The big fish in a small pond: Accommodation and the processing of novel definites

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Abstract

Definite phrases are often used to introduce new entities into discourse but the conditions under which this is possible are not well understood. Evans (2005) argued that the definite article may be used to introduce an entity if it is the most relevant of its type in its local frame of reference, dubbing this the "Small world hypothesis." Additional arguments will be given in support of the Small world hypothesis, and the hypothesis will be developed in an attempt to understand the role of the small frame in processing novel definites. It will be argued that the definite article does not carry a familiarity presupposition, but only an existential and maximality presupposition. Maximize presupposition is also important and plays a critical role in regulating the impact of the Small world hypothesis: a definite will be favored under circumstances where it may be used unless it brings along unwanted implicatures, typically implicatures concerning number. Other types of presupposition accommodation are also considered with an eye to evaluating the claim that distinct classes of presuppositions exist.

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Preliminaries.

Speakers sometimes act as if the common ground includes a proposition that hasn't been explicitly introduced. Hearers may accommodate the proposition, or challenge it, as in (1).

(1)   A: John went to Paris again.

B: Again? I didn't know he went once.

Presupposition triggers that imply a proposition is part of the common ground include <u>the</u>, <u>another</u>, <u>stop</u>, <u>more</u>, <u>again</u>, <u>too.</u> It has been suggested that presupposition triggers may not all behave alike (Abusch, 2005). Schwarz (2005), for example, showed that German readers will perform costly syntactic reanalyses in order to satisfy the presupposition of <u>auch</u> ('too'), but it is unclear whether this is a general feature of presupposition triggers or only of particular ones that are difficult to accommodate.[1]

The present paper will focus on the use of the definite determiner <u>the</u> to introduce novel or unmentioned entities into discourse, as in (2).

(2)   Jason bought a Honda. <u>The steering wheel</u> was positioned oddly.

Section 1 considers various linguistic approaches to novel definites from a psycholinguistic viewpoint. Section 2 provides an overview of psychological work on 'bridging' inferences and the processing of novel definites. Section 3 introduces Will Evans "Small world hypothesis," which will be the starting point for my own proposal. The proposal will be developed in Section

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[1]There is also the issue of whether there are cross-language differences in the implication carried by a presupposition trigger. Matthewson (2005) claims Lillooet Salish don't challenge presupposition failures except in outrageous cases ('nukw'=some but not all, in 'A sun rose.'). She tentatively suggests that the presupposition must only be contained in the objective propositional context in Lillooet.

4. Section 5 explores the small world, and Section 6 presents some experimental evidence for the proposal. In Section 7, we will return to the question of whether distinct presupposition triggers differ in a principled way, and raise the question of whether special processing principles govern the accommodation of unsatisfied presuppositions.

1. Linguistic theories from a psycholinguistic perspective

One approach to novel definites is to assume that a restrictor of the nominal has been elided, e.g., in (2) the unelided form might be 'the steering wheel of the Honda that John bought.' (see discussion of syntactic, semantic vs pragmatic accounts in Stanley and Szabo, 2000, who argue that syntactic and pragmatic accounts of implicit domain restrictions won't work; instead they argue for a semantic account where each nominal comes equipped with a context variable). The problem usually raised for the ellipsis account is that it is often unclear what restrictor has been elided (Abbott, 2004).

In general, it seems somewhat difficult to find an antecedent for an elided constituent more than one sentence back, e.g., in the case of verb phrase ellipsis. But, as illustrated in (3), there is no difficulty with a novel definite (<u>the steering wheel</u>) where the descriptive content of the restrictor would come from a sentence (<u>John bought a car</u>) more than one back from the sentence containing the novel definite.

(3)   John bought a car. He'd just inherited some money. But the steering wheel was placed in an awkward position, so he plans to sell the car soon.

Similarly in general focused antecedents seem to be preferred for elided constituents (e.g., Carlson, 2002, Frazier, Clifton and Carlson, to appear, for focus and VPE). But in the case of novel definites, there does not seem to be a preference for the material supplying the antecedent to come from a focused constituent, as shown in (4) and (5) (and their plausibility 'controls' (4',5')). There does not seem to be a preference to interpret the official as the official of the information booth in (4), but as a police official in (4'), or to interpret the first page as the first page of the novel in (5) but as the first page of the magazine in (5').

(4)   Juan drove up to the INFORMATION booth; his friend went on to the police station. The official was helpful.

-4-

(4')   John drove up to the POLICE station; his friend went on to the information booth. The official was helpful.

(5)   Of course, Lyla opened a NOVEL right away. Maria picked up a magazine eventually. The first page was ripped.

(5')   Of course, Lyla opened a MAGAZINE right away. Maria picked up a novel eventually. The first page was ripped.

Although the evidence is not decisive, at the very least these observations suggest that processing considerations do not particularly point in the direction of an ellipsis account of novel definites.

Another approach to novel definites is based on the assumption that definites carry a familiarity presupposition. The 'matching scorecard' account of Lewis (1979) was based on the claim that the carries a familiarity presupposition. The account emphasized that the speaker and hearer's assumptions should match. If the speaker acts as if a discourse entity is familiar, the hearer should 'accommodate' the presupposition to make her common ground match that of the speaker. As Abbott (2000, 2004) pointed out, the concern then is that accommodation should vitiate the effects of familiarity altogether. Heim (1982,1983) takes up this challenge by assuming that a familiarity approach could be coupled with limited accommodation. Specifically she suggested that accommodation may only be possible where bridging to an explicitly introduced discourse referent is possible.

This approach would be tempting if we had a suitably restricted theory of bridging inferences. But to my knowledge, no such theory exits. A bridging inference is simply any 'backwards' inference to already processed material drawn in order to maintain discourse coherence. Further, in many acceptable examples, such as (6) or (7), no explicitly introduced discourse referent seems to support the introduction of a new discourse referent, such as the tolltaker or the coffee. I suppose that in (6a), for example, one might say that the time introduced by 6am counts as an explicitly introduced discourse referent and thus the coffee may be bridged to it.   But in this case it is not so clear what is being excluded by the condition that bridging must be to an explicitly introduced discourse referent, since in most contexts, a time and location will be available to be used for bridging purposes. Example (6b) suggests that a particularly characteristic time isn't needed in order to obtain successful accommodation of a novel definite,

at least assuming that noon is not a particularly characteristic time for drinking coffee. Example (7) illustrates that a particularly characteristic location isn't needed, assuming that most roads don't have toll takers.

(6) a. Maria got up at 6am. The coffee was already made, and Juan was leaving for work.

   b. Maria got up at noon. The coffee was already made, and Juan was leaving for work.

(7) Rex was already upset when the road narrowed from eight lanes into just four. Then the toll taker was rude to him. He ended up in a terrible mood.

Further, it isn't clear how a familiarity-based account, even one with limited accommodation, would explain the acceptability of novel definites in quantificational contexts, such as (8), or in 'telescoping' examples like (9), if bridging is understood as introducing an entity into a mental model representation (i.e., some post-semantic representation).

(8) In most of John's travels, he offends the customs official.

Indeed, in a written acceptability judgment with Chuck Clifton, we found no general cost for a universal quantifier (every) as opposed to the definite article (the) in telescoping contexts where the universal quantifier would induce a multiple interpretation of a definite phrase in a following sentence. Whether the telescoped sentence was rated as less acceptable or more acceptable than its control depended on the particular sentence. We could not convincingly pin down which properties were most important for facilitating telescoping. Howewer, Anderssen (2004) presented acceptability judgment data showing that the presence of a 'generic' relation, in the sense of a causal connection that could support a general relation, is crucial for acceptable telescoping examples but is not important for their definite description counterparts.

