Negative Polarity Items in Inverse Scope and Topicalized Clauses
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Negative polarity items are words or phrases usually associated with a negative licenser, such as the word *ever*, licensed by *don't*, in *I don't think that I've ever been so surprised*. In unmarked sentences, the negative licenser typically c-commands the negative polarity item, and syntax is sufficient to explain the occurrence of a negative polarity item. There are two types of sentences studied here which license negative polarity items but have no clear c-command relationship between licenser and licensee. These are sentences with negative polarity items in inverse scope and sentences with negative polarity items in topicalized clauses. Semantics and pragmatics are invoked in order to understand the licensing of negative polarity items in these marked sentences. De Swart (1998) uses the work of Grice (1975) to form a theory on the licensing of negative polarity items in inverse scope. Her theory relies on the positive informative value of a sentence with inverse scope. A study is run for this paper, and data are collected concerning how acceptable participants find inverse scope and topicalized clause sentences in comparison with one another. This study and the work done by Grice and de Swart combine to form a new theory on the relation between sentences with negative polarity items in inverse scope and sentences with negative polarity items in topicalized clauses, and their respective informative values.*

1. Introduction

Negative polarity items (NPIs) are words or phrases that typically occur in negative contexts, where some negative aspect of a sentence triggers the negative polarity item. Both semanticists and syntacticians attempt to describe how the process of licensing negative polarity items occurs, and both fields provide models to understand negative polarity items in negative sentences with unmarked word order. Syntax uses syntactic scope and c-command to describe negative polarity item licensing, while semantics employs semantic scope and all its inherent complexities.

(1)   I wouldn't pay *a red cent* for that shirt.

Sentence (1) is a negative sentence with unmarked word order, what I will call a *linear sentence*,[1] where *a red cent* is the negative polarity item licensed by the negative *wouldn't*. Sentences that don't follow this syntactically and semantically linear structure pose a problem for linguists and have been understudied, particularly sentences with inverse scope of negation and sentences with topicalized clauses containing negative polarity items.

This paper studies how English speakers regard sentences with negative polarity items in inverse scope and topicalized clauses. These two contexts are described in Section 2. Section 3 explores some of the literature on NPIs in general, as well as specific literature on NPIs in inverse scope and topicalized clauses. Section 4 compares the two sets of non-linear sentences to see which speakers prefer, and how speakers rate the grammaticality of these non-linear negative polarity item sentences in comparison with their linear counterparts. Section 5 summarizes new and prior research to provide a cohesive theory regarding NPIs in inverse scope and topicalized clauses. The goals of the paper, re-evaluated in Section 6, are to examine NPI grammaticality judgments for each type of sentence and to determine how comparatively acceptable NPIs are in each context. Ultimately, I will explain the preference of NPIs in inverse scope and topicalized clauses.

2.   Inverse Scope and Topicalized Clauses

Before looking at NPIs in the context of inverse scope and topicalized clauses, it is necessary to understand what these two contexts are. "Inverse scope" is a rather

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[1]This is my term, and will be used to distinguish typical sentences with NPIs from sentences with inverse scope or topicalized complement clauses.

obscure term, but has a history in the literature, having been used by May (1977), Szabolcsi (1997), Beghelli and Stowell (1997) and de Swart (1998), to name a few (de Swart 1998: 181). The phrase "topicalized complement clause," known here as "topicalized clause," is more directly descriptive of the phenomenon it describes, and also has a history in the literature, including de Swart (1998) and Hoeksema (2003). Knowing this, we move on to outline what exactly each of these terms describes.

2.1 Understanding Inverse Scope

In order to understand inverse scope, we must first understand another concept, that of "direct scope." The term direct scope is described by de Swart (1998: 177) in (2).

(2) *Direct Scope*
An expression *a* has direct scope over an expression *b* if and only if *b* is in the semantic scope of *a* and *a* c-commands *b* at S-structure.

This definition is filled with terms that themselves need to be described in order to understand direct scope. First, in semantics, a part of a sentence is considered within the scope of a negative if that part of the sentence is interpreted within the context of the negative.

(3) a. Sue doesn't read novels
b. $\neg \exists x$ (Novel(x) $\wedge$ Read(s,x))   (de Swart 1998: 192)

In (3a), the whole sentence is interpreted within the scope of negation. This is illustrated in (3b), where the sentence is laid out in first-order logic to show that the negative lies outside of the parentheses surrounding the entire statement, and therefore has scope over the entire statement.

C-command is another crucial part of direct scope. C-command is the relationship held between a node on a syntactic tree, which corresponds to a part of a

sentence, and its sister nodes, as well as the daughters, granddaughters, etc. of its sisters (Carnie 2002: 75). This complicated sounding relationship can be understood schematically.

