Deixis: This and That in Written Narrative Discourse

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Deixis: *This* and *That* in Written Narrative Discourse

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The existing literature presents conflicting models of how *this* and *that* access different segments of a written discourse, frequently relying on implicit analogies with spoken discourse. On the basis of this literature, we hypothesized that in written discourse, *this* more readily accesses the adjacent/right frontier of a preceding chunk of text, whereas *that* more readily accesses the distant/left. We tested this hypothesis in two eye-tracking experiments, one sentence completion experiment, and one corpus study. Our results showed that both *this* and *that* access the adjacent frontier more easily than the distant. Contrary to existing theories, *this* accessed the distant frontier more frequently and easily than *that*. We propose a processing model integrating segmented discourse representation theory's concept of the left/distant leaf with Grosz and Sidner's attentional and intentional model and Garrod and Sandford's focus framework model, suggesting an important role for working memory and emphasizing the different production modes of readers and writers.

INTRODUCTION

To date, linguistic and psycholinguistic studies of *this* and *that* have mainly emphasized their roles in spoken discourse, treating them as demonstratives pointing to an entity upon which the interlocutor was not previously focusing in a spatial and/or temporal context (Cornish, 2007; Diessel, 2006; Gundel, Hedberg, & Zacharski, 1993; Linde, 1979; Lyons, 1977; Strauss, 2002). Relatively few studies, however, specifically consider the functions of these expressions in written discourse (Cornish, 2007, 2010; Gundel, Hegarthy, & Borthen, 2003; McCarthy, 1994; Webber, 1988). Moreover, as we argue below, what literature does exist offers no single, coherent account of how these deictic expressions work. In part, we claim, this theoretical gap reflects a lack of experimental research: Conclusions have too often been founded upon abstract notions of what ought to happen according to a given theory, frequently based on an implicit analogy with spatial deixis in spoken discourse (cf. Diessel, 2006; Himmelmann, 1996; Strauss, 2002) rather than on observation of actual language processing and language use. To the best of the authors' knowledge, to date there has been no psycholinguistic study of the online processing of English pronominal *this* and *that* in written discourse. Indeed, Fossard (2003), who conducted several studies comparing English prenominal *that* + NP with personal pronouns (Fossard, Garnham, & Cowles, 2012) and French anaphora with demonstratives (Fossard & Rigalleau, 2005), has pointed to the need for such studies to investigate the cognitive load of deixis in written discourse through the application of a direct methodology.[1]

This study is an attempt to answer Fossard's call and to explore the cognitive information processes used in processing *this* and *that* in written discourse. In linguistic analyses, *this* and *that* are accepted as devices through which the addresser orients the addressee's attention to create joint attention, and through which the addressee constructs and modifies the mental representation of unfolding discourse (Cornish, 2011; Diessel, 2006; Rehbein, 2012). These assumptions, however, have not been explored with online methods.

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[1]*This* and *that* in written discourse are named as "pure" and "impure" textual deixis, discourse deixis, or anadeixis. Here, we refer to them with the general term "*deixis in written discourse*," which points to a discourse segment already present in a text that functions as an "antecedent trigger" to evoke related mental representation(s). The mental representation of a discourse segment, the reader's world knowledge, and the linguistic elements after the deictic term create referents for *this* and *that*.

Foci Account of *This* and *That*

As regards the cognitive status of the referent, *this* and *that* bring different entities into focus[2] in written discourse (Linde, 1979; McCarthy, 1994; Strauss, 2002). However, two different assumptions are proposed to explain the foci that *this* and *that* establish. According to one focus-based account, "*this* signals a shift of entity or focus of attention to a new focus, whereas *that* signals reference across entities or foci of attention" (McCarthy, 1994, p. 272). *This* is used to make an entity the focus of attention, whereas *that* is used to signal that reference has crossed the focus boundary by referring back to a previous focus. In (1) below, the antecedent[3] *the brain stem* in (a) is introduced in the focus position and is not yet a discourse topic. Hence, the use of *this* in subject position raises the brain stem to the status of topic as new focus of attention.

(1) (a) Coming out from the base of the brain like a stalk is *the brain stem*. (b) *This* is the swollen top of the spinal cord, which runs down to our 'tail.' (McCarthy, 1994, p. 273)

In (2) below, on the other hand, *that* shifts the attention back across "the kitchen" to the previously mentioned "tiny little hallway":

(2) (a) You entered into *a tiny little hallway* and the kitchen was off *that*. (McCarthy, 1994, p. 273)

On the other hand, Strauss (2002) draws attention to the way in which such a model borrows from the spatial deictic use of *this* and *that* to refer to near and distant entities, respectively, and argues that this model fails to account for the use of deictic expressions to refer back to earlier entities in a discourse. Instead, she proposes an alternative focus-based model, founded on the degree of attention the addresser asks the addressee to give to the referent. *This* is used by an addresser to tell an addressee to devote high attention to the referent because *this* refers to brand-new, less-shared, or hitherto unshared information, whereas

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[2]*Focus* is defined differently across different fields (Gundel, 1998). In this study, focus is understood as a mental representation of a referent in the reader's focus of attention and available in the short-term memory. However, in explanation of (1), focus is also used as a complement of topic.

[3]Gundel, Hedberg, and Zacharski (2004) point to the distinction between *antecedent* and *referent*. *Antecedent* is the linguistic expression (e.g., a noun phrase) whose reference the interpretation of an anaphoric expression depends on. *Referent* is the nonlinguistic entity that an expression refers to (e.g., events, proposition or ideas derived from the sentence). We follow this distinction and use the term *referent* when deictic expressions refer to a mental representation of an event given in the discourse segment. For example, the event *filling up the car with petrol* creates a mental representation, including a sequence of events such as opening the petrol tank door, removing the filler cap, selecting the required petrol type, inserting the petrol pump nozzle, operating the pump, and putting back the pump.

that is used to ask an addressee to give medium attention to the referent because *that* refers to shared information. We follow Strauss in supposing *this* and *that* bring nonsalient entities into focus in discourse, but we explore whether the degree of attention the addresser asks of the addressee applies when accessing salient/less-salient discourse segments.

   Accessibility argument for discourse segments.   The literature provides two main competing hypotheses on the accessibility of discourse segments. On the one hand, certain theories claim that *this* and *that* can only refer to the entities on the adjacent frontier (see the adjacent-frontier-only hypothesis, discussed below) or to entities in explicit focus (see focus memory model, below). On the other hand, an alternative group of theories propose there is more flexibility in the system, and that entities on the distant frontier are accessible to *this* and *that* (see segmented discourse representation theory and space stacks theory, below).

   In the first group of theories, both the adjacent-frontier-only hypothesis (Webber, 1988, 1991) and the focus memory model (Garrod, 1995; Sanford & Garrod, 1981) argue that only entities in the current focus are accessible. However, they use different concepts to explain this phenomenon. The adjacent-frontier-only hypothesis uses Polanyi's (1986) left-frontier/right-frontier distinction. Polanyi uses "right frontier" to refer to the clause or group of contiguous clauses immediately adjacent to the referential expression, which can thus be argued to be salient; the "left frontier" refers to a clause or clauses separated from the deictic expression by intervening clauses or units (i.e., by the right frontier) and can thus be argued to be less salient. In this study we adopt Polanyi's concept but modify his terminology, which risks confusion when applied to languages written from right to left. Instead, we refer to "adjacent" and "distal" frontiers/discourse segments.

   According to the adjacent-frontier-only hypothesis, both *this* and *that* are virtually unable to refer across units to distal entities, referring instead only to the nearest unit currently in focus. Consider, for example, the following example:

   (3) (a) It should be possible to identify certain functions as being unnecessary for thought by studying patients whose cognitive abilities are unaffected by locally confined damage to the brain. (b) For example, binocular stereo fusion is known to take place in a specific area of the cortex near the back of the head. (c) *Patients with damage to this area of the cortex have visual handicaps but they show no obvious impairment in their ability to think.* (d) *This* suggests that stereo fusion is not necessary for thought. (Webber, 1988, p. 6)

Here, the referent of pronominal *this* in unit (d) is the proposition in unit (c), which is on the adjacent frontier, next to the deictic marker. Units (a) and (b) on

the distal frontier do not provide referents for *this*: For the adjacent-frontier-only hypothesis, they can practically never do so.

