

**WHAT BRINGS A HIGHER-ORDER ENTITY INTO FOCUS OF ATTENTION?  
SENTENTIAL PRONOUNS IN ENGLISH AND NORWEGIAN**

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**ABSTRACT**

This paper investigates the use of sentential pronouns in English and Norwegian. We argue that resolution of sentential pronouns is sensitive to the distinction between forms whose referents must be in focus and forms whose referents must only be activated, but not necessarily in focus. An investigation of the distribution and interpretation of sentential pronouns also reveals that the relative salience of a higher order discourse entity is influenced by syntactic structure as well as extralinguistic factors.

**1 INTRODUCTION**

We can refer to an entity with several different expressions, and a single expression can be used to refer to many different entities. Two questions that naturally arise given these facts are 1) How do we as audience manage to understand a speaker's intended interpretation of a referring expression? 2) What determines the speaker's choice of form when referring to an entity? It has turned out to be very fruitful to see these two questions as closely connected. A whole field of research on the distribution and interpretation of referring expressions clearly suggests that the speaker's choice of form helps the audience pick out the intended referent of the expression (cf. for example Garrod & Sanford 1982, Ariel 1988, Gundel, Hedberg and Zacharski 1993).

In this paper we will look at the distribution and interpretation of pronouns that are used to refer to higher-order entities like events, facts, or propositions, as illustrated in (1).

- (1) John won the race. I know that because I saw it happen. But it's still hard to believe it. (Fraurud 1992)

Our main question in this paper is this: what yields an appropriate use of a given pronominal form when it refers to a higher-order entity in English and Norwegian? We will propose that in both languages the form that is most frequently used is one which

requires its referent to be activated, but not necessarily in focus (in the sense of Gundel, Hedberg and Zacharski 1993). This is so because processing a sentence generally brings into focus the major participants rather than the event or state of affairs itself.

**2 COGNITIVE STATUS**

Gundel, Hedberg, and Zacharski 1993 (henceforth GHZ) propose that a particular form conventionally signals that the referent of the expression has a certain cognitive (memory or attention) status for the addressee. In English, for example, an unstressed pronoun such as *it* signals that the addressee's attention is currently focused on the intended referent. Since the addressee's attention will normally be focused on only one or two entities at a time, the number of possible referent candidates for an unstressed pronoun is very low, and referent resolution is therefore made possible even though the descriptive content of a pronoun is very limited.

GHZ assume that there are six cognitive statuses relevant for the distribution of referring expressions: The connection between these statuses and their corresponding forms in English is illustrated in the Givenness Hierarchy in Figure 1 (because of space limitations, we list only the 3 highest statuses here.)

The Givenness Hierarchy

In Focus >	Activated >	Familiar
it	that, this	that N

Figure 1

Figure 1 shows what cognitive status is necessary for an expression with a given form to be used appropriately. This does not exclude the possibility that an entity that has a certain cognitive status can be referred to with a form that is to the right of this status in the hierarchy since the higher statuses (to the left in the table) imply all the lower ones. For instance, the demonstrative determiner 'that' can be used when the referent is familiar, but not activated. And it can also be used when the

referent is in focus. An unstressed personal pronoun, such as *it*, on the other hand, can only be used appropriately if the speaker's intended referent is in the addressee's focus of attention.

### 3 IN FOCUS VS. ACTIVATED

According to Figure 1, we would expect sentential *it*<sup>1</sup> to be used appropriately only when the entity referred to is in the addressee's focus of attention, while 'that' or 'this' can be used whenever the entity is activated, regardless of whether or not it is also in focus. Since higher statuses imply all lower statuses, it should be possible to use the demonstrative pronouns *that* and *this* to refer to entities that have the status In Focus; but analyses of naturally occurring discourse show that these forms are used primarily when the referent is activated, but not in focus. In the statistics presented in GHZ's 1993 paper, only one out of 33 occurrences of demonstrative pronouns in English referred to entities that had the status In Focus. GHZ explain this as the result of interaction of the Givenness Hierarchy with the first part of the Maxim of Quantity "Make your contribution as informative as required (for the current purpose of the exchange)" (Grice, 1975). That is, demonstrative pronouns convey a so-called scalar implicature: a weaker form conversationally implicates that a stronger form does not obtain. Thus, just as "I have two children" implicates that the speaker does not have more than two children, using a demonstrative form implicates that the referent of the expression does not have a status higher than activated, i.e. it is not in focus.