Diagram A:

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      S
   NP ∧ VP
      not ∧ VP
           V ∧ NP
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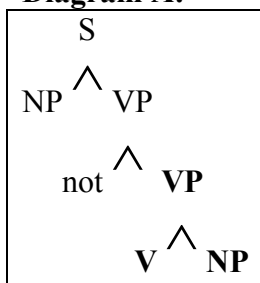
Hoeksema (2003:8)

Diagram B:

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      S
    I ∧ VP
   wouldn't ∧ VP
        pay ∧ a red cent for that shirt
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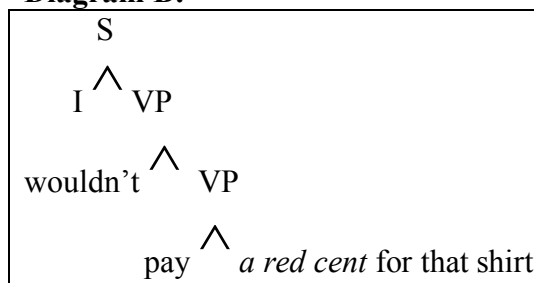
In Diagram A, "not" c-commands its sister "VP" as well as the daughters of "VP," "V" and "NP." These three nodes are shown in bold.

The last term to understand in the definition of direct scope is S-structure, where a process is evident at the surface structure level of syntax. C-command is one such relationship, evident at S-structure, where, as in Diagram B, the order of the nodes from left to right in the tree reflect the order of the sentence.

Syntactic c-command and semantic scope often occur in concordance with one another, and direct scope describes this relationship. Sentences with direct scope can be illustrated as in Diagram A. Looking again at example (1), *I wouldn't pay a red cent for that shirt*, and interpreting it using Diagram A, as demonstrated in Diagram B, we see that *a red cent* is c-commanded by the negative *wouldn't* in the sentence. Since semantic negation also has scope over *a red cent*, this sentence is an example of direct scope.

Not all sentences with NPIs are linear and have direct scope. Sentence (4), given by de Swart (1998: 180), is a sentence which illustrates this. The NPI is shown in italics.

(4)   A doctor who knew *anything* about acupuncture was not available.[2]

The negative does not c-command the NPI in this sentence, so an account of the distribution of NPIs that calls for such c-command fails to account for the occurrence of a NPI in this sentence, and inverse scope is invoked. De Swart (1998: 181) provides the following definition for inverse scope:

(5)   *Inverse Scope*
        An expression *a* has inverse scope over an expression *b* if and only if *b* is in the semantic scope of *a* but does not c-command *b* at S-structure.

In sentence (4), there is no c-command relation between *not* and *anything* at S-structure, yet negation still takes sentential scope over the *anything*, so there must be inverse scope.

2.2   Understanding Topicalized Clauses

The next major concept to be described is topicalized complement clauses, referred to simply as topicalized clauses. Complement clauses are arguments of predicates, such as in (6), where the complement clause is italicized and the predicate is in bold.

(6)   I **believe** *that you like golf*.

Topicalized clauses, then, are clauses where the complement clause shifts to the front of a sentence, as in (7).

(7)   *That you like golf*, I **believe**.

These sentences sound a bit "backwards," and have marked, non-linear word order, but are easily understood by listeners.

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[2] Though this sentence is quoted in de Swart's paper, it was originally presented by Uribe-Etxebarria (1996). This example will be further examined in Sections 4 and 5. Italics are my own.

Topicalized clauses with NPIs are sentences where the NPI is located in the topicalized clause and the predicate that the topicalized clause is a complement of is negative. An example is (8), where the NPI is italicized:

(8)   That Tony *ever* visited this area, I don't believe.

According to the definition of inverse scope given by de Swart, this type of sentence would categorically be an inverse scope sentence, as there is no c-command relation between the negative and the NPI, yet the negative still has semantic scope over the sentence. Since topicalized clauses with NPIs are structurally different from any examples de Swart gives, they will be treated separately from inverse scope sentences here.

The focus of this paper is to study NPIs that occur in the two types of sentences presented above, sentences with inverse scope and topicalized clauses. A review of the literature follows.

3.   Literature

Literature on NPIs in these two contexts, particularly topicalized clauses, is scarce. Henriette de Swart (1998: 182) writes, "I am not aware of any attempts in the literature to explain the lack of linearity constraints on NPIs like *hoeven* or topicalized complement clauses," and limits herself to explaining instances of inverse scope. Many of the sources that are useful to this study do not directly pertain to NPIs in inverse scope or topicalized clauses, but have to do with the larger discourse of semantics and pragmatics.