According to the focus memory model (Garrod, 1995; Sanford & Garrod, 1981), two memory partitions are active in the search for referents: the *explicit* and the *implicit foci*. *Explicit focus* corresponds to the entities currently in focus and representations based on entities mentioned in the text, sometimes called "tokens." The search for referents involves a partial matching between new and not-so-new tokens. On the other hand, *implicit focus* corresponds to current scenario representations with slots in long-term memory (e.g., situations, events, objects, and characters). Crucially, these two partitions are related through the mappings between information in the explicit focus and the various role slots or scenarios afforded by the implicit focus. When a new scenario is introduced and mismatching mappings between explicit and implicit foci happen, then the original scenarios may decay or be displaced or incorporated into a new scenario. Thus, the entities in the implicit focus become inaccessible for referent searches.

However, empirical studies have revealed cases in which the adjacent frontier constraint is violated (see Afentenos & Asher, 2010; Asher, 2008; Holler & Irmen, 2007; Prìevot & Vieu, 2008). Contrary to the adjacent-frontier-only hypothesis and the focus memory model, an alternative group of theories (the segmented discourse representation theory [Lascarides & Asher, 2007] and the space stacks theory [Grosz & Sidner, 1986]) claim that distal entities *are* accessible as long as certain discursive features exist. This second group of theories points to different discursive features that make the system flexible. Segmented discourse representation theory (SDRT), a modified version of Kamp's (1981) discourse representation theory, argues that discourse is composed of discourse segments and of interpretations based on the semantic relations between segments. SDRT states that although for the most part antecedents to anaphora must be discourse representation theory (DRT)-accessible on the adjacent frontier of the discourse structure, where certain kinds of rhetorical relations are present (e.g., *contrast*, *parallel*, and *narration*), discourse referents that DRS would define as inaccessible can in certain cases become available. Therefore, contrary to the adjacent-frontier-only hypothesis, SDRT assumes a dynamic semantic interpretation and thus seems to be flexible in its approach regarding the availability of distal-frontier antecedents to anaphora.

Space stacks theory (Grosz & Sidner, 1986) claims that linguistic structures come together to form discourse segment(s) and to signal attentional and intentional states. Attentional states refer to the tracking in the processing of discourse of foci, which can be shifted between segments thanks to the intentional structures that encode purpose. According to the space stacks theory, discourse is composed of a set of focus space stacks and segments (units/ sentences). The information lower in the stack (corresponding to the left/distal frontier) is usually accessible from higher in the stack—but is less accessible than

the information in spaces higher in the stack (in Polanyi's terms, on the right/ adjacent frontier). Accessibility to lower spaces within the framework of intentional states occurs when the intentional structure of a given discourse segment pushes the current entity (that on the adjacent frontier/top of the stack) down the stack and brings the earlier entity (that on the distal frontier/farther down the stack) back into focus, "popping" it from the stack (Grosz & Sidner, 1986, p. 180). In the change of focus, referring expressions update discourse and constrain the interpretation. However, space stacks theory was developed to account for spoken discourse, not written, and it focuses mainly on utterances in which lower spaces become accessible through flashbacks and interruptions.

In conclusion, then, there is disagreement as to whether, to what extent, and how discourse segments are accessed, and as to whether and how *this* and/or *that* can access the distal frontier. SDRT and space stacks theory, unlike the adjacent-frontier-only and focus memory model, assert that the distal frontier can be opened up to topic continuation through referential expressions thanks to such features as intentional structures, but the frequency of such access, whether it applies identically to spoken and to written discourse, and whether it occurs in online reading are all questions that remain unanswered.

Some studies have explored reference across long stretches of text and demonstrated that when the distance between an anaphor and its antecedent is increased, an increase in reading time is observed after the anaphor has been read; the antecedent is not reactivated when readers process the anaphor, and the anaphor is not resolved when the antecedent is difficult to retrieve from the memory (Ehrlich & Rayner, 1983; Klin, Guzman, Weingartner, & Ralano, 2006; O'Brien, Raney, Albrecht, & Rayner, 1997). Other studies look at reference across time shifts (Anderson, Garrod, & Sanford, 1983; Madden & Whitten, 2000; Zwaan, Weingartner, & Myers, 2013), across episode shifts (Gernsbacher, 1990; Rapp & Gerrig, 2002), and across location shifts (Levine & Klin, 2001); these studies claim to have shown that in online reading, the first event/place after the time/location shift is deactivated and made inaccessible to readers, because it is not in the current focus. However, the possibility of reference across discourse segments to a distal frontier has not been investigated through production experiments or analyses of written corpora. In addition, little research has looked at the comprehension of *this* and *that* in written discourse. Neither linguistic nor psycholinguistic studies have thoroughly investigated the processing of *this* and *that* in written discourse.

In general, accessibility can change according to speakers' intentional and readers' attentional states. We therefore decided to investigate the accessibility of distal and adjacent frontiers and the interaction between frontiers and deictic expressions in two different cognitive domains: online reading and production. To do so, we conducted two online experiments and a corpus study. In Experiments 1A and 1B, by recording eye movements during reading, we observed the

processing of *this* and *that* in narrative written discourse. In Experiment 2, we examined participants' preferences when using *this* and *that* in narrative completions to refer to referents on the adjacent and distal frontiers. And in the corpus study, we explored the referents of *this* and *that* in narrative texts.

If the assumptions of the first focus-based account (that proposed by McCarthy) are right, then processing load should be relatively low when *that* refers to the distal frontier, because *that* signals that the address has crossed the focus boundary by referring across entities (Linde, 1979; McCarthy, 1994). When *that* is used in the experiments to access the adjacent frontier, however, processing load should, according to this account, be greater and fixation times longer. On the other hand, references to the adjacent frontier with *this* should lead to shorter fixations. However, if Strauss's alternative focus-based model is right, then the fixations should be short when *this* refers to the event on the distal frontier and when *that* refers to the event on the adjacent frontier (Strauss, 2002). If the distal frontier is difficult to access even when semantic relations between the referent and *this*/*that* are established, then the assumptions in the first group of focus-based accounts (Linde, 1979; McCarthy, 1994) and in the alternative group of theories on the access to the distal frontier (Lascarides & Asher's SDRT [2007] and Grosz & Sidner's space stacks theory [1986]) will be undermined, and the adjacent-frontier only hypothesis (Webber, 1988) and focus memory model (Garrod, 1995; Sanford & Garrod, 1981) might gain support. This would indicate that any textual trace in the working memory is short-lived (Cornish, 2010; Jarvella, 1979). Also, we might argue that the distal frontier remains in the implicit focus and that the mapping between the implicit and current foci with deictic expressions is weak.

EXPERIMENT 1A

Experiment 1A had a 2×2 within-subjects design, crossing two levels of deictic expressions (*this* and *that*) with two levels of discourse segments (adjacent and distal frontiers). The events on the adjacent and the distal frontiers, which would serve as antecedents for *this* and *that,* differed in their typical time duration. The distal frontier described an event of a relatively long duration, and the adjacent frontier described an event of a relatively short duration that was part of the long event. In the critical sentence, *this* and *that* referred to an event that was specified to have taken either a long or short time (e.g., *5 hours* or *5 minutes*), thus matching either the long event on the distal frontier or the short event on the adjacent frontier. The time duration in the critical sentence was manipulated by condition, as below:

- **Conditions 1 and 2:** *this/that* referring to a long event on the distal frontier of discourse, e.g., "*John drove from Edinburgh to Birmingham*, listening to his favorite jazz CDs. When he arrived in Birmingham, he filled up the car with

petrol. *This/That* took him 5 hours, and afterward he was happy to have enough time to go to his hotel to have a rest."

- **Conditions 3 and 4:** *this/that* referring to a short event on the adjacent frontier of discourse, e.g., "John drove from Edinburgh to Birmingham, listening to his favorite jazz CDs. When he arrived in Birmingham, he *filled up the car with petrol. This/That* took him 5 minutes, and afterward he was happy to have enough time for coffee."