(9) Experiment with Clifton: Written rating study on scale from 1 (not very natural) to 5 (very natural)

   a. Every truck driver will approach the tollbooths nervously.
       The tolltaker will check a list of trucks with unpaid license fees.   3.706

   b. The truck driver will approach the tollbooths nervously.
       The tolltaker will check a list of trucks with unpaid license fees.   3.693

One approach to these data is to assume that what is being quantified over is situations, not entities of the type of the nominal. This would be very compatible with the view advocated in

Section 4.[2]

Another potential difficulty for the familiarity account of definites is the frequency with which novel definites are encountered. In a spoken corpus, Spenader (2002) found that 40% of definites are novel. If the figure were, say, 4%, then a familiarity account would seem more tempting. Viewing accommodation as patching-up of discourse when the familiarity presupposition is not satisfied is somewhat less attractive if it is not exceptional for definites to be novel.

Another important account of definites is based on the assumption that <u>the</u> carries a uniqueness presupposition. Hawkins (1991) proposed an insightful account of this type, based on the idea of pragmatic sets ('p-sets') plus a uniqueness presupposition ('inclusiveness').   He argued that we must "postulate a rich pragmatic structuring of entities within our model" (p. 408) and went on to give examples involving the immediate situation of utterance ("Pass the bucket" if there's a single bucket in the speaker's visual field) and examples involving associative relationships between entities (classroom, professor, student). The core idea was that uniqueness holds within the pragmatic set. The notion of a more structured model is appealing and, in many respects, Hawkins' claim is related to the one proposed in Section 5 below. The problem with the account, as with all accounts including the one offered here, is the problem of developing sufficiently explicit constraints on the structuring of context, or on the definition of p-sets. Further, examples like (10) indicate that there are counterexamples to the uniqueness claim unless p-sets are defined strictly with respect to the structure imposed on the model in response to the linguistic material uttered before the novel definite. Uniqueness does not hold in the larger situation described by the discourse once we include the entire sentence containing the novel definite.[3]

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[2]Florian Schwarz pointed out to me that if one assumes that the small frame introduced in Section 4 is identified as a topic situation, then one may unify the account of telescoping (as quantifying over situations) with (most of) the observations concerning small frames. This seems very promising to me. However, I am not a formal semanticist and thus must leave these issues to others more qualified than myself. See in particular Kratzer (2005).

[3]Heim (1990) and Elbourne (2005) discuss the example in (a), which may be similar to (10). (Thanks to Florian Schwarz for pointing this out to me).

(10) I called the Photo shop about their photography classes. <u>The clerk</u> asked me to hold for

<u>another clerk</u> who knew the schedule.[4]

In summary, an ellipsis approach to novel definites doesn't readily fit with the observation that, with novel definites, the anchor or supporting context can be more than one sentence back and focus doesn't seem to strongly influence the choice of anchor. Both properties differ from what is expected for an ellipsis structure. A bridging inference approach doesn't seem to place any substantive constraints on when novel definites are acceptable, even if one adds the requirement that bridging must be to an explicitly introduced discourse entity (examples like (7b) suggest that either the requirement is incorrect, or it must be interpreted in a sufficiently weak manner that it is not clear what is excluded). Novel definites in telescoping environments do not necessarily create unacceptability or any obvious processing problem, suggesting that the local situation of evaluation is important in licensing the accommodation of definites and suggesting quantification in htese examples may be over situations.

2. Processing background

Perceivers construct inferences when a discourse contains repeated noun phrases, anaphoric dependencies between phrases or causal relations between sentences (or, more accurately, causal relations between the situations they describe). In their classic study, Haviland and Clark (1974) found that a target sentence containing a definite (<u>the beer</u>) was read faster if the context sentence explicitly mentioned some beer, as in (11b) than if it merely set up a likely scenario where beer might be expected, as in (11a).

(a) If a bishop is in the same room as another bishop, he blesses him.
However, (a) seems to me to have a 'generic' quality which is entirely lacking in the episodic sentence in (10). Whether this matters for accommodation, I'm not sure. But I could imagine that (a) might involve quantifying over situations whereas (10) may not.

[4]One might try to account for (10) by assuming that the embedded clause introduces a new frame or a new situation. But that does not seem to be a crucial property of examples like (10). Example (a) below seems relatively acceptable even though the second clerk is introduced in the same clause as the novel definite.
(a) I waited in line at the Photo Shop. The (overworked) clerk asked another clerk to help me.

(11) a.   We checked the picnic supplies.   (Given but bridging inference required)

b.   We got some beer out of the trunk.   (Given and explicitly mentioned)

c.   Andrew was especially fond of beer.   (Control for lexical repetition, inference

required)

Target: The beer was warm.

In general, elaborative inferences (forward inferences, explicit inferences about predictable events) are not drawn in advance, see especially McKoon and Ratcliff. Consequently, reading time is longer for the final sentence (containing the shovel) in (12) following (12b), which doesn't mention a shovel, than in (12a), which does, as shown by Singer (1979).

(12) a.   The boy cleared the snow with a shovel.

b.   The boy cleared the snow from the stairs.

The shovel was heavy.

Note: The instrumental (shovel) inference is elaborative if it occurs before the definite (the shovel) is encountered; it is anaphoric or 'bridging' (Clark, 1977) if it occurs afterward.

However, the data from eye movement recording studies suggest that the degree of contextual constraint determines the processing time for novel definites. In highly constraining contexts, definites take no longer to read with implicit antecedents than with explicit ones, but in low constraint contexts they do. In an eye movement recording study, O'Brien et al. (1988) investigated the processing of examples like (13), where a definite (the knife in the final sentence) was mentioned (13a,c) or not, and the context was highly constrained (13a,b) due to the verb (stabbed) or less constrained (13c,d, containing assaulted).

(13) All the mugger wanted was to steal the woman's money. But when she screamed, he stabbed [assaulted] her with his knife [weapon] in an attempt to quiet her. He looked to see if anyone had seen him. He threw the knife in the bushes and ran away.

a.   Highly constrained context, explicit referent: stabbed her with a knife

b.   Highly constrained context, implicit referent: stabbed her with a weapon

c.   Less constrained context, explicit referent: assaulted her with a knife

d.   Less constrained context, implicit referent: assaulted her with a weapon

O'Brien found that reading times were longer following sentence (13d) than (13c), but not longer

following (13b) than (13a), indicating that the novel definite incurred a processing cost only with the less constraining context. In principle this could be explained either as a counterexample to the generalization that forward inferences aren't drawn or as indicating that backward inferences can be so cheap in sufficiently constrained contexts that their cost cannot be measured with current methods. Interestingly, in speech, there appears to be a penalty even in the highly constraining context if there's not a pitch accent on the noun introducing an unmentioned entity, i.e., a penalty when there's no pitch accent on the novel definite (Birch and Clifton, 2004).

In the ERP literature, the N400 (a negativity peaking 400ms after the onset of the critical word) has often been taken to be an index of 'semantic' integration since it is correlated with the predictability of a word in its context (van Berkum et al., 2003). A late positivity (P600) has been associated with syntactic reanalysis and other complex sentence-level processing operations. In an ERP study of bridging inferences, Burkhardt (2005) tested sentences like those in (14) where a critical definite (the conductor) appeared in a context which either explicitly mentioned the corresponding entity, implied the existence of the entity (a 'bridging' context) or did neither.