3.1   Fauconnier and Scales

One important piece of literature which serves to shed light on NPIs, and can be useful in understanding NPIs in the contexts being studied, is Fauconnier's (1975) paper "Pragmatic Scales and Logical Structure." Fauconnier's paper introduces a way to understand superlatives and their relationship with the quantifier *any*. Fauconnier uses logical principles to describe the pragmatic scale on which superlatives exist, and introduces the observation, "if x_1 is lower than x_2, then R(x_1) entails R(x_2). So in particular if α is the low point [of some scale], R(α) will entail $\forall x$R(x)" (Fauconnier 1975: 364). For example, Fauconnier (1975: 361) takes the superlative "the faintest," and puts it into a context where it has the possibility of being interpreted as a universal quantifier, similar to the quantifier *any*.

(9)   The faintest noise bothers my uncle.

This sentence can be read existentially as well. When read existentially, the following scale, an expansion of the scale outlined above, can be formed.

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_____        "the loudest"
___|___        x₁
___|___        x₂
___|___        "the faintest"                              (Fauconnier 1975: 361)
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Since "the faintest" is lower on the scale than "the loudest," the entailment in (10), similar to the entailment laid out above, is set up.

(10)   The faintest noise bothers my uncle →
          The loudest noise bothers my uncle

When negation is involved, Fauconnier explains that the scales described are flipped and the top of the scale becomes the bottom of the scale. Therefore, the new bottom of the

scale acts as a universal quantifier, so that you get (11), where "the loudest" can function as a universal quantifier.

(11)   The loudest noise doesn't bother him   (Fauconnier 1975: 362)

Fauconnier first explains the relationship between superlatives and *any*, where superlatives can replace the quantifier *any*, using purely syntactic methods. After trying this method, Fauconnier decides that logic, semantics and pragmatics better describe the relationship between the two. Fauconnier returns to the formula "if α is the low point, $R(α)$ will entail $\forall x R(x)$" and rather than trying to explain superlatives in respect to *any*, he describes *any* in respect to superlatives, and the value of α is assigned to *any*. From this, we know that a negative sentence with *any* in it will entail another negative sentence with something higher on the relevant scale. For example, using similar sentences to (11) and the relevant scale where "any noise" is lower than "the loudest noise," the set of sentences can be explained.

(12)   Martha didn't hear any noise.
(13)   Martha didn't hear even the faintest noise
(14)   Martha didn't hear even the loudest noise   (Fauconnier 1975: 367)

(12) pragmatically implies both (13) and (14), because *any* is α, and is at the bottom of the scale of noise reversed under negation.

Fauconnier's explanation of logical scales and entailment are useful in the research of negative polarity items, and his work is still referred to by other linguists. Before we look at a linguist who makes reference to Fauconnier, let us look at a contemporary of Fauconnier, and the work he was doing within logic and pragmatics.

3.2   Grice and Maxims

H.P. Grice is important to the study of NPIs indirectly through his 1975 paper "Logic and Conversation."[3] Grice describes four maxims, borrowed from Kant, which apply to conversation where his Cooperative Principle is being followed.   The Cooperative Principle states that in entering into conversation, participants agree, non-verbally and on assumption, to the following.

> (15)   *Cooperative Principle*
> Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged.   (Grice 1996: 124)

When the Cooperative Principle is adhered to, the maxims of Quantity, Quality, Relation and Manner are applied to discourse.

Each of Grice's maxims participates in upholding the Cooperative Principle. The maxim of Quantity ensures that people are as informative as a situation requires, but no more informative than they need be.   Under Quality, people must have sufficient evidence to believe what they say is true. Relation assures that participants' remarks be relevant to a conversation, and lastly, the maxim of Manner asks that conversational participants be clear and unambiguous (Grice 1996: 124-5).

Traditional logic cannot describe the trajectory of many conversations, but with the four maxims in place, conversational implicature is used to describe the inferences conversants draw that go beyond what their utterances entail. For example, conversants A and B interact as follows:

> (16)   A: Smith doesn't seem to have a girlfriend these days.
> B: He has been paying a lot of visits to New York recently.

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[3] Grice's paper originally appeared in <u>Syntax and Semantics</u>, vol. 3 in 1975. The page numbers of the paper I am referring to are from a reprinted version of the paper, found in <u>Readings in Language and Mind</u>, Ed. Heimir Geirsson and Michael Losonsky, 1996.

Since the Cooperative Principle is in place during this exchange, when the maxim of Relation is taken into consideration, B is pragmatically understood to be implicating that *Smith* might have a girlfriend in New York. Unless the Cooperative Principle is specifically ignored and a person chooses to lie, these maxims operate in all conversation, and can be applied to any discourse.

