

Integrating deictic co-speech gestures in demonstrative forms

Silvia Terenghi
Utrecht University

Deictic co-speech gestures (DCSGs) are commonly regarded as intimately related to exophoric demonstrative forms; yet, no account is available that formalises this relation. This paper proposes that DCSGs spell-out part of the internal structure of exophoric demonstratives: concretely, they contribute the spatial coordinates (direction and distance, syntactically encoded by the Demonstrative ‘Dem’ head and by a Measure Phrase ‘MeasP’ that modifies it, respectively) that identify the location of the demonstrative’s referent and the deictic centre. This naturally captures the intuition that exophoric demonstratives and DCSGs are related, under a multi-modal spell-out approach to demonstrative forms. Further, this proposal is compatible with independent facts regarding both the grammaticalisation of demonstrative forms and their acquisition.

Keywords: demonstratives, deictic co-speech gestures, syntax, multi-modal spell-out

1. Introduction

This paper explores the long-standing intuition that exophoric demonstratives are intimately related to deictic co-speech gestures (henceforth: DCSGs), or pointing gestures, and proposes a formalisation therefor. The idea that the two sets of forms are connected goes back at least to Bühler (1934); recently, several research lines have started delving more into the correlations in the use of demonstratives and DCSGs, providing evidence in their favour. An overview of the main results can be found in Diessel & Coventry (2020:6). These lines of research are either descriptive in scope (fieldwork research, uncovering constraints on the co-occurrence patterns), or interested in the conversational and psycholinguistic sides of the question (what is the communicative role of DCSGs and how are they planned and executed together with demonstratives).

In this work, I integrate the main converging conclusions of these studies into a formal analysis of demonstrative forms. Concretely, I propose that DCSGs spell out part of the internal structure of exophoric demonstrative forms, and that, as such, they are fully integrated within the syntax of demonstratives, under a multi-modal spell-out approach.

This paper is organised as follows. Section 2 provides some background about DCSGs and presents the main findings of the aforementioned strands of studies. Section 3 lays out the main assumptions about the semantics and the internal structure of demonstratives. Section 4 proposes that DCSGs spell out two chunks of that internal structure: one encodes the locative component of demonstratives (and more precisely the Dem head) and the other is a modifier that systematically accompanies it (Measure Phrase; henceforth MeasP). Section 5 introduces some predictions that this account makes with respect to the diachronic development of demonstratives and their acquisition, and shows that they are borne out. Section 6 concludes.

2. Deictic co-speech gestures

DCSGs are gestures (“actions that have the features of manifest deliberate expressiveness”, Kendon 2004: 15) that are produced simultaneously with spoken words (more specifically: demonstrative forms, such as *this* or *there*) and that invariably involve some kind of pointing, as per McNeill’s classification of gestures (e.g. McNeill 1992).¹

More concretely, there is quite some variation with respect to the body parts that are actually involved in the pointing gesture. These include, among others, hands, head, chin, lips (in lip pointing), eyes (eye gaze and eye movements), elbows, and feet (see e.g. Kendon 2004: 199 for a partial overview). The choice of one over the others can be taken to be “standardized within a given culture” (McNeill 1992: 12). Moreover, a considerable amount of variation has also been documented for individual pointers: for instance, Kendon (2004: Chapter 11) provides an extensive review of the different hand shapes available in manual pointing. Differences concern how many fingers are involved (index finger, open hand, or thumb) and what the direction of the hand palm is (neutral, prone, supine, or oblique), yielding a rich taxonomy of hand shapes. In this paper, I do not explore this variation further, but leave it to much needed further research. Here I only note that, at the present stage, it is not yet fully clear whether this variation can

1. For a recent overview of gestures, both within and beyond the scope of linguistics, see Cooperrider 2021.

be associated with differences in meaning, i.e. whether it is semantic or morphological in nature. For the sake of simplicity, in what follows I graphically represent DCSGs by means of the pointing index ‘ \rightarrow ’, but take it to refer to any possible instantiation of the class of DCSGs.