### 4 SENTENTIAL PRONOUNS AND THE IMPORTANCE OF SUBSEQUENT MENTION

According to GHZ, the entities in focus at a given point in the discourse will be that partially-ordered subset of activated entities which are likely to be continued as topics of subsequent utterances. Thus, entities in focus at the beginning of an utterance generally include at least the topic of the preceding utterance, as well as any still-relevant higher-order topics. To the extent that syntactic structure and prosodic form encode topic-comment structure and

serve to highlight constituents whose referents the speaker wants to bring into focus, membership in the in-focus set is partially determined by linguistic form. For example, the subject of a matrix sentence is highly likely to bring an entity into focus, whereas this is not the case for elements in subordinate clauses and prepositional phrases (cf. the centering and focusing algorithms of Grosz, Joshi, & Weinstein 1986).

Since objects in the world can naturally be referred to with expressions that function as a syntactic subject or object, they can obtain the In Focus status after being mentioned only once. A situation or fact, on the other hand, is typically expressed by a whole sentence the first time it is referred to. The first mention of situations or facts will therefore usually not correspond to expressions that have prominent syntactic functions in the sentence, and we would expect them to be activated, but not yet in focus after being mentioned only once.<sup>2</sup> Reference to higher-order entities with an unstressed pronoun, i.e. a form that requires its referent to be in focus, thus typically requires more than one previous mention. Consider the examples in (2) and (3).

- (2) There was a snake on my desk. It scared me.
- (3) There was a snake on my desk. That scared me, and it scared my office mate too.

In (2), the unstressed pronoun *it*, which requires its referent to be in focus, is most naturally interpreted as referring to the snake, not to the situation of a snake being on the desk. However, in (3), *it* is more naturally interpreted as referring to the fact that there was a snake on the speaker's desk. Since this situation was referred to twice, once in the first sentence and once in the second, it is now in focus and can be referred to with an unstressed pronoun. The distribution of sentence *it* vs. *that* in naturally occurring discourse also supports the claim that a sentence rarely brings the situation or proposition it refers to into focus.

<sup>1</sup>The terms 'sentential it' or 'sentence pronoun' are used to refer to a personal pronoun whose antecedent may be a sentence, or, more generally: a pronoun that refers to a higher-order entity like a fact or a proposition.

<sup>2</sup> Within Centering Theory, which may be seen as modelling the process by which an entity is activated and brought into focus (see Gundel 1997), situations and events introduced by a whole sentence are ranked lower as preferred centers than entities introduced by major NP arguments in the sentence.

## 5 PROPOSITIONAL ENRICHMENT

In this section we will report on an experiment which examined the influence of some linguistic cues on pronoun resolution in Norwegian. Some results from this experiment have already been reported on in Fretheim & Borthen 1997. We will discuss here only the results concerning the interpretation of the Norwegian unaccented *det* and accented *det* which are the counterparts of English *it* and *that* respectively. What seems to be the case in the texts that were examined is that a sentence pronoun with two highly likely referents is linked to the closest antecedent when it is accented (*DET*) while it is linked to the furthest possible antecedent when it is unaccented (*det*). At first glance, these results appear to be inconsistent with GHZ's predictions, since it is hard to see why the referent of the more distal antecedent should be more likely to be in focus than the closest one.

The texts were parts of an auditory listening comprehension test on anaphor resolution where reaction time was measured. (5) is one example of the texts the subjects judged. The subjects' task was to decide who was surprised in the last of the three sentences. There were 30 subjects altogether.

