists p]]^{\langle c, c' \rangle} = T$  iff  $c' = \{ h \mid \exists g \in s: g[p]h \}$

Formula (106a) extends the input context  $c$  to a context  $c'$  where all assignments are the same except with the addition of an *i*-dref  $x$  with domain  $p$ . That is,  $x$  will be added to each assignment and arbitrarily assigned to every possible individual concept with domain  $p$ . Formula (106b) adds a *pr*-dref  $p$  to every assignment and arbitrarily assigns it a set of worlds.

<sup>12</sup> The original system in AnderBois et. al. (2015) takes meaning to be a relation on assignments, but I lift it to sets of assignments in order to easily define the definite’s presupposition.

Next, the subset/equality relation on propositional discourse referents, defined in order to account for the statements  $p \subseteq p^{cs}$  and  $p^{cs} = p$ :

107. Relations on propositional drefs

$$[[p \subseteq/= p']]^{<c, c'>} = T \text{ iff } c' = \{ g \in c \mid g(p) \subseteq/= g(p') \}$$

These relations return only those assignments from  $c$  where  $p$  is a subset of or equivalent to  $p'$ .

Next, basic predicate interpretation rules, including that of equative “be”:

108. Basic Interpretation Rules

$$a. [[R_p(x_1 \dots x_n)]]^{<c, c'>} = T \text{ iff } c' = \{ g \in c \mid \forall w \in g(p): \langle g(x_1)(w) \dots g(x_n)(w) \rangle \in \mathcal{I}_w(R) \}$$

$$b. [[x =_p y]]^{<c, c'>} = T \text{ iff } c' = \{ g \in c \mid \forall w \in g(p): g(x)(w) = g(y)(w) \}$$

Basic predicates return only those assignments where the denotation of the  $i$ -dref  $x$  at a world is in the denotation of the predicate at that same world, for all worlds in the  $p$ -dref indexed on the predicate. The equative statement returns only those assignments where the denotation of the  $i$ -dref  $x$  at a world is equivalent to the denotation of the  $i$ -dref  $y$ , for all worlds in the  $p$ -dref indexed on the equative statement.

Dynamic conjunction is defined as true if there is some intermediate context  $c''$  that can serve as the output of the first conjunct and the input of the second conjunct:

109. Dynamic Conjunction

$$[[\varphi \wedge \psi]]^{<c, c'>} = T \text{ iff } \exists c'': [[\varphi]]^{<c, c''>} = T \ \& \ [[\psi]]^{<c'', c'>} = T$$

Since the context change rules above are deterministic, there will only be at most one context  $c''$  that fits this bill. I assume dynamic conjunction is the default form of composition for expressions.

So far, the system described is identical to that of AnderBois et. al. (2015). Below, I will discuss how to integrate Roberts (2003) theory of informational uniqueness into this model along with the modifications discussed in section 2.1-2.2.

My analysis of definite expressions in this formal system involves the following two components: (i) the introduction of a new discourse referent  $x$  that the definite’s restriction  $R$  applies to in all the worlds of the common ground; (ii) an operator *iota* ( $\iota x$ ) that scopes over the DP, imposing its presupposition of informational uniqueness (Roberts 2003): there should be enough information in the restriction for  $x$  to be identified with a weakly familiar dref  $z$  across all assignments in the input context:

110. Iota

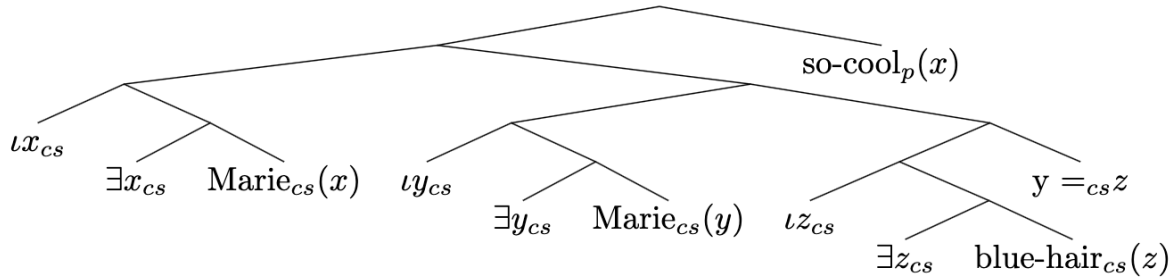
$$[[\iota_{x_p} \varphi]]^{<c, c'>} = T \text{ iff } [[\varphi]]^{<c, c'>} = T \ \& \ \exists z \in \mathbf{dom}(c): \forall h \in c': \forall w \in h(p): h(z)(w) = h(x)(w)$$

In this definition:  $[[\varphi]]$  is the logical expression that *iota* scopes over, i.e. the content of the DP along with its newly introduced dref. What *iota* does is (i) makes sure that its restriction returns true –  $[[\varphi]]^{<c, c'>} = T$  – and (ii) subjects the output context  $c'$  to a test: there has to be a discourse-referent  $z$  in the domain of *iota*’s input context, that in the output context is identified with  $x$  across all assignments and worlds where  $x$  is defined (on  $p$ ). As discussed in section 2.2, although informational uniqueness isn’t explicitly encoded here, it comes from the requirement above + the fact that definites introduce

a new variable that gets randomly assigned – if there are multiple drefs that  $[[\varphi]]$  is compatible with, there will be no dref that corresponds to  $x$  across all assignments.

I assume for all cases in this paper that *iota*, the variable introduced by the noun, and the noun’s restriction, are all subscripted with the context set, like so:

111. [Logical Form] Marie, with the blue hair, is so cool.



I assume that definites quantifier raise out of their base position.

In my proposal, what licenses and causes the question of identification to be able to be implicitly raised is the *failure* of this test to hold. That is, the crucial dynamic timing of the raising of the question of identification comes *after* it’s clear this presupposition cannot be met: between the initial definite description and the appositive. Of course, the fact that the presupposition is met after the appositive might lead one to think that the presupposition is evaluated *at that point*. My proposal contrasts with this logic: the presupposition is only evaluated *once* in the dynamic derivation, at its initial base position; when it fails (and cannot be accommodated), a question is raised that, if answered, would satisfy the failed presupposition. The interlocutors then seek to resolve this question because there is conversational pressure to resolve the raised question<sup>13</sup>, not due to a ‘delayed’ presupposition that is evaluated later in the derivation.

To give a preliminary walkthrough of the logic, let’s go through a number of cases where the presupposition is met or not met. Note that the following cases will not seek to explain why names have the properties that they do; they are merely meant to present what the logic can account for, given certain properties are assumed. Consider the case of a familiar name:

**112. Context A: Familiar Name**

Marie is driving us home.

To start, assume that interlocutors have discussed Marie before, that the input context contains two worlds in the context set ( $w_1$  and  $w_2$ ).

$z = \text{“Marie”}$	$p^{cs}$
$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$w_1, w_2$
$\{w_1 \rightarrow a\}$	$w_1$
$\{w_2 \rightarrow b\}$	$w_2$

<sup>13</sup> Moreover, I believe *not* answering the question would lead to infelicity for various reasons, although my thoughts on this fact are less clear at this point.

The interpretation of the predicate MARIE will return whatever individual is Marie in that world ( $\mathcal{I}_{w_1}(\text{MARIE}) = \{a\}$ ,  $\mathcal{I}_{w_2}(\text{MARIE}) = \{b\}$ ).<sup>14</sup> I will assume Marie drives the interlocutors home only in  $w_1$ , and thus the interpretation of DRIVING-US-HOME is the following: ( $\mathcal{I}_{w_1}(\text{DRIVING-US-HOME}) = \{a\}$ ,  $\mathcal{I}_{w_2}(\text{DRIVING-US-HOME}) = \emptyset$ ). The LF of sentence (112) is then the following:

$$113. [\text{LF}] \exists p \wedge p \subseteq p^{\text{cs}} \wedge \iota x_{\text{cs}}[\exists x_{\text{cs}} \wedge \text{MARIE}_{\text{cs}}(x)] \wedge \text{DRIVING-US-HOME}_p(x)$$