3.3a   De Swart and a Failed Theory

Grice's work is applicable to de Swart's (1998) work, and is used to describe NPIs in inverse scope. Many semanticists and syntacticians have attempted to explain inverse scope, but each theory presented by de Swart is shown to have a weakness where it fails to explain a certain sentence or type of sentence. For example, de Swart presents a theory in which it is the generic nature of the indefinite noun phrase (NP) that licenses the NPI. Sentence (17) is one of the sentences de Swart is trying to account for.

(17)   Tickets to any of the afternoon concerts were not available.

<div align="right">(de Swart 1998: 184)</div>

This type of sentence will be described within the context of de Swart's theory of *generic interpretation*, as I will call it, after the basis for its interpretation is laid out.

Understanding of de Swart's theory of generic interpretation must begin with documenting three semantic observations. First, is that there is equivalence between an existential quantifier under negation and a universal quantifier taking wide scope over negation, as illustrated in (18).

(18)   For all formulas Φ: $\neg \exists x \, \Phi \Leftrightarrow \forall x \, \neg \, \Phi$ (de Swart 1998: 182)

Sentences which illustrate this are found in (19), below.

(19)   a.   There isn't any bird that swims ⇔
       b.   Every bird does not swim

When the universal quantifier *every* takes wide scope over negation in (19b), then (19a) and (19b) have a logical equivalence (de Swart 1998:182).

The second observation is that generics occur when indefinite NPs are interpreted not with existential force, but with quasi-universal force. An example and the formula describing it may look like the following, where *AB* describes abnormal cases, such as penguins, which are birds that do not fly (de Swart 1998: 182).

(20)   a.   A bird flies
       b. $\forall x \, ((\text{Bird}(x) \land \neg AB(x)) \rightarrow \text{Fly}(x))$ (de Swart 1998: 182)

What looks like an indefinite NP, *a bird*, is instead interpreted as a generic with quasi-universal force, so that *a bird* refers to every bird, hence it is generic, except those that do not fly.

The third observation is that the restriction of universal quantifiers is monotone decreasing (de Swart 1998: 182). According to Ladusaw (1980: 10), "the property of being a monotone decreasing function is exactly the property of being an expression which licenses downward entailments." Downward entailment is "entailment from sets to subsets" (Ladusaw 1980: 5). So, for example, if the set of *birds* contains the subset *penguins*,[4] then:

(21)   I don't like birds → I don't like penguins

Because of the negative in (21), a monotone decreasing environment is present. This same environment occurs under universal quantifiers.

(22)   Every child cried → Every small child cried   (de Swart 1998: 183)

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[4] It must be noted that *penguins* is not an abnormal exception to the set of *birds* in this example.

This third observation sets the stage for de Swart's theory of generic interpretation.

To return to her theory, de Swart is examining whether it is the generic nature of indefinite NPs that licenses NPIs. If they are generic, then they would be (quasi-)universal quantifiers, as seen in (20). As universal quantifiers, the generic NPs would set up a monotone decreasing environment for downward entailment to occur, therefore licensing NPIs (de Swart 1998 183). The sentences in (23) are of the type de Swart is describing.

(23)   a.   A doctor who knew anything about acupuncture was not available.
       b.   An article with any convincing examples of NPIs in subject
            relative clauses has never appeared in any journal of linguistics so
            far.
       c.   Examples with any relevance to that issue didn't come up in the
            discussion.

                                                                (de Swart 1998: 183)

Each of these has as its subject something that looks like an indefinite NP, but may be a generic. If the subjects are generic, then they would explain the occurrence of NPIs in each sentence.

De Swart's theory of generic interpretation is crucially dependent on the NPs in inverse scope being generic, and it turns out that there is no proof that this is true. This is illustrated in (17), expanded here to (17a,b):

(17)   a.   Tickets to any of the afternoon concerts were not available.
       b.   *Tickets to any of the afternoon concerts were not green.

                                                                (de Swart 1998: 184)

(17b) would be expected to be a legitimate sentence if "tickets" were a generic, since all the generic tickets would not be green. Since the sentence is unacceptable, not-green cannot be a property of all of the tickets, and therefore the tickets cannot be generic (de Swart 1998: 184). The reading is of a non-specific indefinite, not a quasi-universal

quantifier. This then shows that, as de Swart argues, it would be wrong to claim that all indefinite NPs in negative scope sentences with NPIs have a generic reading.