Materials presented 400ms/word with 100ms ISI.

(14) a. Given context

Tobias besuchte einen Dirigenten in Berlin. 'Tobias visited a conductor in Berlin.'

b. New context

Tobias unterhielt sich mit Nina. 'Tobias talked to Nina.'

c. Bridging context (concert-conductor)

Tobias besuchte ein Konzert in Berlin. 'Tobias visited a concert in Berlin.'

Target:

Er erza"hlte, dass **der Dirigent** sehr beeindruckend war. 'He said that **the conductor** was very impressive.'

She found that given DPs showed reduced negativity (N400) and no positivity. New DPs elicited an enhanced negativity (N400) followed by left posterior positivity (P600). Bridged DPs (14c) patterned first with given DPs (exhibiting a reduced N400), then with new DPs, as

evidenced by the presence of significant positivity. She interpreted the results as showing that, if available, referential dependencies to already given entities are formed (indexed by the N400) and that establishing new discourse referents in a mental model involves extra processing and storage (evidenced by the P600). See also Burkhardt, 2006.

ERP (and other) studies have shown that world knowledge is available quickly. Hagoort, et al (2004) argued that the 'world knowledge N400' induced by (15b) shows up as early as the 'Semantic N400' induced by (15c).[5]

(15) a. Correct: The Dutch trains are <u>yellow</u> and very crowded.

b. World know violation: The Dutch trains are <u>white</u> and very crowded.

c. Semantic violation: The Dutch trains are <u>sour</u> and very crowded.

They conclude that the left inferior prefrontal cortex is involved in the integration of both meaning and world knowledge because the onset and peak latency didn't differ in response to (15b) vs (15c). Further, the amplitude and topography of the ERP components were similar for the two violations.

In the Scenario mapping model of Sanford and Garrod (1998), world knowledge comes into play at a sub-propositional level (in contrast to many early text comprehension models such as that of Kintsch and van Dijk, 1978). On their view, the primary task of the language processor is to map language input onto background assumptions and background knowledge at the earliest possible point. Establishing this mapping is facilitated by using stereotypical knowledge. What they term 'primary processing' involves establishing a set of mappings from tokens held in working memory (denoting things mentioned in the text) to scenarios (long-term memory

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[5]Some caution is needed in interpreting N400 effects. Early studies by Fischler and colleagues (1983) found large N400 effects for sentences with mismatched subject and object terms (sparrow/vehicle) whether the sentence was a false affirmative or a true negative ("A sparrow is a vehicle" or "A sparrow is not a vehicle.") This suggests that the N400 is indexing not truth or semantics but how well the descriptive content of nouns fits into the frame provided by processing earlier material. In the Dutch study, this raises the issue of whether the smaller N400 for the true examples comes not from their truth but from strong associations (train, yellow) present in the true but not the false ('world knowledge violation') examples.

representations).[6] The Scenario-mapping model is very attractive in terms of its outlines. Unfortunately, at this stage of development, it offers illustrative examples (e.g., (16)) rather than an explicit theory of possible scenarios or constraints on the mapping process.

(16) Harry was driving to London.

Explicit focus: Harry, London

Implicit focus: schema for drive, with mapping from tokens into scenario slots

Turning to the processing literature on implicit arguments, Carlson and Tanenhaus (1988) have offered the most fleshed out theory of implicit arguments and their role in discourse processing. They provide an explicit and motivated account of which arguments are represented in the syntax and argue that an unassigned argument, an "open role", is entered into the discourse representation as an index that can support the integration of a later discourse entity. In a makes-sense judgment study with Hudson, they tested examples like (17). Their theory predicts that (17a) does not have an open role, though the sentence does provide a likely context for the final sentence (17b). By contrast, (17a') has an open theme role which should persist as an index in the discourse representation. Consequently, when readers encounter the suitcase in the continuation sentence (17b), there is already a discourse role to which it may be assigned, facilitating its integration into the discourse representation.

(17) a.   Bill hurried to catch his plane.

a'.   Bill hurried to unload his car.

b.   The suitcases were very heavy.

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[6]The Scenario-mapping model distinguishes among distinct partitions of memory. There are permanent (static but updateable) partitions which include general knowledge, and a long term memory record of interpreted text. There are also dynamic partitions ("focus partitions") holding the characters or entities and actions around which narrative unfolds with foregrounded vs. backgrounded characters and actions. Explicit focus tracks currently relevant discourse entities. It's capacity-limited. By contrast, implicit focus tracks currently relevant situations "which we term scenarios" (p.7, ms). It's not capacity-limited. Implicit focus is the currently active part of long term memory. Text gives rise to fast acting passive retrieval of scenarios. The result of the process is an active representation (implicit focus) [Note: Scenarios seems to be used in two ways. It is a long term memory representation like a schema; it is currently foregrounded plot or set of situations mentioned in the text.]

Following a: 1847   84% "makes sense"

Following a':   1628   97% "makes sense"

As predicted by their theory, they found faster makes-sense judgment times for the continuation sentence following (17b) than following (17a). Mauner, Tanenhaus and Carlson (1995) provide further evidence for the theory, showing that processing the rationale clause in (18) is no slower in (18c) with an implicit agent than in (18a,b) with an overt agent.

(18) a.   The owners sank the ship to collect a settlement from the insurance company.

      b.   The ship was sunk by the owners to collect a settlement from the insurance company.

      c.   The ship was sunk to collect a settlement from the insurance company.

      d.   The ship sank to collect a settlement from the insurance company.

Makes sense judgment: (d) is worse at "collect" than the other forms.

        To conclude this section, the reasonably clear generalizations to take away from the processing literature is that inferences are fast, they are typically backward inferences, not forward, and processing a definite without an explicit antecedent can be as fast as processing one with an explicit antecedent, at least in highly constraining contexts. Information about world knowledge and implicit arguments becomes rapidly available to the processor.

3. The Small world hypothesis

        In his undergraduate honors thesis, Will Evans (2005, p.22) proposed the Small world hypothesis: "In order for a new single entity to be introduced with the definite article, the scope of its frame of reference must be small enough to single that entity out as **more relevant than all others of its type**.[bold added] In this way, an entity designated by the definite article must be *locally unique* within its frame of reference." (See Ward and Birner, 2002, for a similar constraint requiring individuability and Sanford and Garrod, 1998, for compatible ideas in the scenario-mapping framework; also Hawkins, 1991.)

        In support of the Small world hypothesis, Evans (2005, 2006) presented examples like those in (19). The a- forms of these examples are predicted to be acceptable because there is one tolltaker in (19a) and one page in (19c) that is more relevant that all others of its type. However, the corresponding b,d-examples do not satisfy the constraint and therefore are predicted to be

unacceptable.

(19) =Evans (33)

    a.   Juan drove up to the busy tollbooths. The toll taker was rude.

    b.   Juan looked at the busy tollbooths. The tolltaker was rude.

  =Evans(36)

    c.   Lyla opened the book. The page was ripped.

    d.   Lyla flipped through the book. The page was ripped.