Regardless of this variation, DCSGs invariably refer to an object by indicating its location, which substantially corresponds to its direction and its distance with respect to the speaker, by means of a body part. This fact has led different authors to assimilate DCSGs to (Euclidean) vectors, or line segments with a given length and direction: see, for instance, Bühler (1934) and Kita (2003).

With this in place, let us consider the patterns of co-occurrence of DCSGs with exophoric demonstratives, that is: demonstrative forms that are used to locate an object or an area in the external world with respect to a deictic centre (Diessel 1999: 6; Levinson 2004: i.a.).

Firstly, it should be remarked that this co-occurrence is not systematic, as the two forms are not necessarily mutually dependent. Also in this respect, there is some cross-linguistic variation. In English, for instance, exophoric demonstratives can occur without being accompanied by a pointing gesture and, likewise, pointing can occur without an exophoric demonstrative being uttered (pro-speech gesture). However, it should be noted that the out-of-the-blue utterance of an exophoric demonstrative without a DCSG (e.g. *look at that dog!*) may be infelicitous.² Similarly, it may be the case that exophoric demonstratives uttered in contrastive contexts (e.g. *would you prefer this or that?*) are more acceptable if accompanied by a DCSG; if such demonstratives are morphologically not contrastive, pointing seems to be instead necessary for the utterance to be well-formed (e.g. *would you like this_[pointing to A] or this_[pointing to B]?*², where A and B are equally near the speaker). Fieldwork research, instead, has uncovered languages for which the co-occurrence of demonstratives and DCSGs is reported to be mandatory; these include, for instance, Yucatec (Mayan; Bohnemeyer 2018), Warao (Warao; Herrmann 2018), Tiriyó (Cariban; Meira 2018).

Secondly, a strong tendency to avoid demonstratives has been detected in contexts in which deictic pointing gestures are not available, that is in any communicative context in which, for whichever reason, the interlocutors do not see each other (García et al. 2017; Bangerter 2004). In these cases, demonstrative rates are lower and demonstrative forms tend to be substituted by referential descriptions. Conversely, the presence of demonstratives affects the “morphology” of DCSGs: whenever demonstratives co-occur with gestures, the latter show a fuller extension (e.g. in terms of arm extension) and a longer duration (Cooperrider et al. 2021).

2. I leave a full exploration of this issue to future research.

Finally, building on the observation that demonstratives are coordinated in time with the DCSGs that accompany them, psycholinguistic research has concluded that their connection stems from their being jointly planned at the level of speech production (Mesh et al. 2021: 3 and references therein). Further, the two have been suggested to be interrelated in speech interpretation as well (Peeters et al. 2015).

In the remainder of this paper, I propose a formal implementation of these conclusions. In order to do so, the next section swiftly reviews the main assumptions on which the present account rests.

3. Assumptions: DemP's internal structure

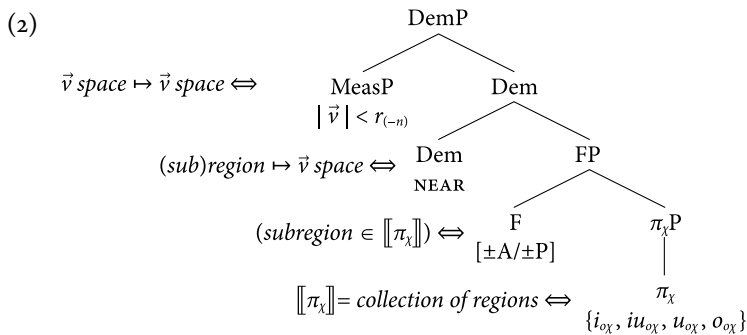
The proposal to be advanced in this work is grounded onto two main assumptions: the first concerns the primitives of analysis for the deictic oppositions encoded in demonstrative paradigms (Section 3.1); the second relates to the internal syntax of demonstrative forms (Section 3.2). Because of space constraints, here I shall only quickly introduce these hypotheses without further providing support for them; the interested reader is referred to Terenghi (2022: Chapters 3 and 4).

3.1 Person features

Despite the semantic variation clearly attested by demonstrative systems cross-linguistically (for a basic overview, see Diessel 2013), I assume that demonstrative forms always minimally make reference to the position of the speaker (as deictic centre) and that they define proximity to the speaker (e.g. English *here, this*) or non-proximity to the speaker (e.g. English *there, that*). That is, I take the semantic core of demonstrative systems to be person-oriented.