3.3b   De Swart and Grice's Maxims

After listing her predecessors and refuting each of their solutions to the problem of inverse scope, de Swart introduces pragmatics to the problem of inverse scope. She explains that positive statements are more informative than negative statements, because there are many more true negative statements about the world than there are true positive statements. Typically, negation in a sentence occurs as in Diagram A, c-commanding the verb and its arguments, but not having scope over the subject. Inverse scope, according to de Swart, must be pragmatically motivated, and sentences with inverse scope must have positive informative value, otherwise there is no pragmatic motivation for a sentence to have inverse scope rather than direct scope (de Swart 1998: 188-9).

In order to describe the pragmatics of negative polarity items in inverse scope, de Swart brings Grice's (1975) maxims and conversational implicatures to her discussion. She uses the maxims of Quantity and Quality to explain scalar implicatures, and the maxims of Relation and Quantity to explain contrastive interpretations of NPIs. These two types of sentences will be discussed further later, but examples of each are presented in (24) and (25), formerly (23a), (24) illustrating the former and (25) the latter.

(24)   All that glitters is not gold   (de Swart 1998: 187)

(25)   A doctor who knew anything about acupuncture was not available

The maxims of Quantity and Quality are combined to create an ordered scale, first used by Horn (1972), where elements on a semantic scale such as <a, all> (where *a* is

equivalent to *some*) entail certain implicatures. On these scales, asserting the weaker claim implies that the stronger claim cannot be asserted. Thus the implicature below, given by de Swart (1998: 189) and using the scale similar to Horn of <some, all>, is true.

> (26)   Some students passed the exam →
>   Not all students passed the exam

We know this to be true, because the maxim of Quantity ensures that a speaker is telling all the information they can, and the maxim of Quality ensures that the information is true. It must be noted here that this scale is very specific and assumes that the speaker has what I will refer to as *full knowledge* of what she is speaking about. De Swart is not concerned with *partial knowledge*, where a speaker says "some" because she does not know about "all." A situation like that could occur if a teacher had graded 3 of 10 exams, and all students thus far had passed, but she did not know about the rest. The teacher could then say *Some students passed the exam*, and not be implying that there was anyone who did not pass the exam, just that she did not know about the others. De Swart makes the assumption with these sentences that the speaker has full knowledge and the <some, all> scale refers to a fully defined and known scale.

Taking into account that de Swart is assuming full knowledge, it is true that if a speaker uttered *Some students passed the exam* while knowing that all students passed the exam, she or he would be violating the Cooperative Principle. Since we assume that speakers do not do this (unless they are purposely lying, a situation which we will not consider here), we know that the implicature in (26) is correct.

Next de Swart looks at universal statements under negation, and sees how a positive informational value can be obtained out of a negative sentence, as in (27), where, as long as *some students* do exist, the two sentences have the same truth values.

(27)   Not all students passed the exam ⇔
         Some students did not pass the exam   (de Swart 1998: 190)

We remember from Fauconnier (1975) that semantic scales are reversed under negation, and so <a, all> becomes <not all, not a>, and the implicature in (28) becomes possible in the same way the implicature in (26) was possible, while the equivalence is possible in the same way it is in (27).

(28)   Not all students passed the exam →
         (It is not the case that not a student passed the exam ⇔
         Some students passed the exam)   (de Swart 1998: 190)

So it is that the negative sentence *Not all students passed the exam* implicates the statements with the same truth value, *Some students did not pass the exam* and *Some students did pass the exam*. Both the latter sentences carry a positive informative value (de Swart 1998: 189-91).

If we now look at sentences with inverse scope, we should be able to understand the pragmatics used to describe the sentence.

(24)   All that glitters is not gold   (de Swart 1998: 187)

The negative "not" takes scope over "all," because this allows for the positive informative value that *some that glitters is gold, and some that glitters is not gold*, and de Swart's theory is seen to account for inverse scope here.

The maxims of Quantity and Relation are used to describe inverse scope in contexts where the NP is not the least element of a scale, when the NP is an indefinite. Geis and Zwicky (1971) note that these maxims can lead to strengthened implicatures of statements, since statements must contain as much relevant information as they can while the speaker says no more than she has to. The sentences and first-order logic in (29), part

of which are seen earlier as (3) in Section 2.1, is given as an example. It must be noted

that the implicature in (29) relies on the assumption that *Sue* is not illiterate.

(29) a. Sue doesn't read novels →
Sue reads things, but not novels

  b. ¬ ∃ x (Novel(x) ∧ Read(s,x)) →
∃ x (Read (s, x) ∧ ¬Novel(x))   (de Swart 1998:192)

Here, the argument of the predicate is interpreted only partially within the pragmatic

scope of negation. It is implied through pragmatics, and reflected in the first-order logic,

that there is a contrastive interpretation that is more informative than the sentence without

an implicature. Here we see that semantic scope and pragmatic scope can differ from one

another, as semantically the first statement in (29b) is true, but pragmatically the second

is conversationally implicated (de Swart 1998: 191-3).