In a written rating study of 16 items like (19), where 1 indicated that the second sentence was a highly unnatural or awkward continuation and 5 indicated that it was a very natural continuation, the a,c-examples were rated more acceptable than the b,d-examples (3.6 vs. 2.4, highly significant by participants and items). Further, in written completion studies testing examples like (20), the definite article (the) was preferred to the indefinite (a) when the "context managed to single out the entity from the set of possibly inferrable entities in the discourse model." [p.29]

(20) Helga lounged at the small private beach. __ lifeguard was yelling at some kids.

In short, as predicted by the Small world hypothesis, novel definites are acceptable when they pick out an entity more relevant than others of its type in the local frame of reference.

In Evans' examples, the referent of the novel definite is acceptable even though the referent is not the unique entity of its type with respect to inferrable entities (the tolltakers in the other tollboths). But we have also seen examples where uniqueness is not satisfied even for the overtly mentioned referents, as in (10) repeated below as (21). This further supports Evans' Small world hypothesis.

(21) I called the Photo shop about their photography classes. The clerk asked me to hold for another clerk who knew the schedule. (= 10 above)

Additional evidence supporting his constraint derives from (22), which shows that overriding the Small world hypothesis doesn't seem acceptable or at least 'smooth' even if one attempts explicit disambiguation.

(22) #I drove up to the toll booths. The toll taker had a heart attack – the one at the opposite end from me.

Indeed, if one pits an overt familiar antecedent against a local accommodated (novel) referent, as

in (23), it seems that the accommodated referent is preferred. At least, informally collected intuitions indicated a preference for the continuation in (23a).

(23) Many large people find that the interior design of Japanese cars isn't ideal for them. For example, the steering wheel may be in an awkward position. But John is huge and he likes the steering wheel on his Honda. Bill bought a Toyota. The steering wheel...

    a.   seemed fine to him.

    b.   bothered him on John's Honda.

    To summarize, accommodation can be best: a novel definite can be preferred to a novel indefinite, as shown by Evans' completion study. Being the most relevant entity of its type is sufficient to permit accommodated definites, as shown by Evans acceptability judgment study. As expected given the Small world hypothesis, overriding the small world candidate is not smooth, as indicated by examples like (22). Although the examples may be difficult to construct, the small world candidate even seems preferred to an overt candidate in the larger context (see (23)).

    Will Evans, Chuck Clifton and I tested the Small world hypothesis in a visual makes sense judgment study where participants read mini-discourses in short frames in a self-paced fashion, pressing a "yes" key for each new segment of the input providing the discourse makes sense, and pressing a "no" key if the discourse stops making sense. Examples like (24) were tested.

(24) Singling out context:

    Barry drove up to the row of busy toll booths and fumbled for change.

    The/A tolltaker was asleep and drooling.

    No-singling out context:

    Barry walked past the role of busy toll booths on his way back home.

    The/A tolltaker was asleep and drooling.

By the final region of the sentence containing the critical definite/indefinite DP, cumulative rejections ("no" responses) were greater for the indefinite than for the definite in the singling out context but greater for the definite than the indefinite in the no-singling out context. Although the effect was small (18,25,28,24% rejections), the interaction was significant. These results reinforce Evans' claim that using a definite to introduce an entity only requires the entity to be

the most relevant of its type in its local frame. Of course, identifying precisely what factors limit the scope of the frame of reference for an entity is important, as well as identifying how a given entity may be singled out. In the present case, the first sentence rather unambiguously served to identify the local frame but in other cases (e.g., 23) the size of the local frame of reference may be unclear. As for what makes a context one that singles out an entity from others of its type, in the present study typically one of two means was employed: the spatio-temporal location of the protagonist served to single out a particular entity or not (drove up to the toll booths vs walked past the tollbooths, went to the food court vs strolled by the food court) or the intention of the protagonist singled out a particular entity or not (went into City Hall to pay a fine vs went into City Hall to get out of the cold, walked up to a row of urinals to relieve himself vs. walked up to a row of urinals to clean them).

In what follows I will take the Small world hypothesis as a starting point. Before leaving this section, however, I wish to point out that on the Small world hypothesis, it would be very natural indeed if use of a novel definite brought with it, or favored, an internal perspective. If being the most relevant entity of its type in a small frame is what licenses the novel definite according to the Small world hypothesis, then it is evaluation INSIDE this small or local frame that matters. As an illustration of this, consider (25).   In (25) the little snack bar implies a local locale. If the discourse had contained the sentence "Bosch ducked into a little snack bar," readers would not have taken the snack bar to be in the courthouse (or they would have assumed that the courthouse had multiple snack bars, see Section 5).

(25) "The hallway outside the courtroom was teeming with lawyers...Bosch ducked into the little
     snack bar and had to wait...." M.Connelly, City of Bones, p. 342 [Note: the novel definite
     "the little snack bar" implies it was in the courthouse; "a little snack bar" wouldn't.]

Similarly, in the telescoping example (26), the telescoping works precisely because an internal perspective is adopted. The only way to get an external perspective is to assume that it is a single tolltaker and every contestant drove up at different times.

(26) Every contestant drove up to the toll booths. The toll taker was rude.

A progressive favors an internal perspective[7] and thus it offers a context that seems to encourage accommodation of definites. The novel definite objects in the first clause of (27)-(29) seem better inside a progressive clause (27b,29b) than in the corresponding simple past tense clause (28b,29d,e). This is expected if a local frame of reference supports a novel definite and a novel definite implies a local frame of reference.

(27) a. On Monday Jill was baking a dessert and the oven caught on fire.

b. ?On Monday Jill was baking the dessert and the oven caught on fire.

(28) a. On Monday Jill baked a dessert and the oven caught on fire.

b. ??On Monday Jill baked the dessert and the oven caught on fire.

(29) a. Last night when I was unwrapping a package, I cut my finger.

b. Last night when I was unwrapping the package, I cut my finger.

c. Last night I unwrapped a package. I cut my finger.

d. ??Last night I unwrapped the package. I cut my finger.

e. ?Last night I unwrapped the package and I cut my finger[8].

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[7]Rohde, Kehler and Elman (2006) investigated perspective with respect to pronoun interpretation. They had subjects complete sentences like those in (i) to see whether pronoun interpretations are governed by the thematic role of the antecedent, which doesn't vary in (i), or by event structure, in which case the focus of a completed event should be on the goal. The event structure hypothesis would predict more goal responses in the perfective/completed event (ia) than in its imperfective/incomplete event counterpart (ib). The idea is that after an event is complete, the theme (book) has been transferred to the goal and thus the 'focus' of the completed event concerns its resultant state, in which the theme is in the possession of the goal. With a progressive/internal perspective, however, there is no reason to expect a goal preference.

(i) a. Completed event/perfective: John [source] handed a book to Bob[goal]. He_____
     b. Incomplete event/imperf: John [source] was handing a book to Bob[goal].He_____

The predictions of the event hypothesis were confirmed with more goal, fewer source, responses in (ia) than in (ib). Although this study does not involve the definite article, it does suggest that reference depends on whether the speaker is describing a state of affairs with an internal perspective, or not.

[8]If (29e) is not quite as infelicitious as (29d) as indicated by the number of question marks, this might suggest that using right context to support a novel definite is easier if that context is at least within the same sentence (29e) than if the context is expressed in a following

In (25) we saw that using a novel definite brought one's perspective inside the current frame (the courthouse); in (27) -(29) we see that establishing an internal perspective helps to license the novel definite. In this way, speakers may use presuppositions (the maximality presupposition of the) as a way of constraining implicit context, signaling that the intended frame of reference is local and promiting an internal perspective.