We assume that reference assignment to an event occurs soon after the deictic expression is read at the start of the critical sentence. Readers should experience processing difficulty if the length of the event (e.g., driving from Edinburgh to Birmingham) mismatches with the time duration subsequently mentioned in the critical sentence (e.g., 5 minutes), relative to when it matches (e.g., 5 hours). Thus, differences in fixation times among conditions should indicate which event was initially chosen as the referent.

Here, we consider two hypotheses, based on the theoretical discussion above. The selective preference hypothesis is that preferences for *this* and *that* differ in the way specified by the first group of focus-based accounts. This predicts an interaction of deixis by time duration: For the *this* conditions, fixation times should be longer when the time duration mentioned in the second sentence is long (5 hours) relative to when it is short (5 minutes), but the *that* conditions should show the reverse pattern. The adjacent-frontier-only hypothesis is based on the idea that the distal frontier becomes less accessible for both types of deictic expression. The adjacent-frontier-only hypothesis therefore predicts a main effect of time duration: Fixation times should be longer when the time duration is long, relative to when it is short, regardless of deixis.

Method

Participants.   Fifty-two paid native English-speaking volunteers aged 21 to 24 from the University of Edinburgh participated. All were unaware of the purpose of the study.

Apparatus.   We used an Eyelink 1000 eye-tracker in tower-mounted mode, and a chin rest was used to stabilize the participant's head.

Materials.   After *this* and *that*, to present the time duration that long and short events require, the same structure . . . *took him/her + time duration* was used throughout the stimuli. After the time duration, the second clause started with "and" and was followed by adverbials with seven or more characters (e.g., *and afterward*) to allow for the possibility that participants would see the word parafoveally during the fixation on the *and*. The frontier/referent preferences of

this and *that* were measured by referring to matching or mismatching time spans for the events (e.g., *this/that took him 5 hours/minutes* referring to either *John drove from Edinburgh to Birmingham* or *he filled up his car with petrol*).

The long events in the stimuli included events such as moving to a new flat, preparing roast turkey and potatoes for a dinner party, and planting roses (see Appendix A for further stimuli samples). The time duration of the long events ranged from 1 hours to 2 months, whereas that of the short events ranged from 5 to 45 minutes. The short events were related to the long events within each item. The durations of the long and short events were also checked by two research assistants in the lab and two PhD students at the University of Edinburgh. Taking their feedback into account, the time duration for a few of the events was changed.

The clause with the long event was given with a modifier (e.g., *listening to his favorite Jazz CDs*). To prevent the modifier being taken as a referent of *this* and *that*, special attention was paid so as not to introduce a new event or use psychological verbs (e.g., *planning* or *thinking*). To indicate the end of the long event and the start of a new event, adverbial clauses with *after*, *once*, or *when* were provided before the clauses with short events to signal that two different events were mentioned in the text (e.g., *When he arrived in Birmingham*). The long event was always on the distant frontier (earlier clause in the first sentence) and the short event on the adjacent frontier (immediately preceding clause in the second sentence; Figure 1).

There were 40 experimental items, each in the four experimental conditions illustrated above. Four files were constructed: In each file each sentence appeared in only one condition and each condition appeared an equal number of times. There were 60 fillers and 10 practice items, which were similar in length to the control sentences. In the filler items, consequent events that a character experienced were given. The texts were presented as three or four written lines. The number of characters in each line was between 66 and 76. *This* and *that* in the second sentence always appeared around the middle of the line. Each participant saw all fillers.

Procedure.   One hundred ten texts were presented in a fixed random order, such that no two experimental items appeared adjacent to each other. Thirteen participants were assigned to each list. The experiment began with eight fillers to familiarize the participants with the experimental procedure. We tracked only the right eye. Items appeared on a monitor approximately 80 cm from the participant's eyes. Before each item, the participant fixated a black square; in this way, before each item, the calibration of the eyes was checked by the experimenter. After reading each item, the participant pressed the X button on the controller to see the corresponding comprehension question and then pressed the left button for the left answer and the right button for the answer on the right. The comprehension questions never probed the referents of *this/that*.
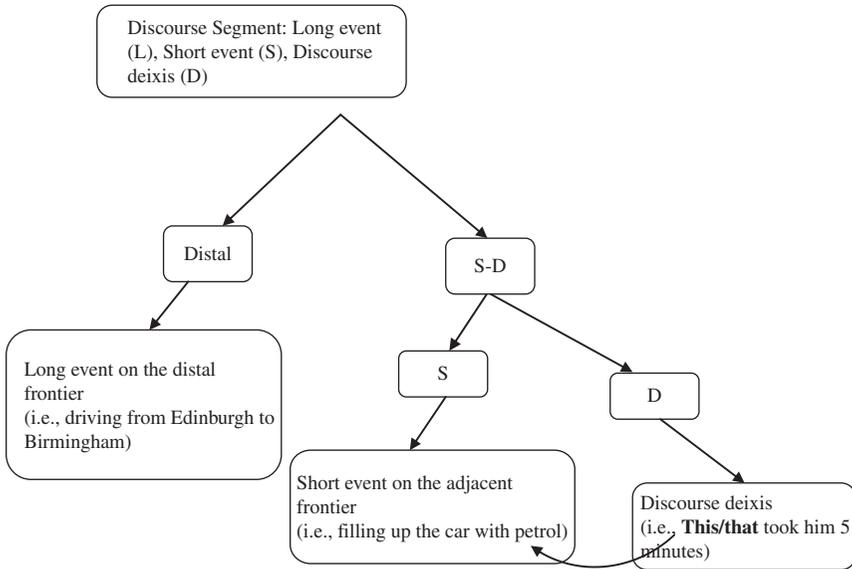
FIGURE 1   Discourse tree for the left and right frontiers of discourse structure.

Data analysis.   Fixations of less than 80 ms and more than 1,200 ms were excluded from the analysis. Only participants who achieved at least 90% correct answers to the questions were included in the analysis: Data from three participants whose performance was lower than 90% were excluded. Texts were divided into nine regions (Table 1).

We predicted the preferences of *this* and *that* would emerge in the time (e.g., *5 minutes/hours*) and connector and adverbial regions (e.g., *and afterward*), in measures of initial processing time (first-pass reading time or regression-path time; see definitions below). Because of the processing load entailed in inferring time intervals and moving from adjacent frontier to distal frontier through deixis, we also predicted that the preferences would emerge in the later pronoun and copula region (e.g., *he was*) and in the adjective region (e.g., *happy to*). Because of the possible delayed nature of the effect, we also expected it to be observed in second-pass reading time, a measure of re-reading.

Results and Discussion

The condition-by-region means in critical regions for the first-pass reading times, regression-path times, and second-pass reading times are reported in Figures 2, 3, and 4, respectively. The means for each region were analyzed using repeated-

TABLE 1
Regions (R) in Experiment 1

R1 Long event on the distal frontier	John drove from Edinburgh to Birmingham
R2 Modifier and adverbial clause	listening to his favorite jazz CDs.
	When he arrived in Birmingham,
R3 Short event on the adjacent frontier	he filled up the car with petrol.
R4 Deixis	*This/that* took him
R5 Time duration	5 hours/5 minutes
R6 Connector and adverbial	and afterward
R7 Pronoun and copula verb	he was
R8 An adjective	happy to
R9 Region after the adjective	enough time to go to his hotel to have a rest

