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Article

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DEMONSTRATIVES, GESTURES, AND LOGICAL FORM

SUMMARY: In *Context and Coherence* (2021), Una Stojnić defends two theses about demonstrative reference: that the deictic gestures accompanying uses of demonstratives are syntactically encoded in multi-modal syntactic constructions, and that deictic gestures so encoded are syntactically individuated by objects and individuals. Critical scrutiny of both theses reveals surprising lessons about the relationship between demonstratives and logic, but such scrutiny also reveals weaknesses in Stojnić's arguments for the theses.

KEYWORDS: indexicals, demonstratives, deictic gestures, context, coherence.

Introduction

In a scene in the last third of *The Force Awakens* (1:41:09–1:41:17), Han Solo gestures over Finn's shoulder. Han Solo uses *lip-pointing*, in which someone purses their lips and gestures with their chin. (Harrison Ford hardly moves his lips, but the gesture is clear). Finn (John Boyega, playing it straight) does not understand and finally asks what Han Solo is doing, performing an exaggerated form of the gesture. The scene is humorous at least in part because it is difficult to imagine not understanding Han Solo's gesture (though of course one may not know that Han Solo's gesture is called lip-pointing). But the scene also offers insight into Finn, who perhaps never learned to recognize the gesture, having been raised as a storm-trooper from birth.

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Interest in gesture in formal semantics and the philosophy of language originates in large part via interest in demonstratives in logic and semantics. As a result, philosophers tend to focus on *deictic gestures* or *demonstrations*: gestures that help resolve deixis, or demonstrative reference, in linguistic communication, and with one or two exceptions below, the present paper shares this focus. Pointing is the canonical deictic gesture, and while index-finger pointing is often taken for granted, lip-pointing is a widely recognized alternative (again, it is difficult to imagine not understanding Han Solo in the scene above).

In *Context and Coherence*, Una Stojnić develops an account of demonstrative reference based on the following two theses about gestures and the syntax and semantics of demonstratives:

Multi-Modality: A speaker's demonstrative or deictic gestures (including index-finger pointing and lip-pointing) are syntactic constituents of the objects of semantic interpretation, or part of what is uttered, in an utterance of a sentence containing demonstratives.

Ambiguity: A speaker's demonstrative or deictic gestures are *syntactically individuated* by the objects identified for demonstrative reference.

The following passages illustrate the two theses:

> A demonstrative gesture is not a mere extra-linguistic supplementation on a par with other extra-linguistic resources. Indeed, it is not a part of extra-linguistic context, to begin with, but rather a part of utterance, an expression among others, with its own conventionally specified contribution, that of an attention-shifting update. This means that uttering a sentence featuring a demonstrative pronoun while pointing at different things is not like uttering the same sentence in various different circumstances; it is like uttering different sentences altogether. (Stojnić, 2021, p. 46)

> Pointing is not semantically interpreted as having a context-sensitive meaning, which given a context (and together with potentially extra-linguistic resources that context makes available), determines a referent. Rather, pointing gestures are ambiguous between multiple possible forms, for example, *pointing at Betty*, *pointing at her tail*, *pointing at one of her whiskers*, etc. In this way, they are akin to names (Stojnić, 2021, p. 54, italics in original)[1]

According to Multi-Modality, deictic gestures (hereafter I will mostly drop "deictic") contribute to the syntactic individuation of utterances. What is uttered is, at least in some cases, *multi-modal*: some syntactic combination of word-types and gestures.[2] To have a simple term, I will call these multi-modal sentences. According to Ambiguity, the gesture types that occur in multi-modal sentenc-

[1] All subsequent citations with just a page number are to Stojnić's text.

[2] Note that there is no claim here about whether deictic gestures themselves are multi-modal.

es are not merely physical act-types, like the act of pointing with one's index finger, but are syntactically individuated by their referents—a different gesture for each object. Together, Multi-Modality and Ambiguity entail the surprising conclusion that demonstrative reference is syntactically encoded.

Multi-Modality and Ambiguity are, of course, only a small part of Stojnić's sophisticated theory of language and communication. A careful examination of the whole of Stojnić's theory is inappropriate in scope for a single paper, but it may be helpful at the outset to consider briefly Stojnić's account of deixis in the context of her broader theoretical aims. According to Stojnić, all semantic context sensitivity "is governed by linguistic rules" (p. 5): "Contrary to the dominant tradition, which maintains that the meaning of context-sensitive language is at least partially determined by non-linguistic features of utterance situation [sic], I argue that meaning is determined entirely by grammar" (p. vii).

Two sources of context-sensitivity with which Stojnić is concerned are deixis and anaphora, and no small part of the power of Stojnić's theory derives from her unified account of these. Much of that power is lost, however, if Stojnić's accounts of deixis and anaphora are not independently motivated.

In this paper, I examine both Multi-Modality and Ambiguity critically. In Section 1, I analyze a central tension identified by Stojnić in the semantics of demonstratives as an inconsistency between four initially plausible claims, and I introduce the details of her solution to the tension. In Section 2, I consider three of four arguments Stojnić gives in defense of Multi-Modality, and I argue that none succeeds. In Section 3, I turn to the fourth argument, and I argue for two claims: (i) that recent work on the logic of demonstratives undermines a dilemma on which the fourth argument relies, and (ii) such work avoids challenges to Ambiguity from the learnability of language.

Finally, while the business of the present paper is to articulate objections to Stojnić, I hope it is clear in what follows that it was extremely rewarding to work through Stojnić's views about demonstratives, anaphora, and discourse.

1. Stojnić on Demonstratives and Deictic Gestures

Kaplan famously distinguished between pure indexicals and true demonstratives. A pure indexical like "I" has a character that for any context uniquely returns the content of "I" in that context. True demonstratives behave differently, and a central problem in the giving a semantics for demonstratives is to characterize the difference.