4. The proposal

Building on Evan's Small world hypothesis, I will make the small frame assumption:

(30) **Small frame assumption**: Entities are introduced into discourse and referred to in terms of the scenario described by the local frame.

The small frame assumption is intended as a descriptive constraint on a general theory of reference processing. For novel definites, the referent of the definite must be part of a scenario described by a plausibly-sized small frame, e.g., the scene described at the stated or implied temporo-spatial location of the protagonist. (Presumably novelists and cameramen have particularly refined notions of the mechanisms of frame-adjustment and frame-manipulation.)

The small frame assumption leads us to expect that even without any scenario-specific information, the mere presence of a local frame should increase the acceptability of a novel definite. In other words, the existence of even a neutral frame should help. Consider (31). Example (31a) seems infelicitous, though (31a') with the progressive seems slightly better, given the affinity of novel definites and the progressive/internal perspective.

(31) a.   #The principal greeted the parents.

    a.'   ?#The principal was greeting the parents.

    b.   ?? I went into the new building. The principal was greeting the parents.

    c.   I went into the new school. The principal was greeting the parents.

Comparing an out-of-the-blue sentence like (31a) to the same sentence in a neutral context (31b), my intuitions suggest a slight increase in acceptability for the neutral context example, though clearly the neutral context example is less natural than one that leads us to expect the entity

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sentence, as in (29d).

introduced by the novel definite.[9]

(31) **Expectedness assumption**- A definite may be used to introduce an entity that instantiates an expected role in the local frame.

(31) is a descriptive statement about the distribution of novel definites. The idea behind it is that identifying an adequate small frame in which the maximality presupposition (see below) of the is satisfied will typically only be motivated when the entity is expected in that frame.

The expectedness assumption by itself does not really help us to characterize the circumstances under which it is easy to accommodate novel definites. What will do some work is whatever constraints we can propose on what makes an entity expected. Systematic sources of expectedness include whole-part knowledge (32a), scenario-based knowledge (32b), and information about implicit arguments (32c).

(32) Systematic sources of expectedness:

  a. Whole-part-Billy likes his new house. The door is painted red.

  b. Scenario- Wilma entered the courtroom nervously. The jurors were standing in the corner.

      Note: Jury trials are rare; most often courtrooms don't contain jurors. So expectedness of a role shouldn't be confused with probability of an entity being present.

  c. Implicit arguments- John was arrested. The policeman roughed him up.

Interestingly, these types of expectedness seem to behave differently from each other with respect to the maximality of the entity/set they introduce – an issue to which we return below.

Turning to semantic assumptions, let's make the assumption that the carries an existence presupposition and a maximality presupposition (maximality picks out the highest degree on a

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[9]In studies of the 'specificity of referring devices,' Vonk et al. have shown that within an episode, speakers tend to use and listeners expect the 'smallest' referring device available, e.g., in English, a pronoun. But when a thematic shift occurs or a new episode is described, then a 'larger/more specific' referring device is natural, and may cue the thematic shift, e.g., using a proper name instead of a pronoun. These studies also suggest that reference is generally proceeding in terms of a local frame.

scale or the most inclusive element in a semi-lattice).[10] Following Heim (1991) let's also assume

that speakers maximize presuppositions, as captured in (33). Note that (33) will explain why

speakers prefer the to a when introducing a new entity into discourse, e.g., in Evans' experiment,

assuming that the indefinite article carries no presupposition and thus the has a more informative

presupposition than a.

(33) **Maximize Presupposition** (Heim, 1991): Use the most informative presupposition that is

satisfied.

Indeed, given the Small world account and (33), the prediction is that whenever the definite

article is acceptable, it should be preferred to the indefinite.

Although it is true in many circumstances, like in Evans' experiment, that a novel definite

is preferred to an indefinite, in other circumstances (e.g., the experiment described in connection

with (35) below) either a novel definite or an indefinite seem acceptable, with only a subtle

difference between the two. Often the difference involves the existence of alternative entities of

the type of the novel nominal. In other words, the difference often concerns implicatures

concerning number.

(34) **Avoid unwanted implicatures**: The may introduce into discourse an entity or set of

entities expected in the scenario described by its local frame, providing that it doesn't

introduce any unwanted presuppositions**.**

What scales a context invokes or highlights, and therefore what competitors for the definite

article are active to generate implicatures, is a question that needs to be explored.

5. Exploring the Small world

A. Avoiding unwanted number implicatures--

Consider an example like (35). Either the novel definite in (35a) or the indefinite in (35b)

seems perfectly acceptable. Why? According to the Small world hypothesis, the definite may be

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[10]Inclusiveness in Hawkins (1991) is closely related to the Maximality presupposition:
"This pragmatic structuring also reveals the existence of a more general logical regularity for
definite descriptions. This regularity is labelled 'inclusiveness' in my earlier work, and it
amounts to the claim that a definite NP involves reference to the totality of entities or mass that
satisfy the description of the NP within a given P-set." (Hawkins, 1991, p.409).

used if the entity (butcher) is the most relevant of its type. By virtue of being the butcher that took Lucille's order, a butcher will necessarily satisfy the Small world requirement. But then why is (35b) perfectly acceptable? By hypothesis, the reason is that the speaker may wish to avoid the implicature that there was only one butcher in the scene described. In other words, the avoidance of an unwanted (number) implicature may hold the effects of the Small world hypothesis (the licensing of novel definites) in check.

(35) a.   Lucille was at Whole Foods this morning. The butcher took her order for 5 whole pigs without batting an eye.

      b.   Lucille was at Whole Foods this morning. A butcher took her order for 5 whole pigs without batting an eye.

In this scene there was probably:

        One butcher   More than one butcher

To test this hypothesis, I conducted a small written study using examples like (35). In the examples, using either the or a was felicitous. Participants were asked to indicate whether there was likely to be one entity (butcher) or more than one entity in the scenario described. The prediction was that more "one butcher" responses would appear in the definite examples than in the indefinite examples, because the indefinite could be interpreted as a way of avoiding the implicature that there was only a single butcher.

Eight critical examples were combined with a few fillers and presented, in a counterbalanced fashion, to 24 participants in an undergraduate linguistics class.   Out of 12 possible responses for each form of each item, there was a mean of 9.75 "one N" responses in the definite examples, compared to a mean of 3.5 "one N" responses for the indefinites [$t(7)= -5.45, p < .0001$]. The results thus strongly confirmed the prediction of the hypothesis that novel definites licensed by the Small world hypothesis are avoided when their use would give rise to an unwanted number implicature.

As usual, there was variability across items, showing that world knowledge as well as implicature avoidance governed the responses. Some illustrative examples are given in (36), where the variation in the responses to the novel definites is of most interest.

(36) particular items:

	Definite DP	Indefinite DP
coach at a skating rink:	12/12= "one coach"	3/12= "one coach"
clerk at a cheese shop:	12/12 ="one clerk"	2/12= "one clerk"
butcher at Whole Foods:	10/12 ="one butcher"	6/12="one butcher"
policeman at police station:	5/12= "one policeman"	3/12= "one policeman"

When one imagines a scenario involving a skater and a coach/coaches or a cheese shop and a clerk/clerks, probably the most likely situation involves just a single coach or clerk. All responses to the novel definite indicated that there was probably just one coach (or clerk) in the scenario described. On the other hand, at a police station it's easy to imagine several policemen, and indeed for the policeman example the majority of responses to the definite indicated that the scene described probably included other policemen. So both the linguistic means used to introduce an entity and background knowledge about likely participants in various types of scenarios played a clear role in this study.