measures ANOVA treating deictic expressions (*this-that*) and discourse segments (distal/adjacent frontiers [DF/AF]) as within-participant and within-item factors. Analyses were performed on the means of each participant, collapsing over items (F1), and for each item, collapsing over participants (F2). Data for each region are given using the three different measures, which give different information about the time-course of processing. First-pass reading time is the total duration of all the fixations in a region between the time when the participant's eye-gaze first enters the region from the left and the time when the region is first exited to either the right or left. It gives information about early processing in each region. Regression-path time is the sum of fixations from the time when the reader's gaze first enters the region from the left to the time when the region is first exited to the
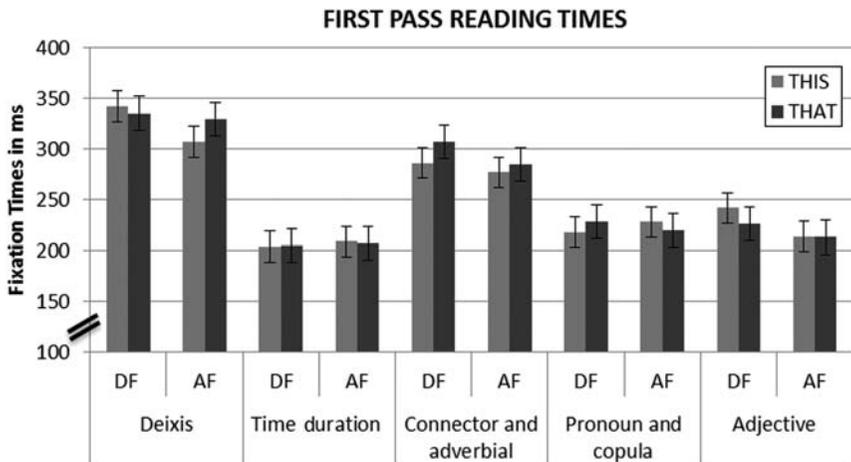
FIGURE 2   First-pass reading times (in ms) across regions.
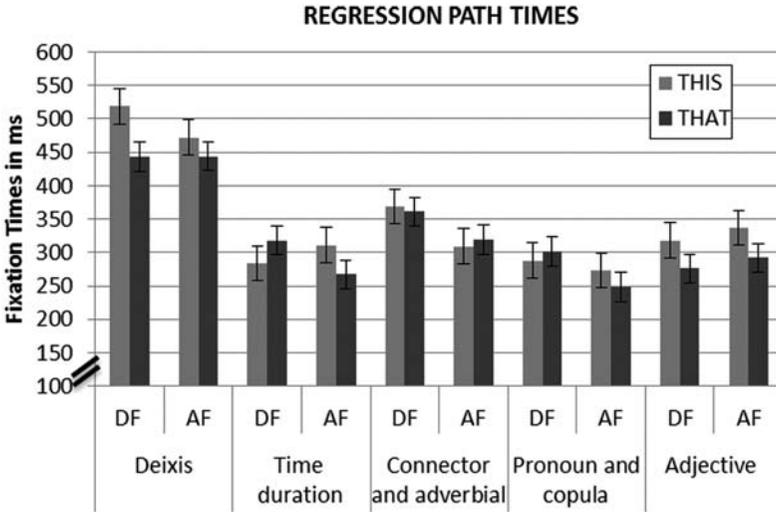
FIGURE 3   Regression-path times (in ms) across regions.

right. Second-pass reading time is the sum of fixations made on a region after that region has already been exited (either to right or left) for the first time. This measure excludes time spent during the initial reading of a region and gives information about any processing that occurs after a delay in relation to the first
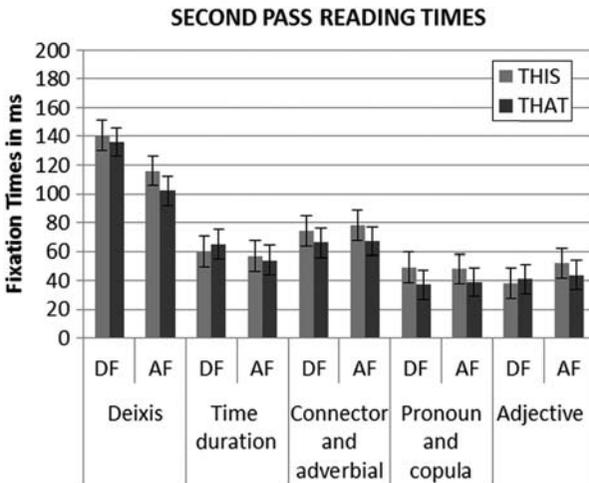
FIGURE 4   Second-pass reading times (in ms) across regions.

encounter of the critical region. In the analysis, we removed zeros from first-pass reading time because they signified no fixation in these regions. Such trials were treated as missing data. On the other hand, for second-pass reading time we did not remove zeros, and trials where a region was not refixated contributed a value of 0 ms to the cell mean. We first report the results of first-pass reading time measures.

In the connector and adverbial region of first-pass reading time measures (e.g., *and afterward*), a significant main effect of deixis was seen, $F1(1,51) = 5.223$, $MSE = 2160$, $p < .05$, $\eta p^2 = .093$; $F2 (1,39) = 7.683$, $MSE = 1,383$, $p < .05$, $\eta p^2 = .165$. Fixations were longer in the *that* condition than the *this* condition, $That = 296$ ms, $SE = 14.032$; $This = 281$ ms, $SE = 11.489$. A significant main effect of discourse segment was also seen in the same region, $F1 (1,51) = 9.588$, $MSE = 1,365$, $p < .05$, $\eta p^2 = .158$; $F2 (1,39) = 4.084$, $MSE = 2,031$, $p < .05$, $\eta p^2 = .095$. References to the distal frontier of the discourse led to longer fixations than references to the adjacent frontier of the discourse, $DF = 297$ ms, $SE = 12.937$; $AF = 281$ ms, $SE = 12.406$. The same significant main effect of the discourse segment was seen in the deixis and the adjective regions. In the deixis region, $F1(1,51) = 5.910$, $MSE = 3,701$, $p < .05$, $\eta p^2 = .104$; $F2(1,39) = 4.326$, $MSE = 5,052$, $p < .05$, $\eta p^2 = .100$; $DF = 338$ ms, $SE = 14.767$; $AF = 317$ ms, $SE = 12.322$; in the adjective region (e.g., *happy to*), $F1(1,51) = 15.380$, $MSE = 1,358$, $p < .05$, $\eta p^2 = .232$; $F2(1,39) = 11.482$, $MSE = 1,085$, $p < .05$, $\eta p^2 = .227$; $DF = 234$ ms, $SE = 9.393$; $AF = 214$ ms, $SE = 8.260$.

The time duration region of regression-path times (e.g., 5 hours/minutes) revealed a significant two-way interaction between deixis and segments in the subject analysis but not in item analysis, deixis × segments: $F1(1,51) = 4.207$, $MSE = 1,857$, $p = .045$, $\eta p^2 = .076$; $F2(1,39) = 1.023$, $MSE = 1,579$, $p = .318$, $\eta p^2 = .026$. References to the long event on the distal frontier with *this* led to shorter regression path durations than references with *that*, *This* DF = 284 ms, $SE = 16.500$; *That* DF = 318 ms, $SE = 28.605$; $t(52) = 1.940$, $p = .058$. References to the short event on the adjacent frontier with *this* led to longer regression path durations than with *that*, *That* AF = 267 ms, $SE = 13.749$; *This* AF = 311 ms, $SE = 26.713$; $t(52) = 1.128$, $p > .05$.

In the deixis region of second-pass reading times, a significant main effect of discourse segment was seen, $F1(1,51) = 9.526$, $MSE = 4,523$, $p < .05$, $\eta p^2 = .157$; $F2(1,39) = 5.853$, $MSE = 3,297$, $p < .05$, $\eta p^2 = .103$. When *this* and *that* referred to the long event on the distal frontier, fixations were longer than for the adjacent frontier, $DF = 139$ ms, $SE = 12.140$; $AF = 109$ ms, $SE = 9.688$. In the connector and adverbial region (e.g., *and afterward*), neither a main effect of discourse segment alone nor an interaction between deixis and segment were observed, all $F < 2$.

The results of Experiment 1A support the adjacent-frontier-only hypothesis. Regardless of whether *this* or *that* was used, fixations were shorter when the time

span matched the adjacent frontier of discourse (the immediately preceding clause) rather than the distal frontier (the earlier clause). Because this finding was seen for all eye-movement measures, the processing of long events on the distal frontier was evidently difficult for the participants. The selective preference hypothesis was not supported: Access to the earlier sentence was not as predicted by SDRT (Lascarides & Asher, 2007) and as shown in some empirical studies (Asher, 2008; Afentenos & Asher, 2010; Holler & Irmen, 2007; Prèvot & Vieu, 2008). This finding does, however, support the adjacent-frontier-only hypothesis.