The first statements create the proposal and set it as a subset of the context set:

Input Context for *Iota* (**context A**):

$$\exists p \wedge p \subseteq p^{\text{cs}}$$

$z = \text{“Marie”}$	$p^{\text{cs}}$	$p$
$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$w_1, w_2$	$w_1, w_2$
$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$w_1, w_2$	$w_1$
$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$w_1, w_2$	$w_2$
$\{w_1 \rightarrow a\}$	$w_1$	$w_1$
$\{w_2 \rightarrow b\}$	$w_2$	$w_2$

Then  $\iota x_{\text{cs}}$  applies to this context, requiring a variable  $x$  introduced in its scope to be identified in its output context with some variable in its input context. That variable is then introduced in the context set and assigned to MARIE in all worlds in the context set. The output context to evaluate *iota*'s test will thus look like the following:

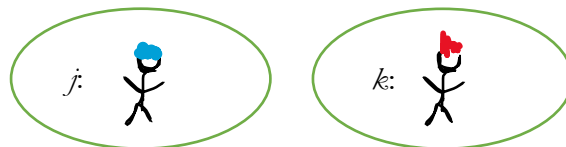
Output context for *Iota* (**context A**):

$$\dots \wedge \iota x_{\text{cs}}[\exists x_{\text{cs}} \wedge \text{MARIE}_{\text{cs}}(x)]$$

$z = \text{“Marie”}$	$p^{\text{cs}}$	$p$	$x = \text{“Marie”}$
$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$w_1, w_2$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$
$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$w_1, w_2$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$
$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$w_1, w_2$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$
$\{w_1 \rightarrow a\}$	$w_1$	$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow a\}$
$\{w_2 \rightarrow b\}$	$w_2$	$\{w_2 \rightarrow b\}$	$\{w_2 \rightarrow b\}$

In this context, *iota*'s requirement passes: there is a referent in the input context above – namely,  $x$  – that across assignments and worlds in the output context's  $p^{\text{cs}}$  is equivalent to  $x$ .

Now consider the case where the interlocutors are at a party, Marie ( $j$ ) is standing across the room from them along with some other person ( $k$ ). They have not discussed Marie before.



<sup>14</sup> I will not account for the rigidity of names under certain modal operators in this QP, although that will be necessary to have a story for in future work.



In this context, sentence (112) is infelicitous:

**114. Context B: Unfamiliar Name**

#Marie is driving us home.

Below, I put the input and output context for the *iota* operator to evaluate in this context:

Input Context for *Iota* (**context B**):

$$\exists p \wedge p \subseteq p^{cs}$$

$j = \text{“blue hair”}$	$k = \text{“red hair”}$	$p^{cs}$	$p$
$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$\{w_1 \rightarrow b, w_2 \rightarrow b\}$	$w_1, w_2$	$w_1, w_2$
$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$\{w_1 \rightarrow b, w_2 \rightarrow b\}$	$w_1, w_2$	$w_1$
$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$\{w_1 \rightarrow b, w_2 \rightarrow b\}$	$w_1, w_2$	$w_2$
$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow b\}$	$w_1$	$w_1$
$\{w_2 \rightarrow a\}$	$\{w_2 \rightarrow b\}$	$w_2$	$w_2$