While this view is commonly assumed in theoretical(-oriented) approaches to demonstratives, experimental studies have found it to be too simplistic when it comes to accounting for the actual use of demonstrative forms in conversation. These studies recognise additional factors as relevant to the choice of demonstrative forms: some of these factors are psychological in nature (psychological proximity, status of the hearer's attention, etc.), some others can be related to properties inherent to the referent (e.g. its size and shape); an overview of the issue and a new comprehensive framework are presented by Peeters et al. (2021). A full discussion of why a person-based semantics, rather than a more fine-grained model, is assumed here as fundamental in the derivation of demonstratives exceeds the scope of this paper, but the general rationale is that, while various pragmatic factors determine the utterance of one demonstrative form over

sition *near*) locate a figure (that is, the demonstrative's referent), in the vicinity of a selected ground, which in demonstratives is taken to correspond to the region in space occupied by (one of) the discourse participants (speaker, the hearer, or the other(s)). In a nutshell, under this approach, *this* is analysed as equivalent to *near me*:



In (2), π_χ represents the collection of the regions in space associated to the discourse atoms (*i*, the speaker; *u*, the hearer; *o*, the other(s)). The notation is based on Harbour (2016): π is the locus of person in the syntax and is needed for the person features to be present, while χ introduces spatial deixis (including demonstrative paradigms). This constitutes the basic ground for demonstratives, i.e. the deictic centre with respect to which the demonstrative's referent will be located. The ground may be further specified as the location of a given discourse participant (e.g. the speaker: as in English *this X 'X (is) near me'*). This specification depends on the person features (' $\pm A$ [uthor]' and ' $\pm P$ [articipant]') encoded under FP.

Dem introduces a NEAR function, the propositional-like part of demonstratives. In line with vectorial accounts for prepositions, NEAR is taken to denote a set of vectors that originate at the deictic centre defined at FP level and point to the figure (i.e. the demonstrative referent, e.g. *bike in that bike*).⁴ Specifically, the relevant vectors define the deictic centre's vicinity region, the boundaries of which are determined in each pragmatic context: we can equally well say *this house*, *this city*, and *this world*, but clearly the scale of what we construe as close-by shifts considerably in these three contexts. Following Zwarts' (1997) treatment of vicinity for the preposition *near*, the boundaries of the vicinity region can be formalised as an upper limit imposed onto the vectors' length, represented by *r* and introduced in (2) by a MeasP. In languages that make distance-oriented distinctions in demon-

4. Due to space constraints, I must leave aside here how the figure is inserted in this structure.

stratives (e.g. English *there-yonder*), I take MeasP to introduce additional length limits (n), which result in different classes of vectors (e.g. one whose length does not exceed r_{-n} , for intermediate distances: *there*; and one whose length is comprised between r_{-n} and r , for greater distances: *yonder*).

Importantly, partial evidence for this derivation comes from the morphological decomposition of demonstratives. Consider again the examples in (1): those forms can be decomposed as follows, in compliance with the Mirror Principle:⁵

- (3) a. Italian
que-st-o *que-ll-o*
 π_{χ}^{-1} _{[+author]⁻SG.M} $\pi_{\chi}^{-2/3}$ _{[-author]⁻SG.M}
- b. Catalan
aque-st *aque-ll*
 $\pi_{\chi}^{-1/2}$ _[+participant] π_{χ}^{-3} _[-participant]
- c. Sicilian
chi-st-u *chi-ss-u* *chi-dd-u*
 π_{χ}^{-1} _{[+A/+P]⁻SG.M} π_{χ}^{-2} _{[-A/+P]⁻SG.M} π_{χ}^{-3} _{[-A/-P]⁻SG.M}

However, while the presence of Dem is necessary to the semantics of exophoric demonstrative forms, as it provides the spatial connection between the person-related ground of demonstratives and their figure, it appears that Dem is not typically spelled out independently, both in the Romance languages reviewed here and beyond (but see fn. 6 for a possible exception). The same holds, in part, for MeasP, which is only rarely spelled out independently (see Terenghi 2022: Section 4.4.2). This poses clear problems for the acquisition of Dem and MeasP. The next section proposes a solution to this issue.