Notice that the role of 'right' context, the part of the sentence that follows the definite/indefinite DP, becomes critical in evaluating the Small world hypothesis. Consider (35). Taking the VP of the second sentence into account, the absolute uniqueness of the butcher under discussion is almost guaranteed, given the assumption that only one butcher takes a customer's order. But at the point of processing the subject phrase the/a butcher there are plausibly other butchers in the scene described to that point. At the very least, then, the present results show that right context need not be taken into account in determining whether the maximality presupposition of the definite is satisfied. Otherwise the use of the indefinite in examples like (35) should be completely infelicitous (on a par with using a sun to refer to "the sun"). At present, the circumstances under which right context can be taken into account are essentially unknown.

One may view the process of avoiding unwanted number implicatures (Sauerland, 2003, Sauerland et al., 2005) as a matter of frame-size adjustment: Often the 'edges' of the small or local frame are fuzzy rather than clearly-defined. With number implicatures, tightly constraining the size of the local frame ("zooming in") in examples like (35) will guarantee that a novel

definite is maximal within its frame. Letting the size of the frame grow slightly, maximality may no longer be satisfied. With implicatures other than number implicatures, however, selection of the rather than some other determiner may not be resolvable solely in terms of assumptions about frame size.

B. Avoiding implicatures: competition among forms

It is not always an unwanted implicature concerning number that governs whether a definite or some alternative form sounds more acceptable for a particular discourse context. Further, the competition in selecting how to refer to an entity is not just a competition between the definite and indefinite article. Consider (37a), taken from the Colbert Report (a Fox news parody)**:**

(37) a. "They learn math without a book because the school couldn't afford them."

b. They learn math without a book because the school couldn't afford books.

c. They learn math without a book because the school couldn't afford the books.

In (37) it seems that use of the pronoun best conveys the intended meaning. Using the bare plural would imply the school couldn't afford any books. Using the definite plural seems to imply that there were specific math books under discussion.[11]

Carlson (2005) investigated weak definites, like (38).

(38) Sally is reading the paper.

He shows that weak definites like the newspaper, the calendar, etc. behave much like bare plurals, and are number insensitive (see Sussman et al., 2006 for psycholinguistic support). Now consider (39).

(39) From The Last Coyote by Michael Connelly, p.80:

Cop to reporter: "I'm just trying to catch up" he said. "Like you said, I don't read the papers."

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[11]Competition between pronouns and demonstratives has been investigated by Brown-Schmidt, Byron and Tanenhaus (2005). In a visual world study, they showed that a pronoun will preferentially refer to an already available entity whereas a demonstrative will pick up a composite (the cup on the saucer, given (i)).
(i) Put the cup on the saucer. Now put it (cup)/that (composite) on the tray.

Reporter: "That's *paper,* not papers" she said smiling. "I better not catch you reading or talking to the Daily News." [Note: emphasis in original]

Apparently when the definite singular is a number neutral weak definite, the definite plural easily picks out multiple kinds.

In (40), there is an interesting use of an old indefinite. In this interview with Ted Allen, turkey has been mentioned many times. But presumably he talks about cooking a whole turkey, meaning to cook the turkey whole, because if he said "cooking the whole turkey" it would be interpreted as referring to the (maximal) quantity of the turkey, rather than the form in which it is cooked.

(40) From NPR interview with the food critic Ted Allen:

"Well, I think you're right. I think there's no dish that inspires more fear across our great nation than that gigantic frozen bird which is why turkey companies have 800 numbers to talk you off the ledge when you realize its still frozen and your house is full of people. So I had an idea that I thought could help with this problem which is: the whole problem with cooking a turkey is that you're cooking **a whole turkey.** The breast meat doesn't want to get done at the same time as the dark meat and it takes forever to thaw and so I thought why not instead do, I call it, build your own bird: cook the turkey in pieces. So you buy a turkey breast..."

Although the use of the indefinite in (40) may be due to properties very specifically tied to the particular context in (40), what is interesting is that the avoidance of the definite article is likely because standard assumptions about how maximality can be satisfied would result in the unintended (maximal quantity) interpretation of the definite.

Looking at the various options for individuating discourse entities, and the potential implicatures that may then be exploited or avoided, it is little wonder that we currently do not come close to having a sufficiently refined taxonomy of discourse contexts to give a complete and explanatory account of the accommodation of definites. What is missing is an account of how scales or active competitors to the definite article are related to both stable properties of the language and to dynamic properties of the context (see Potts, 2006).

5. The Maximality presupposition[12]

As foreshadowed earlier, the maximality presupposition of the seems to play an important but complicated role in accounting for novel definites. With Whole-part accommodation, if the part is introduced with a novel definite, it must be maximal. Thus, in (41) the novel definite the leg is felicitous but only if the table has a single leg. Similarly in (42a) it is clear that the definite and the indefinite contrast with respect to maximality.

(41) Our new table was destroyed. The leg was broken.

(42) a.   Dowtown arraignment court was always a zoo...Bosch scanned the rows of public
          seating... (Maximal) p.340

      b.   Dowtown arraignment court was always a zoo...Bosch scanned some rows of public
          seating. (Nonmaximal)

However, when we turn to scenario-introduced roles, how maximality behaves depends on the number-bias of the scenario-participants. With scenario-participants that are expected to be multiple, novel definites contrast with their indefinite counterparts, which are not necessarily maximal. This is illustrated in (43) - (44) using scenarios with scenario-dependent participants that are biased toward multiple members: barracks (soldiers); school (students), hospital (patients), courtroom (jurors), factory (employees), etc.

(43) a.   A visitor went into the barracks. The soldiers were chatting in a corner. (Maximal)

      b.   A visitor went into the barracks. Some soldiers were chatting in a corner (Not
          necessarily maximal)

(44) a.   A visitor went into the bar. ? The soldiers were chatting in a corner.

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[12]It is well-known that in general plurals tolerate exceptions. Without a good understanding of when they tolerate exceptions, Maximality becomes somewhat difficult to evaluate. When the probable consequences of an event are comparable independent of whether all versus most of the entities of the type of the nominal participate in the event described, then exceptions seem more readily tolerated. For example, if we imagine a situation with four boys, I can imagine saying (i) a if only three of the four boys ate cupcakes, but if the cupcakes are poisoned (ib) then it is more difficult to tolerate an exception.
 (i) a. After dinner, the boys ate cupcakes.   (Yes, three of the four did.)
    b. After dinner, the boys ate poisoned cupcakes. (No, three of the four did.)

b.   A visitor went into the bar. Some soldiers were chatting in a corner.

(45) a.   A reporter went into a school. The students were rude to him. (Maximal)

      b.   A reporter went into a school. Some students were rude to him.(Not necessarily maximal)

(46) a.   A reporter went into a diner. ?The students were rude to him.

      b.   A reporter went into a diner. Some students were rude to him..

(47) a.   Wilma nervously entered the courtroom. The jurors were standing in the corner.

      b.   Wilma nervously entered the courtroom. Some jurors were standing in the corner.

      c.   Wilma nervously entered the courtroom. #The juror was standing in the corner.