1.1. The problem of referential promiscuity

Here is how Stojnić frames the central problem raised by demonstratives:

> Either an ambiguity or an underspecification seems inevitable if we want to maintain that
>
> (i) utterances like "He [pointing at Bill] is sad, because he [pointing at Tim] is leaving" are interpreted against a single, unchanging context; and
>
> (ii) the two occurrences of the demonstrative in "He [pointing at Bill] is sad, because he [pointing at Tim] is leaving" have different semantic interpretations. (pp. 29–30)

Stojnić correctly identifies a tension in the naïve application of a Kaplanian picture to true demonstratives. What Stojnić calls "ambiguity" and "underspecification" amount to rejecting (1D) and (2D), respectively:

(1D) The demonstrative "that" has the same linguistic meaning wherever it occurs.

(2D) The linguistic meaning of an expression is or determines its character: a function from contexts to propositional contents.

What we want to maintain, according to Stojnić, are a view of context as a fixed, unchanging, parameter of semantics and an apparent feature of demonstratives and other pronouns. The Kaplanian picture of context as a fixed, unchanging parameter of semantics is bound up with questions about what Kaplan calls "monsters"—expressions that shift a parameter of context. Fundamentally, however, what is at issue is the compositionality of our semantic theories:

(3D) The propositional content of a complex expression *e* relative to a context *c* (the result of applying the character of *e* to *c*) is determined by the propositional contents of the immediate constituents of *e* relative to *c* (the results of applying each of the characters of the immediate constituents of *e* to *c*), plus the syntactic structure of *e*.

This is a principle of compositionality in Kaplanian semantics.[3] Stojnić's "unchanging context" is explicit in this principle, according to which the propositional content of a complex expression relative to a context *c* is determined by the propositional content of its constituents relative to the same context *c*. Allowing shifts or updates to context can lead to violations of this compositionality principle.

The second claim Stojnić suggests we want to maintain is a seemingly obvious fact about true (I will drop "true" hereafter) demonstratives. They are what I will call *referentially promiscuous*:

[3] It is stated here informally. For details, see Kaplan (1989a, p. 507), Rabern (2012), and Westerståhl (2012). I also set aside here challenges to the identification of propositions with compositional semantic values.

Strong Referential Promiscuity. An expression *e* is strongly referentially promiscuous if and only if for every sentence *S* containing multiple occurrences O_1 and O_2 of *e*, there is some context *c* such that the propositional content of O_1 relative to *c* (what O_1 contributes to the proposition expressed by *S* relative to *c*) is distinct from the propositional content of O_2 relative to *c*.[4]

The apparent referential promiscuity of demonstratives is not unique to English. It is attested cross-linguistically in studies of contrastive uses (such as "I like this beer better than this beer").[5] I know of no language whose demonstratives are not referentially promiscuous.

Rejecting an apparently universal feature of demonstratives is a costly move. Yet Stojnić observes, as others have before, that (1D–3D) together are inconsistent with the referential promiscuity of demonstratives. Consider a simple sentence such as (1):

(1) That chases that.

Let *c* be any context. According to (2D), the character of (1) is (or determines, but I will drop this hereafter) a function from contexts to propositions. Let us say, for simplicity, that the propositional content of (1) relative to *c* is *the proposition expressed by (1) relative to c*. According to (3D) the proposition expressed by (1) relative to *c* is determined by the propositional contents, relative to *c*, of the constituents of (1). The contents of the constituents of (1) relative to *c* are the results of applying the characters of the constituents of (1) to *c*.

According to (1D), the two occurrences of "that" in (1) have the same character. Together with (2D) and (3D), it follows that the occurrences of "that" in (1) contribute the same content, relative to *c*, to the proposition expressed by (1) relative to *c*. But our choice of *c* was arbitrary. It follows that for any *c*, the occurrences of "that" in (1) relative to *c* will contribute the same contents to the proposition expressed by (1) relative to *c*. This consequence is inconsistent with the thesis that demonstratives are strongly referentially promiscuous. Thus, if we want to maintain that demonstratives really do behave as they universally appear to behave, we have to reject at least one of (1D–3D). In the remainder of this paper, I will call this result *the problem of referential promiscuity*.[6]

[4] I distinguish strong and weak referential promiscuity. The latter is that for some sentence containing multiple occurrences and some context, the occurrences differ in their contribution to the proposition expressed by the sentence relative to the context. Weak referential promiscuity can arise in some theories from the semantics of binding.

[5] Cutfield (2018), Herrmann (2018), Levinson (2018), Terrill (2018), and Wilkins (2018) all offer examples from languages other than English.

[6] A clear recent statement of this argument is given by Pickel, Rabern, Dever (2018).

1.2. Stojnić's Solution

Stojnić's solution to the problem of referential promiscuity can be divided into three steps. As we shall see, Multi-Modality and Ambiguity only arise in the third step. The first step is to identify (3D) as the culprit in the problem. Instead, Stojnić proposes a dynamic conception of context that shifts or updates with demonstrative or deictic gestures. Stojnić is not the first to suggest such a view. Pickel, Rabern, and Dever, for example, explicitly reject the compositionality principle (3D) in their dynamic semantics for demonstratives.

The second step is a theory of such dynamic contexts. For Stojnić, a context is a ranking of objects that tracks the changing attentional states of the conversational participants: "At any given point in a discourse, the context provides a ranking by prominence of candidate interpretations for a pronoun, tracking what is most prominent—that is, at the center of attention" (p. 40).

Here Stojnić borrows the idea of an attentional state from work by Barbara Grosz and others.[7] Since deictic gestures can shift the attention of conversational participants, distinct occurrences of the same demonstrative may be evaluated relative to distinct attentional states. Hence we need some mechanism in semantics to update, or shift, a context.

Stojnić's third step is to modify the view of attentional states. According to Grosz and Sidner, for example, the attentional state is determined by the salience of objects in a conversational situation (p. 175). Stojnić, in contrast, takes attentional states to be a record of what she calls "prominence". Prominence is not salience, according to Stojnić, because shifts in prominence are linguistically controlled rather than pragmatically worked out. Various syntactic constituents of a sentence can shift a prominence ranking, including, for Stojnić, deictic gestures.