The results from Experiment 1A did not accord with the selective preference hypothesis (that *this* and *that* have different frontier preferences). Instead, they show that *this* and *that* both prefer the adjacent frontier. The interaction in the regression-path times was not seen in the item analysis nor in other eye-movement measures. In the next section, we report the results of another reading experiment in which we investigated whether we would see the same patterns of accessibility if we changed the order of long and short events.

EXPERIMENT 1B

Experiment 1B was an eye-tracking study that attempted to replicate the results of Experiment 1A while ruling out a potential confound in the interpretation of its results. Experiment 1A showed faster reading for short time durations in the critical sentence relative to long time durations. We interpreted this as a mismatch effect showing a preference for adjacent-frontier reference for both deixis types. However, the results could also be interpreted as a preference for reading short time durations (e.g., *5 minutes*) relative to long durations (e.g., *5 hours*) or for reference to short events over long ones, and this could have been unrelated to the distal- or adjacent-frontier status of the antecedent. To rule out this potential counter-explanation, we kept the same design as in Experiment 1A, changing only the order of events. The short event was moved to the distal frontier (the earlier clause), and the long event was moved to the adjacent frontier (the immediately preceding clause). If readers showed a preference for reference to the adjacent frontier, then we should now observe faster reading times for long time durations relative to short time durations. Examples of the conditions are as follows:

- **Conditions 1 and 2:** *this/that* referring to a long event on the adjacent frontier, e.g., "John filled up the car with petrol, being careful not to spill any over his white wedding trousers. Then *he drove from Edinburgh to Birmingham. This/That* took him 5 hours, and afterward he was happy not to have had to stop on his way."
- **Conditions 3 and 4:** *this/that* referring to a short event on the distal frontier, e.g., "*John filled up the car with petrol*, being careful not to spill any over his

white wedding trousers. Then he drove from Edinburgh to Birmingham. *This/
That* took him 5 minutes, and afterward he was happy not to have stained his
trousers."

Method

Participants.   Forty paid native English-speaking volunteers aged 21 to 24
from the University of Edinburgh participated. These volunteers were unaware of
the purpose of the study.

Apparatus.   We used an Eyelink 1000 eye-tracker in tower-mounted mode,
and a chin rest was used to stabilize the participant's head.

Materials.   The design of Experiment 1B is identical to that of Experiment
1A. The only difference in the stimuli was the indication of the end of the short
event and the start of a long event by adverbials (e.g., *then*) instead of
the adverbial clause with "when" or "after" used in Experiment 1A (see
Appendix A).

Procedure.   The procedure was the same as for Experiment 1A.

Data analysis.   Eye-movement data and the same number of regions were
prepared for analysis as in Experiment 1A.

Results and Discussion

The analysis was identical in all relevant respects to that of Experiment 1A.
Figures 5, 6, and 7 show the fixation times in milliseconds for the measures of
first-pass reading times, regression-path times, and second-pass reading times,
respectively.

There were no reliable effects in the analysis of first-pass reading times.
Regression-path time analysis in the adjective region revealed a trend toward a
two-way interaction between deictic expressions and segments in the subject
analysis but not in the item analysis, deixis $\times$ segments: $F1(1,39) = 3.17$,
$MSE = 13,053$, $p = .082$, $\eta p^2 = .075$; $F2(1,39) = .073$, $MSE = 18,571$, $p >$
$.05$, $\eta p^2 = .019$. References to the long event on the adjacent frontier with
this led to longer regression path durations than did those with *that*,
This = 342 ms, $SE = 25.520$; *That* = 293 ms, $SE = 24.520$. References with
that to the short event on the distal frontier led to longer regression path
durations than did those with *this*, *This* = 313 ms, $SE = 36.982$; *That* = 327 -
ms, $SE = 22.831$.
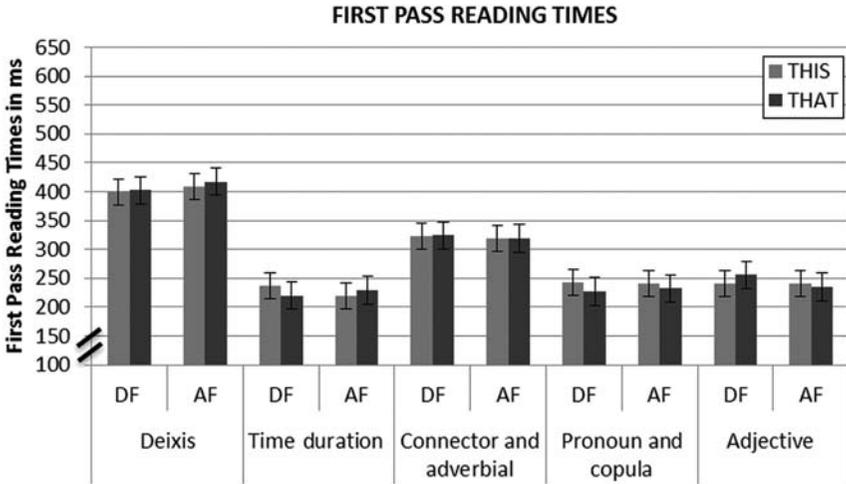
FIGURE 5   First-pass reading times (in ms) across regions.

Second-pass reading time in the duration region revealed a main effect of the discourse segment, $F1(1,39) = 19.20$, $MSE = 1,744$, $p < .05$, $\eta p^2 = .330$; $F2(1,39) = 5.078$, $MSE = 6,397$, $p < .05$, $\eta p^2 = .115$; $DF = 98.092$ ms, $SE = 12.66$; $AF = 69.151$ ms, $SE = 10.76$. Fixations were longer when *this/that* referred to the short event on the distal frontier than to the long event on the
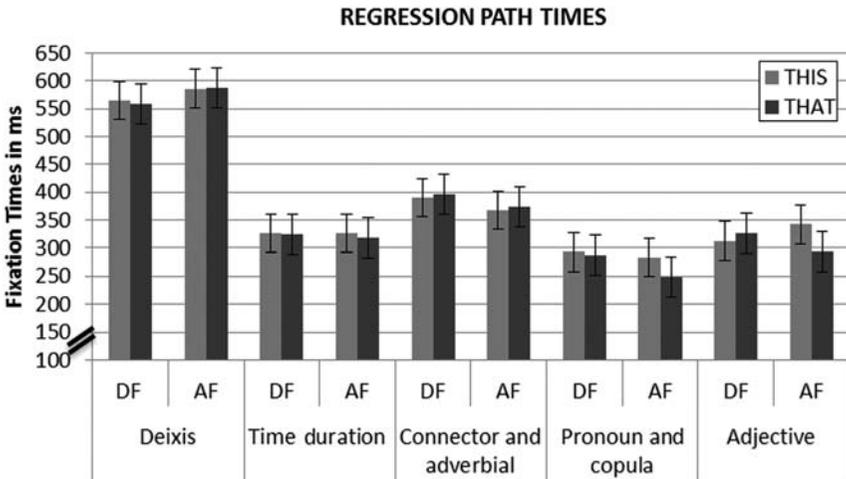
FIGURE 6   Regression-path times (in ms) across regions.
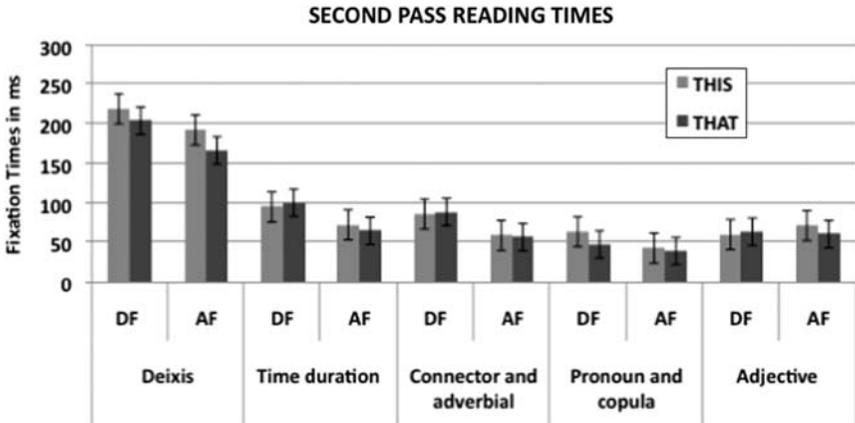
FIGURE 7   Second-pass reading times (in ms) across regions.

adjacent frontier. The same main effect of discourse segment was seen in the discourse deixis region as well as the connector and adverbial region, although this effect very narrowly missed the conventional level of significance in the subject analysis of the former, and the item analysis of the latter: the deixis region, $F1$ $(1,39) = 3.98$, $MSE = 10,172$, $p = .053$, $\eta p^2 = .093$; $F2(1,39) = 4.15$, $MSE = 47,854$, $p < .05$, $\eta p^2 = .096$; DF = 212 ms, $SE = 17.363$; AF = 180 ms, $SE = 22.104$; the connector and adverbial region $F1(1,39) = 14.92$, $MSE = 2,291$, $p < .05$, $\eta p^2 = .227$; $F2(1,39) = 4.03$, $MSE = 10,008$, $p = .052$, $\eta p^2 = .094$; DF = 88 ms, $SE = 9.434$; AF = 59 ms, $SE = 10.301$.