Several generalizations may be observed concerning such examples. In accord with the expectedness assumption, the scenario-introduced role licenses the (compare (43a) with (44a), and (45a) with (46a)). With a scenario-introduced role that is biased to multiple individuals the+plural noun is interpreted as being maximal with respect to the local frame, i.e., maximal with respect to all of the soldiers in the barracks in (45), with respect to all relevant students, e.g.,those the reporter talked to, in (46). By contrast, some + plural noun is not necessarily interpreted as being maximal. Some + plural noun easily gets a 'partitive' interpretation where, for example, some but not all of the students the reporter talked to were rude to him. With scenario-introduced roles that are strongly multiple (jurors), the + singular noun is completely unexpected and thus infelicitous, as in (47c).

Some scenario-dependant roles are biased to the singular: school (principal), movie (director), classroom (teacher), courtroom (defendant), grocer (cashier), as in (48). With these, a novel definite plural (48a) sounds odd, at best.

(48) a.   A reporter went to a school. The principals were rude to him. (Implausible)

      b.   A reporter went to a school. #Some principals were rude to him.(Principals at other schools?)

      c.   A reporter went to a school. The principal was rude to him.

      d.   A reporter went to a school. A principal was rude to him. (Implausible, implies multiple principals)

With implicit argument roles, matters appear to be different.[13] In implicit argument examples biased to a multiple instantiation of the implicit argument, as in (49) and (50), the 'partitive' construal seems difficult, e.g., in (49b) and (50b) an interpretation where some of the children who ate the cupcakes were ravenous, some of the policemen who clubbed the students had no choice. To get this interpretation, an explicit partitive subject seems to be required (some of the policemen/children).

(49) a.   Many students were clubbed. The policemen had no choice, given their orders.

       b.   Many students were clubbed. Some policemen had no choice, given their orders.

(50) a.   Lots of cupcakes were eaten. The children were ravenous.

       b.   Lots of cupcakes were eaten. Some children were ravenous.

This contrasts rather sharply with the scenario-dependent multiple biased examples discussed in (43)-(47).

With implicit arguments biased to a singular instantiation of the implicit argument, if a phrase picks out the implicit argument it usually must be definite and it typically must be interpreted as maximal.

(51) a.   John was hit. The men were drunk

       b.   John was hit. # Some men were drunk. (#as a complete discourse)

       c.   John was hit. The man was drunk.

       d.   John was hit. # A man was drunk. (# as a complete discourse)

Goal:

(52) a.   Josh brought pastry. The host supplied coffee.

       b.   Josh brought pastry. #A host supplied coffee. (Unless there are multiple hosts)

In sum, unlike the scenario-dependant roles, with singular implicit arguments an indefinite anaphoric to the implicit argument is typically not felicitous, and with plural implicit arguments, a 'partitive' interpretation is not readily available. To really understand how maximality works,

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[13]Caution is needed in comparing implicit arguments and scenario-introduced roles. One needs to be careful about implicit scenario information, eliminate an anaphoric dependency to the subject of the first sentence, and to have a fair comparison, e.g., with the 'barracks' and 'school' examples, one must work to bias the sentence to a construal with a plural implicit argument.

we would need to explain such differences. The Carlson and Tanenhaus (1988) theory of implicit arguments could explain why a definite must be used to refer to the implicit argument, but it is not clear to me why using an indefinite would not permit a 'partitive' interpretation.

We have been exploring the properties of the maximality presupposition. On the present account, the definite determiner only carries an existence and a maximality presupposition. So one important question to address is why the definite determiner appears to have a familiarity presupposition?[14] On the present account, classic examples of already given definites (A girl..The girl...) are just the clearest case where the existence and maximality presupposition of the definite are satisfied unambiguously in an overt explicitly provided frame. Presumably it is for this reason that the definite determiner appears to carry a familiarity presupposition: whenever the referent of the definite is already familiar, both the existence and maximality presupposition are easily satisfied without adjusting the current frame. The familiarity hypothesis also appears to be supported by the behavior of (most) definites in discourse initial position. Because there is no frame in discourse-initial position, a definite will typically be infelicitous, unless the existence and maximality presuppositions can be satisfied independent of which particular frame is chosen (the sun, the President of the United States, etc).

As I have tried to show in this section, in many circumstances the precise frame the speaker intends may not be clear. Use of a novel definite may in effect serve as an instruction to the listener to choose a frame that is the right size and shape for maximality to be satisified. Given that the description of a situation typically leaves most properties of that situation unmentioned, it is presumably helpful to guide the listener to the intended frame of reference for the entities introduced into discourse. Thus, as Schwarz (2005) has argued, assuming that presuppositions can be satisfied is one method by which the listener may be informed about implicit context.

6. ' Accommodating' novel definites: the process

The information needed to process a novel definite includes linguistic knowledge and more. Knowledge of whole-part relations is presumably either stored in the lexicon (available to block

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[14]Thanks to Chris Potts for pointing out that I should address this question head-on.

possessive's like * the lid's jar) or it is conceptual knowledge readily accessible from a lexical input. Implicit arguments are also plausibly generated from lexical-thematic information (see Carlson and Tanenhaus, 1988). Scenario information is also critical. It may derive from various sources including thematic information from verbs, as suggested by Garrod and Sanford. Scenario information has also been shown to be readily available from nouns, see McRae, Hare, Elman and Ferretti, 2005.

Exactly how fast the relevant linguistic and nonlinguistic knowledge can be identified and exploited in processing a DP is still an open question. Early studies of 'bridging' tended to look at whole clause or whole sentence reading times. ERP studies (e.g. Burkhardt, 2005) have shown that by 400 ms. after onset of the noun, one can observe distinctions between an already given nominal and a new one. In an eye-movement study, Cook and Frazier (in progress) investigated sentences like those in (53). In two forms (53a,c), the subject of the second sentence was an expected "appropriate" participant for the action described in the first sentence; in two forms (53b,d) it was an unexpected "inappropriate" participant for the particular action described by the first sentence (though an appropriate participant in the general type of scenario invoked). There was both a definite (53a,c) and an indefinite (53b,d) form of each sentence.

Imagine a familiarity account of definites. On this account, it seems most natural to expect that the most difficult case to process will be (53b), where there is not only a novel definite but one that is not instantiating the expected event role. (53b) would seem to be a case where the referent of the busboy is neither explicitly introduced nor easily bridged to the event just described. By contrast, consider the Small world account of novel definites where use of the definite article indicates that the speaker is maintaining an internal perspective on the scenario described by the local frame. Even though the frame may in some sense be neutral for the inappropriate role, use of the definite article may help to keep the discourse integrated. In this case, the INDEFINITE inappropriate example (53d) should be the most difficult to process since neither the content of the role nor the linguistic means used to introduce the busboy should integrate the second sentence with the first.

(53) a. My order was taken. Then the waiter rushed into the kitchen. (Definite, Appropriate role)

b.   My order was taken. Then the busboy rushed into the kitchen.(Definite,Inappropriate role)

c.   My order was taken. Then a waiter rushed into the kitchen.   (Indefinite, Appropriate role)

d.   My order was taken. Then a busboy rushed into the kitchen. (Indefinite,Inappropriate role)

In an eye movement recording experiment, the expectation based on the familiarity account was clearly disconfirmed and the expectation based on the Small world account was confirmed: in both first pass reading times on the subject of the second sentence and in total times in this region, the definite appropriate role example (53a) was read fastest and the indefinite inappropriate role example (53d) was read slowest. Though there was a clear effect of definiteness on first pass (ms/character) reading times on the critical subject, there was only a marginally reliable effect of appropriateness in first pass times in this region, suggesting that the effect of determiner may tend to precede the effect of appropriateness[15].