In her formal theory, Stojnić represents deictic gestures as follows:

$$\langle \pi b \rangle,$$

where "π" is her symbol for a gesture, and "b" names the object determined by the gesture.[8] Interpretation of the gesture $\langle \pi b \rangle$ relative to a context c yields an updated context c' differing from c at most in that the object named by "b" is at the top of the prominence ranking and all other values are demoted:

> To represent the effect of pointing, we can introduce a family of updates, $\langle \pi e \rangle$, where π corresponds to the act of pointing and e names the individual pointed at. This update stores the entity denoted by e as the top-ranked entity—the new center of attention—and pushes all others down a position in the ordering. (p. 44)

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[7] Grosz and Sidner's (1986) is one source. Stojnić cites others.

[8] Two points: (i) in a footnote, Stojnić suggests that π is the type of definites more generally, and (ii) strictly, there is another element, so that a full formal representation looks like this: $\langle \pi 0 b \rangle$, where 0 indicates the place in a prominence ranking where the object named by "b" is placed by the update.

Gestures combine with demonstratives in syntax, and the resulting multi-modal demonstrative phrases are then combined with predicates or verb phrases to yield multi-modal sentences. For example, suppose I utter (2) while pointing throughout my utterance at one object:

(2) That is identical to that.

Using a kind of mashup of natural language syntax and Stojnić's formal notation, we may represent what Stojnić calls the *logical form* of my utterance of (2) as follows:

$$[\langle \pi b \rangle \text{ that}] = [\langle \pi b \rangle \text{ that}]$$

In contrast, sometimes I utter (2) when I am clearly pointing at different objects. Given Ambiguity, the logical form of such an utterance would be:

$$[\langle \pi b \rangle \text{ that}] = [\langle \pi c \rangle \text{ that}]$$

Here I use square brackets to indicate syntactic constituency relations. (Stojnić does not use this notation, but this small misrepresentation of her view has no effect on the argument of the present paper).

Semantically, given a context, an occurrence of the demonstrative "that" is assigned the most prominent value of the context. Because a gesture is interpreted before its corresponding demonstrative, and the effect of a gesture on context is to place the object named by the gesture at the top of the prominence ranking, the value of an occurrence of a demonstrative is always the object named by its corresponding gesture. According to Stojnić, gestures syntactically encode demonstrative reference.

In summary, we may clearly distinguish three claims in Stojnić's account of demonstrative reference:

(a) Context is or includes a dynamic, updating parameter.
(b) This updating parameter tracks the changing attentional state of conversational participants.
(c) All updates to context are linguistically controlled.

The first claim is sufficient to avoid the problem of referential promiscuity, but it says nothing about what contexts are. The second claim is Stojnić's answer to this question. Yet only the third claim requires something like Multi-Modality and Ambiguity. In rejecting Stojnić's arguments for Multi-Modality and Ambiguity in what follows, I am not rejecting the use of dynamic semantics in the treatment of demonstratives, such as recent work by Pickel, Rabern, and Dever, nor am I challenging the utility of an attentional state parameter. The best semantics

for demonstratives may well turn out to require some kind of shifting context, an attentional state parameter, or both.

2. Against Three of Four Arguments for Multi-Modality

There are, by my count, four clear arguments for Multi-Modality in Stojnić's text:

- an argument from the conventional nature of gestures (based on Kendon and Wilkins, 2003),
- an argument from the overriding force of deictic gesture,
- an argument from prosody (based on Kendon, 2004),
- an argument from logic

Stojnić's own discussion suggests that the second and third of these are based on the first, but each one raises issues of its own. Furthermore, the argument from logic may also be taken to support Ambiguity. Accordingly, in this section, I evaluate the first three arguments exclusively as arguments for Multi-Modality. I turn to the argument from logic in the last section.

2.1. Gestures and Conventions

Stojnić calls the first argument "the key argument" (p. 46). The crucial premise of the key argument is that "[t]he association between a form and shape of a gesture and its semantic effect is arbitrary, learned, and it varies across different linguistic communities" (pp. 46–47).

She cites several examples from Adam Kendon (2004) and Wilkins (2003) as evidence for the conventionality of deictic gestures. For example, thumb pointing is not generally allowed by English speakers as a deictic gesture. There are restricted circumstances where thumb-pointing is allowed, such as a use of "can you believe this guy" while thumb pointing toward someone to one's side, but such restrictions seem like arbitrary conventions. Another example concerns the use of an open palm in index pointing to indicate a particular class or type of the object demonstrated. (Her particular example is "That is a British Shorthair cat" [p. 47] with an open palm). The latter example is a clear case of Stojnić's premise: "The distinction in form underwrites distinction in meaning" (p. 47).

These examples clearly show that deictic gestures differ conventionally in some of their semantically significant features. But it does not follow that all semantically significant features of deictic gestures are conventional. Her example of an open versus closed palm in index pointing, in particular, provides no reason to think that index pointing generally is conventional. Plausibly, open palm and closed palm are conventional variations on a more fundamental behavior of index pointing. Of course, there is nothing conventional about the physical

limitations of the human body, but we impose many different conventions on the sounds we can physically produce. But the case of index pointing is importantly different, in that there is something universal about the significance of the gesture: "We may describe pointing as a universal gesture in babies given the geographical dispersion of the longitudinal studies" (Butterworth, 2003, p. 11).

However much cultural variation there is in the use of deictic gestures, some semantically significant features of index pointing are universal.

Stojnić appears to suggest that lip-pointing is not allowed in English: "Other languages, unlike English, allow speakers to indicate objects in other ways, for example, by deictic gestures of the lips, and not an extended index finger" (p. 48).