4. Proposal: Dem + MeasP \Leftrightarrow DCSGs

The core proposal of this paper is that DCSGs spell out the vectorial component of demonstrative forms, and namely: the NEAR function introduced by Dem; and its related MeasP. As such, the decomposition of the demonstrative forms in (3) can be revisited as including a DCSG, indicated here by ‘ χ ’:

5. The number and gender agreement features present in (3a) and (3c) are orthogonal to the present discussion and are therefore left aside, for the sake of brevity.

- (4) a. Italian
que-st-^{⊗P} -o *que-ll-^{⊗P} -o*
 $\pi_{\chi}^{-1}{}_{[+author]}^{-NEAR-SG.M}$ $\pi_{\chi}^{-2/3}{}_{[-author]}^{-NEAR-SG.M}$
- b. Catalan
aque-st-^{⊗P} *aque-ll-^{⊗P}*
 $\pi_{\chi}^{-1/2}{}_{[+participant]}^{-NEAR-SG.M}$ $\pi_{\chi}^{-3}{}_{[-participant]}^{-NEAR-SG.M}$
- c. Sicilian
chi-st-^{⊗P} -u *chi-ss-^{⊗P} -u*
 $\pi_{\chi}^{-1}{}_{[+A/+P]}^{-NEAR-SG.M}$ $\pi_{\chi}^{-2}{}_{[-A/+P]}^{-NEAR-SG.M}$
chi-dd-^{⊗P} -u
 $\pi_{\chi}^{-3}{}_{[-A/-P]}^{-NEAR-SG.M}$

This proposal is also intuitively compatible with the empirical observations made in Section 2: co-occurrence facts and temporal alignment are naturally captured under this multi-modal spell-out approach, and so is the preference for referential descriptions in exophoric contexts if DCSGs are absent.

Let us now unpack this proposal. The idea that DCSGs spell out the vectorial component of exophoric demonstratives is reminiscent of the intuition, mentioned in Section 2, that DCSGs can be modelled as vectors (Bühler 1934; Kita 2003). Informally, this refers to the fact that DCSGs physically start at the speaker, who performs the gesture, and indicate the location of the demonstrative's referent by providing its direction. From a communicative perspective, this is taken to guide the interlocutor's attention to the referent and to thereby achieve joint attention.

Here, from a more formal standpoint, I propose instead that DCSGs spell out part of the internal structure of exophoric demonstratives. As regards the NEAR function, which introduces the vectorial component of demonstratives, I suggest that DCSGs substantially embody the spatial component of DemP by plainly instructing on the direction of the relevant vectors, namely those that start at the discourse atom that functions as the deictic centre and lead to the figure. This is in line with the geometrical property of vectors as oriented segments, that is, lines with a direction.

However, we know that geometrical vectors also encode length: as such, I propose that DCSGs also spell out MeasP, and hence that they encode the vectors' length. Evidence for this proposal is provided by the fact that DCSGs have been shown to be sensitive to differences with respect to the scale of the context in which the referent is located. Also in this respect, some cross-linguistic variation is attested. On the one hand, some languages have been described for which the rate of occurrence of DCSGs increases as the distance of the referent increases (Mesh et al. 2021: 3 and references therein); on the other hand, the frequency of occurrence of DCSGs is higher for proximal referents in some languages (Diessel

& Coventry 2020: 6–7 and references therein). That is, cross-linguistically the occurrence of DCSGs may indicate distance or proximity. At any rate, whenever DCSGs consist in a pointing arm, the height of the arm increases as a function of the referent's distance (a strategy known as “far-is-up”: Mesh et al. 2021: 3; see Mesh 2017: 47 for specific examples from both spoken and sign languages). This strongly indicates that DCSGs explicitly inform of the length of the vectors involved in the derivation of demonstrative forms, as encoded in MeasP.

