

Indirectly direct: An account of demonstratives and pointing*

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Abstract

There has been a long debate on whether demonstratives are directly referential as Kaplan originally argued, or indirectly referential like a definite description. I propose a new analysis of demonstratives that combines intuitions from both direct and indirect approaches. The demonstrative is analyzed as an indirectly referential expression with a binary maximality operator that takes two arguments, where the second argument can be a deictic pointing, an anaphoric index, or a relative clause. Direct reference is encoded not in the meaning of the demonstrative but in the meaning contributed by the pointing gesture, thus capturing both direct and indirect uses. I further propose that some pronouns in English function as demonstratives, realizing the binary structure and competing with the demonstrative. The main advantages of this proposal include a) deriving the distribution of pronominal and adnominal demonstratives systematically; b) capturing the unique interaction that demonstratives have with a pointing gesture; and c) locating English demonstratives against a larger, cross-linguistic picture.

Keywords: demonstratives, pronouns, deixis, anaphora, reference, pointing

1 Introduction

This paper is concerned with the analysis of demonstratives. In English, demonstratives can occur pronominally as in (1a) and adnominally as in (1b).

- (1) a. that, those [pronominal demonstratives]
b. that linguist, those linguists [adnominal demonstratives]

Traditionally, English demonstratives have been analyzed as having a rigid, directly referential interpretation (Kaplan 1989). The idea is that unlike a definite description, which picks out an entity by satisfaction of a uniqueness requirement, a demonstrative simply returns the entity by denoting it directly. For example, if a speaker points to a singer named Jin and utters (2), the LF would simply return (2a), with *j* referring to the individual being pointed to in the utterance context. This is different from a definite description *the singer* in (3), in which the referent of the definite description is determined by identifying a unique entity that meets the description in the given context.

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- (2) (Pointing at Jin) That singer lives in Seoul.
 - a. live-in-seoul(j)
- (3) (Pointing at Jin) The singer lives in Seoul.
 - a. live-in-seoul(ιx .singer(x))

The use of demonstratives where an entity is directly pointed to is often called ‘deictic’. Deictic uses generally carry some kind of a demonstration that shows where the referent is: a pointing gesture is commonly used, but eye gaze and other gestures could be used as well. I indicate this demonstrative gesture with the symbol \rightarrow that follows the linguistic expression that accompanies it as in (4).

- (4) [That linguist] \rightarrow looks happy.

While Kaplan’s work focuses on deictic uses of demonstratives, recent studies have shown that demonstratives have a wide range of non-deictic uses (Himmelman 1996; King 2001; Roberts 2002; Wolter 2006; Elbourne 2008). These non-deictic uses can be divided into various subkinds based on different criteria, such as whether there is a variable bound in it, whether it refers anaphorically to an entity, etc. What they share in common is that the direct, rigid reference we saw above in (2) does not hold. For example, in a non-deictic, anaphoric use as in (5), the referent of *that linguist* can change across contexts being considered, just like a definite description *the linguist*.

- (5) Every time I meet a linguist, that linguist looks happy.

In order to account for the use of demonstratives that are not direct or rigid, at least two different approaches have been taken in subsequent works. The first approach is to discard Kaplan’s proposal of direct reference altogether and analyze demonstratives as an indirectly referential expression, just like a definite description. This is the approach taken by King 2001, later adopted in works such as Elbourne 2008, Nowak 2019, and Blumberg 2020, where demonstratives are analyzed as definite descriptions with an additional argument. Other works that fall into the indirectly referential view include Wolter 2006, where demonstratives are analyzed as a definite description whose uniqueness presupposition is evaluated in a different kind of a situation than the topic situation in which the main predicate is evaluated, as well as works that define demonstratives as marked definite descriptions (Hinterwimmer 2015; Hinterwimmer & Bosch 2016, 2018, Dayal & Jiang 2020, a.o.). The second approach is to maintain Kaplan’s direct referential view but incorporate it into an indirectly referential definite-like denotation. This approach is taken in Roberts 2002, where the demonstrative is analyzed like a definite description in that it also looks for a unique entity that meets the description in a given context, but has a directly referential component, namely a presupposition that there is a demonstration and that the unique entity that meets the description is identical to the entity that is being demonstrated in the utterance context. Thus, it has an effect of fixing the referent at the utterance context as in Kaplan’s work.

The two approaches capture different aspects of demonstratives. The indirect view covers a wider range of demonstrative uses that the direct view cannot capture, while the direct view readily explains the rigid reference effect that distinguishes demonstratives from other referential expressions. In this paper, I propose to combine aspects of both approaches into a more comprehensive analysis of demonstratives. Demonstratives will be analyzed as realizing a structure like the one proposed in Nowak 2019 in the indirect approach, but with more focus on the deictic nature of

demonstratives like in Roberts 2002. Specifically, demonstratives will be analyzed as lexicalizing a binary maximality operator that requires an additional restriction other than the NP restriction that a definite determiner is assumed to take. The motivation for combining with this additional restriction outside the first argument comes from the fact that it is often filled with an expression in the gestural modality, namely a deictic pointing. I analyze the pointing gesture as contributing a modifier meaning that restricts the location of the argument in the utterance context. Thus, I derive direct referentiality from the semantics of a deictic pointing rather than from the lexical meaning of a demonstrative, differing from Roberts 2002. If a pointing gesture is not available, this additional restriction slot is filled with an anaphoric index or a relative clause. The grouping of these elements is motivated by the fact that many expressions in natural languages such as *same* and *like* compose with reference arguments that take the form of an anaphoric index, an overt clause, or a deictic pointing (Alrenga et al. 2012; Umbach & Gust 2014; Hanink 2018). This analysis allows us to account for both the unique interaction that demonstratives have with gestural content and the wide range of non-direct readings demonstratives allow.

In addition, I propose that English pronouns realize both the definite structure and the demonstrative structure. That pronouns are similar to demonstratives is not a novel claim. Kaplan (1989) states in his original discussion of demonstratives that ‘The word ‘he’, so used, is a demonstrative, and the accompanying pointing is the requisite associated demonstration’ (p.489). Heim (1982) also considers pronouns to be definite descriptions, highlighting their similarities in referring to familiar discourse referents. However, recent discussions on demonstratives from linguistics and philosophy literature have often focused solely on a specific type of demonstratives, namely the singular demonstrative description. Works like Roberts 2002 distinguish demonstratives from pronouns and other expressions in uniquely allowing deictic readings. In this paper, I argue that while pronouns and demonstratives do not carve out the same semantic space, pronouns do realize the demonstrative structure in English and compete with demonstratives when they do. This analysis allows us to correctly predict the tightly knit interaction we see in English and account for some pronoun-specific differences that have been presented as problematic for D-type theories of pronouns (Elbourne 2013).

Most of the ingredients that constitute the proposal presented in this paper have already been motivated and used in previous works. The main novelties of this proposal are a) encoding deixis through the locational modification contributed by the pointing rather than the lexical meaning of the demonstrative, and b) distinguishing demonstratives from other referential expressions by arguing that only demonstratives can compose with this pointing gesture in a restrictive manner inside the DP. I will show that, with minimal changes to analyses of demonstratives and pointing, we come up with a much simpler analysis of demonstratives that can better account for their distributive and interpretive properties.

The rest of the paper is organized as follows. In the next section, I will first discuss Kaplan’s direct referential analysis of demonstratives in more detail, and go over the two main approaches that either reject (the indirect approach) or extend (the extended direct approach) Kaplan’s view. After discussing the main advantages and remaining issues for each approach, I propose to combine aspects of the two approaches into one uniform account. The main motivating argument for this is that while it is true that demonstratives allow a wide range of non-deictic, non-direct uses as argued in the indirect approach, they are unique in composing with the co-speech pointing gesture in a restrictive way, as highlighted in the extended direct approach. I lay out the proposal in Section 3, and discuss its main implications and advantages. In Section 4, I propose that pronouns also realize

the demonstrative structure, and show that the various patterns we see from anaphoric and deictic pronouns result from a tightly-knit competition with demonstratives. Section 5 discusses how the analysis can be extended to other languages that have different morphosyntactic distinctions within demonstratives, focusing on the morphological distinction in Korean and the structural distinction in Romanian. Section 6 concludes with a discussion of remaining questions.

2 Demonstratives: Previous accounts

Kaplan's (1989) analysis of demonstratives is often the starting point of any discussion of demonstratives in linguistics and philosophy. In his lecture, he proposes two main principles for demonstratives:¹

1. The referent of a demonstrative depends on the associated demonstration.
2. Indexicals, pure and demonstrative alike, are directly referential.

The second principle, that demonstratives are directly referential, has been discussed extensively in subsequent literature. A directly referential term in Kaplan 1989 is defined as 'an expression whose referent, once determined, is taken as fixed for all possible circumstances, i.e., is taken as *being* the propositional component' (p.493). Here, the propositional component refers to the underlying denotation. Thus, what makes a demonstrative different from a definite description for Kaplan is that while a definite description takes an NP argument and returns a unique individual that meets the NP content, a demonstrative simply *denotes* the individual. It is important to note that by 'fixed for all possible circumstances' he does not mean that a demonstrative always refers to the same entity across any given context. Instead, he argues that 'a directly referential term *may* designate different objects when used in different *contexts*. But when evaluating what was said in a given context, only a single object will be relevant to the evaluation in all circumstances' (p.494). Thus, its semantic content is 'relevant only to determining a referent in a context of use and *not* to determining a relevant individual in a circumstance of evaluation' (p.498). This leads to rigid reference: once an entity is determined in the context of use, the referent of the demonstrative stays unchanged across different possible circumstances. Kaplan notes that this is similar to how indexical expressions such as *actually*, *here*, and *now* in (6) only refer to a specific group of people who are actually in the utterance context regardless of the temporal and locative displacement.

- (6) It is possible that in Pakistan, in five years, only those who are actually here now are envied.
[Kaplan 1989:(4)]

As discussed in the introduction, many non-direct uses of demonstratives have been identified since Kaplan's initial remarks. For example, the same demonstrative description *that poet* can be used deictically or anaphorically in English as shown in (7a) and (7b).

¹As an anonymous reviewer noted, Kaplan has also argued in other works that speaker's intentions should also play a role in determining the referent of a demonstrative. In this paper, I do not provide a formal analysis of incorporating speaker intention but assume that speaker intention is always considered when reference to an individual is made, regardless of the referential expression (pronoun, definite, demonstrative, etc.) and the mechanism (anaphoric vs. deictic).

- (7) a. [That poet]_→ looks happy. [deictic]
 b. I met a poet. That poet looked happy. [anaphoric]

The two principles proposed in Kaplan do not capture the fact that the anaphoric use of the demonstrative in (7b) does not depend on an associated demonstration, because there is no such demonstration present. Moreover, the referent of the demonstrative is not fixed, and instead can change across different possible circumstances as shown in (8).

- (8) If I meet a poet when I travel to Korea, I will talk to that poet.

Unlike in (6) where the referent of *those who are here now* was fixed to the utterance context, the referent of *that poet* covaries with the quantifier introduced by *a poet*. Thus, non-deictic uses of demonstratives pose an empirical challenge for Kaplan’s proposals.

In the rest of this section, I will present a review of two approaches that the subsequent works have taken in response to this issue. In Section 2.1, I will discuss the indirect approach, where the Kaplanian view of direct reference is rejected. I will review the line of work represented by King 2001, which argues that demonstratives are definite descriptions with an additional argument, hence the name ‘Hidden Argument Theories’ (HATs; Nowak 2019). While there are other lines of work that fall under the indirect approach as mentioned above, I will focus on the HATs in this paper because my proposal will adopt the general binary structure for demonstratives. The second approach I review is what I call the extended direct approach, where some direct referentiality is maintained specifically for the demonstrative. I discuss Roberts 2002 under this approach in Section 2.2.

2.1 The indirect approach

The initial motivation for the Hidden Argument Theories (HATs) come from King 2001. In response to Kaplan’s proposal, King (2001) discusses uses of demonstratives where they are not directly referential as shown in (9). In King 2001, the use in (9a) is called ‘no demonstration no speaker-reference’ to highlight that there is no deictic referent, while the use in (9b) is called ‘quantifying-in’ because a quantifier binds a pronoun inside the description, and does not fix a referent of the demonstrative to the utterance context.

- (9) a. That hominid who discovered how to start fires was a genius. [NDNS]
 b. Every father dreads that moment when his oldest child leaves home. [QI]
 [King 2001:(3-4)]

He argues that such uses constitute evidence for more complex underlying semantic content and analyzes the demonstrative as a definite expression that carries an additional argument. This view is adopted in subsequent works such as Elbourne 2005; Nowak 2019; Blumberg 2020. Because King’s analysis is presented in a different framework with a Russellian view of definites as quantifiers, I present the main arguments from the original HATs as summarized in Nowak 2019. While the details of the implementation differ, the main idea presented in the HATs is that demonstratives carry an additional property as compared to a definite. For instance, while a definite description *the F* returns the unique entity that is *F* as in (10), a demonstrative of the form *that F* returns the unique entity that is *F and G*, where *G(x)* is the additional restriction, as shown in (11).

- (10) the F = the x: F(x)
 (11) that F = the x: [F(x) & G(x)]

In a deictic use of demonstratives, this G(x) is filled with an identity relation to the entity being pointed to, as in (12a), where Jin is a singer being pointed to.

- (12) [That singer]_{→Jin} is happy.
 a. the x: [singer(x) & identical-to-Jin(x)]

In an anaphoric use, G(x) is filled with an index as shown below, where y is an index.

- (13) I met a linguist. That linguist looked happy.
 a. [[that linguist]] = the x: [linguist(x) & x=y]

For uses that do not involve deixis or anaphora such as (14), the original HATs assume that G(x) can be filled with a semantically trivial property, as in (14a). The result is that the demonstrative is made semantically equivalent to a definite in (15).

- (14) That guy who wrote *Waverley* also wrote *Ivanhoe*.
 a. the x: [guy-who-wrote-Waverley(x) & self-identical(x)]
 (15) The guy who wrote *Waverley* also wrote *Ivanhoe*.

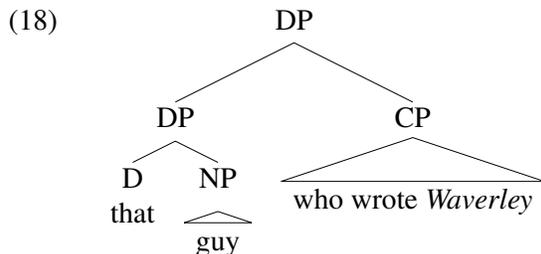
Nowak (2019), however, shows that using a trivial property that equates demonstratives to definites overgenerates and cannot account for contrasts such as (16).