The Star Wars example at the beginning of the paper is a counterexample to Stojnić's suggestion. We do not take Han Solo to be trying to use a language other than English in the scene, and Finn's misunderstanding is not like our failure to understand a speaker of another language. The use of a pointing gesture may be more or less conventionally accepted, but even if a gesture is not widely used it does not follow that the gesture is not immediately or universally understood. All this suggests that there are semantically significant nonconventional features of pointing.

The force of the present objection is not merely that even if we grant Stojnić's claim that the conventions governing pointing are syntactically encoded, nothing follows about Ambiguity. A fully justified response to this observation is that nothing is supposed to follow about Ambiguity. Rather, the present challenge is structural: if only the culturally specific conventions governing deictic gestures are linguistically encoded, Ambiguity is false. Stojnić's argument at best supports the claim that culturally specific conventions are linguistically encoded. So the strongest interpretation of her argument undermines her own theory.[9]

One response to the present objection to Stojnić appeals to a recent account of linguistic conventions due to Armstrong.[10] Armstrong is concerned with two kinds of what he calls "linguistic innovation". One is where a speaker uses a word with which the addressee is unfamiliar, but the addressee immediately and correctly identifies the relevant convention. The other is where a speaker uses a familiar word in a novel way: "Bea managed to houdini her way out of her cell" (Armstrong, 2016, p. 94). According to Armstrong, speakers and audiences can coordinate on linguistic conventions on the fly, so that linguistic conventions are dynamic, rather than stable, for speakers of languages.

Borrowing from Armstrong, it is open to the defender of Stojnić's view to take a pointing gesture to be governed by such a dynamically identified convention. In particular, a pointing at an object *o* may be taken by conversational participants during the conversation to be a conventional name of *o*. Because ges-

[9] Thanks to an anonymous referee for pushing me to clarify the relationship between the present argument and Ambiguity.

[10] Thanks to an anonymous referee for pressing this point.

tures are conventional, Stojnić's argument from conventionality for Multi-Modality succeeds.

We can, I think, find clear cases of innovation in pointing. We point with all kinds of tools, from pencils to lasers, and these strike me as plausible candidates for Armstrong's account.[11] But the present argument concerns standard index pointing—the use of an extended index finger to indicate an object or direction—which is not analogous to either of Armstrong's examples of linguistic innovation. Index pointing is a universally familiar gesture. There is no recognition of something unfamiliar in our understanding of a standard use of index pointing. Thus, pointing at an object is not like the use of an unfamiliar word. But neither is a standard use of index pointing the use of something familiar in a novel and surprising way. (Though, to repeat, there are such pointing gestures). We use index pointing to point things out. Novelty in the object being pointed out does not require or appear to us as an innovative use of pointing. It is the point of pointing. (Similiarly, using a demonstrative to refer to an unfamiliar object is not the use of a familiar word in a novel way. It is a proper use of a demonstrative). Extending Armstrong's account of dynamic conventions to deictic gestures seems at best ad hoc, and at worst a mistake about the conventions governing pointing and the use of demonstratives.

2.2. Gestures and Intentions

In developing the argument from conventionality, Stojnić introduces two further arguments in favor of Multi-Modality: (i) that demonstrative gestures have an overriding force even in the face of other reasons to take some object to be prominent; and (ii) that our use of demonstrative gestures is required to be synchronized with speech in specific ways. Given the weakness of her "key argument", what support for Multi-Modality do these arguments offer?

I will return to (ii)—what I will call the argument from prosody—below. The argument from overridingness is explicit in the following passage: "The presence of a deictic gesture is hard to override, which suggests that it does not merely serve as one piece of evidence on a par with other contextual, extra-linguistic cues" (p. 50).

As an argument for Multi-Modality, we might interpret this passage along the following lines: the overriding force of a deictic gesture, even in cases in which it seems the speaker intends to refer to something else, are analogous to cases of malapropism. Suppose I utter "She is inconsiderate", in a context in which it is clear that I mean of someone that she is inconsistent. Despite my clear intention, what I have said is that she is inconsiderate. The word I use is what determines what I say. On this understanding of Stojnić's argument, the overriding force of a deictic gesture is a result of its status as a syntactic constituent. Multi-Modality

[11] Thanks to Adam Podlaskowski for discussion and examples.

is thus defended as the best explanation of the overriding force of deictic gestures in the semantic interpretation of demonstratives.

As with all arguments to the best explanation, the strength of the argument here turns on the strength of the alternative explanations. An intentionist about demonstrative reference—one who maintains that demonstrative reference is fixed by some intention on the part of the speaker—can offer an alternative: deictic gestures have overriding force because they are clear indications of the relevant intention. Yet according to Stojnić, the intentionist explanation falters in cases where the intention and the gesture come apart. She offers an example:

> Suppose I want to say that Mary is my best friend, but due to some accident, perhaps a muscle spasm, or confusion, I point at Sue while saying "She is my best friend". While you might realize that a mistake of sorts happened, because, say, you might have good reasons to think that Mary is the one I in fact wanted to talk about, it is essential to the case that a *mistake* happened: I accidentally said something I did not mean, just as I would have said something I did not mean to say had I uttered a wrong word. (p. 50)

I want to consider this example in some detail, because I think there are different ways to understand it, and they yield, at least to me, different intuitions. I suggest that none of the different ways of understanding the example is individually compelling.

Note that Stojnić considers two options in the example: a muscle-spasm or confusion. On reflection, the muscle-spasm case itself factors into two. Recent work on intentions suggests that intentions are discerned in perception, and in particular, they not merely inferred from perceptual evidence about behavior:

> It is a fact of experience that when a perceiver observes someone else's bodily movements, she directly perceives these movements as goal-directed and intentional. Moreover, what is consciously perceived and stored in memory is not the pure sensorimotor aspect of the movement, but rather part of its teleological content, that is a specific dynamic interaction between behavior and environment, as involving this or that part of the body, with this kind of timing and that portion of space being a target of the action. (Proust, 2003, p. 300)

Gestures are intentional actions, and Kendon may be granting Proust's point about perceiving intentions when he says "an action that is gestural has an immediate appearance of gesturalness" (Kendon, 2004, p. 15). Pointing gestures, in particular, are plausible candidates for objects of perception. Yet in Stojnić's muscle-spasm case, the bodily movement produced by the speaker is not intentional (even though she intends to perform a gesture). While Stojnić allows that the audience "might realize that a mistake of sorts happened", she does not specify whether the audience correctly does not perceive her movement as intentional, or the audience mistakenly perceives her movement as intentional.