- (5) (a) Gro spurte Anne om hun var klar over at Senterpartiets oppslutning var synkende.  
 (b) Hun fikk ikke noe svar.  
 (c) *DET* kom som en overraskelse på henne.
- (a) 'Gro asked Anne if she was aware that the Center Party's popularity was decreasing'.  
 (b) 'She didn't get any answer.'  
 (c) 'That came as a surprise to her.'

Average reaction time: 1243ms  
 30: *henne* 'her' = Gro and *DET* finds its antecedent in the (b) sentence.  
 0: *henne* 'her' = Anne and *DET* finds its antecedent in the (a) sentence.

Even though the interpretation of the sentential pronoun was not directly tested in the experiment, we can infer the interpretations based on how the subject interpreted the feminine personal pronouns. In a minimal pair of texts only contrasting in whether the sentence pronoun is accented or not we get almost opposite results for the two text fragments. In (6), which is exactly like (5) except that *det* is unaccented, 23 subjects chose Anne as the referent of the feminine pronoun *henne*, while only 7 subjects chose Gro.

- (6) (a) Gro spurte Anne om hun var klar over at Senterpartiets oppslutning var synkende.  
 (b) Hun fikk ikke noe svar.  
 (c) Det kom som en overraskelse på henne.
- (a) 'Gro asked Anne if she was aware that the Center Party's popularity was decreasing'.  
 (b) 'She didn't get any answer.'  
 (c) 'It came as a surprise to her.'

Average reaction time: 1859ms  
 7: *henne* 'her' = Gro and *DET* finds its antecedent in the (b) sentence.  
 23: *henne* 'her' = Anne and *DET* finds its antecedent in the (a) sentence.

Since the presence vs. absence of accent on *det* is the only difference between the two texts, we can infer that this difference must have to do with what antecedent the accented sentence pronoun *DET* ('that') takes and what antecedent the unaccented *det* ('it') takes. We can assume that when the subjects choose Anne as the referent of the feminine pronoun, they have selected the antecedent of the sentence pronoun *det* as being found in sentence (a), while when they choose Gro, they have selected the antecedent of the sentence pronoun as sentence (b).<sup>3</sup> This is so for the following reasons. If it was the fact that the Center Party's popularity was decreasing that surprised one of the women, it should be Anne who was surprised, since Gro would not be surprised by the content of her own utterance. If it was the fact that Anne didn't answer that was surprising, it should be Gro who was surprised by this, not Anne.

While the distinction between accented and unaccented sentence pronouns almost led to opposite results for (5) and (6), there was a small number of subjects who chose Gro as the referent of *henne* in the version with the unaccented *det*. The average reaction time for (6) is also longer than for (5). This may be because Gro is clearly in focus, since she is explicitly referred to in sentence (b). Note, moreover, that according to the Centering algorithm (cf. Grosz, Joshi and Weinstein 1986, Walker and Prince 1996) the fact that Gro was explicitly referred to with a pronoun in sentence (b) would necessarily make her the backward

<sup>3</sup>We cannot be certain from the informants' answers if it is the content of the whole sentence (a) or just the complement of 'aware' that is chosen as the referent of the unaccented *det*, but according to our intuitions and real world knowledge, it is most probable that it is the content of the complement of 'aware' that would be interpreted as the referent of *det*.

looking center, and therefore most likely the referent of *henne* in sentence (c). Thus, while most subjects accommodated in resolving the referent of *henne* in order to get a reading which was consistent with their interpretation of the sentence pronoun, a small minority chose the interpretation that was most consistent with reference processing principles for the feminine pronoun.

Further support for the role of accented vs. unaccented sentence pronouns in determining interpretation of the personal pronouns in these texts comes from examples like (7).