- (16) a. That guy who wrote *Waverley* also wrote *Ivanhoe*.
 b. #That author of *Waverley* also wrote *Ivanhoe*. [Nowak 2019:(4-5)]

Note that the original analysis would not predict the relative oddness of (16b), because the analysis of (16b) would be identical to (16a) except for the content of the NP restriction, as in (17).

- (17) the x: [author-of-Waverley(x) & self-identical(x)]

To resolve this overgeneration problem, Nowak (2019) modifies the original theory in two ways. First, he proposes that the relative clause in (16a) must appear outside the main DP headed by the demonstrative as in (18).



The idea is that a demonstrative requires a G(x) property that can syntactically occur in this higher position, and only (16a), but not (16b) has a property that appear in such a construction.

Second, Nowak adds to the denotation of demonstratives a presupposition that requires G(x)

to properly restrict the set denoted by the first restriction F . Thus, a semantically trivial property cannot occur in $G(x)$. The proposed denotation of a demonstrative that incorporates this semantic restriction is shown in (19).

- (19) $\llbracket \text{that} \rrbracket = \lambda f \lambda g$: the intersection of $\{x: f(x) = 1\}$ and $\{x: g(x) = 1\}$ is a proper subset of $\{x: f(x) = 1\}$. $\iota x: f(x) = g(x) = 1$ [Nowak 2019:(38)]

Deictic information as in (20a) is argued to occur as an indexical information, which in turn is assumed to occur inside the $G(x)$ slot. Because being identical to Mirzakhani does properly restrict the set of women, the presupposition is met, and this sentence is felicitous.

- (20) [That woman]_{→Mirzakhani} won a Fields medal.
 a. the x : [woman(x) & identical-to-Mirzakhani(x)] [Nowak 2019:(39-40)]

For non-deictic uses, only those with properties that satisfy the CP requirement and the presupposition in (19) are predicted to be felicitous. For example, in (16a), the relative clause *who wrote Waverley* occupies the CP position and properly restricts the set denoted by the DP, thus is correctly predicted to be felicitous. In (16b), however, the genitive phrase *of Waverley* occurs NP-internally and cannot occupy the CP position. Thus, it is predicted to be infelicitous.

2.1.1 Remaining questions

The modifications Nowak (2019) makes on the original HATs resolves the overgeneration issue in (16) and correctly captures why *that guy who wrote Waverley* is felicitous while *that author of Waverley* is not. Despite the empirical advantage of adding further restrictions on demonstratives, however, there are at least two issues that need to be resolved. The first issue is specific to how Nowak implements the restrictions to distinguish demonstratives from definites. The second issue is a general one that pertains to the HATs as a whole. I discuss them in turn below.

Nowak adds two restrictions to demonstratives: a syntactic restriction that requires the content of $G(x)$ to structurally appear outside the NP, and a semantic presupposition that requires $G(x)$ to be properly restricting. The syntactic restriction makes the right prediction about the distribution of complex, non-deictic demonstratives as we saw above, though it remains a question what theoretically motivates this syntactic stipulation. The analysis proposed in the current paper will also adopt this structure, though I will show that the gestural modality of the pointing provides further motivation for this structure.

The more serious empirical issue I would like to raise is in the semantic restriction. The semantic restriction is implemented by adding a presupposition that $G(x)$ be properly restricting the set denoted by the NP restriction. This requirement turns out to be too strong. Recall that demonstrative descriptions allow anaphoric uses as in (21).

- (21) I met a linguist. That linguist looked happy.

The demonstrative description *that linguist* is felicitous even if there is only one linguist that is relevant in the context. It is possible to argue that the set $\{x: \text{linguist}(x)=1\}$ is not actually a singleton in (21), and that only after the index information in $G(x)$ is intersected, it returns a singleton, namely the one that the speaker met. However, what we find is that even when $F(x)$ is assumed to always return a singleton, a demonstrative description can be used. Consider a slight modification

of (16b) in (22). While (16b) used out of the blue is degraded as Nowak claims, we can create an anaphoric context as in (22) by providing a linguistic antecedent.

(22) I once met the author of *Waverley*. That author of *Waverley* also wrote *Ivanhoe*.

What we observe is that when the demonstrative description is used anaphorically, it is felicitous. A slight degradedness is felt due to the fact that a shorter expression like a pronoun could have been used instead, but it is not ruled out as we would predict if there was a presupposition failure.

Blumberg (2020) provides additional arguments against implementing the semantic restriction as a presupposition. Consider the example in (23).

(23) I don't know if there are any other cars in this showroom, but [pointing to a particular car]
that car looks expensive. [Blumberg 2020:(30a)]

The use of the demonstrative description *that car* in a context where it is not established that there are other cars is felicitous in (23), and this is different from what we observe with other kinds of presupposition failures such as (24).

(24) #I don't know if Mary ever smoked, but Mary stopped smoking. [Blumberg 2020:(31b)]

In order to resolve this, Blumberg suggests replacing the semantic presupposition with a pragmatic economy principle to derive the markedness effect. Specifically, he proposes to apply Schlenker's (2005) *Minimize Restrictors!* in order to explain why a non-restricting $G(x)$ used with a demonstrative is deemed redundant or infelicitous. *Minimize Restrictors!* (MR!) is used to explain why *the tall president* is degraded when there is a unique president in the context: *the tall president* returns the same individual as the simpler description *the president*, so unless *tall* has some additional pragmatic function, it is ruled out by the principle. Similarly, a demonstrative with a non-restricting argument is argued to be ruled out because a simpler definite description is available. The current proposal will also derive the relative markedness of demonstratives using pragmatic principles rather than encoding markedness directly into the semantics of demonstratives.

The second issue I would like to raise concerns the assumption made across the HATs: that deixis is just one of the many uses that a demonstrative can have. Motivated as a response to Kaplan's argument that demonstratives are inherently deictic and directly referential, the main focus of the HATs is to derive all of the other uses of demonstratives in a uniform manner. As Nowak (2019) notes, a side effect of this has been that a demonstrative is not sufficiently distinguished from a definite description. Nowak (2019) and Blumberg (2020) propose ways to restrict the original HATs to explain why demonstratives would not appear in certain contexts that definite descriptions do. However, what is still lacking in the HATs including the most recent works is an explanation on why *only* demonstratives appear in deictic contexts. Formally, the HATs implement deixis by subsuming it under anaphoric indices (Elbourne 2008; Nowak 2019; Blumberg 2020). While this assumption is widely made in the semantics literature (Heim & Kratzer 1998, a.o.), it results in overgeneration when demonstratives are brought into the picture. This is because while a definite description can be anaphoric, it cannot be deictic. It is well-known that definite descriptions allow anaphoric uses, and there is growing evidence suggesting that in English and other languages definite descriptions carry anaphoric indices (Schwarz 2009). Subsuming deixis under anaphoricity wrongly predicts that definite descriptions would allow deictic uses in contrastive contexts as in (25).

- (25) a. #[The linguist]_→ is happy, and [the linguist]_→ is not.
 b. [That linguist]_→ is happy, and [that linguist]_→ is not.

One simple solution to this issue would be to argue that deixis, or demonstrations, is distinct from anaphoric indices and that only the semantics of demonstratives supports composition with deictic information. This is done in Roberts 2002, where Kaplan's direct reference notion is maintained in an indirectly referential analysis. I discuss the main arguments of Roberts 2002 next.

2.2 The extended direct approach

Roberts (2002) encodes the deictic nature of demonstratives by arguing that demonstratives carry a presupposition that there is a demonstration to a familiar entity. The informal description that she provides is shown in (26).

- (26) **Presupposition of Demonstrative NPs** (Informal): [Roberts 2002:19]
 Given a context C, use of a (non-)proximal demonstrative NP_i presupposes (a) that there is an accompanying demonstration δ whose unique demonstratum, correlated with a weakly familiar discourse referent by virtue of being demonstrated, lies in the direction indicated by the speaker at a (non-)proximal distance to the speaker, and (b) that the weakly familiar discourse referent for the demonstratum is the unique familiar discourse referent contextually entailed to satisfy the (possibly liberalized) descriptive content of NP_i.

A demonstrative is analyzed as an indirectly referential expression. It is a definite-like expression that refers to an entity through a description that is evaluated against the given context. However, there is a mechanism within this indirect denotation that allows for a direct reference, which is the presupposition of a demonstration. The presupposition that there is an entity being demonstrated by the speaker in the utterance context and that the unique entity described by the expression is identical to that entity results in fixing the referent at the utterance context as Kaplan did. This differs from the HATs, because in the HATs, deictic information is encoded through anaphoric indices, which do not on their own bring any rigidity effects given their variable nature.

The main advantage of arguing that demonstratives differ from definite descriptions and pronouns by requiring a demonstration to be present is that it explains straightforwardly why deictic uses such as (25) would not be allowed with definite descriptions. This resolves the issue that we raised for the HATs, which was that they do not sufficiently distinguish demonstratives from definites in their deictic uses. Because demonstratives presuppose a demonstration in its meaning, and definite descriptions do not, *Maximize Presupposition!* (Heim 1991) can be implemented to explain why definite descriptions would not occur when accompanied by a demonstration. The definite description and the demonstrative under Roberts' analysis are extensionally identical except for the presupposition that there be a demonstration, and so if there is a demonstration present, *Maximize Presupposition!* would require that the expression that has a stronger presupposition be used.

Another advantage of Roberts' theory is that the anaphoric use of demonstratives can be captured while maintaining the directly referential component in the meaning. Roberts motivates this by discussing examples as in (27). In (27a), the demonstrative description *that dog* refers to the dog that the speaker saw, and it is not necessary that the entity be present or fixed at utterance context. In (27b), *that dog* corefers with the universal quantifier, thus ruling out the direct referential view.

- (27) a. I saw a dog. That dog looked happy.
 b. Every dog in my neighborhood, even the meanest, has an owner who thinks that that dog is a sweetie. [Roberts 2002:(11)]

Roberts (2002) extends her analysis of deictic demonstratives to account for discourse deictic and anaphoric uses of demonstratives. Two changes are made. First, the demonstratum is no longer an actual entity as it is in deictic uses, and instead is a linguistic object like an NP or a sentence for anaphoric uses. Second, while in the deictic demonstrative the requirement is that the returned referent be identical to the demonstratum (the entity pointed to), the anaphoric demonstrative instead requires that the returned referent be identical to the discourse referent introduced by that demonstratum. Thus, we are able to obtain an anaphoric reading while maintaining the directly referential component intact: it rigidly refers to a linguistic object, but the linguistic object would show flexibility in who it refers to across different scopal and modal relations.

2.2.1 Remaining questions

We have seen in Roberts 2002 that there is a way to maintain the directly referential component that distinguishes demonstratives from definites while still capturing the anaphoric use. We also saw that because demonstratives are semantically specified for carrying deixis, we no longer run into the issue of explaining why only demonstratives allow deictic uses. It is, however, unclear how this analysis can account for uses such as (9a) in King 2001, repeated in (28), where there is neither an overt pointing to an actual entity in the context nor a discourse referent that can serve as an antecedent.

- (28) That hominid who discovered how to start fires was a genius.

Because there is no direct pointing to an entity in the context, the denotation in (26) would result in a presupposition failure. There is also no linguistic object that can serve as an antecedent, namely the anaphoric demonstratum. It may be possible to argue that while the conversation participants cannot specify who the referent is, there is still a weakly familiar discourse referent available in the context assuming that it is common knowledge that there exists some hominid who discovered the use of fire. In that case, it might be possible to extend the proposal in Roberts 2002 so that the demonstrative points to the abstract discourse referent. However, this seems too powerful given that not any contextually assumed discourse referent can be referred to with a demonstrative description. For example, we saw in (16) that *that author of Waverley* is not felicitous even though it is likely that the unique discourse referent is contextually available. Similarly, the use of a demonstrative in (29) is not felicitous even though the moon is often assumed to be familiar to conversation participants.

- (29) ?That moon is bright tonight.

In summary, the main issue that we run into under Roberts 2002 is that because the demonstrative as a whole is analyzed as encoding deixis either to an actual entity or to a linguistic entity, it becomes difficult to extend the meaning to a non-deictic use of a demonstrative. Extending the deictic metaphor to also cover contextually assumed discourse referents to account for cases like (28) would overgenerate and wrongly predict examples such as (29) to be felicitous.

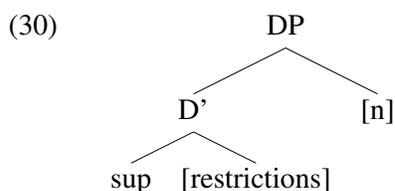
3 A unified analysis

The goal of this paper is to account for the wide range of uses that demonstratives show while capturing the unique interaction they have with the pointing gesture. To do so, I combine the intuitions from previous works, specifically that of the HATs (Nowak 2019; Blumberg 2020) and Roberts 2002. In particular, I argue that a demonstrative is a definite description with an additional argument as argued in the HATs, and claim that it differs from other referential expressions in the way it composes with pointing and results in a direct reference, as argued in Roberts 2002. The way I implement the latter point, however, will be very different. Unlike Roberts 2002, I do not assume that direct referentiality or deixis is encoded in the denotation of a demonstrative itself. Instead, I argue that a demonstrative is unique in allowing an additional restriction outside the NP restriction, which in turn hosts a gestural element. The gestural pointing is what brings direct referentiality and the rigidity effect, not the demonstrative itself. Thus, direct referentiality is separated from the basic denotation of a demonstrative, even though a demonstrative is the only linguistic expression that can combine with a gestural content to result in direct referentiality. I will show that this proposal combines the advantages of the previous accounts and allows for a more comprehensive analysis of demonstratives across languages.

I first start by discussing some basic theoretical assumptions made in the proposal in Section 3.1. Then, I discuss in Section 3.2 the main proposal for demonstratives. In Section 3.3, the binary structure is motivated by looking at some other ways in which demonstratives interact with pointing. In Section 3.4, I show how the analysis can be implemented to derive the three uses of demonstratives: deictic, anaphoric, and descriptive. The main predictions and advantages of the analysis are summarized in Section 3.5.

3.1 Basic theoretical assumptions

As the basis for my analysis, I take the extended D-type (D-2) analysis of anaphoric expressions in Ahn 2019. In Ahn 2019, all anaphoric expressions including null and overt pronouns, and definite descriptions are analyzed as sharing the same underlying semantic structure represented in (30). The main ingredients of this structure are the supremum operator, the restrictions, and the index (represented as $[n]$). The supremum operator, as defined in (31) takes the $\langle e, t \rangle$ restrictions and returns the maximal entity that meets all of the restrictions. The index function idx , defined in (32), takes an index n and an individual x and returns x if x is identical to the individual indexed at n ($g(n)$).