De Swart tests her theory on non-inverse scope sentences. She looks at sentences

such as (30) that do not allow for inverse scope, and sees whether her theory correctly

explains, or rather checks that it does not accidentally explain, the situation.

(30) *Anyone did not talk to me   (de Swart 1998: 194)

This sentence does not allow for inverse scope, and thus is judged to be an unacceptable

sentence, as no negative licenses the negative polarity item *anyone*. If *anyone* is

considered to be at the bottom of some scale, similar to <a, all> earlier, then the

generalized scale is <NPI, …>, and that scale under negation is <not …, not NPI>.

Looking back, we see that in the part of de Swart's analysis that relies on Grice's maxims

of Quantity and Quality, an element must be at the bottom of the relevant scale in order to

exist in inverse scope, but the negated NPI is at the top of its scale and cannot carry any

positive informative value under inverse scope. Thus, under the maxims of Quantity and

Quality, inverse scope is not allowed in this sentence. This sentence also cannot be

allowed inverse scope under the maxims of Quantity and Relation, as a quantitative scale is set up, and thus a qualitative contrast is not possible (de Swart 1998: 194-5).

De Swart also tests her theory on sentences that do invoke inverse scope. NPIs disallow inverse scope when they are bare-NPs, such as demonstrated above, but allow for inverse scope when they are embedded in NPs. This is because of the contrastive interpretation of the sentence with the embedded NPI, and the positive informative value that this interpretation holds. I used Sentence (31) as an example of inverse scope in Section 2 (4), so it is apropos to discuss this sentence again, using de Swart's methods.

(31)   a.   A doctor who knew anything about acupuncture was not
available →
A doctor was available, but not one who knew anything about
acupuncture

        b. $\neg \exists x$ (Doctor(d) $\wedge$ Know($d,acupuncture$) $\wedge$ Available(d)) →
$\exists x$ (Doctor (d) $\wedge$ Available(d) $\wedge$ $\neg$Know($d,acupuncture$))

Note that the pragmatic situation being set up is one in which there are doctors available, rather than a situation where no doctor is available. With this in mind, the contrastive interpretation applies to (31) because doctors who know anything about acupuncture are being contrasted with doctors who do not, and the sentence is given a positive informative value because of the pragmatic implicature gained through inverse scope (de Swart 1998: 196). De Swart's theory of inverse scope is seen to work on the type of sentence she is describing.

Unfortunately, her account does have one drastic shortcoming, and that is its reliance on *coinciding pragmatic knowledge* between a speaker and a listener, where the listener is assumed to have the same knowledge as the speaker. In her explanation of inverse scope, de Swart assumes pragmatic knowledge in her implicatures that is not readily available from the semantics of a sentence. This was seen in the <some, all>

scale, where *some* is assumed to refer to part of the known *all*, not the only known part of *all*, explained earlier in terms of full knowledge versus partial knowledge. Similar assumptions are made again in example (29) where *Sue* is assumed not to be illiterate and in (31) where doctors are assumed to be available. This assumption of coinciding pragmatic knowledge does not discredit de Swart's theory of inverse scope, but makes it narrower and more context-dependent than if it could explain inverse scope in every pragmatic situation.

De Swart provides a rather comprehensive account of inverse scope and NPIs in inverse scope and her theories even have ramifications for the interpretation of NPIs in topicalized clauses. Though the theory is not perfect, it nevertheless has implications for further study on non-linear negative sentence with negative polarity items, and will be returned to later in the paper, when there are more sentences and data to which to apply the theory.

3.4   *Topicalized Clause Literature*

As mentioned earlier, there is a dearth of information available about NPIs in topicalized clauses. Hoeksema (2000) presents a large corpus of data, mainly Dutch, where negative polarity items are topicalized, but does not draw any conclusions about these negative polarity items. Scope is given considerable weight as a trigger, but exactly how this triggers negative polarity items is not described. Hoeksema is hesitant to explain negative polarity item topicalization, but rather illustrates continuously that it is not c-command which allows this topicalization. The paper is extremely useful in its presentation of data, but less so in its presentation of conclusions.

Each paper described in this section serves to inform new accounts of NPIs in the two contexts this paper is concerned with, again those contexts being topicalized clauses and inverse scope. I conducted new research for this paper on these two non-linear contexts. Before connecting this new research with the literature explored above, the data received from the research must be analyzed and described.