- (7) (a) Gro spurte Anne om hun var klar over at Senterpartiets oppslutning var synkende.  
 (b) Hun svarte ikke.  
 (c) Det kom som en overraskelse på henne.
- (a) 'Gro asked Anne if she was aware that the Center Party's popularity was decreasing.'  
 (b) 'She didn't answer.'  
 (c) 'It came as a surprise to her.'

Average Reaction time: 1196ms

1: *henne* 'her' = Gro and *det* finds its antecedent in the (b) sentence.

29: *henne* 'her' = Anne and *det* finds its antecedent in the (a) sentence.

In (7), the (b) sentence is changed so that the expressed proposition is the same as in (5) and (6) (Anne did not answer Gro's question), but the pronoun *hun* ('she') in (b) must be interpreted as referring to Anne.<sup>4</sup> In this case, then, there is no conflict between the status of Anne as the backward looking center (and therefore 'in focus' entity) in (c) and the expected reading based on the interpretation of the unstressed sentential pronoun. As predicted, 29 out of 30 subjects did in fact interpret the text so that it was Anne that was surprised. That this is at least partly due to the unaccented form of the sentence pronoun in (7) is indicated by (8), which is identical to (7) except that *det* is accented. For (8), 22 out of 30 subjects chose an interpretation that violates the Centering principle (and possibly also the expectation that the referent of the unstressed feminine pronoun will be an in focus entity) but is in accordance with the hypothesis that an accented sentence pronoun will be interpreted as referring to a situation or state of affairs that is activated, but not in focus:

- (8) (a) Gro spurte Anne om hun var klar over at Senterpartiets oppslutning var synkende.  
 (b) Hun svarte ikke.  
 (c) *DET* kom som en overraskelse på henne.

- (a) Gro asked Anne if she was aware that the Center Party's popularity was decreasing.  
 (b) She didn't answer.  
 (c) That came as a surprise to her.

Average Reaction time: 1675ms

22: *henne* 'her' = Gro and *det* finds its antecedent in the (b) sentence.

8: *henne* 'her' = Anne and *det* finds its antecedent in the (a) sentence.

For all the fragments in (5)-(8), the result is that whenever the sentential pronoun is the unaccented *det* ('it') the subjects prefer to interpret *henne* ('her') as being Anne, which means that *det* finds its antecedent in the (a) sentence. And whenever the sentential pronoun is the accented *DET* the subjects prefer to interpret *henne* as being Gro, which means that *DET* finds its antecedent in the (b) sentence. But why is it that the further antecedent is chosen when the sentence pronoun is unaccented and the closer one is chosen when it is accented? If the predictions of the Givenness Hierarchy are correct, why is the content of a further antecedent more likely to be in focus than that of a closer one?

We believe the answer to this question lies in the enriched interpretation of the second sentence. Even though 'answer' is used intransitively here, there is an implicit object which must be recovered when this sentence is processed, namely Gro's question about whether Anne was aware that the Center Party's popularity was decreasing. Thus, since the fact that the Center Party's popularity was decreasing is a part of the second sentence, this fact is in a sense repeated twice (and must be processed twice), and is therefore in focus at the beginning of sentence (c). If the second sentence were not connected to the first sentence in this way, we would not expect the same effect for the interpretation of an unaccented pronoun. This is supported by (9). According to our intuitions it is impossible for *det* in the third sentence of (9) to refer to any content connected to the first sentence. It is more likely that *det* has the second sentence as its antecedent, but then the text is not fully coherent. This indicates that the implicit content of the second sentence in (5), (6), (7), and (8) is crucial for bringing the content of some fact presented in the first sentence of the text into focus.

<sup>4</sup>We have assumed that the person who does not answer is necessarily interpreted as Anne, while the person who does not get any answer is necessarily Gro.

- (9) (a) Gro spurte Anne om hun var klar over at Senterpartiets oppslutning var synkende.  
 (b) Da kom Jan plutselig inn i rommet.  
 (c) Det kom som en overraskelse på henne.
- (a) 'Gro asked Anne if she was aware that the Center Party's popularity was decreasing.'  
 (b) 'Then Jan suddenly came into the room.'  
 (c) 'It came as a surprise to her.'