Neither option presents a challenge for intentionist theories of demonstrative reference. If the movement is not perceived as intentional because the audience

recognizes the symptom of a muscle-spasm, then the movement is not perceived as a deictic gesture at all, and on Stojnić's own theory the movement is not a syntactic constituent of anything (unless syntax is desperate). If the movement is mistakenly perceived as intentional, then the speaker is mistakenly taken to have said something, similar to how I might take you to be saying something when I fail to recognize that you are talking in your sleep.

The other option Stojnić considers is that the speaker is confused. I take this to be a kind of case where the speaker does perform a deictic gesture but is mistaken about what object their gesture singles out for demonstrative reference. Much ink has been spilled about such cases. Here I will only suggest a response: on one variety of intentionism, the relevant intention is descriptive, where the speaker intends the hearer to identify an object in a particular way. If a speaker performs a deictic gesture, it is immediately recognized as such, and so the overriding descriptive content we attribute to the speaker is something like *the ___ at which I am pointing* (this is obviously very rough). Such a view—call it *descriptive intentionism*—captures the overriding force of deictic gestures in cases in which the speaker is confused, because an object may satisfy the description of such an intention without being what the speaker in some looser sense has in mind. The speaker, in particular, may have a singular intention to refer to *o* for an object *o* that does not satisfy the description of their descriptive intention, but according to descriptive intentionism, the descriptive intention is semantically significant, and thus overrides any singular intention. Descriptive intentionism is no *worse* as an explanation of the overriding force of deictic gestures than is Stojnić's incorporation of deictic gestures into syntax. This is sufficient to undermine any argument to the best explanation (of the overriding force of deictic gestures) in favor of Multi-Modality.

2.3. Gestures and Speech

I turn now to the argument from prosody. The central idea behind this argument is that the use of deictic gestures is subject to constraints on well-formedness: "English speakers count deixis as well-formed only when the pointing action is synchronized appropriately with the prosody of the accompanying utterance. They often repair utterances that fail to align speech and gesture in time" (p. 48). Stojnić cites here the work of Kendon. Kendon breaks a gesture down into three components, or phases: a preparation, where the speaker moves their hand or hands into position, a stroke, and a recovery, where the speaker's hands return to a resting position (Kendon, 2004, p. 112). The stroke is the semantically significant phase of a gesture, and Kendon observes that with many kinds of gesture, speakers will regulate their speech to synchronize the stroke of a gesture with the utterance of the particular word or phrase that the gesture is intended to semantically modify. Speakers, for example, may pause their speech during the preparation phase in order that the semantically relevant word is synchronized with the stroke phase. Or they may pause speech during

the stroke phase in order to avoid the stroke of a gesture overlapping with the use of another word.

Stojnić takes observations like this to support Multi-Modality, insofar as prosody (such as intonation to clarify focus) is syntactically encoded: "That there should be such constraints on well-formedness would be really surprising if pointing effects were not integrated in the logical form (indeed, it seems somewhat arbitrary to exclude the effects of pointings while including effects of prosody)" (p. 53, Footnote 29).

I agree that Kendon's observations about synchronization would be very surprising for deictic gestures in communication, but while Kendon's observations about synchronization are compelling, the most compelling examples he provides involve non-deictic gestures. One of Kendon's clearest examples involves a speaker uttering the sentence: "He used to go down there and throw ground rice over it" (Kendon, 2004, pp. 113–114).

The utterance occurs during a conversation about basement storage in a grocery shop. During this utterance, the speaker produces a gesture mimicking the scattering of ground rice. The start of the stroke phase of this gesture is synchronized with the speaker's utterance of "throw", but the stroke takes longer than the utterance of "throw". Kendon observes that the speaker pauses their utterance until the stroke is completed, only resuming with an utterance of "ground" during the recovery phase of the throwing gesture.

In the examples of deictic gestures that Kendon analyzes (mostly in Chapter 11, *On Pointing*), however, there is little indication of such prosodic constraints. The stroke of a pointing gesture usually temporally overlaps with the utterance of a demonstrative, but the stroke may also overlap with utterances of other words as well (and not just nominal complements of complex demonstratives). Intuition about our own use of deictic gestures supports this as well: we can use pointing gestures fairly freely in indicating objects for demonstrative reference, to the point of no overlap at all.[12] Of course, some of this freedom is lost if we utter sentences containing multiple demonstratives, but in such cases, there are pragmatic reasons to synchronize deictic gesture and utterance more clearly. We generally seek to avoid confusion in a conversation over what is being said about what.

Stojnić offers an example that seems to push back on the above objection:

> The misalignment is marked; for instance, it would be strange to utter "I would like a piece of that cake", where the pointing gesture accompanies the utterance of "I", but not "that cake". (p. 48)

Once again, careful consideration of the example suggests two possibilities. I submit that this example is not compelling unless it is clear in the case that the speaker *intends* the gesture to be synchronized with their utterance of "I". If the

[12] Justin Khoo (in press) raises this issue for Stojnić as well.

speaker adjusts their utterance to synchronize the gesture with their utterance of "I", the accompaniment is forced to relevance, and it is unclear why the speaker has done this. Thus, in the intentional case, the misalignment the gesture and the utterance of the demonstrative is marked, because there is a conflict with the semantics of "I". But if the gesture is performed more freely, without any suggestion that the speaker intends to synchronize their gesture with their utterance of "I", then the gesture may occur at many points during the utterance of "I would like a piece of that cake" without being marked.