The trend toward the interaction in the subject analysis of regression-path times indicates that references with *that* to the entities on the distal frontier led to longer regression path durations than those with *this*. However, this was not seen in the item analysis or in the other eye-movement measures. The findings of second-pass reading times show that the participants experienced a heavy processing load when *this/that* referred to the distal frontier of the discourse structure. In Experiments 1A and 1B, no matter whether a long event or a short event was given on the distal frontier, the fixations were longer when the time duration matched the event on the distal frontier condition. This indicates that the distal frontier is less accessible for readers, irrespective of whether *this* or *that* is deployed, and is not compatible with an interpretation of Experiment 1A in which short events were preferred *per se*. Our findings in Experiments 1A and 1B showed that even when the events followed immediately one after another in sequential order, the first event on the distal frontier was consistently deactivated for readers, irrespective of whether the intervening events were of a long or a short duration.

The findings in Experiments 1A and 1B led us to focus on language production in relation to deictic demonstrative processing: We wanted to assess how naive participants would use *this* and *that* when they were asked to complete narrative texts. Given the results of Experiments 1A and 1B, we expected to find that participants would tend to produce completions relating to adjacent events.

EXPERIMENT 2

In Experiment 2, we explored which segments the participants referred to when completing a sentence beginning with *this* or *that*. Participants were given the same sentences used in Experiment 1A, but, unlike in Experiment 1A, the rest of the sentence after *this* or *that* was left blank (see Sample Stimulus below). The participant was asked to provide a spoken completion of the sentence in a manner consistent with the previous part of the text.

Sample Stimulus

John drove from Edinburgh to Birmingham, listening to his favorite jazz CDs. When he arrived in Birmingham, he *filled up the car with petrol. That* . . .

Method

Participants.   Thirty paid native English-speaking volunteers aged 21 to 24 from the University of Edinburgh participated, without being informed of the purpose of the study. They had not participated in the first experiment.

Materials.   There were 40 experimental and 60 filler sentences. There were two experimental conditions, corresponding to the two deictic expressions *this* and *that.* Two versions of each sentence and two files were constructed. In each file, each sentence appeared in only one condition.

Procedure.   Sentences were given on the computer in a fixed random order. At the beginning of each trial, the participant looked at a blank square on the monitor to generate a new stimulus, and then completed the sentence given in the stimulus by speaking aloud. We recorded the participants' completions using a voice recorder. Participants were asked to complete the sentences in a clear voice.

Data analysis.   Relying on our Experiments 1A and 1B, we predicted that *that* and *this* would be used to refer to entities on the adjacent frontier of the discourse structure. Therefore, the entities on the distal frontier would only rarely be selected as referents for either *this* or *that*. It is worth mentioning again that our

main aim was to explore the usage of pronominal *this* and *that* and whether they refer to the entities on the adjacent and/or distal frontiers, but while coding their referents we also coded prenominal *this* and *that* (*this/that* + noun phrase [NP]) and other antecedent types. All the continuation codings and samples for prenominal and pronominal *this* and *that* are given in Appendix B. Two PhD students transcribed the data independently and were asked to code the continuations according to the categories given to them. The continuations that the annotators did not understand were excluded from the data analysis.

Results and Discussion

Figure 8 shows the relative proportions of reference to the distal and adjacent frontiers, as a function of deixis type. Figure 9 shows the distribution of other types of references.

Because the data for this experiment are categorical, the statistical analyses in this section used logistic mixed effects regression,[4] taking *condition* (*this* vs. *that*) as the fixed effect and including crossed random intercepts and slopes for subjects and items. In 14% of cases, *this* and *that* were used prenominally (e.g., *this boy*), or their antecedents were unclear. The proportion of these trials (coded as *other*) did not differ between *this* and *that* conditions ($Z = -1.33, p = .18$). Prenominal and pronominal uses of *this* and *that* are assumed to signal different cognitive processes (Ariel, 1996; Gundel et al., 1993), and because our study focuses on pronominal uses of *this* and *that*, we excluded all trials coded as "other" from further statistical analysis.

Of the remaining responses, both *this* and *that* conditions showed a strong preference for reference to the adjacent frontier (*this*, 78%; *that*, 84%), relative to the distal frontier, consistent with our predictions and the results of Experiments 1A and 1B. In the logistic mixed effects regression, we coded references to the distal frontier as 0 and references to the adjacent frontier as 1, taking *this* as the intercept. The intercept was significantly different from zero ($\beta = 1.317, Z = 9.22, p < .001$), reflecting the overall preference for adjacent-frontier reference. There was also a significant effect of condition, with more adjacent frontier reference for *that* than for *this* ($\beta = 0.696, Z = 3.12, p < .01$).[5] The overall pattern of the results of a logistic mixed effect analysis therefore appears to confirm the findings of Experiments 1A and 1B, showing that both *that* and *this* most frequently access the

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[4]The analyses were computed using the lme4 package in R: (see http://lme4.r-forge.r-project.org).

[5]The addition of the fixed effect of condition increased the log-likelihood of the model by 4.12, relative to a baseline model lacking the fixed effect (baseline model: -497.04; model including fixed effect: -492.92).
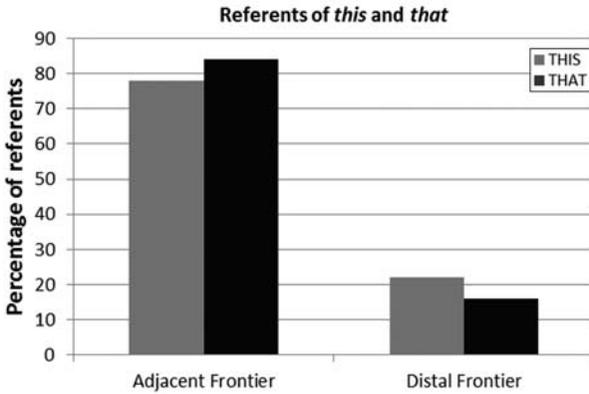
FIGURE 8   The referents of *this* and *that* in the logistic mixed effects regression.

adjacent frontier. The small but reliable effect of condition indicates that *this*, not *that*, is perhaps most likely to access the distal frontier.