(31) $\llbracket \text{sup} \rrbracket = \lambda P. \iota x: \forall y [P(y) \leftrightarrow y \sqsubseteq x]$

(32) $\llbracket [n] \rrbracket = \llbracket idx \rrbracket(n) = \lambda x: x=g(n). x$

Note that the structure containing a supremum operator and a set of restrictions does not differ much from the typical Fregean view of definite descriptions, which also has some maximality

operator (like sup or ι) taking a set of NP restrictions and returning the maximal/unique individual that meets the denotation of the NP. Analyzing definite descriptions as carrying anaphoric indices is also not new: the familiarity theory of definites (Heim 1983; Roberts 2003) assumes that definite descriptions refer to familiar entities and implement this by the use of indices, and Schwarz (2009) argues that languages distinguish unique and familiar definites, where the familiar definites carry indices in their denotation. A structure similar to (30) is also proposed in Patel-Grosz & Grosz 2017 following Schwarz 2009, where the German demonstrative pronoun is analyzed as carrying an additional index argument.

In Ahn 2019, the index function is presuppositional and ϕ -features are part of the restrictions that the supremum operator takes. This is different from what is assumed traditionally, where indexical information is part of the restriction and ϕ -features are presupposed (Heim & Kratzer 1998; Schwarz 2009). However, the exact nature of ϕ -features is still debated (see Sauerland 2008; Bobaljik & Zocca 2011; Sudo 2012), and Esipova (2019) motivates a theory of nominals where ϕ -features are analyzed as $\langle e, t \rangle$ -type predicates. Following Esipova 2019 and Ahn 2019, I argue that ϕ -features that have semantic content, such as English gender, are $\langle e, t \rangle$ -type predicates that serve as restrictions to the supremum operator. Note that not all ϕ -features are semantic. Some ϕ -features, such as noun classes in Bantu languages or grammatical gender in Slavic or Romance languages, only play a role in verb agreement and are not interpreted in meaning composition. Grammatical and semantic ϕ -features are known to show different patterns in ellipsis resolution and agreement (Sauerland 2008; Bobaljik & Zocca 2011) and some features responsible for agreement have been argued to occupy a higher syntactic position in Sauerland 2008. Thus, I restrict this analysis to semantic ϕ -features only and leave aside the grammatical ones.

The exact nature of the index, on the other hand, is not crucial to this proposal: it can either be a function that adds a presupposition as in Ahn 2019, or it can be an e argument that the supremum operator takes as in Schwarz 2009 and Patel-Grosz & Grosz 2017. I leave this open in the current paper and move on to discuss some examples of how referential expressions are analyzed.

A pronoun such as *she* in English would be analyzed as in (33).

- (33) $\llbracket \text{she}_7 \rrbracket = \iota x: x = g(7). \forall y [\text{entity}(y) \wedge \text{female}(y) \wedge \text{singular}(y) \leftrightarrow y \sqsubseteq x]$
 ‘the maximal entity z such that z is female and singular’
 presupposition: $z = g(7)$

A definite description would carry the NP property and the property of being singular in the restriction, with *the linguist* returning (34).

- (34) $\llbracket \text{the linguist}_7 \rrbracket = \iota x: x = g(7). \forall y [\text{entity}(y) \wedge \llbracket \text{linguist} \rrbracket(y) \wedge \text{singular}(y) \leftrightarrow y \sqsubseteq x]$
 ‘the maximal entity z such that z is a linguist and singular’
 presupposition: $z = g(7)$

In arguing that pronouns and definites share the same structure in (30), the proposal in Ahn 2019 resembles the D-type theory of pronouns (Evans 1980; Neale 1988; Elbourne 2005), which proposes that pronouns are underlyingly definite descriptions. For example, Elbourne (2005) argues that pronouns have the same denotation as a definite description, so that a pronoun such as *she* in (35) is semantically equivalent to the definite description *the linguist* except that the NP complement is elided.

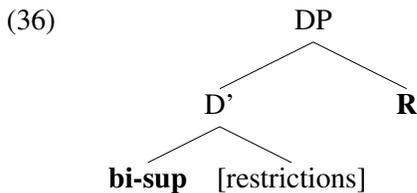
- (35) I met a linguist. She looked happy.
 a. $\llbracket \text{she} \rrbracket = \llbracket \text{the linguist} \rrbracket$

Ahn (2019) extends the D-type theory in two ways. First, she argues that all anaphoric expressions, including overt and null pronouns, have the same underlying structure as a definite description. Second, instead of arguing that a pronoun is identical to a definite description underlyingly, she argues that the anaphoric expressions differ from each other in the kinds of restrictions that they carry. For example, a pronoun in her analysis only carries the semantic ϕ -restrictions while a null pronoun only carries a general property of being an entity. I adopt this view because of the advantage it has on accounting for pronominal demonstratives and resolving a puzzle found with ‘Voldemort phrases’ in the original D-type analysis that Elbourne (2013) presents. This is discussed in Section 4.

3.2 Analysis of demonstratives

There are three main pieces to the analysis of demonstratives I propose. First, I argue that demonstratives extend the basic structure in (30) by requiring a second argument in order to bring the gestural content into the restriction. Second, I propose that a pointing gesture is a linguistic morpheme that contributes a locative property and analyze it as an $\langle e, t \rangle$ -type property that takes an individual x and returns true iff x is located at the indicated location. Third, I argue that there is a limited set of properties that can occupy the second argument position when pointing is not available. After motivating each of the three arguments, I will go over how the analysis handles the different uses of demonstratives.

Recall from the HATs that a demonstrative is analyzed as a definite description that carries an additional argument. Adopting this intuition, I propose that demonstratives extend the basic structure in (30) by realizing a binary maximality operator that takes not just the regular set of restrictions in (30) but also an additional restriction. As in Nowak 2019, this additional restriction, which I call R throughout the paper, occurs outside the main set of restrictions. The proposed structure of a demonstrative is shown in (36), and the definition of the binary supremum is shown in (37).



(37) $\llbracket \text{bi-sup} \rrbracket = \lambda P. \lambda R. \iota x: \forall y [P(y) \wedge R(y) \leftrightarrow y \sqsubseteq x]$

What is novel to this structure and different from Nowak 2019 is that, following Ahn 2019, a pronominal demonstrative such as *that* would be analyzed as having just the relevant ϕ -features in the first restrictions and carrying an R property in the second. An adnominal demonstrative would be analyzed as carrying the NP restriction as well as the R property.

Another difference from the HATs is the theoretical motivation behind the syntactic and semantic placement of the R property. Recall that in Nowak 2019, the syntactic requirement that the additional restriction be a CP occurring outside the NP was a stipulation added to account for the

data. In this analysis, I argue that the main role of *R* is to host a pointing gesture, and because of the difference in modality, the pointing gesture cannot compose with the rest of the restrictions in the lower position using Predicate Modification. There is evidence in the literature that gestural information does not compose with the rest of the linguistic content as readily as the spoken information does (Schlenker 2015; Zlogar & Davidson 2018; Zlogar 2019; Esipova 2019, Ebert et al. 2020). Based on this data, I propose that a regular mechanism of combining information such as Predicate Modification is not available for gestural content. *R* is specified for this use, and a demonstrative is the only linguistic expression that composes with *R* using the binary supremum operator. Thus, while the current analysis adopts the syntactic stipulation of Nowak 2019, it provides additional empirical reasons to separate *R* from the rest of the restrictions.

What is the exact nature of *R*, and why does pointing gesture only combine with the rest of the linguistic content through *R*? I analyze a pointing gesture as a property that restricts a given set of entities based on location. In other words, a pointing to some location, say *a*, is an $\langle e, t \rangle$ -type property that takes an entity *x* and returns true if and only if *x* is located at *a*. This is the second main piece of the analysis that differs from previous assumptions. Traditionally, a deictic pointing is analyzed as simply returning an index, which in turn refers to an individual via the assignment function. However, in this account, I argue that a pointing gesture is a predicate that predicates over an individual, just like other modifiers such as *tall*.

Lastly, I argue that when there is no pointing gesture produced to fill the *R* argument, other information can be accommodated in *R*. There is, however, restrictions on what kind of information can be hosted in *R*. For example, we see from (38) that when there is no pointing, a pronominal demonstrative can be used anaphorically as in (38b) or be accompanied by a relative clause as in (38c), while it cannot appear with adjectives as in (38d). Based on this, I argue that only an anaphoric index and a relative clause can be used to fill the *R* slot when a demonstrative is not accompanied by a pointing gesture.

- (38)
- a. Those_→ are some well-written books.
 - b. Last week I finished three books written by J. I recommended those to my friend.
 - c. Those that make you reevaluate your assumptions are well-written books.
 - d. *Those dense and rich are well-written books.

This set of properties that can appear in *R* is not random. We see that an anaphoric index, a relative clause, and a deictic pointing often form a set of expressions that occupy the same syntactic position to provide a reference set for various linguistic expressions. Degree heads as well as expressions such as *same*, for example, have been analyzed as taking an implicit, anaphoric argument as in (40a) or an overt, linguistic argument as in (40b) (see Carlson 1977; Alrenga et al. 2012; Umbach & Gust 2014; Hanink 2018, a.o.). Investigating the German demonstrative *so*, Umbach & Gust (2014) show that the role a deictic gesture plays is similar to that of overt and covert reference arguments. For example, in describing how Anna cut the fish in (39), the reference argument can be deictic (39a), anaphoric (39b), or clausal (39c).

- (39)
- a. (speaker pointing to someone preparing a fish)
So hat Anna den Fisch (auch) zerlegt.
'Anna cut the fish like this, (too).'
 - [deictic]
 - b. Berta zerlegte den Fisch in fünf Teile. Anna hat das auch so gemacht.
'Berta cut the fish in five parts. Anna did it like that, too.'
 - [anaphoric]

- c. Anna hat den Fisch so zerlegt, wie diese Person es tut.
 ‘Anna cut the fish like this person did.’ [clausal]
 [Umbach & Gust 2014;(1c),(2c),(4c)]

We find that a deictic gesture also serves as a reference argument for *same* as in (40c). By pointing to a book, the speaker implies that they have a book that is identical to the one being pointed to, thus serving the same role as the anaphoric information in (40a) or the clausal argument in (40b).

- (40) a. I have the same book.
 b. I have the same book that Jin has.
 c. I have the same_→ book.

In Korean, there is an adverbial particle *tolok* that attaches to a relative clause *X* to turn it into an adverbial of the meaning ‘as *X*’ as in (41). In addition to taking an overt clausal argument, *tolok* can also take demonstrative particles that mark anaphoricity or deixis. For example, in (42a), *tolok* attaches to an anaphoric demonstrative and is interpreted as taking some contextually salient entity anaphorically, which would be some thinking event in this case. In (42b), the deictic demonstrative *ce* signals that this contextually salient entity is to be found in the utterance context by the speaker’s demonstration. So (42b) would be felicitous in a context where a speaker is pointing out someone who is deeply contemplating on something and saying that she also had an experience of contemplating as much as that person.

- (41) nal cemwul-tolok sayngkak-hayss-ta.
 day end-as think-do-DECL
 ‘I contemplated (so much) that the day ended.’
- (42) a. *ku-tolok sayngkak-hass-ta.*
 DEM_{ANA}-as think-do-DECL
 ‘I contemplated (as much) as that.’
 b. *ce-tolok sayngkak-hass-ta.*
 DEM_{DEICTIC}-as think-do-DECL
 ‘I contemplated (as much) as that_→.’

In German *so*, English *same*, and Korean *tolok*, the reference argument is provided deictically by pointing, anaphorically with some contextually salient information, or overtly with a clausal description. I use the term ‘reference argument’ to collectively refer to the three kinds of information that serve as reference to linguistic expressions as above, and argue that *R* is filled with one of these elements. Thus, when a deictic gesture is not available for demonstratives, an anaphoric information or a clausal expression can fill the *R* slot and help identify the referent.

Finally, I motivate the binary structure with an *R* argument in the next subsection by discussing how demonstratives compose with pointing.

3.3 Interaction with pointing

There are motivations for the proposed binary structure that can be found from studies that investigate the interaction that demonstratives have with pointing. In particular, I focus on the claim that demonstratives make meaning contribution of pointing at-issue and restrictive (Ahn & Davidson

2018; Ebert et al. 2020) and show that the binary structure proposed here can derive this property.

3.3.1 Demonstratives make pointing at-issue

Formal semantic studies on gestures have shown that co-speech gestures generally do not contribute information that restricts the set of entities to a proper subset. Ebert et al. (2020) argue that co-speech gestures only contribute supplementary information that is not part of the actual assertion (see Schlenker (2018) who argues that the contribution is instead that of co-supposition, and Esipova (2019) who argues that the composition mechanism available for adnominal content is identical in spoken and signed domain). Consider (43) for example. When a speaker points to a bottle while uttering the sentence in (43), the pointing suggests that the bottle in discussion is identical to the bottle being pointed to, as in (43c). However, this information is part of the non-at-issue content of the utterance, meaning that the addressee cannot directly reject the identity information as one can with asserted information.

- (43) Cornelia brought [the bottle] \rightarrow .
- presupposition:** there is a unique (contextually salient) bottle
 - at-issue:** Cornelia brought that bottle
 - non-at-issue:** the gesture referent is that bottle and is itself a bottle

Ebert et al. (2020) argue that demonstratives play a special role in shifting this non-at-issue meaning of gestures to at-issue (also see Ebert 2017; Ebert & Ebert 2014). For example, in (44), which is identical to (43) but with a demonstrative instead of a definite article, the identity information is now at-issue, allowing the addressee to reject this identity information directly.

- (44) Cornelia brought [this bottle] \rightarrow .
- presupposition:** there is a unique (contextually salient) bottle
 - at-issue:** Cornelia brought that bottle
 - at-issue:** the gesture referent is that bottle (and is itself a bottle)

Ebert et al. treat the lexical meaning contribution of pointing to be ‘mere reference to an individual g ’ (p.7). This is implemented by introducing a new discourse referent z as in (45) ($[z]$) and identifying it with the rigid designator I_g which simply refers to the individual that is pointed to.

- (45) $[z] \wedge z = I_g$ where for all $w \in W$: $\llbracket I_g(w) \rrbracket = g$

For a definite description accompanied by pointing, they argue that ‘the temporally aligned performance’ of a definite article and a gesture result in an expression of identity. The example with the definite article in (43) is repeated in (46) with the proposed formal analysis. In (46a), a new discourse referent is introduced ($[x]$) and is identified as a bottle at issue (represented by p in $\text{bottle}_p(x)$). Then a new discourse referent is introduced ($[z]$) and identified to the bottle that is pointed to ($z = I_B$, where B represents the bottle, indicated as  in this paper). Then, the unique bottle (x) is equated with z , the pointed bottle, but at the non-at-issue dimension (represented as p^* in $x =_{p^*} z$). Combined with the rest, (46a) results in an assertion of Cornelia bringing the bottle at issue, with a non-at-issue content equating that bottle to the bottle pointed to.