In particular, suppose I make eye contact with the baker across the store and point at a cake on display. The baker makes his way over, and long after my pointing gesture is complete, I utter "I would like a piece of that cake". I am not required to make any other gesture at this point in the conversation, unless there is some unclarity about which of several cakes my original gesture indicated. Yet prosodic features, no matter how much variation is allowed, seem to require some overlap with the syllabus or segments they modify. Prosody offers a poor analogy for the constraints on our use of deictic gestures.

It is useful to compare the argument from prosody with another argument from elsewhere in the text. In her account of anaphora, Stojnić maintains that what she calls discourse conventions are grammatically, or linguistically, encoded. Discourse conventions, for Stojnić, resolve anaphora by updating or shifting the prominence ranking of the values of a context (not by adding a new value). She argues that discourse conventions are needed to account for cases where pragmatic abductive reasoning about anaphoric resolution, or perceiving speakers' intentions, overgenerates available readings:

(3) Margaret Thatcher admires Ronald Reagan, and George W. Bush absolutely adores her (p. 68, attributed by Stojnić to Kehler).

It is important for the example that "her" here is the unstressed pronoun. Stojnić argues that this sentence (so understood) is infelicitous, but if anaphoric pronoun resolution were merely a matter of pragmatic abductive reasoning (or, we might add, perceiving speakers' intentions), then there should be no trouble in finding a felicitous use of (3) according to which "her" is anaphoric on "Margaret Thatcher". This is a powerful argument that appeals to clear and compelling linguistic intuitions. Leaving pronoun resolution up to abductive reasoning (or perception of intentions) cannot explain clear restrictions on available readings of (3).

The argument from prosody for deictic gestures does not approach this argument in strength. In Stojnić's example of constraints on anaphora, there is a clear target for felicitous pronoun resolution, so abductive reasoning or perception should find it and presumably quickly. The question is what prevents us from considering it, or why it is infelicitous. In Stojnić's "I would like a piece of that cake", the questionable case—where the gesture is intentionally synchronized with the use of "I"—is ruled out by the semantics: nothing in the context is both the speaker and the cake. If it is clear that the gesture was intended to be syn-

chronized with the use of "I", the audience is within their rights to pause for clarification. (Though even here an addressee might press ahead, interpreting the demonstrative correctly and ignoring the oddity of the timing). But if the gesture is even loosely connected to the utterance "that cake" (even with a temporal gap between them), then abductive reasoning or perception of intentions is sufficient to account for the reference resolution. No matter how we understand the example, appealing to speaker intentions and audiences' abilities to infer or perceive such intentions is sufficient to explain our intuitions.

I can think of at least one kind of case in which I detect stronger restrictions on synchronization of deictic gesture and demonstrative.[13] Suppose we replace the demonstrative "that" in Stojnić's cake example with the indefinite "this":

I would like a piece of this cake.

Here, it seems to me, there are some restrictions on pointing and the use of the demonstrative. If there is no overlap in utterance and pointing, the case is usually marked.[14]

Yet we can explain this kind of case by appealing to semantic features of "this" and to cross-linguistic observations about pointing. Unlike "that", the indefinite demonstrative "this" imposes a restriction on proximity to the speaker. A distinction between proximal and non-proximal demonstratives (those that impose a proximity restriction and those that do not) appears to be a linguistic universal, though other languages make more distinctions than English does. It

[13] A very different kind of case is based on a different example from Kendon: "They come in crates about as long as that" (Kendon, 2004, pp. 165–167). Suppose that in uttering this sentence, the speaker holds their hands out some distance apart, palms facing each other. Such a gesture seems to me to be required to overlap with the speaker's utterance of "that", but the gesture in question is not a pointing gesture.

Kendon takes his example to illustrate the use of gesture in creating a target for deictic, or demonstrative, reference (p. 177). The sense in which such a gesture creates a length is not clear to me, but I agree with Kendon that such gestures behave differently than standard pointing gestures. The gesture itself makes the length available for deictic reference. There are other ways to do this. If, for example, a stick of the appropriate length were nearby, then I could point at the stick. But in the absence of something else of the correct length, a speaker may introduce the length using the kind of gesture Kendon considers. It follows that there are clear reasons to synchronize one's gesture with one's utterance of "that" in such cases. Unless the gesture is synchronized, or at least overlapping, with one's utterance of "that", the length one wants to refer to with the demonstrative is not available in the context. This explanation does not require that gestures be syntactically encoded.

[14] Suppose there is only one cake, prominently displayed, but the baker is across the room. I might make eye-contact while pointing at the cake, but only utter "I would like a piece of this cake" once the baker has crossed the room, after the pointing. Here the temporal gap between pointing and use of "this" is less marked to me, but it is an open question whether the proximity induced by the pointing is relevant once the baker has crossed the room.

has also been widely observed across languages that pointing extends proximity (Levinson, 2018, p. 19):

Pointing Extends Proximity. A pointing gesture extends proximity to include the object of the gesture. The object of a pointing gesture is proximal to the gesturer (during the gesture).

Even a distant peak may be referred to using "this" provided that the speaker is clearly pointing at the peak. Furthermore, there is no evidence I am aware of to suggest that the effects of pointing on proximity survive the pointing gesture itself. For an English speaker to exploit the effects of pointing on proximity, therefore, they must time their utterance of "this" to overlap with the gesture. Nothing in the present explanation requires that gestures be part of syntax.

Stojnić is not the first to accept Multi-Modality. Frege appears to have accepted this thesis, though without the contemporary theoretical understanding of gesture. While Multi-Modality remains an intriguing hypothesis, I have argued that three of Stojnić's four arguments identified above offer little to no support for it. The universality of index pointing undermines the argument from conventionality. The argument from the overriding force of deictic gesture raises several methodological and philosophical issues, but ultimately nothing follows about gestures being included in syntax. The argument from prosody is not very strong, in part because we can account for the most compelling cases without Multi-Modality. Thus the burden of proof for Multi-Modality, and for Stojnić's account of demonstrative reference more generally, now falls to the fourth of Stojnić's arguments. Evaluating this argument will occupy us for the remainder of the paper.