Output context for *Iota* (**context B**):

$$\dots \wedge \iota x_{cs} [\exists x_{cs} \wedge \text{MARIE}_{cs}(x)]$$

$j = \text{“blue hair”}$	$k = \text{“red hair”}$	$p^{cs}$	$x = \text{“Marie”}$
$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$\{w_1 \rightarrow b, w_2 \rightarrow b\}$	$w_1, w_2$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$
$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$\{w_1 \rightarrow b, w_2 \rightarrow b\}$	$w_1, w_2$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$
$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$\{w_1 \rightarrow b, w_2 \rightarrow b\}$	$w_1, w_2$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$
$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow b\}$	$w_1$	$\{w_1 \rightarrow a\}$
$\{w_2 \rightarrow a\}$	$\{w_2 \rightarrow b\}$	$w_2$	$\{w_2 \rightarrow b\}$

Here there are no drefs in the domain of the input context that can be identified with  $x$  in the output context. The relevant drefs,  $j$  and  $k$ , can only be identified with  $x$  in one world of the context set, not all of them.

What happens in this context? First, note that since all drefs are definite subjects, a question of identification is licensed: there is a non-trivial partition on the worlds in the context set that correspond to the statements  $x = j$  and  $x = k$ . The fact that  $x$ ,  $j$ , and  $k$  are definite subjects follows from (i) our assumption that names are semantically unique, or only pick out one referent per world and (ii) our assumption that perceptually grounded discourse referents are also semantically unique, given they are clearly individuated to both participants.

How could an addressee resolve this presupposition? The default method, accommodation of a new dref, seems to not be possible. I noted in section 2.1 that QoIs are required when the dref of the definite expression has some *extra* presuppositions associated with it that make it clear to the hearer that it must be one of the weakly familiar discourse referents, and thus accommodation of some new dref would violate informational uniqueness. We will not give a formal explanation of what these presuppositions are, but in the case of names, one might trace them to the content of the name itself, that is, the predicate MARIE. The theory of Matushansky (2008), for example, proposes that names

encode *naming conventions* presupposed to be shared by the hearer: these presuppositions may force the content of the name itself to range only over weakly familiar discourse referents.

If accommodation isn't possible, then it's impossible to extend the context set to meet the presupposition. Reduction of the context set to only assignments where  $x = j$  ( $p^{cs} = \{w_1\}$ ) or  $x = k$  ( $p^{cs} = \{w_2\}$ ) is not motivated by any information present in the discourse. Thus, the best one can do is *split* the context to include only those assignments where each assignment *on its own* satisfies the presupposition. That is, the following context:

$j = \text{"blue hair"}$	$k = \text{"red hair"}$	$p^{cs}$	$x = \text{"Marie"}$
$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow b\}$	$w_1$	$\{w_1 \rightarrow a\}$
$\{w_2 \rightarrow a\}$	$\{w_2 \rightarrow b\}$	$w_2$	$\{w_2 \rightarrow b\}$

Note that this is exactly what raising an overt question of identification would do to the context set.

We can encode this via a discourse rule that applies if an update would lead to the empty set, as the presupposition would in **context B** above. I call this rule "filtering":

115. **Filtering:** Given a context  $c$ , if some update  $U$  to  $c$  results in  $\emptyset$ , remove all assignments  $g \in c$  such that  $U(\{g\}) = \emptyset$ .

This would leave only assignments that the update could theoretically apply to so long as more information is added to the context. Note that if this rule applied to the sentence in (112), then the speaker would be erroneously ceding their turn with the reference of "Marie" not yet determined. This would pose a problem for the default assumption that as an assertion this sentence should be informative. Indeed, one may be able to relate the infelicity to the overarching QUD: only when reference is disambiguated can the sentence provide an answer to the question of who is driving the interlocutors home. I assume that so long as the speaker is aware of such a conversational effect of their sentence, it is infelicitous to use such a referring expression.

Finally, let's look at how an identificational appositive can "rescue" this sentence from infelicity in the same context.

#### 116. **Context C: Unfamiliar Name + Identificational Appositive**

Marie, with the blue hair, is driving us home.

This is a slightly more complicated sentence, involving multiple iota operators. I will show how positing these distinct operators explains how anaphora can work between the main clause and the appositive.