- (46) Cornelia brought [the bottle] \rightarrow .

$$a. [x] \wedge \text{bottle}_p(x) \wedge [z] \wedge z = I_B \wedge x =_{p^*} z \wedge \text{bottle}_{p^*}(z) \wedge \text{bring}_p(\text{cornelia}, x)$$

The demonstrative differs from a definite in making the identity inference at-issue. So **DEM** is treated as an operator that takes a given proposition in p^* and shifts its dimension to p as shown in (47). The effect of the demonstrative is shown in (48), where the identity inference is now at-issue, as indicated by $x =_p z$ in (48a).

$$(47) \quad \mathbf{DEM}: \wp_{p^*} \rightarrow \wp_p \quad [\text{Ebert et al. 2020:(17)}]$$

$$(48) \quad \text{Cornelia brought [this bottle]} \rightarrow \text{bottle}$$

$$a. [x] \wedge \text{bottle}_p(x) \wedge [z] \wedge z = I_B \wedge x =_p z \wedge \text{bottle}_{p^*}(z) \wedge \text{bring}_p(\text{cornelia}, x)$$

Note that they further claim that sometimes, definite descriptions accompanied by pointing can also directly refer. In these cases, the identity inference contributed by the pointing is at issue, while the descriptive content of the definite is non-at-issue. The main difference between definites and demonstratives in their account, then, is that while definites only allow one of the two contents to be at-issue, demonstratives make both contents at-issue.

While I adopt their empirical claim that demonstratives allow both the NP content and the pointing meaning to be at-issue, I do not adopt their formal implementation because the role of the demonstrative is too restrictive under their account. Under Ebert et al.'s analysis, the only semantic function that a demonstrative has is the shifting of the dimension, which takes the inference resulting from a definite description accompanied by pointing and shifts the dimension of the meaning contributed by the pointing. This runs into at least two issues. First, because the shifting of the domain applies only to deictic pointing, the denotation of the demonstrative is restricted to direct, deictic uses of demonstratives like Kaplan 1989 and Roberts 2002. Thus, the issues that we raised for the direct approach in Section 2, such as accounting for non-deictic uses of demonstratives, remain for Ebert et al. 2020. Second, the resulting meaning of a demonstrative pronounced with a co-speech pointing depends fully on the meaning of a definite pronounced with a co-speech pointing. What this entails is that a definite description must always result in an identity inference when accompanied by pointing. However, this does not seem to be the case. For example, consider the examples in (49), which is identical to (46) except that the target of pointing is now a person rather than a bottle.

$$(49) \quad \text{Cornelia brought [the bottle]} \rightarrow \text{person}$$

This example can be made felicitous in a context where the person being pointed to has had a conversation in the past with the speaker about Cornelia bringing a bottle. For example, the speaker and the pointee might have been wondering whether Cornelia would bring the bottle that she always brings to class or a cup that she recently bought. In that context, a temporally aligned performance of pointing and the definite description *the bottle* in (49) is felicitous. In this context, however, the resulting inference is not that of an identity: the speaker does not imply that the individual being pointed at is identical to the bottle. The resulting inference instead is that the person being pointed to is relevant to the topic of the conversation. The same point can be made regardless of what the speaker points to: if the speaker pointed to a calendar, for example, we could come up with a context where that would be felicitous. The speaker might know that there is a bottle that Cornelia always brings on Mondays. Upon seeing that it is a Monday today, the speaker can point to the calendar and utter (49), and the resulting inference would be again that the calendar – or the day of

the week – is relevant to the question under discussion. What we are seeing is that the combination of a definite description and a pointing alone does not result in an identity inference. What seems to result, instead, is a much weaker inference that the entity being pointed to is somehow relevant to the sentence that contains the definite description.

Ebert et al. (2020) do remark that ‘deferred reference’ is allowed for definite descriptions co-occurring with pointing, in the sense of Nunberg 1993. What this means is that the intended referent of the definite description does not have to be identical to the target of pointing, but can be a referent that stands in some obvious relation to it (ft 4). However, it is unclear whether the notion of deferred reference alone can account for cases like (49) because deferred reference in the sense of Nunberg 1993 is concerned with the relation that the target of pointing has with the intended referent of the referential expression. For example, Nunberg (1993) discusses a case where a speaker points to a painting and utters ‘Now *he* knew how to paint goats!’. Here, the salient relation the painter has with the painting allows the intended referent to be identified. However, the felicitousness of (49) does not come from the relation that the bottle has with the person being pointed to. Instead, it is the question of whether *Cornelia brought* the bottle or not that is relevant to the person being pointed to. This is what allows pointing to a calendar to be felicitous as well: this does not require there to be some relation between the bottle and the calendar. What this suggests is that the scope of pointing that occurs with a definite description – or anything that is not a demonstrative – is much wider than the nominal scope: it is enough for the target of pointing to be relevant to the QUD of the discourse rather than the referent of the DP. Given that Nunberg (1993) uses the notion of deferred reference to discuss how intended referents are identified for indexicals, it does not seem sufficient to account for the flexibility of pointing exemplified by (49).

Given this, I reject the argument in Ebert et al. 2020 that a definite produced with a pointing gesture necessarily results in an identity inference, even with the help of deferred reference. While I do not adopt their formal implementation, the intuition from Ebert et al. 2020 that demonstratives are unique among referential expressions in allowing both the NP restriction and the gesture information to compose at issue is an important property of demonstratives that needs to be accounted for.

3.3.2 Demonstratives make pointing part of the restriction

A related characteristic that demonstratives show is that they make the information contributed by the pointing gesture restrictive. Note that non-restrictiveness follows from non-at-issueness, so what is described in this section can be taken as a corollary to the ideas presented in the previous section. The characteristic I would like to highlight in this section is that with demonstratives, pointing enters the restriction of the DP, which is not the case with other referential expressions. This becomes evident when more than one referent is pointed to as in (50), where A and B are locational variables and $\rightarrow A$ represents pointing to A. In the examples in (50), the linguistic description is identical in the conjoined clauses. The only difference between the two DPs is the target of pointing. The fact that the sentences in (50) are not contradictory indicates that the pointing information must be part of the restriction that resolves the referent.

- (50) a. I like that $\rightarrow A$ but not that $\rightarrow B$.
 b. [That computer] $\rightarrow A$ is new, but [that computer] $\rightarrow B$ is old.

This is different from both the inanimate pronoun *it* and definite descriptions, which again follows

from the argument that pointing is non-at-issue with these expressions (Ebert et al. 2020). In (51), the sentences are contradictory even though pointing targets two different locations (Examples like (51b) are also discussed in King 2001 and Blumberg 2020).

- (51) a. #I like it_{→A} but not it_{→B}.
 b. #[The computer]_{→A} is new, but [the computer]_{→B} is old.

Ahn & Davidson (2018) further show that the pointing information *must* be restrictive for demonstratives. Specifically, they show that an anaphoric link is broken when demonstratives occur with pointing. For example, in an intersentential context as in (52) and in a bound variable context as in (53), the referent of the demonstrative is fixed by pointing in the utterance context, rather than referring anaphorically or covarying with the referent of the quantified noun.

- (52) a. I saw [a water-type Pokemon]_i. That_{→*i} looked happy.
 b. I saw [a water-type Pokemon]_i. [That Pokemon]_{→*i} looked happy.
 (53) a. Every time I found [a water-type Pokemon]_i, I caught that_{→*i}.
 b. Every time I found [a water-type Pokemon]_i, I caught [that Pokemon]_{→*i}.

It is important to note that Ahn & Davidson (2018) are not claiming that all uses of demonstratives with pointing block the anaphoric reading. The exact contribution of the pointing depends highly on the manner in which it is produced. For example, when the pointing gesture is made in a casual manner that follows the speech rather than being produced at the same time as the demonstrative (see Schlenker 2018 for discussion of co- and post-speech gestures and their differences), the anaphoric reading can be maintained. What is important is that when the pointing gesture is produced at the same time as the demonstrative is uttered, the anaphoric link is not available. This is in line with Kaplan's initial observations.

Definite descriptions and *it*, on the other hand, never block the anaphoric reading. Regardless of whether pointing is present or not, the anaphoric link is maintained for these expressions, though relative felicitousness of the sentence might be affected by the presence of pointing.

This difference between demonstratives and pronouns is experimentally shown in Ahn & Davidson 2018. In their study, intersentential contexts such as (54) were tested empirically with demonstratives and pronouns appearing with and without pointing.

- (54) One woman is my friend. {That woman_→ / That woman / She_→ / She} plays soccer.

Because the study asked the participants to identify who the friend was after presenting stimuli like (54), they assumed that an anaphoric reading would be preferred over a deictic reading. What they find is that when a pronoun is used, the participants do consistently interpret it as being anaphoric regardless of pointing. However, when a demonstrative description is used, participants do not interpret it as anaphoric, choosing at random when asked who the friend is. That the demonstrative description blocks the anaphoric reading even in a context that prefers it shows that the deictic information is always taken to be restrictive when accompanying a demonstrative.

In summary, we observe at least two ways in which demonstratives are unique among referential expressions in their interaction with pointing. First, only demonstratives allow at-issue composition with gestures in addition to the regular restrictions (Ebert et al. 2020). Second, only demonstratives require the pointing information to be restrictive (Ahn & Davidson 2018). The binary structure

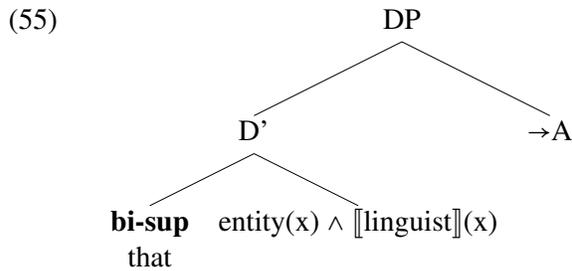
proposed in this account is compatible with both observations. Under this account, definite descriptions always realize a unary structure with one slot for restrictions, while demonstratives have a binary structure with the additional R allowing gestural information. If we assume that gestural content cannot compose with the rest of the linguistic content through Predicate Modification inside the first restriction, we predict that a gestural content produced with a definite description would not compose inside the restriction of the maximality operator. Instead, it would have to appear outside the DP, contributing a supplementary meaning like a non-restrictive relative clause. On the other hand, a gestural content produced with a demonstrative description would appear inside the R slot, thus entering the restriction of the maximality operator. This accounts for both the at-issue contribution of the pointing and the restrictive composition with the locational meaning.

We now move on to discuss how this analysis is formally implemented for the three predicted uses of demonstratives. I start with the deictic use, and move on to look at the anaphoric use and the descriptive use. Note that this proposal makes the presence of R obligatory. Thus, demonstratives must occur with exactly one element of the reference set and not more. I discuss how this implementation makes desirable predictions on the distribution of demonstratives.

3.4 The three uses of demonstratives

3.4.1 Deictic uses

The structure and the relevant denotations for the deictic use of a demonstrative are shown in (55) and (56), respectively. As discussed above, I analyze a pointing gesture as a modifier that takes an individual x and returns true if and only if x is at the demonstrated location in the real world as shown in (57). Note that while I have omitted world variables in the denotations throughout this paper, w_0 is indicated in (57) to show that it fixes the location at the utterance context and does not allow the world variable to be bound by intensional operators above. This results in rigidly denoting the entity located at some location in the utterance context regardless of the evaluation context, thus deriving rigidity that Kaplan and the extended direct approach argue for.



(56) $\llbracket[\text{that linguist}]_{\rightarrow A}\rrbracket = \text{bi-sup}([\lambda x. \text{entity}(x) \wedge \llbracket[\text{linguist}]\rrbracket(x)])(\llbracket[\rightarrow A]\rrbracket(x))$
 = the maximal entity that is a linguist and at A

- (57) a. $\llbracket[\rightarrow]\rrbracket = \lambda a. \lambda x. x \text{ is at } a \text{ at } w_0$
 b. $\llbracket[\rightarrow A]\rrbracket = \lambda x. x \text{ is at } A \text{ at } w_0$

Because the binary supremum takes both the restrictions in its sister node and the R slot, the returned individual is the maximal entity that is a linguist and is at location A, as evaluated in the utterance context. A deictic use of the pronominal demonstrative *that* would be identical except that the restriction only carries the ϕ -information and not the NP restriction.

- (58) $\llbracket \text{that}_{\rightarrow A} \rrbracket = \text{bi-sup} (\lambda x. \text{entity}(x) \wedge \text{inanimate}(x)) (\llbracket \rightarrow A \rrbracket(x))$
 ‘The maximal inanimate entity that is at A’

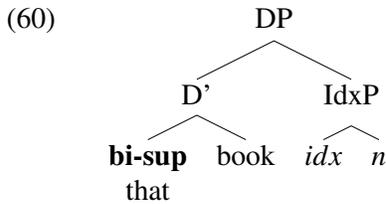
Note that pointing has been analyzed as contributing different meanings: Roberts (2002) analyzes the demonstratum as an individual, while Ebert et al. (2020) analyze the pointing gesture itself as contributing an individual. Wolter (2006) analyzes pointing as providing a situation in which uniqueness can be evaluated. Instead of analyzing pointing as directly referring to an entity or a situation, I analyze it as a modifier that contributes a locational information. Encoding location rather than returning an individual is motivated by the fact that demonstratives across languages, regardless of whether they are distance-oriented or person-oriented, are observed to mark distinction that is locationally determined (Diessel 1999). For example, languages often have two to three-way contrasts based on the relative distance from both the speaker and the addressee or from the hearer (see Diessel 2013 for the typological variations). Assuming that demonstratives reflect underlying features such as $[\pm\text{proximal}]$ or $[\pm\text{near speaker}, \pm\text{near hearer}]$, locational information would readily allow computations of relative proximity to speaker or addressee location, while it is less clear how an individual-denoting system would be made compatible.

3.4.2 Anaphoric uses

I have argued above that when R is not filled with the meaning contribution of the deictic pointing, it can be filled with another reference argument. The first candidate is the anaphoric index. Because R requires a property rather than a presuppositional element, the anaphoric index would have to take the form of a property, as shown below. I implement this as an index function that takes an index n , an individual x , and returns true if $x=g(n)$.

- (59) $\llbracket \text{idx} \rrbracket = \lambda n \lambda x. x \text{ is } g(n)$

Composing with this idx function, an anaphoric demonstrative is analyzed as referring to the maximal entity that meets the relevant descriptions and is identical to $g(n)$ as shown in (61).