3. The Argument from Logic

Stojnić's fourth argument appeals to intuitions about valid inference using demonstratives: "Finally, note that the linguistic contribution of a pointing gesture affects the inference patterns (17) licenses" (p. 51). Here we must proceed carefully, because her examples involve anaphora as well. To avoid questions about the proper treatment of anaphora in logic, I will focus on examples involving only deictic uses of demonstratives. As we have seen above, I take Stojnić's arguments about anaphora to be much stronger than her arguments concerning deixis. The point of the present discussion is that Stojnić's theory of deixis is inadequate if it cannot handle examples involving only deictic uses of demonstratives, and so I draw no conclusions about Stojnić's theory of anaphora.

3.1. Stojnić's Dilemma

To fix ideas, consider the following examples, based on Braun (1996), who in turn adapted an example from Perry (1977):

The Ship

We are sitting on a hill, watching ships enter and exit a harbor. From our vantage point, a tall building obscures a stretch of the channel. Having turned away for a moment, I turn back to see the bow of a ship emerging to the left from behind the building, and the stern of a ship disappearing behind the building from the right. I utter:

(4) That ship is identical to that ship.

Example A: while pointing at the emerging bow throughout my utterance.

Example B: while pointing first at the bow and then at the stern. B factors into two cases:

B1: there is exactly one ship whose bow and stern I point at.

B2: the bow and stern at which I am point belong to different ships.

In A and in B1, I have said something true. In B2, I have said something false. Already we have a difference in inference patterns, because nothing false follows from anything true, but true things follow from themselves. More subtly, however, it is plausible that A and B1 differ in their inference patterns. As Kaplan and others after him have emphasized, there is an important way in which I could be wrong in B1 that is not possible in A. In particular, it is in some sense epistemically possible in B1 that I am in B2, because we may suppose that the physical actions of my gestures are the same across the two cases.[15] As a result, my utterance in A has an epistemic or logical force that the utterance in B1 lacks.

According to Stojnić, the only way to capture the inferential behavior of demonstratives in a Kaplanian framework requires abandoning the referential promiscuity of demonstratives: "The difference in form between [the two uses of her example] boils down to a difference in the representation of the pronoun, that is, to a difference in the choice of a variable that represents the pronoun" (p. 51). The idea is that what appears to be the same sentence appearing in different contexts (and exhibiting different inferential behavior) is in fact two different sentences each with its own unique inferential behavior. For example, in appearing to utter (4), a speaker is really uttering one of either (4.1) or (4.2) or (4.3) or, etc.:

(4.1) That$_1$ ship is identical to that$_1$ ship.

(4.2) That$_1$ ship is identical to that$_2$ ship.

(4.3) That$_2$ ship is identical to that$_{247}$ ship.

[15] One might object here that given Kaplan's "old switcharoo" (1989b, p. 589), there are no cases like A. Georgi (2020, p. 130, Footnote 9) rejects this argument.

The result is a kind of massive ambiguity, and Stojnić describes it as such: "This suggests that the ambiguity is in the pronoun itself" (p. 51). Strictly speaking, however, on the view targeted by Stojnić, there is no one referentially promiscuous or ambiguous demonstrative "that". There are, instead, a series of demonstratives "$that_1$", "$that_2$", etc. So the view Stojnić targets amounts to rejecting the referential promiscuity of demonstratives. To have a name for this proposal, I will call it the *demonstratives as variables view*.

Stojnić takes the ambiguity entailed by the demonstratives as variables view to be problematic. She concludes that her account of the logical behavior of demonstratives is simpler than any Kaplanian account. The conclusion follows via a simple dilemma: "It [the demonstratives as variables view] represents the difference between [the utterances of (4)] as a difference in the representation of a single ambiguous expression, rather than as a difference in the linguistic material the two utterances contain" (p. 52). Stojnić appears to assume here that there are two options for capturing the inferential behavior of demonstratives: either the target view or her own. If these two options are exhaustive, then any challenges to the demonstratives as variables view are evidence in favor of Stojnić's account of demonstratives, and Stojnić has a valid argument for her account. But if these options are not exhaustive, then Stojnić's argument is invalid.

Work on the logic of demonstratives by Georgi (2015; 2020), however, shows that Stojnić's options are not exhaustive. According to Georgi (2020), Kaplanian contexts determine *coordination schemes*, where a coordination scheme is a restriction on coreference between occurrences of demonstratives. Georgi proposes that a sentence containing demonstratives is logically true relative to a context *c* iff it is true in all contexts of all models that share the coordination scheme of *c*. On this picture, we model logical differences between utterances of (4) as differences in context. (4) is logically true relative to a context *c* iff the two occurrences of "that" are coordinated in *c*. Example A above is a plausible candidate. Yet in B1, the occurrences of "that" are not coordinated, and this is sufficient to explain the differences in logical force in the example: (4) as uttered in B1 is true, but it is not logically true.

3.2. Ambiguity and Logic of Demonstratives

Georgi's logic of demonstratives is sufficient to show that Stojnić's argument from logic is invalid. The key dilemma on which Stojnić relies is not exhaustive. But Stojnić is correct to reject the demonstratives as variables view. There is nothing ambiguous about the demonstrative "that". It is one word. In learning to use demonstratives, we do not learn an infinite sequence of indexed expressions "$this_1$", "$that_1$", "$this_2$", "$that_2$", etc. And when a speaker utters a sentence like "That is a dog" there is no sense in which it is unclear what the first word is, in contrast to "Banks are good places to relax" (see Stanley, Szabó, 2000, pp. 226–227 for discussion).

Finally, there are clear cognitive benefits to having a single word whose semantic role, to borrow a term from Kit Fine, is to semantically encode objects in the shared environment of a conversation. If each apparent use of a demonstrative to refer to a distinct object is in fact a use of a new word, the result is a significant challenge to our finite cognitive resources.