4.   New Research

I have conducted two surveys on the appearance of NPIs in topicalized clauses and inverse scope, one for this study and one for an earlier study. The first survey looked at a broad range of NPIs and, though helpful to the earlier study, was not entirely conclusive.[5] Therefore I designed a second survey, more compact and user-friendly, to try and hone in on what exactly it is that is being studied. The first survey contained the NPIs "ever," "think . . . matter," "care," "even," "cares at all," "mind," "possibly," "much of a chance," "so much as," and "anymore." The second survey[6] looked at a different, smaller set of NPIs, these being "ever," "much of a," "anything," "in the least," and "so much as say a word." I studied stronger NPI phrases that could only be interpreted as NPIs. For example, in the first survey I used the sentence "Nurses who cared were not available," and it was rated a higher score than other sentences with NPIs. The phrase "not available" did not have scope over "cared," and thus "cared" was not interpreted as a NPI. The sentence was open to more interpretations than just inverse scope, which confounded the study. I avoided ambiguous phrases such as this in the second survey.

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[5] See Appendix A for the Survey 1 and results.
[6] See Appendix B for the Survey 2 and results.

4.1   Survey and Results

The second study is the one that is referred to throughout this paper. The survey

sentences from this study are as follows:

(32)   ever:
        a.   That Tony ever visited this area, I don't believe.
        b.   A waitress who has ever made a decent cup of coffee doesn't exist
                in this establishment.
        c.   I don't think that I've ever been so surprised!

(33)   anything:
        a.   That she might have known anything about the murder beforehand,
                I really don't believe.
        b.   A doctor who knew anything about acupuncture was not
                available.   (de Swart 1998: 180)
        c.   I really don't believe that he let anything stop him on his rise to
                stardom.

(34)   so much as say a word:
        a.   That Sally so much as said a word to Suzy, I choose not to believe.
        b.   People who had so much as said a word about the affair were not
                welcome at the party.
        c.   It doesn't seem possible that Anne would so much as say a word
                concerning the gossip.

(35)   in the least:
        a.   That he's in the least involved in that scandal, it's just not
                plausible.
        b.   Surgeons who are in the least inclined to save people aren't
                available in this hospital.
        c.   I don't believe that she is in the least adequate for the position.

(36)   much of a:
        a.   That she has much of a shot of getting into Princeton, it doesn't
                seem possible.
        b.   Teachers who have much of a chance of survival in public schools
                don't exist these days.

        c.   I can't imagine that she has much of a chance of passing the
                chemistry test.

        extraneous (testing as a base line):
(37)   I really like eating green eggs and ham.
(38)   I don't want any apple juice.

The (a) sentences are all sentences with NPIs in topicalized clauses, while the (b) sentences all have NPIs in inverse scope. The (c) sentences are linear negative sentences with NPIs, and (37) and (38) are two "extraneous" sentences. The (c) sentences were used in the survey because each contained a NPI in a complement clause. They served as test-cases for how participants would rate linear negative sentences containing NPIs in complement clauses. The hypothesis was that these sentences should be well received, as they are contexts in which NPIs are generally well-accepted and in which the theory allows them.

The "extraneous" sentences were tested in order to gain a baseline for how participants rated typical sentences. *Extraneous* refers to their relationship with the other sentences, not to their relationship to the survey as a whole. Sentence (38) contained a NPI while sentence (37) did not. (37) was the first sentence participants read on the survey, put there so that they would have a "normal" sentence to read and rate before they got into more complicated sentences. The hypothesis was that the two extraneous sentences would score very high, 5 or close to 5, on the 1-5 scale provided to participants, and finding this to be true would insure that I was making similar assumptions to the participants about the meaning of the scale.

Each of the 30 people surveyed was asked to rate these sentences on a scale of 1-5, where 1 is a sentence that is so awkward as to be unintelligible and 5 is a sentence that is perfectly fine. Participants were also reminded to "go by their gut," and rate a sentence instinctually, rather than poring over the sentences until they no longer make sense. The results of the survey are presented in Table A.

Table A:

NPI	Sentence	Mean	t	p
ever	32a	3.00	0.94	0.35
	32b	3.23		
	32c	4.97	--	--
anything	33a	3.03	5.09	0.00
	33b	3.60		
	33c	4.43	--	--
so much as say a word	34a	2.57	6.71	0.00
	34b	4.07		
	34c	4.17	--	--
in the least	35a	2.70	4.98	0.00
	35b	3.77		
	35c	3.5	--	--
much of a	36a	2.2	2.54	0.017
	36b	3.30		
	36c	4.70	--	--
"extraneous"	37	4.70	--	--
	38	4.97		

Table A Legend

a	NPI in topicalized clause
b	NPI in inverse scope
c	NPI in complement clause

The mean value of each sentence is recorded in Table A, as well as the t-value and p-value of sentences compared under the Student's paired t-test. In order to evaluate the data, it is important to rely on statistical analysis so that the data can be fully understood.