The eye movement data, as well as the evidence presented earlier, do not support a familiarity based account of the definite article. Instead they favor an account of the definite article based on an existence and maximality presupposition, together with the Small world

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[15]There is a concern with these data given the length difference between the definite and the indefinite. In first pass times, the main effect of determiner is only significant in the ms/character measure, which is thought to overcorrect for length differences, and not in deviation from regression (a length correction based on the general function relating reading times to length), which tends to undercorrect. Though this may complicate the interpretation of the main effect of definiteness, it does not undermine the central point made in the text: namely, that the condition that stands out as being particularly difficult is the Indefinite with an Inappropriate role, not the Definite with an Inappropriate role. This may also be seen in the first pass times on the target word (waiter, busboy) itself:

	The	A
Appropriate	34.35.	34.92
Inappropriate	34.03	37.64

Pairwise contrasts of the Definite vs. Indefinite Inappropriate condition were significant in both the ms/character and the deviation from regression measures, whereas the Definite vs. Indefinite Appropriate condition were not significant in either.

hypothesis. One consequence of this approach is that an internal perspective comes along with Small world licensing of a novel definite. Given that a novel definite indicates an internal perspective, the novel definite itself may help to integrate an otherwise disconnected or not fully coherent discourse.[16]

7. Do we need a general theory of presupposition processing?

Are presupposition triggers really so different from each other? It has been claimed that the presupposition of <u>too</u> can't be accommodated since otherwise (54) should be fine in an out of the blue context (Kripke,1991).

(54) [JOHN] is having dinner in New York tonight, too.

Is it really true that the presupposition of <u>too</u> can't be accommodated? Imagine I'm speaking to a local linguist as we approach the house of my colleagues, Lisa and Angelika. I see Lisa's bike is gone and I utter (55).

(55) I guess Lisa's gone too.

Here the presupposition failure doesn't seem so extreme; the listener may just assume that I know Angelika is gone and add the proposition that Angelika is gone to the common ground.[17]

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[16]We do not have evidence concerning the interpretation assigned to "My order was taken. Then the busboy rushed into the kitchen." My intuitions suggest that either one may take the busboy to be the agent of the verb <u>order</u>, in which case the situation may include other busboys (though not other busboys who took my order, see (49,50)), or the busboy may simply be another discourse participant, separate from the agent of <u>order</u>, in which case there is an implicature that the restaurant only has one busboy. This is entirely in line with our observations in Section 5 about how maximality works.

[17]Vague accommodation also seems possible. Imagine that I'm looking particularly harried as I walk into the room. A few minutes later, I look around me and say:
(i) Of course, I had to loose my scarf too.
I think under these circumstances, vague accommodation is possible. (i) presupposes that some other unfortunate event has occurred to me but not necessarily that I lost some other object. Another example comes from the television series "Desperate Housewives:"
(ii) A: What do you think about the Applewhites?
    B: They're interesting.
    A: Yeah, they weird me out too.
In (ii), B responds without any clearly marked sarcastic intonation. So it is background

Examples like these suggest that the presupposition of <u>too</u> doesn't behave so differently from the presupposition of <u>the;</u> in both cases, accommodation of the presupposition may be possible if the currently available information satisfies the Small world hypothesis: there must be a locally most relevant proposition.[18]

Turning back to processing issues, in Crain and Steedman's (1985) classic article, they proposed the principle of Parsimony. Basically the Parsimony principle favors whatever analysis of a sentence violates the fewest presuppositions. They used the principle to explain why, in a null context, readers and listeners would avoid a reduced relative clause analysis of an ambiguous sentence (since a restrictive relative clause analysis would, they assume, presuppose the existence of a context set of entities of the type of the nominal, e.g., horses, in <u>The horse raced past the barn fell</u>.) The current work would pose a problem for a theory which generally avoids presupposition violations IF the definite article carried a familiarity presupposition. If instead, it carries only an existence presupposition and a maximality presupposition, then many uses of novel definites become consistent with a system governed by the avoidance of

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knowledge that A has about B that allows A to interpret B's remark as evidence that the Applewhites weird B out.

Chris Potts informs me that examples like these have been discussed in the semantics literature, in connection with examples like (iii), due to Barbara Partee.
(iii) They left the party at 2 am, and we left early too.
All of these examples seem difficult to reconcile with a view that some presupposition triggers are harder to accommodate than others for a principled reason due to the category or nature of the presupposition trigger itself.

[18]Florian Schwarz (personal communication) points out that while the 'property' part of the presupposition of <u>too</u> may be accommodated, the antecedent cannot. He provides the striking example below.
(i) I flagged down a cab.
(ii) The cab driver was a young Italian man.
(iii) A little dog was in the car too.
In (ii) there's no difficulty accommodating the cab driver, and in (iii) <u>too</u> is felicitous, with cab driver as its antecedent (assuming the cab driver is assumed to be in the cab). But if one leaves out (ii), then in (iii) <u>too</u> is no longer felicitous. This example might suggest that presupposition triggers really are different with respect to the way they may be accommodated.

presupposition violations.[19]

In more recent work on the issue, Moulton (2006) investigated examples like those in (58), where the elided VP may take either a 'small VP' antecedent, which presupposes that Kiley reviewed the article, or a 'big VP' antecedent, which also presupposes that Kiley reviewed the article carefully. In three written paraphrase selection experiments, he showed that readers do not accommodate adverbs in presupposed contexts such as relative clauses or temporal subordinate clauses. His examples contrasted verb phrase ellipsis with antecedent containment, as in (58b), with verb phrase ellipsis in main clause and conjoined clause contexts, as in (56a)

(56) a.   Jordy carefully reviewed the article and Kiley did too.   (Readers prefer big
                                                                                                                  antecedents.)

        b.   Jordy carefully reviewed the article after (also) Kiley did.   (Readers prefer small
                                                                                                                  antecedents.)

Using the presupposition triggers after, before, and when, he showed that the small antecedent interpretation, was preferred in presupposed contexts like (56b). By contrast, in assertion contexts, like (56a), the big antecedent interpretation, was preferred. Based on these data, he proposed that readers Minimize Accommodation.

These results are important for developing a theory of processing ellipsis. But they also suggest that a processing theory of accommodation is going to need to be sensitive to the linguistic context in which presupposition triggers occur and the context they create. As Moulton (2006) points out, plausibly it will also be necessary to consider the syntactic category of the material that needs to be accommodated (an adverb may be more difficult than a DP, for example), as well as the sorts of world knowledge that may support accommodation.

In the end, it may be that a successful theory of accommodation simply is the theory of grammar together with the overall (independently motivated) theory of language use. At least at present it would seem premature to conclude that there exist any special processing principles

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[19]The Crain and Steedman approach to presupposition was intended as a statement about how context influences the processing of the current sentence. In contrast, the approach advocated here has emphasized how implicit properties of the current sentence may be responsible for adjusting the frame defining the locally available context.

which apply only to the processing of words with unsatisfied presuppositions. Small frames, or distinguished parts of context corresponding to the local perspective, may be the rule in language processing. Given a sufficiently small and carefully circumscribed frame, 'accommodation' may simply amount to interpretation inside that small frame.

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