Stojnić, however, appears to accept that an adequate treatment of the inferential behavior of demonstratives will require some kind of ambiguity.[16] As a result, her theory amounts at best to offloading the problematic ambiguity onto deictic gestures, and so it appears to face at least some challenges of any ambiguity view. Pickel, Rabern, and Dever, for example, argue that any view along the lines proposed by Stojnić imposes significant cognitive costs on language users: "Language learners are still left with a vast primitive vocabulary to learn. And in this case, the vocabulary consists largely of demonstrations—pointing fingers, gestures, glances, directing intentions, must all be construed as lexical inputs to interpretation" (Pickel, Rabern, Dever, 2018, p. 146).

On Stojnić's view, understanding a pointing gesture is akin to learning a new name, because understanding a pointing gesture amounts to learning a conventional sign for the thing pointed at. (We will return to the role of convention in Stojnić's argument below). Given the frequency with which we use demonstratives, the result is a massive increase in the vocabulary of language users. It makes no difference that this vast vocabulary is gestural rather than verbal. Each new convention must be learned. Thus, even if we are sympathetic toward Multi-Modality, we should be suspicious of Ambiguity.

It is important to recognize that the required vocabulary is massive. The inferential behavior of deictic gestures requires that deictic gestures be very fine-grained. Examples B1 and B2 above show that what appear to be instances of the same gesture are in fact instances of distinct gestures naming distinct objects. This much Stojnić explicitly grants in the second quoted passage at the beginning of the paper. Examples A and B1, however, show that distinct gestures may name the same individual. Otherwise, Stojnić can only represent what is uttered in A and in B1 using the same formula:

$$[\langle \pi b \rangle \text{ that ship}] = [\langle \pi b \rangle \text{ that ship}]$$

This fails to account for the logical differences between A and B1. To distinguish distinct pointing gestures aimed at the same object, Stojnić's formal theory requires either a series of indexed symbols for each gesture: π_1, π_2, etc., or that

[16] This is suggested, for example, in her use of the definite description "the ambiguity" in the passage quoted four paragraphs above and repeated here: "This suggests that the ambiguity is in the pronoun itself" (p. 51).

different constants in her formal notation can denote the same object. Each option imposes further cognitive costs on language learners.[17]

In contrast, Georgi's logic of demonstratives requires no such ambiguity. The two occurrences of "that ship" in (4) are coordinated in A but not in B1. As a result, Georgi's logic entails that (4) is logically true relative to the context of A, but it is not logically true relative to the context of B1 (even though it is true relative to this context). Thus, Georgi's logic of demonstratives offers an account of the inferential behavior of demonstratives without any ambiguity at all.

3.3. Validity, Semantics, and Pragmatics

Yet Stojnić may object here that the conception of logical consequence defended by Georgi is unacceptably pragmatic, because the logical form of an argument in a context is determined in part by pragmatic processes of pronoun resolution. She presses just this objection to the demonstratives as variables view:

> Further, it also suggests that, if we want to capture the intuitive difference between [the two utterances of (4)] as a difference in validity of the logical form, we would have to understand validity partly as a pragmatic notion, as it is pragmatic reasoning that guides the choice of the representation of the pronoun. (p. 51)

But one might extend her point to Georgi's proposal, via the following argument. According to Georgi, coordination, like the reference of a demonstrative on Kaplanian views, is a parameter of context. As such, it is identified by discourse participants via pragmatic reasoning or perception. If such coordination is not necessary for logical form, then validity is not, on Georgi's proposal, strictly a matter of logical form alone, because validity requires such coordination. Yet if such coordination is necessary for logical form, then the logical form of an argument can vary from one context to another, and Georgi's proposal makes logical form itself a matter of pragmatic processes. Thus, either validity, or logical consequence, is not formal (not a matter of logical form), or validity is in part a pragmatic notion.

There is, however, a significant disanalogy between the demonstratives as variables view Stojnić rejects and Georgi's proposal. On the demonstratives as variables view, the logical properties of an utterance if (4) are a matter of *what sentence*—(4.1) or (4.2)—was uttered. This is sometimes called a *pre-semantic* role of context, because any resolution of what is uttered must occur prior to the semantic interpretation of what is uttered. If follows that on the demonstratives as variables view, coordination relations are determined pre-semantically. It is this role of context that Stojnić rejects in the passage quoted in the previous paragraph. On Georgi's proposal, in contrast, coordination relations are deter-

[17] One might appeal to Armstrong's work on dynamic conventions in response to this argument as well, but the disanalogies between Armstrong's examples and deictic gestures discussed in Section 2.1 remain.

mined by the contexts of our semantics. As a result, coordination, on Georgi's view, is as much a matter of the semantic role of context as is standard indexical reference for Kaplan. To the extent that Kaplanian semantics is distinct from pragmatics, we may reject the second horn of the dilemma in the previous paragraph. The logical form of a sentence or argument can vary from one context to another, but logical form, and hence validity, is not an objectionably pragmatic notion.

Conclusion

My goals in this paper have been limited: I have argued (i) that none of the four arguments Stojnić offers for Multi-Modality is wholly successful, and (ii) that Ambiguity has significant cognitive costs for language users. Along the way, we have encountered an alternative logic of demonstratives that avoids introducing any kind of ambiguity to account for the inferential patterns we observe in the use of demonstratives.

As I have emphasized above, none of the objections to Stojnić in the present paper challenge her views about anaphora. But the present objections do undermine the appeal of Stojnić's unified account of deixis and anaphora. Such a unified account promises greater overall theoretical simplicity. Simplicity considerations, however, are tiebreakers at best. They require an "all else equal" condition. But the argument of Section 3 suggests that all else is not equal in comparing Stojnić's and Georgi's account of logic. Simplicity considerations alone cannot support the surprising theory that demonstrative reference is syntactically encoded.[18]

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