## 6 THE SALIENCE PROMOTING ROLE OF EXTRALINGUISTIC CONTEXT

From the examples considered so far it appears that one-time-mention is not enough to bring a situation into focus. However, speakers do often accept an unaccented Norwegian *det* or English *it* used immediately after a higher-order entity has been introduced, and has therefore been mentioned only once (see Fretheim 1997). We will consider here some of the clearer cases of this type.

Imagine an interviewer suddenly placing a microphone in front of a startled linguist:

- (10) A: What do you think of the fact that linguists usually earn less than computer scientists?  
 B: It's terrible!  
 B': That's terrible!

According to the native speakers of English we consulted, both B and B' are appropriate answers to A's question. One possible analysis of (10) while maintaining the predictions in the Givenness Hierarchy, would be to say that we accommodate and this is why (10A-B) is acceptable. But if this is our explanation, we would not be able to explain why (11b) does not sound as good as (10A-B).

- (11) (a) I have heard that linguists earn less than computer scientists, and that's terrible.  
 (b) ??I have heard that linguists earn less than computer scientists, and it's terrible.

We believe the difference between (10) and (11) resides in the fact that some contexts are more salience-promoting than others. A question in an interviewing-situation can have the effect of establishing a discourse topic right away because the topic chosen by the interviewer is generally timely and/or the interviewee already knows something about it.

It might appear that the difference between (10) and (11) is attributable to the fact that the situation in question is presented as part of an NP in (10) but not in (11); however, note that in Norwegian we get exactly the same effect even though the fact in (10) is not presented inside an NP: "Hva synes du om at lingvister som regel tjener mindre penger enn dataingeniører?" (lit. 'What do you think of that linguists usually earn less money than computer scientists?')

Also the next example suggests that the salience of a higher-order entity can be promoted nonlinguistically. We assume that the difference in acceptability between (12A1-B-A2) and (12A1-B-A2') can be attributed to the fact that the proposition expressed in (12B) is activated, but not in focus.

- (12) A1: Why didn't you come to the rehearsal yesterday?  
 B: I thought I told you. I had to help Peter move.  
 A2: Ah, that's true.  
 A2': ??Ah, it's true.

In (13), in contrast, it is fully appropriate to use *it*.

- (13) A: Why didn't you come to the rehearsal yesterday?  
 B: I thought I told you. I had to help Peter move. (Pause) It's true!

Note that (13A-B) is only coherent if there is a pause right before B's third utterance. And B's insistence on the truth of what he says will be a result of B believing that A does not believe him. This may be 'activated' through a skeptical look from A, for instance. With no such pause or exchange of looks B's answer would not sound natural. (13) thus shows that cognitive status can be raised by extralinguistic means.

## 7 CONCLUSIONS

We have seen how the form of an anaphor referring to a higher-order entities may influence the interpretation of the anaphor. On the basis of this and on the basis of a restricted analysis of natural speech and intuitive judgments of invented texts, we conclude that the use of sentential pronouns in English and Norwegian can be explained by the theory proposed in Gundel, Hedberg and Zacharski (1993), which links different referring forms to the assumed cognitive status of the referent. According to this theory, a necessary condition for appropriate use of English *it* and Norwegian unaccented *det* is that the referent is in the

addressee's focus of attention. Explicit subsequent mention is one way of bringing a higher-order entity into focus of attention. But in addition to that we have shown that an account of propositional enrichment (based on linguistic or extralinguistic context) is necessary in order to adequately capture these facts. It also seems to be the case that some contexts or situations are more salience-promoting than others, and that a person's general knowledge and expectations may affect the degree to which something is easily brought into focus. It is not clear how such factors can be taken into account in a computer-based processing system, but propositional enrichment is indeed one factor that would lead to a more adequate account of pronoun interpretation.

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