The LF of (116) corresponds to the tree visualized in (113). I have put it below, with the appositive beginning on the second line:

117. [LF]  $\exists p \wedge p \subseteq p^{cs} \wedge \iota_{x_{cs}}[\exists x_{cs} \wedge \text{MARIE}_{cs}(x)] \wedge$   
 $\iota_{y_{cs}}[\exists y_{cs} \wedge \text{MARIE}_{cs}(y)] \wedge \iota_{z_{cs}}[\exists z_{cs} \wedge \text{BLUE-HAIR}_{cs}(z)] \wedge y = z \wedge$   
 $\text{DRIVING-US-HOME}_p(x) ]$

Assume the same context, with the denotation of the predicate BLUE-HAIR as follows:  $\mathcal{I}(\text{BLUE-HAIR}) = \{w_1 \rightarrow \{a\}, w_2 \rightarrow \{a\}\}$ . The input context and output context for  $\iota x$  will be the same:

Output Context for  $\iota x$  (**Context C**):

$$\exists p \wedge p \subseteq p^{cs} \wedge \iota x_{cs}[\exists x_{cs} \wedge \text{MARIE}_{cs}(x)]$$

$j = \text{“blue hair”}$	$k = \text{“red hair”}$	$p^{cs}$	$x = \text{“Marie”}$
$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$\{w_1 \rightarrow b, w_2 \rightarrow b\}$	$w_1, w_2$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$
$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$\{w_1 \rightarrow b, w_2 \rightarrow b\}$	$w_1, w_2$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$
$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$\{w_1 \rightarrow b, w_2 \rightarrow b\}$	$w_1, w_2$	$\{w_1 \rightarrow a, w_2 \rightarrow b\}$
$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow b\}$	$w_1$	$\{w_1 \rightarrow a\}$
$\{w_2 \rightarrow a\}$	$\{w_2 \rightarrow b\}$	$w_2$	$\{w_2 \rightarrow b\}$

We can then assume the **Filtering** rule applies to this context, as it does not pass the test of *iota* and cannot be accommodated:

$j = \text{“blue hair”}$	$k = \text{“red hair”}$	$p^{cs}$	$x = \text{“Marie”}$
$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow b\}$	$w_1$	$\{w_1 \rightarrow a\}$
$\{w_2 \rightarrow a\}$	$\{w_2 \rightarrow b\}$	$w_2$	$\{w_2 \rightarrow b\}$

Unlike in context B, however, the derivation is not yet finished: we have to evaluate the appositive as well. The appositive introduces its own discourse referents, the first corresponding to “Marie”:

Output Context for  $\iota y$  (**Context C**):

$$\dots \wedge \iota y[\exists y_{cs} \wedge \text{MARIE}_{cs}(y)]$$

$j = \text{“blue hair”}$	$k = \text{“red hair”}$	$p^{cs}$	$x = \text{“Marie”}$	$y = \text{“Marie”}$
$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow b\}$	$w_1$	$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow a\}$
$\{w_2 \rightarrow a\}$	$\{w_2 \rightarrow b\}$	$w_2$	$\{w_2 \rightarrow b\}$	$\{w_2 \rightarrow b\}$

Note that unlike with the first mention of “Marie”,  $\iota y$  is satisfied here because there’s a *dref* in *its* input context that’s equivalent to  $y$  in all worlds: namely, the *dref* introduced in the main clause  $x$ . In this way, *iota* operators in appositives can refer back to newly introduced individuals in the main clause because their input context is not the same as the input context to the clause.

The second appositive *dref*  $z$  is introduced and evaluated with respect to the context above – its uniqueness presupposition is satisfied with respect to  $j$ :

Output context for  $\iota z$  (**context C**):

$$\dots \wedge \iota z_{cs}[\exists z_{cs} \wedge \text{BLUE-HAIR}_{cs}(z)]$$

$j = \text{“blue hair”}$	$k = \text{“red hair”}$	$p^{cs}$	$x = \text{“Marie”}$	$y = \text{“Marie”}$	$z = \text{“blue hair”}$
$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow b\}$	$w_1$	$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow a\}$
$\{w_2 \rightarrow a\}$	$\{w_2 \rightarrow b\}$	$w_2$	$\{w_2 \rightarrow b\}$	$\{w_2 \rightarrow b\}$	$\{w_2 \rightarrow a\}$

Above,  $z$  is identified with  $j$  in all worlds.