Therefore, as vectors have both a direction and a length, which neatly matches the individual contributions made by Dem and MeasP, I suggest that the two are spelled out by one and the same unit. Besides, the spell-out of the prepositional-like part of the derivation (NEAR function, under Dem) together with its modifier in MeasP further parallels Svenonius' (2008: 69–71) account for the spell-out of bounded prepositions (such as, crucially, *near*). In fact, Svenonius posits a single unit spelling out, within the extended PP, both the relevant Locative head (which denotes the set of vectors for the given preposition) and the Degree head right above it, which intrinsically modifies it. Concretely, in the case of the preposition *near*, both the vectorial part and the inherent length of the vectors (relatively short, for the interpretation to converge) are spelled out as a span by one and the same unit:

$$(5) \text{ [DegP } \textit{near} \text{ [LocP } \textit{near} \text{ [AxPartP } \dots]]}]$$

Likewise, here I assume a spanning operation (Bye & Svenonius 2012; Svenonius 2016, 2020), whereby one morpheme (span) spans over a series of adjacent nodes: MeasP–Dem (for a span including a phrasal element and a head, see Davis' 2021 account for English possessive determiners).⁶

6. A possible exception to the non-manual spell-out of the MeasP–Dem span is provided by elevational demonstratives, which encode verticality values, such that the location of a referent is described as being above, below, or at the same level as that of the deictic centre. For an extensive review, see Forker (2020). The elevational part can be tentatively identified with a vector (encoding direction: Dem). Moreover, as noted by Forker, elevation is encoded by preference in combination with distal demonstratives, thus inherently spelling out the distance modifier (MeasP). As such, elevation morphology might be preliminarily regarded as a form of verbal pointing, since it defines the vectors' direction and possibly length.

An anonymous reviewer wonders whether the availability of any verbal morphology realising the MeasP–Dem span (or any of its parts) predicts that DCSGs will be overall less required and, as such, less frequent in use: given the well-documented tendency of languages to display doubling, I would refrain from making predictions in this respect on the sole basis of the present account. However, further research is needed to better understand which relation, if any, subsists between the two possible spell-outs (manual and verbal) of the MeasP–Dem span and/or its subcomponents.

As such, DCSGs can be argued to be fully integrated into the spell-out of exophoric demonstrative forms (exposing both the vectorial component and its length modifications), which in turn explains the correlations between exophoric demonstratives and DCSGs presented in Section 2. The next section shows that the current proposal captures some additional observations which relate to both diachronic and acquisition facts.

5. Extensions

The proposal that DCSGs spell out the MeasP–Dem span of exophoric demonstratives makes some predictions with respect to the diachronic evolution of demonstrative forms (Section 5.1) and to their acquisition (Section 5.2).

5.1 DCSGs, endophoricity, and diachrony

So far, we have considered exclusively exophoric demonstratives. Let us now address (spoken) endophoric demonstrative forms, which are used instead in non-spatial, pragmatic functions to refer to the (intra)linguistic context; instantiations of this class of demonstratives are anaphoric demonstratives, discourse demonstratives, and recognitional demonstratives (Diessel 1999: Chapter 5). Crucially, the use of endophoric demonstratives is not straightforwardly compatible with DCSGs, as they do not refer to the extralinguistic context. Note, however, that under the present proposal endophoric demonstratives are still regarded as encoding a vectorial component, by virtue of their demonstrative syntax (although a fully-fledged formalisation thereof is left to future research): importantly, this is fully compatible with the view that endophoric demonstratives involve an *absent* pointing gesture that refers to the discourse space (see, for instance, Roberts 2002 and Hinterwimmer 2019). Physical pointing may then also arise in these contexts, but in this sense it is rather to be conceived metaphorically, or as an analogical extension of the exophoric DCSG use.⁷ Further, it is not uncommon for endophoric demonstratives to be formally identical to exophoric demonstratives, despite clearly bearing a different interpretation

7. One such case is given by the arbitrary mapping of discourse-internal referents onto gestural *loci*: physically absent referents might be given a position inside the signing space and can be consistently referred to by DCSGs that point to that *locus*, much in the same vein as sign languages' *loci* (see, for instance, Schlenker 2020). I thank Philippe Schlenker for discussing this issue with me.