Among the other categories, prenominal *that* + NP was used numerically more frequently to refer to entities on the distant or adjacent frontier than was *this* + NP, DF: *this* + NP = 10.8, *that* + NP = 15.3; AF: *this* + NP = 9.9, *that* + NP = 15.3. This may also be linked to the preferences for *pronominal this* over *that* when referring to the entity on the distal frontier of a discourse structure. These preferences can be put down to the fact that pronominal *this* is a marked demonstrative and pronominal *that* an unmarked demonstrative (Cornish, 2009) because the degree of attention the reader is asked to pay to the referent changes depending on the use of *this* or *that* (Strauss, 2002). *This* has a higher degree of deicticity than *that*. *This* is used in a way that is capable of drawing the reader's attention to a referent on the distal frontier of a discourse structure. In accordance
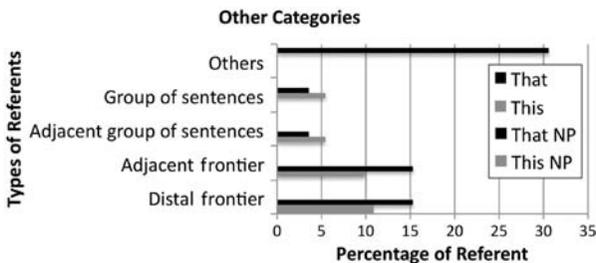

FIGURE 9   Percentages of other categories.

with Strauss's alternative model, references with *this* signal that the writer is asking the interlocutor to place a HIGH FOCUS on the referent, because the referent is "less salient" and related to the "earlier part of discourse." On the other hand, with *that* the writer is asking the interlocutor to place a MEDIUM FOCUS on the referent, because the referent is on the right frontier and thus is given information on the recent segment. The use of NP with *that* seems to make *that* stronger deictically than *this* + NP, and so the frequency of *this* + NP is lower than that of *that* + NP.

To sum up, in the completion experiment, both *this* and *that* are used mainly to refer to the entities on the adjacent frontier of the discourse structure. This matched our prediction based on the results of the eye-tracking experiments. The number of references with *this* to the distal frontier was significantly higher than *that* when connections were made between the current segment and the distal frontier. This finding is counter-intuitive and contradicts the traditional approach to *this* and *that* founded on an analogy with spatial deixis, but it aligns with the uses of *this* and *that* in Strauss's (2002) alternative focus-based model.

CORPUS ANALYSIS

Corpus Collection

The corpus data were retrieved from Brigham Young University, The British National Corpus. The British National Corpus was originally constructed by Oxford University in the 1980s and early 1990s. There are several versions on the web, but we used the recently updated version at http://corpus.byu.edu/bnc/. Two hundred extracts, 100 for *this* and 100 for *that*, were taken randomly from fiction writing: Only texts from the narrative genre were chosen to mirror the text genre in Experiments 1A and 1B. The number of words per text ranged from 670 to 770. Only pronominal deictic uses of *this* and *that* without a noun phrase were selected.

Method

The reliability of the codings was assessed by two annotators. One annotator was one of the authors of the present article and the other was a paid native speaker, a university lecturer in English Literature. The annotators were asked to define the referents of *this* and *that* in the given extracts from the corpus. They were asked to code the referents of *this* and *that* to the adjacent frontier as 1, references to a group of contiguous units that includes the adjacent frontier as 2, and references to the distal frontier as 3. The two annotators worked independently to annotate

the extracts. Extracts whose referents were not clear or were disagreed upon were excluded from the analysis.

Results

An inter-rater reliability analysis using the kappa statistic was performed to determine consistency among annotators in determination of referents of *this* and *that.* Of the extracts featuring *this*, the annotators disagreed in 7% of cases. Both annotators agreed that in 64% of cases *this* referred to the adjacent frontier; in 26% *this* referred to a group of contiguous units that included the adjacent frontier; and in 3% *this* referred to the distal frontier, with a kappa of 0.80 ($p < .000$). Of the extracts featuring *that*, the annotators disagreed in only 3% of cases. Both agreed that in 88% *that* referred to the adjacent frontier; in 7% *that* referred to a group of contiguous units that included the adjacent frontier; and in 2% *that* referred to the distal frontier, with a kappa of $= 0.78$, ($p < .000$). The percentages of the referents to which *this* and *that* referred are given in Figure 10.

Both *this* and *that* are used far more frequently to access the adjacent frontier than the distal. In the corpus study, 90% of uses of *this* and 95% of uses of *that* access the adjacent frontier, referring to the sentence or to a group of contiguous sentences immediately preceding. Only 3% of uses of *this* and 2% of uses of *that* from our corpus sample access the distal frontier. This finding suggests that both *this* and *that* favor the adjacent frontier over the distal in written discourse. On the basis of the results of our corpus study, therefore, we limit ourselves to arguing that in a significant majority of cases both *this* and *that* access the adjacent frontier of the discourse structure.
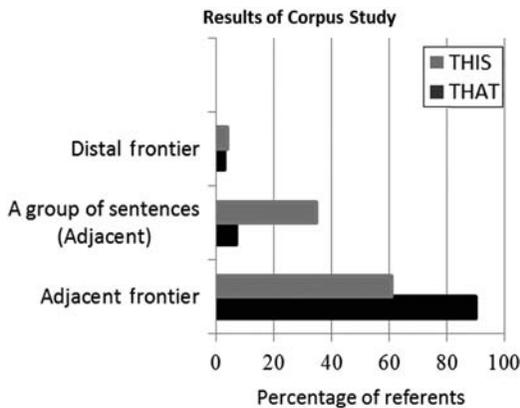

FIGURE 10   Percentages of the antecedents to which *this* and *that* referred.

DISCUSSION AND CONCLUSION

Our aim was to investigate (1) whether the adjacent and distal frontiers of a discourse structure are open for topic continuation in online reading, (2) which of these segments is accessible to *this* or *that*, and (3) whether only the adjacent frontier is accessible to *this* and *that*. A first group of focus-based accounts in the linguistics literature suggested that *that* would tend to refer to the referent on the distal frontier of a given discourse structure, whereas *this* would tend to refer to the adjacent frontier. However, our corpus analysis, reading, and production experiments showed that the deictic functioning of *this* and *that* in written discourse is far more complex than has hitherto been acknowledged and does not, contrary to common assumptions, simply mirror the use of distal and proximal deictic markers in spoken discourse. In both the corpus analysis and production experiment, *both* expressions referred far more frequently to the adjacent frontier than the distal frontier. Furthermore, in our online reading experiments, fixations were longer in the distal frontier condition, irrespective of whether *this* or *that* was used. These findings are consistent with the assumptions by Cornish (2010) and Jarvella (1979) in that the trace of the text is short-lived in memory, and effortful processing was seen when *this/that* referred to the distal frontier. This result was also largely consistent with the adjacent-frontier-only hypothesis (Webber, 1998) that sees "discourse deixis" as generally pointing to the nearest sentence or entity on the adjacent frontier. However, our findings may be problematic for assumptions that the distal frontier can be accessed when semantic connections are made between the units (SDRT [Lascarides & Asher, 2007] and space stacks theory [Grosz & Sidner, 1986]).

Although our data consistently show a strong adjacent-frontier preference in both production and comprehension, our production experiment additionally revealed a small but statistically reliable difference in the relative frequencies with which *this* and *that* access the distal frontier. Yet the pattern showed that *this* accessed the distal frontier more frequently than *that*, again contradicting the assumptions of the first group of focal-based accounts (McCarthy, 1994; Linde, 1979) and the adjacent-frontier-only hypothesis. However, this finding is in line with the degree of attention *this* and *that* signal in Strauss's (2002) alternative focus-based model. It is also in line with Cornish's (2009, p. 6) notion that the degree of deicticity depends on a distinction between proximal (marked) and distal (unmarked) demonstratives. According to Cornish, *this* is more deictically marked than *that*, and our findings agree with this: the writer uses *this* when s/he requires HIGH FOCUS from the reader because s/he is referring to the distal frontier, which is less salient. High focus is required to bring about a focal shift. On the other hand, s/he uses *that* when the referent is in the adjacent focus, and no (or only a minimal) focal shift is therefore required.

The shortcomings of the existing literature are perhaps due in part to their failure to take into account both writers' and readers' perspectives, and also to their failure to pursue experimental methods when examining deictic expressions (Gundel et al., 1993, 2002; Lascarides & Asher, 2007; McCarthy, 1994; Webber, 1988). These studies ignore how deixis is actually processed by writers and readers in real time and the simultaneous roles of the working memory and of intentional/attentional states in language use and processing.