Finally,  $y$  and  $z$  are equated in the worlds of the common ground. This removes  $w_2$  as a potential assignment to  $p^{cs}$  since  $y$  and  $z$  are not equal in that world:

$$\dots \wedge y = z$$

$j = \text{“blue hair”}$	$k = \text{“red hair”}$	$p^{cs}$	$x = \text{“Marie”}$	$y = \text{“Marie”}$	$z = \text{“blue hair”}$
$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow b\}$	$w_1$	$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow a\}$

Equating  $y$  with  $z$  makes it clear that Marie is the person with the blue hair. At this point, the initial failed presupposition (1x) is satisfied. This does not mean it is ‘checked again’ at this point. Rather, felicity of the utterance follows from the fact that it presents a coherent thought with disambiguated reference for the addressee. Of course, this story is not fully worked out at this point. For now, the pragmatic story outlined above is an initial attempt at understanding what’s going on, and specifically what causes the implicit question of identification to be raised. My answer to this question is that a pragmatic rule (**Filtering**) applies after the presupposition of informational uniqueness for  $x$  fails and cannot be accommodated, resulting in a context with multiple maximal alternatives where  $x$  is identified with distinct weakly familiar discourse referents.

#### 5.4 Subjective Modification

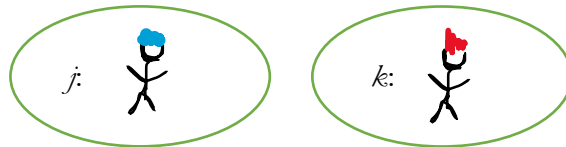
Above, I’ve demonstrated how an appositive can be used to help meet the definite presupposition for an expression that does not pick out uniquely some discourse referent in the context. I will show in this section that the theory still works for cases of regular restrictive subjective modification.

118. *There are two men standing in front of the speaker. One has blue hair, the other red.*  
The man with the blue hair is so cool.

In (118), can see that regular restrictive modifiers can subjectively restrict the denotation of the noun to help it meet its uniqueness presupposition. Note the difference in logical form from the appositive:

119. LF:  $\iota_{x_{cs}}[\exists x_{cs} \wedge \text{MAN}_{cs}(x) \wedge \text{BLUE-HAIR}_{cs}(x)] \wedge \text{SO-COOL}_p(x)$

We can model the context of this situation as below:



$j$	$k$	$p^{cs}$
$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$\{w_1 \rightarrow b, w_2 \rightarrow b\}$	$w_1, w_2$
$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow b\}$	$w_1$
$\{w_2 \rightarrow a\}$	$\{w_2 \rightarrow b\}$	$w_2$

After the preliminary update  $\exists x_{cs} \wedge \text{MAN}_{cs}(x)$ ,  $x$  will range over concepts that refer to both the man with the blue hair and the man with the red hair, and both:

$x$	$p^{cs}$
$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$w_1, w_2$
$\{w_1 \rightarrow a, w_2 \rightarrow b\}$	$w_1, w_2$
$\{w_1 \rightarrow b, w_2 \rightarrow a\}$	$w_1, w_2$
$\{w_1 \rightarrow b, w_2 \rightarrow b\}$	$w_1, w_2$
$\{w_1 \rightarrow a\}$	$w_1$
$\{w_1 \rightarrow b\}$	$w_1$
$\{w_2 \rightarrow a\}$	$w_2$
$\{w_2 \rightarrow b\}$	$w_2$