(see e.g. English). On these grounds, I propose that the MeasP–Dem span is by default null in endophoric demonstratives.

This proposal makes a prediction. The fact that the MeasP–Dem span tends to be null in endophoric demonstratives might ultimately make it hard to learn and, as such, it might eventually undergo loss. This hypothesis is fully compatible with the idea that endophoric demonstratives constitute the first stage in the grammaticalisation of demonstratives (Diessel 1999: Chapters 5/6, i.a.). Demonstrative forms are in fact well-known for being the diachronic source of a varied host of grammatical elements, including: determiners, pronouns, complementisers, copulas, linkers, connectives, etc. Crucially, all these forms have a vectorless semantics: this is fully expected once we assume that the MeasP–Dem span is null in endophoric demonstratives, that is: more likely to be lost. The loss of the MeasP–Dem span naturally entails the loss of the demonstrative syntax of the form altogether, and thus the development of non-demonstrative grammatical elements.

5.2 DCSGs and acquisition

As regards acquisition, the proposal that the MeasP–Dem span is spelled out by DCSGs is fully compatible with the role of DCSGs in the acquisition of demonstratives. Demonstrative acquisition notoriously happens early, a fact that has been traced back to the very presence of pointing gestures (Diessel 2006; Iverson & Goldin-Meadow 2005; Ozçalışkan & Goldin-Meadow 2005; Clark 1978; i.a.). If DCSGs spell out part of the internal structure of exophoric demonstratives, they might ultimately facilitate the acquisition of the internal structure of DemP.

For the sake of completeness, it should be mentioned here that early production does not necessarily entail full acquisition of adult-like contrasts: concretely, there is a large body of evidence that suggests that children's demonstrative production does not align with the adult-like usage of the same forms until relatively late (not before 4 years of age). This has been investigated, among others, by Clark (1978); Clark & Sengul (1978) and Tanz (1980) for English and, more recently, by Küntay & Özyürek (2006) for Turkish (in this case, additional pragmatic and cognitive factors come into play as well, further delaying the full mastery of the system, which is not yet fully in place for 6-year-olds). While this observation seems at odds with the idea that demonstratives are acquired early and are aided, in this respect, by the availability of DCSGs, it should be noted that children show consistent (albeit non-adult-like) behaviours when it comes to demonstrative production and comprehension, as shown by Clark & Sengul (1978). This clearly indicates that children do acquire demonstrative forms early on, although not in their adult-like version. Besides, as underlined by Clark (1978: 95–97), the earli-

est stages of these non-adult-like grammars strongly rely on the use of DCSGs to encode deictic oppositions.

If the early acquisition of demonstratives and its strong connection with DCSGs is on the right track, then the hypothesis that the MeasP–Dem span is null in endophoric demonstratives plainly predicts that these will be acquired later, according to facts. Moreover, the acquisition of different exophoric demonstrative forms shows cross-linguistic differences (preliminary findings are presented by Diessel & Coventry 2020): however, in languages that display a hearer-oriented demonstrative ('that near you', see Sicilian in (1c)), that form is consistently acquired last. Crucially, in hearer-oriented forms the deictic centre is shifted from the speaker to the hearer, making the location of the hearer the starting point for the relevant set of vectors: as a consequence, the accompanying DCSG does not embody the actual direction and length of the relevant vectors, but can be rather conceived of as the conventionalised realisation of the MeasP–Dem span, independently of the actual vectorial component. This might make these forms ultimately less immediate to acquire.

6. Conclusions

The major contribution of this paper is the integration of descriptive observations concerning the co-occurrence of DCSGs and exophoric demonstrative forms into a syntactic account for demonstratives. Concretely, I proposed that DCSGs spell out part of the internal structure of exophoric demonstrative forms, and more precisely the MeasP–Dem span, which denotes their vectorial component. This leads to the assumption of a multi-modal spell-out for exophoric demonstratives. Finally, I showed that this account is fully compatible with some independent facts that relate to the grammaticalisation and acquisition of demonstratives.

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Address for correspondence

Silvia Terenghi
 Utrecht University
 Trans 10
 3512 JK Utrecht
 The Netherlands
 s.terenghi@uu.nl

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