- (61) $\llbracket \text{that book}_7 \rrbracket = \text{bi-sup}(\lambda x. \text{book}(x))(\llbracket \lambda n. \lambda x. x = g(n) \rrbracket(7)(x))$

Note that the denotation in (61) is very similar to what Schwarz (2009) proposes for anaphoric definite descriptions. In Schwarz 2009, an anaphoric definite description is also analyzed as taking an individual x and an index y and returning true iff x meets the descriptions and is identical to y . The only difference in Schwarz 2009 is that the index information is also presupposed in addition to entering the restriction in his account. In this account, I argue that an anaphoric definite description only presupposes identity between x and the index, while an anaphoric demonstrative asserts this identity. As mentioned when discussing the presuppositional account of index above, the exact nature of the index is not critical to this paper. However, the distinction drawn in this paper on

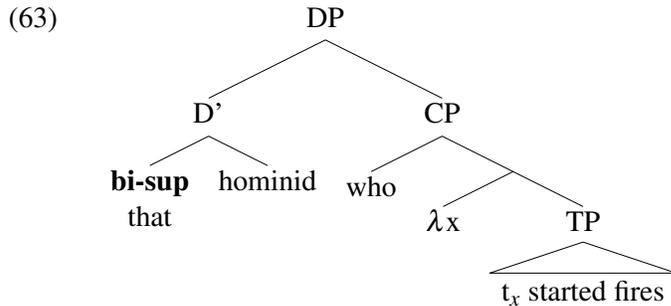
the way indices are implemented for definite descriptions and demonstratives does have some desired consequences when accounting for the distributional differences and the relative markedness of demonstratives. More specifically, that the demonstrative in this analysis has an additional restriction that is taken by the bi-sup allows independently motivated semantic economy principles to derive the relative markedness of anaphoric demonstratives compared to definite descriptions and pronouns. I discuss this in more detail in Section 3.5.3.

3.4.3 Descriptive uses

By descriptive uses, I refer to uses of demonstratives where they occur with an overt relative clause. We look at an adnominal demonstrative from King 2001 in (9a) repeated below in (62).

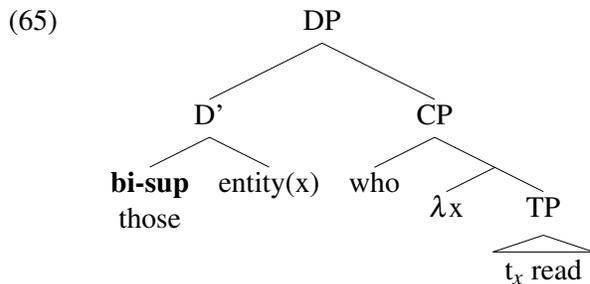
(62) That hominid who discovered how to start fires was a genius.

The relative clause phrase ‘who discovered how to start fires’ occupies the *R* slot. The NP restriction *hominid* appears inside the NP restriction as the first argument. The structure is shown in (63), with the resulting meaning in (64).



(64) $\llbracket \text{that hominid who started fires} \rrbracket = \text{bi-sup}(\lambda x.\text{hominid}(x))(\lambda x.\text{started-fires}(x))$
 ‘The maximal entity that started fires’

A relative clause can also occur with pronominal demonstratives, as in *those who read*. The pronominal use would be analyzed similarly, with the relative clause appearing in the *R* slot. The only difference is that because a pronominal demonstrative is used, the restrictions do not contain an NP property. Instead, it simply carries the entity property and the ϕ -restrictions.



(66) $\llbracket \text{those who read} \rrbracket = \text{bi-sup}(\lambda x.\text{entity}(x))(\lambda x.\text{read}(x))$
 ‘The maximal entity that reads’

Note that there is another syntactic position that the relative clause can appear in when the demon-

strative is adnominal: the complement position of the NP. There is nothing in the current proposal that blocks the relative clause from appearing as a complement to the NP. When it occupies *R*, we predict the demonstrative description to be uniqueness-denoting. When it occupies the NP-internal position, we predict the demonstrative description to be familiarity-denoting, because *R* would need to be filled with either a deixis or a pointing. While this prediction is difficult to test given that the underlying structure would only be signaled by the resulting interpretation, thus making the argument circular, there is a clear prediction made for pronominal demonstratives. Given that pronominal demonstratives are analyzed as not having an NP restriction in this account, we predict that pronominal demonstratives appearing with relative clauses would always be uniqueness denoting and not anaphoric because there is no NP that can host the relative clause in the lower restrictions.

There is an interesting use of a pronominal demonstrative that arises when there is an overt relative clause. Consider (67), where a pronominal demonstrative occurs with a relative clause.

(67) Those who read never fail.

In (67), the demonstrative phrase ends up having a free relative-like meaning of *whoever reads never fails*. This reading is not readily captured by previous accounts. In Roberts 2002, there needs to be either an actual entity or a linguistic expression that can be pointed to, but there is no such expression available. The HATs, on the other hand, do not make a prediction on uses like (67) because they focus on adnominal demonstratives only. It is unclear how the HATs would account for the difference in meaning we observe between the demonstrative in (67) and the definite counterpart in (68).

(68) The people/ones who read never fail.

In the definite counterpart, the reading that results still requires some specific entity to be defined rather than having the free relative meaning. While a full analysis of free relative-like readings of pronominal demonstratives is outside the scope of this paper, I suggest that the key to deriving this reading may lie in the fact that the pronominal demonstrative combines directly with the relative clause without the NP restriction. Note that an adnominal demonstrative does not have a generic reading:

(69) Those people who read never fail.

The idea is that a pronominal demonstrative that carries a relative clause in *R* only has the restriction contributed by the relative clause to identify the referent. This is different from the adnominal counterparts such as (68) and (69). It has been argued in Polian & Aissen 2020 that free relatives that have a maximality interpretation should be analyzed as a definite determiner taking a CP as a complement. Caponigro (2003) also presents cross-linguistic evidence that free relatives are a determiner taking a CP as complement. The semantic structure proposed in this account for pronominal demonstratives with a relative clause occupying *R* is identical to such accounts of free relatives because the maximality operator only takes the relative clause as a restriction.

3.5 Predictions

Let's briefly summarize the analysis before moving onto the main consequences and predictions. I argue that demonstratives obligatorily realize a binary supremum operator which takes R as an argument in addition to the regular set of restrictions proposed in Ahn 2019. I motivate the structure where R appears higher in the DP by arguing that R cannot appear as an additional property inside the first argument because it is marked as an expression in the gestural modality. The pointing gesture is analyzed as an $\langle e, t \rangle$ -type property that encodes location. I further argue that when the pointing gesture is not available, another reference argument, such as an anaphoric index and a clausal expression, can fill the R slot. For a pronominal demonstrative, the binary supremum takes the ϕ -feature restrictions as the first argument and the R property as the second. For an adnominal demonstrative, the first argument also contains an NP restriction.

This analysis maintains many of the desirable predictions of the previous accounts. Similar to the direct accounts of demonstratives such as Roberts 2002 and Ebert et al. 2020, we are able to account for the rigid reference effect of demonstratives because direct referentiality is encoded in the pointing gesture, which only demonstratives can compose with in a restrictive manner. On the other hand, like in the indirect accounts such as the HATs, non-deictic and non-direct uses can also be captured straightforwardly because direct reference is not encoded directly into the denotation of demonstratives. When pointing is not available, R can be filled with an anaphoric index or a clausal expression. In capturing both the unique interaction with pointing and the non-deictic uses, the proposal combines the benefits of the main two approaches of demonstratives. I discuss the implications in more detail in Section 3.5.1.

In addition to combining the benefits of the previous accounts, this proposal brings several additional advantages of its own. First, the analysis predicts that a demonstrative would be limited to one of three uses, based on the information R hosts. In this analysis, the demonstrative always carries a deictic information, an anaphoric index, or a relative clause as an additional argument, but only one of the three. This correctly predicts that when it is accompanied by a pointing gesture, it will block the anaphoric reading, and that when there is no overt pointing or a relative clause, it will always be interpreted anaphorically. I discuss some evidence that this prediction is borne out in Section 3.5.2.

Secondly, this analysis allows independently motivated economy principles to apply directly to derive the relative markedness of non-deictic demonstratives. For example, it explains why demonstratives are more marked in anaphoric uses than definite descriptions or pronouns, and why the pronominal demonstrative *that* is even more degraded in anaphoric contexts. I discuss this in Section 3.5.3.

3.5.1 Indirectly direct

Recall the main advantages of the two approaches of demonstratives discussed above. The main advantage of the direct approach such as Roberts 2002 is that the unique interaction demonstratives have with deictic pointing is captured. We also saw in Section 3.3 that demonstratives are unique among referential expressions in making the meaning contribution of a pointing gesture not only at-issue (Ebert et al. 2020), but also restrictive for identifying a referent. We noted that this unique ability to bring the meaning contribution of pointing into the restriction inside the DP is not something that is captured by the HATs, or any account that assumes that deixis is subsumed under

anaphora because many expressions in natural languages are anaphoric but do not allow pointing to contribute restrictive meaning in this way. Because deixis is analyzed as fixing the referent in the utterance context, the rigidity effect observed in Kaplan 1989 is also derived straightforwardly in the direct approaches. However, we also noted that the direct approach has shortcomings as discussed in King 2001 and the rest of the HATs, which is that non-deictic, non-direct uses of demonstratives are difficult to capture. The main advantage of the indirect approach is that the wide range of non-direct uses are accounted for. Because demonstratives are analyzed as definite descriptions with an additional argument, it is not necessary to derive the anaphoric and descriptive readings by extending the deictic meaning.

The current account avoids the issues raised for the two approaches by encoding deixis not directly into the meaning of demonstratives but into the meaning of the pointing gesture. The pointing gesture is analyzed as encoding a locational information for an entity: taking a location variable a and an entity x , it returns true iff x is located at a . Because a is fixed at the utterance context, the referent denoted by the demonstrative DP cannot change depending on evaluation contexts, as Kaplan (1989) showed. Let's consider the example in (70), where $\rightarrow A$ indicates that the pointing gesture accompanying the demonstrative description points to some location A . The LF of the consequent part of (70) is shown in (70a). It shows that regardless of the possibility world that is being considered, the location of the referent of the demonstrative is fixed at the utterance context, in w_0 .

- (70) It is possible that if I meet a singer in Korea, I will talk to [that singer $\rightarrow A$].
 a. $\exists w' \in W[\text{R}_{\text{epi}}(w)(w') \wedge \text{talk}_w([\text{bi-sup}(\lambda x.\text{singer}(x))(\lambda x.x \text{ is at } a \text{ in } w_0)],\text{sp})]$

Because the denotation of the pointing gesture always identifies the entity in the utterance context, rigidity is derived just as in Kaplan 1989 and other direct approaches. However, direct reference is indirectly specified for demonstratives because it is not the denotation of a demonstrative that encodes this information. This is the main difference between my proposal and that of other direct approaches. While demonstratives are analyzed as encoding deixis either in its asserted or pre-supposed meaning in Kaplan 1989, Roberts 2002, and Ebert et al. 2020, the demonstrative itself is not specified for direct reference under my account. This has an advantage over the direct approaches because demonstratives often have non-direct uses as noted in King 2001. In my account, demonstratives obligatory require an additional R property. When that property is a pointing gesture, it results in a direct, rigid reference. However, when R is filled with another property like an anaphoric index or a relative clause, direct reference is no longer part of that DP meaning.

3.5.2 Three uses of demonstratives

Because a demonstrative is analyzed as obligatorily requiring this R property, we predict that every use of a demonstrative would entail a presence of a deictic gesture, an anaphoric index, or a relative clause. The three elements are also predicted to be mutually exclusive, with only one of them serving as the R restriction for the given demonstrative at a time. In this section, I show that these predictions are borne out.

Let's consider a demonstrative that is accompanied by a deictic pointing first. We saw already from Ahn & Davidson 2018 that when pointing accompanies a demonstrative, the anaphoric reading is no longer available.

- (71) a. I saw [a water-type Pokemon]_i. That_{→*i} looked happy.
 b. I saw [a water-type Pokemon]_i. [That Pokemon]_{→*i} looked happy.

This follows naturally from our account because *R* is already occupied by the pointing gesture, and there is no other slot available for the anaphoric index. The assumption that *R* in the demonstrative replaces the usual slot for the presuppositional anaphoric index in other referential expressions in Ahn 2019 also predicts that there would not be an additional index available.

When a demonstrative is accompanied by a relative clause, there are two possibilities as discussed earlier in the paper. If the relative clause occupies *R*, we predict that the demonstrative phrase would not have an anaphoric reading. If the relative clause occurs noun-internally, then we predict that *R* can be filled with an anaphoric index. In the examples presented in King 2001 where the complex demonstrative description results in a uniqueness reading with no reference to a specific entity, we can argue that the relative clause is occurring in *R*, thus bleeding an anaphoric reading. For example, in the two examples from King 2001 repeated below, the demonstrative description *that hominid who discovered how to start fires* is interpreted as the unique individual who discovered fire, and *that moment when his oldest child leaves home* is interpreted as the unique moment that exists for each father.

- (72) a. That hominid who discovered how to start fires was a genius. [NDNS]
 b. Every father dreads that moment when his oldest child leaves home. [QI]

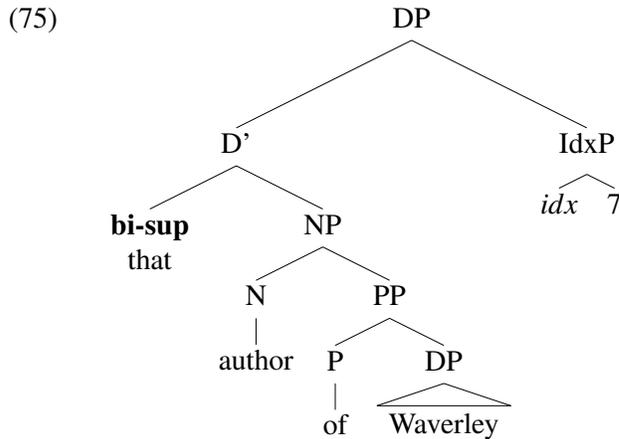
Finally, let's consider a demonstrative with no overt gesture or relative clause present. The prediction made by this analysis is that this demonstrative would always be interpreted anaphorically. This prediction is compatible with many recent works that suggest that demonstratives in English and other languages encode anaphoricity (Schwarz 2009; Jenks 2015; Patel-Grosz & Grosz 2017, a.o.). Furthermore, it resolves an undergeneration issue we noticed with the account in Nowak 2019. Recall that Nowak (2019) proposes a syntactic restriction that the additional argument of a demonstrative must be a CP-level element that attaches higher in the DP. He uses this restriction to account for why (73b) is bad while (73a) is good: (73b) does not have a linguistic expression that can form a syntactic constituent inside the higher CP slot.