There is no dref in the input context with which this can be identified. With regular subjective modification as in  $\dots \wedge \text{BLUE-HAIR}_{cs}(x)$ , however, *iota*'s presupposition will be able to be met, as any assignment where  $x$  resolves to  $b$  will be ruled out:

$j$	$k$	$x$	$p^{cs}$
$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$\{w_1 \rightarrow b, w_2 \rightarrow b\}$	$\{w_1 \rightarrow a, w_2 \rightarrow a\}$	$w_1, w_2$
$\{w_1 \rightarrow a\}$	$\{w_1 \rightarrow b\}$	$\{w_1 \rightarrow a\}$	$w_1$
$\{w_2 \rightarrow a\}$	$\{w_2 \rightarrow b\}$	$\{w_2 \rightarrow a\}$	$w_2$

## 6. Issues

There are significant issues in the proposal above – it is my first attempt at formalizing the basic intuitions behind the account I want to pursue. In this section, I discuss three of these issues: (i) the pragmatic process that results in a QoI being raised; (ii) the concept of ‘semantic uniqueness’ assumed throughout for names; (iii) the nature of rigidity in the theory.

### Raising Questions of Identification

There is a lot left to do to flesh out the exact mechanism whereby these questions of identification are raised. The rule of **Filtering** is a stop gap, representing a sequence of reasoning that I have not yet fully determined.

The general idea is that questions must be raised when satisfying informational uniqueness is impossible in the current context, and moreover, no new discourse referent can be accommodated to satisfy it. In order to formalize this idea, I will have to determine the exact condition that prevents accommodation – I believe it is something like the dref only ranges over individuals that some weakly familiar dref also maps to in every world. I will then have to work through the logic to ensure that a reasonable presupposition accommodation mechanism would rule out accommodation in this instance. But more generally, I believe that understanding more about the *semantics* of sentences in which identificational appositives are used will clarify this point. Based on preliminary research, I think

the notion of an *acquaintance relation* with the addressee may be relevant to this point. Alternatively, maybe my goal of giving names and definites the same underlying representation is misguided: an alternative analysis might be that names/pronouns are really free variables, imposing a stronger familiarity requirement than regular definites, while for definite descriptions there is some optional representation including a free variable that must surface in questions like “did you like my dad?”.

Once I’ve worked out the logic that drives the inability for this presupposition to be accommodated, I will have to understand what leads to the necessary raising of the question. I believe tying it to the overarching QUD is a fruitful direction to take, since all of these questions of identification are subquestions to the QUD targeted by the matrix sentence, in the sense that one must have an idea of who is being mentioned in order to provide an answer to a question that includes that individual. Having this connection formally spelled out would motivate more fully why the QoI gets raised.

Lastly, since I embed the theory in a dynamic system that interleaves at-issue and appositive content, I take QoI raising to be a dynamic process. However, Onea (2016) argues that questions answered by appositives are really **potential questions**, i.e. questions that would arise were the matrix sentence accepted in the context. Since the questions that appositives answer arise through speaker reasoning about potential future discourses, they may not be compositional or dynamic in the sense outlined in my proposal. Indeed, an analysis based on potential questions neatly explains the use of identificational appositives, since if the speaker updated the context with the matrix sentence, the addressee would certainly raise a QoI in many of the cases discussed above. It is important to understand both the logic of how the question gets raised and how this logic is embedded or not within a dynamic system like the one above.

### **Semantic Uniqueness + Names**

Throughout this paper, I assumed that names are ‘semantically unique’, i.e. resolve to one individual in each world of the common ground. This assumption was made in order to account for how the anchor’s update licenses a question of identification, as only semantically unique drefs can lead to a partition on the worlds in the context set. This assumption, however, cannot work for all DPs that trigger identificational appositives:

120. *Joe and Marta went to a party. Joe’s two uncles were at the party, but they only talked to one of them.*  
I loved that party. Did you like my uncle, the guy with the white hair?