In the following discussion, we sketch a model for deixis processing in production and reading. Our model incorporates the role of working memory and is based on Sanford and Garrod's focus memory model (1981) and Grosz and Sidner's space stacks theory's (1986) distinction between intentional and attentional states. During reading, two memory partitions are active: the *explicit focus* and the *implicit focus*. The explicit focus corresponds to the entities currently in focus, whereas the implicit focus contains currently active background information, such as text scenarios including earlier events (e.g., driving from X to Y), the name of the character, and the situation the character is in. The distal frontier, including any nonfocused referent, becomes the implicit focus when a second event (e.g., filling up petrol) is given. According to Grosz and Sidner's theory of attentional states, the lower space in the stack is less active. The adjacent frontier corresponds to the higher space in the stack, and therefore the accessibility of the adjacent frontier is greater than that of the distal. The lower space/distal frontier has weak mappings with the sentence with referential expressions, and therefore its retrieval from the implicit focus is more difficult. This finding is also consistent with the results of certain previous psycholinguistic studies, where the processing of third-person pronouns in a distant referent condition was slower than that for a near referent condition (Clark & Sengul, 1979; Ehrlich & Rayner, 1983). This suggests that in these studies, the integration of the distal frontier might not be complete at the point that the referential expression is encountered and even after the referential expression had been read, because the textual trace of the distal frontier condition was not part of the current focus and was short-lived in the memory (Cornish, 2010; Jarvella, 1979).

In reading, we assume the distal frontier is still active as the implicit focus but its mapping of the current focus with the deictic expressions is generally too weak to be easily retrieved, and so shallow processing occurs when *this* and *that* refer to the distal frontier. Despite the semantic relation between the clause with deictic expressions and the distal frontier, attention is not diverted from the adjacent to the distal frontier through strong pragmatic processing, as is implied by SDRT and some empirical studies (Afentenos & Asher, 2010; Asher, 2008; Holler & Irmen, 2007; Prìevot & Vieu, 2008). What all these processes show is that the adjacent frontier is active and in the reader's focus of attention, and thus the change of focus from the adjacent to the distal caused processing difficulties.

Therefore, in online reading, because of working memory constraints, the recent segment stayed in focus, but a change from the adjacent to the distal frontier was not highly preferred. This indicates that the processing of deixis in reading is limited to the mental representation of explicit focus, not implicit focus.

Experiments 1A and 1B both showed that fixations were longer in the distal than in the adjacent frontier condition. We suggest that this is due to the processing load entailed in moving from explicit to implicit focus through deixis. It is interesting to note that the measures that showed the most consistent effect of discourse segment across both experiments were indicative of relatively delayed processing: For example, both experiments showed this effect in second-pass reading time (on the deixis region in both experiments and in the adjective and time duration regions in Experiment 1B), whereas only Experiment 1A showed effects of the discourse segment in first-pass reading times. The fact that this effect was most replicable in later measures might be an indication of the time it takes for the reader to calculate the temporal information encoded in the duration phrase (e.g., 5 minutes) and compare it with the information encoded in the discourse representation. It might also be because the shift from the explicit to implicit focus may occur during a relatively late integration phase.

On the other hand, in production, intentional, attentional, and linguistic states are active, as in the discourse model of Grosz and Sidner (1986). Attentional states can be shifted between segments, relying on the intentional structures. Thus, if a speaker makes a connection to the distal frontier, then the intentional structure of a given discourse segment can push the current entity (that on the adjacent frontier/top of the stack) down the stack and can pop the earlier focus (that on the distal frontier) out from the stack and back into focus. In this process, *this* is preferred over *that* as a procedural device to change the focus from the adjacent frontier to the distal frontier. Deeper processing may have occurred in the sentence completion experiment because the speaker is pushed to establish relations between discourse segment(s). Thus, the power of deixis to access the distal frontier and change focus may be stronger in production than in reading. If so, this may explain why, despite the overall preference for adjacent frontier reference in Experiment 2, we still observed around 20% of completions referring to the distal frontier, and this proportion differed reliably between *this* and *that*. In terms of the construction of discourse, we can say that *this* and *that* are usually deployed to refer to the immediately preceding entity or clause, currently in the explicit focus.

Linguistic studies suggest that a speaker chooses a referring expression to match the cognitive accessibility of the intended referent within the addressee's mental model of the discourse under construction (Ariel, 1996; Gundel et al., 1993). It may be the case that readers' and writers' mental representations for the processing of *this* and *that* do not always match. In our experiments, though speakers in the continuation study sometimes referred to the distal frontier, it was

difficult for the readers to process such reference in the eye-tracking studies. This finding may also support the finding of Fukumura and Van Gompel (2012) showing that, in writing, the accessibility to a discourse segment is governed by the writer's own discourse continuation (purpose/intentional states) and his/her own discourse structures rather than by the addressee's mental/discourse state or working memory.

To summarize, the extrapolation from the spoken use of deictic markers to argue that in written discourse *this* refers to proximal (adjacent frontier) entities, whereas *that* refers to distal (distal frontier) entities is conclusively shown by our study to be unsustainable. If anything, *this* more commonly and easily accesses the distal frontier than *that*, pointing to the importance of high focus in those cases where the distal frontier does become accessible. In reading and writing, the adjacent frontier of a discourse structure is more open for continuation than the distal frontier. Perhaps most of all, our study points to the need for further work on pre/pronominal deixis in written discourse, highlighting the complexities involved. Future studies, however, will almost certainly have to pay special attention to the role of the working memory, attentional/intentional structures in anaphoric resolution, and the integration of production and reading tasks.

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APPENDIX A

Sample Stimuli From Experiment 1A

1. Diana packed her belongings with the help of her best friend. Once she had wrapped everything, she put the packages in her small car with great care. 1A) *This/that* took her 3 hours, and subsequently she was pleased to have finished everything on time. 1B) *This/that* took her 8 minutes, and subsequently she was pleased to have fitted them all into her car.

2. Robert ate his meal, annoyed that there was no beer. After he finished eating, he helped his girlfriend to prepare coffee with Scottish whisky and cream. 2A) *This/that* took him 2 hours, and thereafter he was pleased that he had spent the evening with her. 2B) *This/that* took him 15 minutes, and thereafter he was pleased that he had some whisky in his coffee.

Sample Stimuli From Experiment 1B

3. Diana phoned to book a taxi to the airport for 7 pm, becoming stressed by the busy operator. Afterward, she packed her suitcases with all her holiday clothes. 3A) *This/ that* took her 1 hours, and afterward she was sad to be leaving the country. 3B) *This/ that* took her 5 minutes, and afterward she was sad to be leaving the country.
4. Robert had a look at the festival program, hoping to find a play that grabbed him. Then he saw Lady Windermere's Fan at the Festival Centre Theatre. 4A) *This/that* took him 2 hours, and afterward he was happy to have watched a well-performed play. 4B) *This/that* took him 20 minutes, and afterward he was happy to have found something that he liked. Please visit the following website for the full set of stimuli used in Experiment 1A/1B: http://samplematerials.weebly.com/.

APPENDIX B

The following are the categories for coding the referents of *this* and *that*:

1. If pre(pro)nominal *this* or *that* referred to the short event, then its referent was coded as the recent clause referent. (1) Harry flew back from Turkey to Edinburgh, traveling with his wife. When he arrived at Heathrow, he went to the Duty Free Shop to buy whisky for his father-in law. *This* ended up being a disaster as there was no whisky at all. (2) Kelly had face-to-face meetings with her clients, highlighting the new product features. Before she left her office, she visited the ladies room downstairs. *That toilet* was much cleaner than the toilet upstairs.
2. *If* pre(pro)nominal *this* or *that* referred to the early clause with the long event, then its referent was coded as the early clause referent. (1) Kirsty played squash with her ex-boyfriend, hoping that she would beat him as she had in the old days. After the game, she did her routine stretching. *That* was the first time they'd played sport together since they had broken up. (2) Charles argued with his wife about their financial problems, hoping that the children would not hear. After the argument, he had a hot shower to calm down. *This argument* had really shaken him up.
3. If prenominal *this* or *that* referred to a group of sentences, then the group of sentences was entered as referent. (1) Gavin did his weekly shopping, picking up all the goods on the shopping list. When he arrived back at his flat, he put the groceries into the fridge and cupboards. *This process* helped Gavin as he had had a busy day up until then.
4. Other categories: if the referents of *this* or *that* were not clear, if the new discourse focus was introduced by the use of *this* or *that*, if *this* or *that* was used with time expressions such as *this night* or *that evening*, or if incoherent sentences were made with the previous part of the text, then all these cases were coded as other categories.