- (73) a. That guy who wrote *Waverley*₇ also wrote *Ivanhoe*.
 b. #That author of *Waverley* also wrote *Ivanhoe*. [Nowak 2019:(4-5)]

The issue we raised for this is that as long as the demonstrative description is used anaphorically, (73b) is felicitous as in (74).

- (74) I once met the author of *Waverley*₇. [That author of *Waverley*]₇ also wrote *Ivanhoe*.

In this account, we are able to correctly predict (73b) to be degraded and (74) to be felicitous. First, (74) is felicitous because it is anaphoric. Under this account, the full NP *author of Waverley* appears inside the regular NP restriction, while an anaphoric index appears higher in *R*, as in (75).



The same underlying LF is assumed for (73b) as well. I argue that the reason (73b) is degraded is not that it does not have a CP-level constituent, but that it is an anaphoric demonstrative appearing in a non-anaphoric context. There is no antecedent available for the demonstrative description. On the other hand (73a) is predicted to be felicitous because *R* is occupied not by an anaphoric index but a relative clause, thus having a uniqueness interpretation, not an anaphoric interpretation. Thus, the prediction that a demonstrative without an overt pointing or relative clause is always anaphoric resolves the undergeneration issue.

Finally, I would like to discuss the predictions of this analysis when more than one element from the reference set is available. For example, what happens when a pronominal demonstrative occurs with both a relative clause and a pointing gesture? The prediction is that only one of them would serve the restrictive role in *R* while the other appears outside the maximality operator, thus having a supplementary role. This is borne out as well. For example, consider (76), where the pronominal demonstrative *those* is used to refer to some plurality of books and appears with a relative clause and a deictic pointing.

(76) [Those that discuss pronouns]_{→A} should be moved to this shelf.

The relative clause provides a descriptive information on what the books are about, while the co-speech pointing provides a locational information of the books. It seems that for any given possible interpretation, only one of the two can be restrictive, with the other only adding supplementary information. For example, consider the context where the speaker and the addressee are organizing a collection of linguistics books at a library. The speaker points to different sections of books and tells the addressee where those books should be moved to. In this case, where the speaker is pointing to different books, the locational information would be restrictive, while the relative clause *that discuss pronouns* would be a non-restrictive relative clause. The exact syntactic status of a non-restrictive relative clause is debated. Often, they are assumed to attach higher than inside the NP, at the DP level (see Demirdache 1991; Potts 2005) or even higher at the clausal level (see Emonds 1979; McCawley 1982). Details of the non-restrictive relative clause aside, the main idea is that it does not enter the restriction of the binary supremum operator. It is possible to construct another context where the two functions are reversed. For example, if the speaker is describing to the addressee which topics should go where, we can have an interpretation of (76) where the relative clause has the restrictive meaning while pointing only provides some supplementary information.

The two paraphrases are shown in (77).

- (77) a. The maximal entity that is located at *A*, which (by the way) discuss pronouns, should be moved to this shelf.
b. The maximal entity that discusses pronouns, which (by the way) are located at *A*, should be moved to this shelf.

3.5.3 Relative markedness of demonstratives

Across languages, it is observed that demonstratives are more marked than definite descriptions. For example, it is shown that demonstrative descriptions often resist referring to the unique, salient entity such as the topic or the syntactic subject of the sentence (Roberts 2002; Wolter 2006; Hinterwimmer 2015; Hinterwimmer & Bosch 2018; Koulidobrova & Lillo-Martin 2016; Dayal & Jiang 2020, a.o.). In order to account for this, many works encode anti-uniqueness or anti-saliency restrictions into the denotation of demonstratives. For example, Dayal & Jiang (2020) add an anti-uniqueness presupposition to demonstratives, ruling out the use of a demonstrative when there is only one entity that meets the relevant description. However, we have already seen from the discussion of Nowak 2019 that this type of anti-uniqueness presupposition is too strong for English: English demonstratives can refer to the most salient and unique entity without resulting in presupposition failure.

The current proposal does not encode markedness directly into the denotation of demonstratives: all it requires is a presence of another argument *R* which can be filled with a deictic pointing, an anaphoric index, or a relative clause. We have already seen that requiring at least one of these three reference arguments can explain why demonstratives are degraded in uniqueness contexts: demonstratives must at least carry an anaphoric index and are degraded when there is no anaphoric antecedent. In this section, I show that other kinds of markedness observed for demonstratives also do not require any lexical specification of markedness. As suggested in Blumberg 2020, I propose that independently motivated pragmatic principles derive the relative markedness of demonstratives. What distinguishes this account from Blumberg 2020 is that it also predicts subtle differences between pronominal and adnominal demonstratives. I first discuss how the current analysis accounts for the relative markedness of anaphoric demonstratives and then discuss the asymmetry between pronominal and adnominal demonstratives.

First, the relative markedness of anaphoric demonstratives compared to that of other anaphoric expressions can be accounted for straightforwardly by economy principles because a demonstrative that carries an anaphoric index in *R* becomes truth-conditionally equivalent to an inanimate *it* when it is pronominal, and identical to a definite description when it is adnominal. While a definite or a pronoun makes use of a unary supremum operator with a presuppositional index, a demonstrative makes use of a binary supremum operator that takes both the restrictions and the indexical information as restrictions. Thus an anaphoric demonstrative is extensionally equivalent to an anaphoric *it* or definite but has a more complex structure, and so would be degraded for economy reasons. This can be derived by *Minimize Restrictors!* (Schlenker 2005) as argued in Blumberg 2020, or more general economy principles such as *Efficiency* (Meyer 2014) which rules out a more complex LF when two LFs are extensionally identical. Observing a similar kind of markedness in German demonstrative pronouns, Patel-Grosz & Grosz (2017) propose *Minimize DP!*, which blocks the use of an underlying DP structure when there is a simpler structure that is extensionally equivalent.

This principle can also apply and derive the relative markedness of anaphoric demonstratives.

There is an asymmetry between pronominal and adnominal demonstratives in the extent to which they allow anaphoric uses. Specifically, the pronominal demonstrative is much more degraded in anaphoric uses than the adnominal demonstrative. Roberts (2002) discusses examples as in (78) from Maclaran 1982, where the anaphoric use of demonstratives *this* and *that* are highly degraded.

- (78) A car drew up at the door. Two dark-suited men got out of {it / the car / ?this / ?that}, then {it / ?this / ?that} disappeared down the drive again. (after Maclaran 1982)

The adnominal counterparts, however, are not as degraded as shown in (79).

- (79) A car drew up at the door. Two dark-suited men got out of {it / the car / that car}, then {it / the car / this car / that car} disappeared down the drive again.

This asymmetry can also be captured if we consider the competition among pronominal and adnominal elements separately. Specifically, I assume that adnominal demonstratives compete with anaphoric definite descriptions while pronominal demonstratives compete with personal pronouns. While the economy principle consistently blocks the use of the more structure in either competition, there is an additional layer that needs to be considered for the adnominal elements. Definite descriptions in English have been observed to allow both uniqueness-denoting and familiarity-denoting structures (Schwarz 2009). This differs from an adnominal demonstrative which is predicted to be always anaphoric unless accompanied by an overt relative clause or a deictic pointing. Thus, it is possible that speakers sometimes choose to use the demonstrative description rather than a definite description to signal that an anaphoric use is intended.

For a pronominal demonstrative, however, no such additional pragmatic function is predicted because personal pronouns are always familiarity denoting. Thus, we don't expect speakers to choose a more complex demonstrative over a personal pronoun to signal an anaphoric reading. This suggests that a pronominal demonstrative would be more degraded in anaphoric contexts than anaphoric demonstratives. This correctly derives the contrast between (78) and (79).

This analysis has an advantage over previous works that encode markedness directly into the meaning of demonstratives. Theoretically, it is simpler and makes use of independently motivated economy principles. Empirically, it covers cases where demonstratives do refer to the most salient entity and subtly captures differences between pronominal and adnominal demonstratives.

4 Demonstrative pronouns in English

So far, in discussing differences between demonstratives and personal pronouns, I have focused only on the inanimate pronoun *it* because it forms a minimal pair with the pronominal demonstrative *that* with respect to the presence of *R*: *that* only differs from *it* in carrying this additional property *R*. However, when we look at other pronouns such as *she*, *he*, and *they*, we immediately notice that they allow deictic uses as well as descriptive uses in some cases. In this section, I discuss the deictic and descriptive uses of pronouns and identify some pronoun-internal differences. Then, I propose that pronouns allow both the unary and the binary supremum structures, and that they compete with demonstratives when realizing the binary supremum. This analysis correctly derives

the distribution of pronouns that allow deictic and generic uses. In addition, I show that this analysis resolves a puzzle present in the original D-type analysis of pronouns in Elbourne 2005.

4.1 Pronouns can be demonstratives, too.

In Section 3.3, we saw that the inanimate pronoun *it* does not allow deictic uses. It always requires there to be a familiar entity established in the discourse. This was expected from the proposed structure because definite descriptions and pronouns realize a unary supremum with an anaphoric index presupposed. With other pronouns, however, we see that many of them readily allow deictic uses as well as descriptive uses with relative clauses, both of which are not predicted if we assume that pronouns always realize the unary supremum structure. Note that the fact that pronouns have deictic uses is not surprising given that Kaplan's initial discussion of demonstratives started with the pronoun *he* that is used deictically. However, something that has not been discussed much in previous works is that there is a pronoun-internal variation, with some allowing deictic and descriptive uses more readily than others. I discuss this further in the rest of this section. I start by looking at the deictic use next, followed by the descriptive use with relative clauses.

4.1.1 Deictic uses

Recall that the inanimate pronoun *it* and the definite description do not allow deictic uses as in (80), repeated from (51).

- (80) a. #I like $it_{\rightarrow A}$ but not $it_{\rightarrow B}$.
b. #[The computer] $_{\rightarrow A}$ is new, but [the computer] $_{\rightarrow B}$ is old.

This was compared to demonstratives, which readily allow deictic uses as in (81) repeated from (50).

- (81) a. I like $that_{\rightarrow A}$ but not $that_{\rightarrow B}$.
b. [That computer] $_{\rightarrow A}$ is new, but [that computer] $_{\rightarrow B}$ is old.

When we look at animate pronouns such as *she*, *he*, and *they*, however, we see that they do allow deictic uses. New referents that are not familiar to the addressee can be pointed out as in (82).

- (82) Look at {her, him, them} $_{\rightarrow}$!

These pronouns can also be used contrastively, where two different entities are pointed to and distinguished in the same utterance as in (83).

- (83) a. She_{\rightarrow} is happy, and she_{\rightarrow} is not.
b. He_{\rightarrow} is happy, and he_{\rightarrow} is not.
c. $They_{\rightarrow}$ are happy, and $they_{\rightarrow}$ are not.

Note that *they* is slightly degraded in this contrastive use: in colloquial speech adnominal demonstrative forms with NPs denoting sets or subsets of people such as *those people*, *those guys*, or *those kids* seem more natural.

- (84) [Those people] $_{\rightarrow}$ are happy, and [those people] $_{\rightarrow}$ are not.

We will come back to this relative degradedness of *they* in the analysis. Before moving on to descriptive uses, I would like to note that there is a prosodic difference between pronouns used anaphorically and those used deictically. It is widely observed that when used deictically, pronouns are produced with prosodic stress (Schwarz 2009). In all of the deictic uses discussed in this section, the pronouns seem to carry some stress or accent. I will later argue that the prosodic stress on pronouns reflects the presence of the binary structure in the underlying LF. Note that prosody does not have this effect for definite descriptions: stressing *the* does not make it felicitous in contrastive uses. This provides further support that pronouns have the option to realize the binary structure, while definite descriptions do not.

4.1.2 Generic uses

Another use that is not predicted if pronouns only have the anaphoric structure as argued above is the descriptive use with relative clauses. Recall (67) where a pronominal demonstrative appears with a relative clause and results in a free relative-like generic use. I have suggested that this is a result of a demonstrative combining directly with the content of the relative clause, following previous works on free relatives. In this section, I show that some pronouns in English, too, allow this generic use.

Elbourne (2013) shows that the animate pronoun *he* hosts relative clauses as in (85). He calls these ‘Voldemort phrases’ following the famous fictional moniker ‘he who must not be named.’ Note, however, that there is a crucial difference between the real Voldemort phrase and (85). Zobel (2015) calls the real Voldemort phrase a name-like use, while she calls a use like (85) a generic use. As the names suggest, (85) does not refer to a specific entity, while the Voldemort phrase does. The Voldemort phrase is more similar to singling out a specific referent out of already familiar entities, while the generic use does not require familiarity. The name-like use seems more compatible with a supplementary relative clause use that composes with a familiarity-denoting pronoun, and so I adopt Zobel’s distinction and focus only on what she calls the generic Voldemort uses.

(85) He who hesitates is lost. [Elbourne 2013:205]

There are more pronoun-specific differences in the ability to host relative clauses. Zobel (2015) notes that the generic use is possible but less frequent with the feminine pronoun *she* (fn 2), and that it is much more archaic-sounding with the plural pronoun *they* (fn 9). Elbourne (2013) also notes that these phrases are ‘slightly degraded’ (p.206) with *they* as in (86).

(86) ?They who hesitate are lost. [Elbourne 2013:206]

In summary, what we see is that pronouns in English show some variation with respect to allowing deictic and descriptive uses. All animate pronouns allow deictic uses with *they* showing some degradedness. The male singular pronoun *he* allows generic Voldemort phrases, while *she* and *they* are degraded. The inanimate pronoun *it* allows neither as we saw above. This is summarized in the table below.