The use of “my uncle” in (120) is clearly informationally unique, but I’m not sure it’s semantically unique. Moreover, the idea of semantic uniqueness is a stipulation – the whole point of Roberts’ theory was to get rid of such a notion. In future work, I need to understand better the use of this assumption, and where it comes from. I see two paths forward.

First, all definites may be required to be unique by virtue of their semantics (i.e., this is actually what *iota* does), expressions like ‘my uncle’ above involve situational domain restriction or some other mechanism in order to meet this requirement (Elbourne 2005). The process I outline here is the definite meeting an *additional* requirement of being identified with some weakly familiar dref in the context. Despite involving more components to predict the same data, similar kinds of explanations have been pursued in the literature (Schwarz 2009).

Second, it may be the case that the dref associated with ‘my uncle’ in the context above is semantically unique in the context set because *other* requirements on it make it resolve only to individuals that Marta met, who are clearly distinct from each other in any given world.

Regardless, more investigation needs to be done in order to see what I have to stipulate, and where the notion of semantic uniqueness comes from. A comprehensive analysis of the semantics of names is needed to understand this point better.

## **Rigidity**

In the proposal outlined above, I follow Aloni (2001) in taking rigidity of reference only to apply to individuals that both interlocutors can point at. Rigidity here is related to the interlocutor's epistemic states – if you can point at an individual, there is no uncertainty about reference. This conception of rigidity important does not apply to names, allowing me (like Aloni) to circumvent problems surrounding questions about the identity of a named individual. However, names are classically rigid designators in non-epistemic contexts. In order to ensure my analysis of names does not overgenerate, I need to ensure the final analysis can explain how names are rigid in these contexts.

There is a deeper problem, though, in the way I've set up the system. If pointing at an individual makes the dref associated with that individual rigid, and rigidity is meant to represent certainty of reference in the common ground, how can we account for cases where *the same individual* is pointed at in different contexts, but interlocutors are not sure whether it is the same individual?

121. *At a party last night, Joe pointed out Marie to Marta and said "that person over there is named Marie." Now, Joe and Marta are at another party, where Marie is wearing a mask. Joe knows it's Marie, but Marta doesn't.*

Marta: Is that Marie?

Since weakly familiar discourse referents last beyond a single context, my proposal predicts that if an individual is pointed at in one context, they will be disambiguated in all future contexts. This is clearly wrong.

One can start to get a handle on this using the following reasoning: all pointing does is limits the dref  $x$  to "the person standing there in this time at this location" (Kaplan 1989). This kind of information is not negotiable to an addressee in a given context, so there can be no uncertainty of reference. In future contexts, however, that information is not usable to identify the referent. That is, either the model used to verify particular statements changes between contexts, while the overall 'information' surrounding a particular dref stays the same, or our concept of rigidity needs to change. I'm not exactly clear on how to formally cache either of these options out in a system such as the one proposed in AnderBois et. al. (2015). In any case, these considerations make it clear that I need to better understand the use of individuals and discourse referents in the system I've proposed.

## **7 Conclusion**

This paper presents (i) a detailed empirical investigation and grammatical analysis of PP modifiers of referring expressions and (ii) a theoretical investigation into how they can inform our theories of discourse reference and constraints on definite expressions. On the first point, I showed that PP modifiers of names and unique definite descriptions are appositives, akin to nominal appositives, with the structure of elliptical copular clauses. Moreover, I showed they are grammatically and pragmatically identical to fragment answers to a subclass of questions I called "Questions of Identification", which I formally defined as questions that embed an equative internal proposition.

On the second point, I argued that the use of these appositives is best explained by the theory of weak familiarity & informational uniqueness in Roberts (2003), coupled with the insights surrounding epistemic reasoning and uncertainty about reference in the theory of conceptual covers in Aloni (2001). I embedded this theory in the formal system of AnderBois et. al. (2015), which models appositives as direct impositions on the context set and argued that the questions of identification are implicitly raised by the default application of a pragmatic rule that applies when the definite presupposition fails and cannot be accommodated.

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