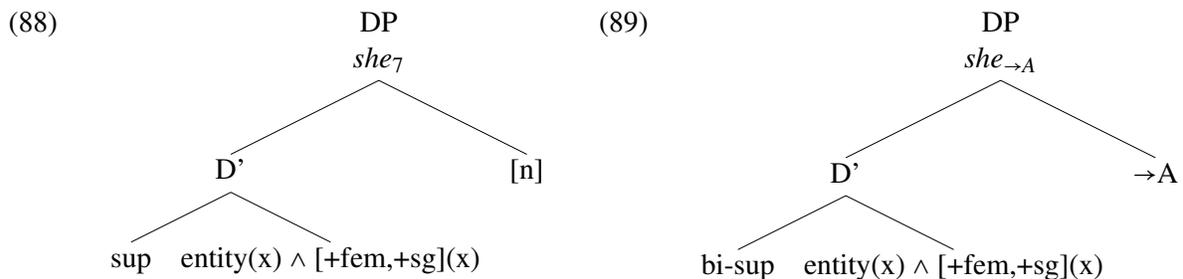
	pronominal dem		adnominal dem		animate pronouns			inanimate pronouns
	<i>that</i>	<i>those</i>	<i>that</i> N	<i>those</i> N	<i>he</i>	<i>she</i>	<i>they</i>	<i>it</i>
(87) Deictic	✓	✓	✓	✓	✓	✓	?	*
Descriptive	✓	✓	✓	✓	✓	?	?	*

The varying degree at which pronouns allow deictic uses provides further support for separating deixis from anaphora. As we discussed above, many formal semantic studies assume that deictic uses of pronouns are special subkinds of anaphoric uses. For example, deictically introduced entities are assumed to be familiar by simply being present in the context (see Heim 1982; Roberts 2002). In formal implementation, too, the mechanism by which a deictic pronoun refers to its referent is identical to how a coreferring pronoun refers to its antecedent (Heim & Kratzer 1998). However, this assumption runs into at least two problems already discussed in this paper. First, the pronoun-internal variation cannot be captured. We have already seen that *it* does not allow deictic uses altogether while animate pronouns do. Subsuming deixis under anaphora wrongly predicts all anaphoric expressions to allow deictic readings. Second, the ability to host descriptive uses shows a similar pattern to deictic uses in pronouns: it is not allowed in *it* while animate pronouns show a variation. Thus, we need a theory of pronouns that can capture both the variation in deictic uses and the variation in descriptive uses in a uniform way.

4.2 Demonstrative pronouns: Analysis

I propose that pronouns in English are semantically identical to demonstratives, as argued in Kaplan 1989, but with one difference, which is that they can also realize the familiar structure. Why would pronouns have this flexibility? I suggest that this is because of the morphological gap we see in English. As I will discuss further in Section 4.2.1, modern day English has morphological gaps in the pronominal animate demonstratives. So, it is possible that personal pronouns take on the role of pronominal demonstratives when it is necessary to refer to a singular, animate entity using a deixis or a clausal description.

In this account, the pronoun *she* used anaphorically lexicalizes the familiar structure in (88) while *she* used deictically lexicalizes the binary structure in (89). Recall that there is a prosodic difference observed between anaphoric uses and deictic uses of pronouns. It is possible to argue that the prosodic stress signals the presence of the binary supremum with the *R* property, though the exact way in which prosody signals such information is open for further investigation.



There is a general assumption in the literature that pronouns and demonstratives are separate semantic elements that differ in their meaning. While Kaplan categorized pronouns and demon-

stratives into one category, discussion of pronouns and demonstratives have diverged into two rather disjoint line of works recently. Works that look at demonstratives either treat them as being uniquely deictic, or focus on complex demonstratives and only draw a parallel to definite descriptions without discussing pronouns. Works that look at pronouns focus on the anaphoric properties of pronouns without much discussion of how demonstratives often allow such uses as well. Across languages, however, it is often difficult to draw a clear boundary between pronouns and demonstratives (see Himmelmann 1996). There are many languages, for example, that simply use the pronominal form of one of their demonstratives as the pronoun, including Hindi, Korean, Japanese, and Turkish.

In this paper, I propose to go back to the earlier assumption in the semantic literature that in English, too, pronouns do not differ categorically from demonstratives. Instead, pronouns can function as demonstratives that realize the binary structure. Crucially, I propose that all personal pronouns have an option to lexicalize the binary supremum operator in contexts where there is no demonstrative available due to morphological gaps or pragmatic reasons.

4.2.1 Competition

When is a demonstrative not available? In order to determine this, we can investigate how the pronoun and demonstrative morphemes of English realize different ϕ -feature combinations. In the table in (90), the ‘-’ symbol indicates a gap in the morphology for that particular ϕ -feature combination. What we see is that in English, the pronominal demonstratives are restricted to inanimate entities. In other words, English does not have animate demonstrative pronouns.

(90) English pronouns and demonstratives

	pronoun	dem-pro	dem-adn
sg	he	–	that male
	she	–	that female
	it	that	that thing
pl	they	–	those males
	they	–	those females
	they	those	those things

Thus, in contexts where a demonstrative pronoun is required to refer to an animate entity, the animate pronouns *she*, *he*, and *they* have an option to employ the binary structure. This is what we see with the deictic uses of pronouns in (82) and (83) as well as the generic uses of pronouns in (85). Recall that the use of *they* in contrastive, deictic contexts was observed to be slightly degraded. An anonymous reviewer points out that in the object position, a deictic use of *them* is perfectly felicitous, as shown in (91a). In this case, we see that the pronominal demonstrative *those* is ruled out due to animacy constraints as in (91b). So the contrast between (91a) and (91b) is predicted by the current proposal.

- (91) a. (Pointing to groups of people) I like them_→, but not them_→.
 b. (Pointing to groups of people) #I like those_→, but not those_→.

Similarly, this competition-based analysis predicts that the animate pronouns would be ruled out even in animate contexts if the pronominal demonstratives are available. This prediction is borne

out. First, recall that the plural pronoun *they* was slightly degraded in deictic uses compared to *she* or *he*. This can be explained by the fact that the plural demonstrative *those* sometimes do allow a reference to animate entities. For example, it is possible for a speaker to point out her relatives to a friend by uttering (92).

(92) Those_→ are my parents over there.

Moreover, *they* has been argued to be archaic-sounding when appearing with a relative clause in generic uses (Zobel 2015). This is readily accounted for by the fact that *those* in non-deictic uses can refer to animate entities easily, as we saw with (67) repeated below in (93).

(93) Those who read never fail.

It is also possible to find contexts where the singular pronoun *he* is degraded in an deictic context due to competition with the demonstrative *that* (Florian Schwarz, pc). One place where *that* can be used for animate referents is in a presentational context, where the speaker is pointing out different individuals to the addressee, as in (94).

(94) That_→ is Jin, and that_→ is Jimin.

Note that in (94), the demonstrative *that* freely refers to animate entities. What is interesting is that it is in this specific context that the pronoun *he* seems to be much more degraded, as shown in (95)

(95) #He_→ is Jin, and he_→ is Jimin.

Thus, what we see is that the deictic and generic uses of pronouns is tightly linked to the availability of a demonstrative. When demonstratives can be used for animate referents, as with *those* with relative clauses and *that* in pointing-out contexts, pronouns *they* and *he*, respectively, are blocked.

Now that we have established that some pronouns allow deictic and descriptive uses as readily as demonstratives, it might be tempting to argue that pronouns only lexicalize the binary supremum, rather than allowing both structures. However, I do not make this claim because pronouns, unlike demonstratives, allow non-restrictive pointing when necessary. We already saw from Ahn & Davidson (2018) that adult speakers interpret pronouns as referring anaphorically even when accompanied by pointing, in contrast to demonstratives, where pointing blocks an anaphoric interpretation. Moreover, I will show below that there is an additional advantage of analyzing them as having both structures, which is that it resolves a puzzle in the D-type analysis of pronouns (Elbourne 2013, 2005).

4.3 Voldemort phrases: A puzzle in D-type analysis

One advantage of analyzing pronouns as allowing both the familiar and the binary structure is that it resolves a puzzle observed in the D-type analysis of pronouns (Elbourne 2005). In the D-type analysis of pronouns, pronouns are analyzed as definite descriptions with null NPs. Semantically, pronouns are identical to definite descriptions, as in (96).

(96) a. $\llbracket \text{the} \rrbracket = \lambda f_{\langle e, st \rangle}. \lambda s: s \in D_s \ \& \ \exists !x \ f(x)(s) = 1. \ \iota x \ f(x)(s) = 1$
 b. $\llbracket \text{it} \rrbracket = \lambda f_{\langle e, st \rangle}. \lambda s: s \in D_s \ \& \ \exists !x \ f(x)(s) = 1. \ \iota x \ f(x)(s) = 1$

Elbourne (2013) notes that one of the strongest pieces of evidence for a pronoun carrying an NP-complement comes from Voldemort phrases, discussed already in Section 4.1.2 of this paper. I repeat the example from (85) here, in (97).

(97) He who hesitates is lost.

The idea is that the pronoun can host a relative clause because it carries an NP underlyingly. The NP is what hosts the relative clause.

The puzzle in the D-type analysis is that while (97) is possible, inanimate *it* does not allow relative clauses as in (98).

(98) a. *It which rolls fastest gathers no moss.
b. *It that rolls fastest gathers no moss. [Elbourne 2013]

If all pronouns are analyzed as carrying an NP that can host a relative clause, Elbourne's analysis wrongly predicts (98) to be felicitous. Elbourne leaves this for future investigation, suggesting that it might be due to the inability of *it* to receive focal stress. However, recall that *she* and *they* also show degradedness, while allowing focal stress, which suggests that the issue does not seem to be due to inability to receive focal stress.

In the current analysis, however, the contrast between *he* and *it* is derived from two main aspects. The first is that pronouns in this account do not carry NP complements in their meaning. Instead, they only carry ϕ -properties as restrictions. This means that in the regular familiar use, there is no NP to host the relative clause for pronouns. The second is that the binary structure makes available a slot that can host relative clauses, allowing a subset of pronouns to host relative clauses. The resulting prediction is that only the pronouns that are not blocked by the competing demonstrative would have the generic Voldemort uses. Specifically, we do not expect a generic Voldemort reading from *it*, which in principle can realize the binary structure but would be blocked by the presence of the pronominal demonstrative *that*. The animate pronoun *he*, on the other hand, does not have a pronominal demonstrative counterpart that can block it, and so we predict *he* to allow generic Voldemort readings. This prediction is borne out as we saw above. Similar to *it*, the plural *they* is predicted to be degraded because the plural pronominal demonstrative *those* can refer to animate entities when accompanied by a relative clause and thus blocks *they*. In summary, assuming that pronouns also realize the binary structure and that pronouns compete with the demonstratives with the respective *phi*-feature combinations resolves the puzzle presented in Elbourne 2005.

There is another advantage that this analysis has over D-type analysis. In Elbourne's D-type analysis, ϕ -features are assumed to be presuppositional. Thus, there is no difference between the different pronouns in terms of their asserted content. Thus, there is no straightforward way to explain why *he* is felicitous in the Voldemort uses while *she* isn't, and why *those* is the most natural out of all. In this account, however, ϕ -properties are restrictions inside the supremum operator. Given that the generic Voldemort phrases do not specify the gender or number of the referent, semantic economy principles can correctly predict that the simplest form with the least number of restrictions would be most felicitous. If we assume that the masculine pronoun *he* does not carry a gender-specifying restriction while the feminine pronoun *she* does, we can account for why *he* would be more felicitous in generic uses than *she*.

In addition, this analysis readily accounts for why pronouns cannot host adjectives as in (99).

(99) *she happy

Elbourne (2013) argues that this suggests that the relative clause attaches higher at the NP-level while adjectives are NP-internal and end up being elided along with the NP. In this account, an alternative solution is proposed: pronouns do not allow adjectives because there is no covert NP complement inside the maximality operator. We have already seen that relative clauses, deixis, and anaphora form a semantic class as reference-providing arguments. Arguing that pronouns allow the binary structure provides a simpler analysis for why adjectives would not be hosted by either pronouns or demonstratives.

In summary, we see that the current analysis not only accounts for the contrast between *he* and *it* observed in Elbourne 2005 but also systematically predicts the relative degradedness of other pronouns without adding any stipulation other than that pronouns also realize the binary structure. Note that this account does not alter any predictions that existing theories of pronouns make. The bound uses of pronouns are accounted for just as they would be in any D-type theory of pronouns. What distinguishes the current analysis is that pronouns are now predicted to only allow either a deictic use or a familiar use, and not a uniqueness use like definites do. Furthermore, the proposal that pronouns overlap with demonstratives in some uses is in line with typological studies that show that pronouns and demonstratives across different languages do not differ from each other semantically except for the kinds of restrictions that they carry.

5 Demonstratives in other languages

While this paper focuses on English demonstratives, the analysis proposed here can be extended to demonstratives of other languages. Unlike English, there are languages that morphosyntactically distinguish anaphoric and deictic uses of demonstratives. For example, Korean has two demonstrative morphemes *ku* and *ce*, which are argued to be exclusively anaphoric and deictic, respectively (Ahn 2017). Romanian is also observed to show a morphosyntactic distinction, where the short form of the demonstrative is restricted to anaphoric uses, while the long form is restricted to deictic uses. In this section, I discuss languages that carve out the different semantic meanings of demonstratives and show how the current analysis can account for them.

5.1 Anaphoric vs. deictic demonstratives

Korean has a three-way distinction in the demonstrative paradigm (Sohn 1994, a.o.): *i* for ‘this’, *ce* for ‘that over there’, and *ku* for ‘close to hearer or known to both speaker and hearer’. Ahn (2017) shows that *ku* marks anaphoricity, and is required in anaphoric uses such as the bound-variable context in (100).

(100) *secem-eyse aylpem-ul pol ttaymata *(ku) aylpem-ul sassta.*
bookstore-DAT album-ACC see every.time KU album-ACC bought
‘Every time I saw an album I bought it.’ [Anaphoric]

Crucially, *ku* is not allowed in deictic uses. In uses such as (101) where an entity is pointed out deictically, the deictic demonstrative *ce* must be used.

- (101) $\{ce/*ku\} \text{ enehakca}]_{\rightarrow} \text{-nun nay chinkwu-i-ta.}$
 CE linguist-TOP my friend-be-DECL
 ‘That linguist is my friend.’

Another language that makes a morphosyntactic division that between anaphoric and deictic uses is Romanian. Romanian makes use of a number of different demonstrative constructions. Two forms of demonstratives have been discussed in previous literature due to how they correspond to anaphoric and deictic uses (Ahn 2017). The first type is called the short demonstrative in Cornilescu 1993, and appears prenominally as shown in (102a). The long form is used postnominally, strictly adjacent to the noun bearing the definite article. This is also called a double definite structure because the noun carries the affixal definite. This is shown in (102b).

- (102) a. *acea stea*
 that star
 ‘that star’ [short form]
- b. *stea.ua aceea*
 star.DEF that
 ‘that star’ [long form]

Ahn (2017) shows that the short form is restricted to anaphoric uses while the long form is restricted to deictic uses. This is shown in (103) and (104) respectively.

- (103) *In fiecare bibliotecă care are vreo carte despre varză, caut în (acea) carte dacă pot să frig la grătar varza.*
 in each library that has some book about cabbage search.1SG in (that) book
 if can.1SG SUBJ grill.SUBJ+1SG cabbage.the
 ‘In every library that has a book about cabbage, I look in the book whether I can grill cabbage.’
 [bound variable; short/*long]
- (104) $\hat{I}mi \text{ place } \{[steaua \textit{aceea}]_{\rightarrow} / [*acea \textit{stea}]_{\rightarrow}\}.$
 me.CL please star.the that/that star
 ‘I like that star.’ [deictic; *short/long]

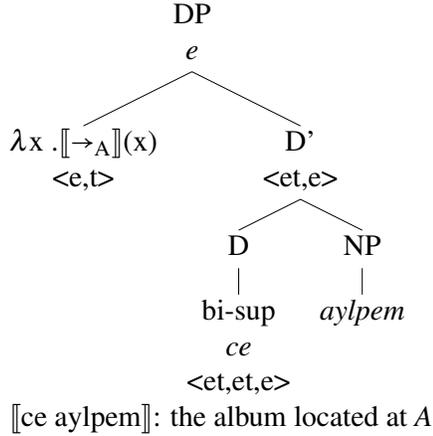
Thus, Korean and Romanian each has two demonstrative morphemes that divide the semantic space allowed for English *that*: Korean *ku* and the short demonstrative in Romanian correspond to the anaphoric uses of *that*, while Korean *ce* and the long demonstrative in Romanian correspond to the deictic uses of *that*. For generic uses, neither Korean nor Romanian makes use of demonstratives; they simply make use of a bare noun with a relative clause.

5.2 Analysis: Morphological and structural distinction

The current analysis can account for Korean and Romanian if we assume that demonstratives can come with a restriction on what the *R* slot can host. In the case of Korean, where there are two separate morphemes, this can take the form of a lexical restriction, while in Romanian, this can be a structural derivation. For example, Korean *ce* might be specified for a deictic *R*, meaning that only the locational meaning contributed by the pointing gesture can appear inside the *R* slot. This could be formally implemented by requiring that *ce* always takes a locational variable *a* in addition to the regular restrictions *F*, and that *a* is taken as an argument by the denotation of the pointing $[[\rightarrow]]$, which is part of the denotation of the demonstrative. This is shown in (105).

(105) $\llbracket ce \rrbracket = \lambda F. \lambda a. \text{bi-sup}(\lambda x. \text{entity}(x) \wedge F(x))(\lambda x. \llbracket \rightarrow \rrbracket(a)(x))$

(106)



Analyzing demonstratives as directly encoding the locational information in its denotation resembles the analyses proposed in Roberts 2002 where deixis is presupposed by the denotation of *that*. While we observed that directly encoding deixis for *that* is problematic for non-direct uses of demonstratives, this problem does not arise for *ce* in Korean, because it is indeed restricted to direct, deictic uses only. There is empirical evidence for this: Ahn & Davidson (2018) show that Korean speakers consistently interpret *ce* as being deictic only and reject the anaphoric reading even when there is no pointing accompanied. This suggests that *ce* is indeed lexically specified for deixis.

On the other hand, the anaphoric *ku* would be lexically specified to always take an anaphoric index. The current proposal gives two options for implementing this. The first option is to analyze *ku* in line with the anaphoric definite description and argue that it always realizes the unary structure with a presupposed index, as in (107). The other option is to analyze *ku* as realizing the binary structure like *ce* but requiring *R* to be always an anaphoric index, as in (108). Currently, there is no empirical data that teases apart the predictions of the two options, and more cross-linguistic comparison would be necessary to motivate one option over the other.

(107) $\llbracket ku_7 \rrbracket = \lambda F. \text{sup}[\lambda x. \text{entity}(x) \wedge F(x)]$
 presupposition: $\text{sup}[\lambda x. \text{entity}(x) \wedge F(x)] = g(7)$

(108) $\llbracket ku \rrbracket = \lambda F \lambda n. \text{bi-sup}[(\lambda x. \text{entity}(x) \wedge F(x))(\lambda x. x=g(n))]$

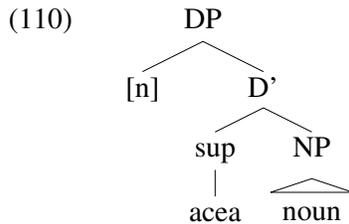
The distinction between anaphoric and deictic uses in Romanian is made structurally: the same demonstrative morpheme *acea* results in an anaphoric reading when it appears prenominal and results in a deictic reading when it appears postnominally with a definite-marked noun. The distinction in Romanian can be captured by the current analysis by arguing that the short, prenominal demonstrative reflects the unary structure, while the long, postnominal demonstrative reflects the binary structure. While still preliminary, I briefly sketch out what the syntactic analysis would look like for Romanian in the remainder of this section.

I propose the following structure for Romanian. I first start by noting that definite-marking is reflected by the suffix that appears on the noun in Romanian. Consider the structure in (109). I argue that for definiteness to be licensed, the spec-DP has to be filled. This is done by NP raising to spec-DP position, and is morphologically realized as the suffix on the noun. This kind of syntactic

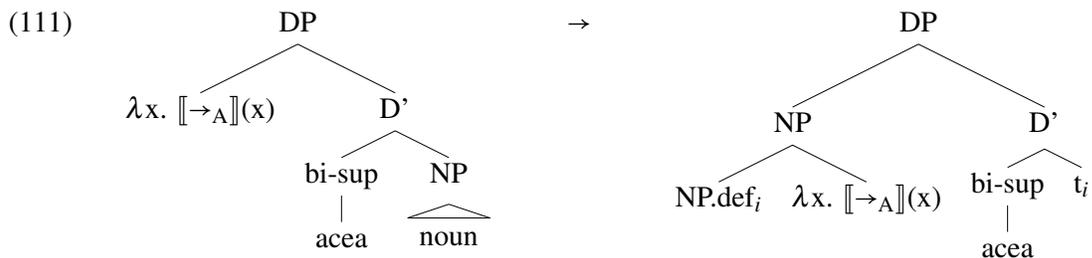
marking of definiteness resulting from movement has been proposed in a number of works for various kinds of languages (see Cheng & Sybesma 1999 for Mandarin and Cantonese, Dayal 2012 for Bangla, and Simpson et al. 2005 for Southeast Asian languages).



I further argue that the demonstrative in Romanian is realized at the D head as shown in (110) (see similar arguments in Simpson et al. 2005). In anaphoric uses, the anaphoric index appears in the spec-DP position, thus bleeding the NP movement. This results in the correct word order where the demonstrative precedes the noun. Also, because there is no NP movement, the noun does not have the definite suffix.



Finally, in deictic uses, *R* occupies the spec-DP position in place of the anaphoric index, realizing the binary structure. I argue that the definiteness is not licensed by the pointing gesture that occupies *R* because it is not in the same modality as the rest of the DP. Thus, the presence of *R* in spec-DP is argued to trigger the NP movement again. The raised NP occupies the slot where the pointing property is, licensing definiteness. This results in both the definite-suffixed NP and the order in which the demonstrative follows the NP.



In summary, we see that the anaphoric vs. deictic distinction found in languages such as Korean and Romanian can be captured by the current proposal with some independently motivated syntactic assumptions. The morphological distinction between anaphoric and deictic uses of demonstratives in Korean suggests that the information that occupies *R* can be further specified than that of English. The relative ordering of the noun and the demonstrative in Romanian suggests that gestural content may require overt linguistic expressions to be licensed.

5.3 Prediction for pronominal demonstratives in Korean

Recall that in the analysis, only one of the three reference arguments – the deictic pointing, the anaphoric index, and the relative clause – is predicted to occur in *R*. Moreover, pronominal expressions such as personal pronouns and pronominal demonstratives are argued to lack an NP restriction in the first argument, meaning that the relative clause does not have an additional slot in which it can be hosted. Thus, we predict that it would be impossible for pointing and relative clause to co-occur with a pronoun or a pronominal demonstrative in a way in which both provide restrictive information. Only one of the two would be able to provide restrictive information, while the other would have to be supplementary, structurally appearing outside the nominal domain.

This leads to an interesting prediction for languages like Korean and Romanian which morphosyntactically mark the deictic use. When pointing and a relative clause co-occur for these languages, the deictic marking in the morphosyntax would require that pointing be restrictive, thus always rendering the relative clause supplementary. In order to test this prediction, however, we need to find a pronominal expression that allows the introducing structure. The long demonstrative form in Romanian requires a definite-marked noun, so it is not possible to test this prediction. In Korean, too, the deictic demonstrative *ce* most often occurs adnominally, with a full noun complement.

There is, however, one exception to this in Korean, in casual speech. The demonstratives *ku*, *ce*, and *i* can combine with the noun *ay* ('child, kid') to form monosyllabic expressions *kyay*, *cyay*, and *yay*, and can be used like pronouns in various dialects including the standard Seoul dialect. Thus, they form a set of highly restricted pronouns in Korean that can be used in casual speech to refer to entities who are of the same age or younger than the speaker. Because it is impossible to attach a relative clause to the reduced noun in this case, we can test our prediction on *cyay*, the deictic pronoun.

This prediction is borne out. In (112), where the deictic pronoun *cyay* is used with pointing and a relative clause 'who reads', the only possible reading is the one where the relative clause is supplementary.

- (112) *[chayk ilko-iss-nun cyay]*_→ *-nun silpay ha-ci anh-ul kes-ita.*
 book read-be-RC **cyay**-TOP fail do-CI NEG-FUT thing-DECL
 'That kid (who is by the way reading) will not fail.'

Because *cyay* is lexically marked for deictic reference as argued in the last section, pointing must occur inside the *R* slot and thus carry a restrictive meaning. But *cyay* is pronominal and cannot host an NP-internal relative clause. Thus, the only possible way to interpret the relative clause in (112) is as a non-restrictive, supplementary relative clause.

In summary, what we see is that the current analysis can be extended to account for languages that have different morphosyntactic realizations of the binary structure. Comparing English *that* with Korean and Romanian demonstratives suggests that languages may differ on the degree to which the demonstrative specifies the information that *R* can host: Korean demonstratives lexically specify whether *R* can be filled with an anaphoric index or a deictic pointing, while Romanian and English demonstratives leave the content of *R* unspecified. Unlike English, however, Romanian does syntactically mark the presence of a deictic information in *R*. It would of course be necessary to test the predictions against a larger set of languages than discussed here to know whether the current analysis can derive the wide range of morphosyntactic distinctions found across languages.

While the analysis presented in this section is preliminary, it still shows that the analysis is flexible enough to account for lexical and structural variations, while restrictive enough to make testable predictions on the syntactic and semantic possibilities allowed for demonstratives.

6 Conclusion

In this paper, I have presented a new analysis of demonstratives. Observing that the indirect approach and the direct approach to demonstratives capture different aspects of demonstratives, I propose to combine the two into a uniform account. Specifically, I analyze demonstratives as lexicalizing a binary supremum operator that requires a second argument R . R can only be filled with a deictic pointing, an anaphoric index, or an overt relative clause. I encode direct referentiality into the meaning of the pointing gesture, which correctly derives the direct, rigid reference that demonstratives show in deictic uses. However, because demonstratives themselves are not specified for direct reference, the analysis can capture non-direct uses of demonstratives as well. The analysis specifically predicts two kinds of non-direct uses: anaphoric and descriptive. I have shown that this analysis not only maintains the advantages of the existing theories but also bring additional empirical advantages, such as accounting for the different degree of markedness shown by pronominal and adnominal demonstratives. Furthermore, I propose that English pronouns also have the option of realizing the binary structure proposed for demonstratives, and that pronouns compete with demonstratives for the deictic and the generic Voldemort readings. This correctly predicts that pronouns allow deictic and generic uses only when there is no demonstrative alternative. This analysis was also shown to resolve a puzzle in the D-type analysis of pronouns with Voldemort phrases (Elbourne 2005). Finally, I have discussed how the current analysis can be extended to derive distinctions made in other languages, focusing on Korean and Romanian. While more cross-linguistic data need to be tested against the predictions of the current analysis, this paper contributes a step towards a more comprehensive analysis of demonstratives, which can derive not only the distributional and interpretive properties of pronominal and adnominal demonstratives, but also the competition with personal pronouns and the parametric possibilities. I conclude this paper by discussing some remaining questions.

6.1 Remaining questions

6.1.1 Affective uses

There is a use of demonstratives that I have not discussed in the current paper, which is the affective, emotive uses (Lakoff 1974; Davis & Potts 2010; Potts & Schwarz 2010; Kim 2018) like those shown in (113).

- (113) a. How's that "hope" and "change" working out for you? [Potts & Schwarz 2010, citing Barbara Partee]
b. How's that toe? [Lakoff 1974]

While a full analysis of how these readings arise is outside the scope of this paper, I provide a brief sketch of how my analysis might derive these uses. Note that these demonstratives appear without deictic pointing or an overt relative clause. So, under this analysis, we would predict that these are

anaphoric readings with an anaphoric index appearing in *R*. The idea I would like to suggest is that the affective reading arises from the inherent nature of marking some entity as being familiar. By anaphorically referring to the entity rather than using a definite description, the speaker is signaling that they are familiar with it. Given that these demonstratives are not used in obviously anaphoric contexts, the addressee must reason why the speaker chose to mark the entity as familiar. This may have a negative, scolding effect as in (113a), or a positive, friendly effect as in a nurse coming in the office and saying (113b). Note that as soon as the nurse points to the toe, the affective reading disappears, suggesting that the familiarity analysis might be on the right track.

6.1.2 Proximal demonstratives

So far, I have only focused on the distal demonstratives *that* and *those* and have not discussed proximal demonstratives such as *this* and *these*. There is a straightforward way to extend the current analysis to proximal demonstratives. The main difference between distal and proximal demonstratives would be that the locational information for the latter is often already saturated: the intended entity is to be found near the speaker. Unless the speaker is making a contrast within entities that are all proximally located to them, the proximality alone can often help in identifying the entity. Thus, we predict this locational information to be always available for *R* even in the absence of pointing, thus making deictic uses possible without pointing. The main consequence of this argument is that we do not predict proximal demonstratives occurring without pointing or relative clause to necessarily be anaphoric, as we do for distal demonstratives. For proximal demonstratives, either an anaphoric reading or a deictic reading should be possible as long as proximality alone is sufficient to identify the entity. This prediction is borne out: we have already observed that proximal demonstratives resist anaphoric readings and require deictic readings from Roberts 2002.

Another difference between distal and proximal demonstratives that we can account for is that the latter does not allow the free relative reading that the pronominal use of *that* or *those* does. I show this in example (114), where the only reading possible is where the speaker is making a specific reference to some entities nearby and adding a relative clause as a non-restricting modification. The free relative reading available for the distal demonstrative is not available in (114).

(114) These which/that roll do not gather moss.

We have already discussed that the pronoun *she* does not allow generic Voldemort uses as readily as *he* because it is more marked in carrying the [+fem] feature. We can have a similar account for *this* here: proximal demonstratives are more marked than distal ones because they additionally carry the [+prox] feature. Thus, the only reading available is where the relative clause composes non-restrictively and *R* is occupied either by assumed proximality or some anaphoric index. This seems to be compatible with the reading we get in (114).

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