4.2   Paired Student's t-Test

Each set of topicalized clause and inverse scope sentence containing the same NPI was run through the paired Student's t-test (physics.csbsju.edu).[7] The paired t-test gives two important output values, called the p-value and the t-value. The t-value is negative or positive depending on which set of inputs is larger. All of the t-values in Table A are positive because the inverse scope sentences, which have a higher mean than the inverse sentences, were put into the equation first. The larger an absolute t-value is, the smaller the corresponding p-value. The p-value serves to show whether it is likely that there is a real difference between sets of values. A p-value of 0.20 is interpreted to mean that there

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[7] This is the website that provided the formula and mechanism with which to test all of my data.

is a 20 percent, or a 1 in 5, probability that the survey results were obtained by chance. In relation to this survey, a p-value is pointing to whether two sets of data are correlated. The example given above has a very high p-value, and the data would not be considered significantly correlated (D'Angio, personal communication, Fall 2006).

In analyzing the data from the survey in the paired t-test, it becomes apparent that all of the topicalized clause and inverse scope sentence pairs are significantly correlated, except for the pair with the NPI "ever." When two sets of data are significantly correlated, it means that individual participants were consistent in how they marked the two types of sentences. A brief example of correlated and non-correlated sets of data might serve to illustrate this concept. Suppose there is an Experiment X, a subset of the experiment run for this paper, where two sentences are compared and data is collected on each of these sentences from four participants, Participants a, b, c and d. Table B shows one possible configuration of data in a study where participants' reactions to Sentence A correlate to their reactions to Sentence B. In other words, participants are not judging the sentences on two independent scales.

Table B

	Participant/ Score		t	P
Sentence A	a	5		
	b	4		
	c	5		
	d	4	5.00	0.015
Sentence B	a	4		
	b	3		
	c	3		
	d	3		

Table C

	Participant/ Score		t	p
Sentence A	a	5		
	b	3		
	c	4		
	d	4		
Sentence B	a	4		
	b	3		
	c	3		
	d	5		

The results here look similar from participant to participant, with a trend of Sentence B being judged less acceptable than Sentence A, and the t-test confirms that these results

would most likely be found in a larger study, so therefore we assume that Sentence A and Sentence B are judged by participants on a similar scale.

If, for some reason, the way each participant rates Sentence A is unconnected with how that participant rates Sentence B, then the results will be uncorrelated, like those in Table C.

This explanation of the paired t-test should illuminate the actual study being presented. The NPIs *anything*, *in the least*, *so much as say a word*, and *much of a*, are significantly correlated, so participants were judging them on a similar scale, and we can look at the data from each sentence (a) and consider it significant compared to the data from each sentence (b). But with the NPI *ever*, the two types of sentences cannot be compared against one another. It remains to be explained why these two sentences were not judged in a correlating manner, a question which will be explored in Section 4.5

4.3   Visual Representation

Another way to look at the data is to put them on a scale and see visually how the NPIs correspond. Diagram C represents the data collected from this survey on such a scale, where the rounded mean of each NPI, in each context, is what determines where on the scale the NPI falls. NPIs in inverse scope are represented in italics and NPIs in topicalized clauses are represented in bold.

Diagram C

4.1	*so much as say a word*
4.0	
3.9	
3.8	*in the least*
3.7	
3.6	*anything*
3.5	
3.4	
3.3	*much of a*
3.2	*ever*
3.1	
3.0	**ever/anything**
2.9	
2.8	
2.7	**in the least**
2.6	**so much as say a word**
2.5	
2.4	
2.3	
2.2	**much of a**

From Diagram C, it is easy to see that NPIs are more preferable in inverse scope than topicalized clauses. It is interesting that, though significantly correlated, *anything, so much as say*, *in the least*, and *much of a* do not occur in the same order or distribution between contexts. The same is true of *ever*, though this is not surprising given its non-correlation. But there are differences in the range of distribution between the four correlated NPIs and *ever*, as "*ever*" and "**ever**" occur almost next to one another on the scale, whereas the other NPIs occur much further apart. The significantly correlated NPIs might not remain in the same order, but the inverse scope sentences are proportionally more favored than the topicalized clause sentences.

4.4   Checking Hypotheses

The hypotheses from Section 4.1 need to be checked before the results of the survey can be analyzed further, to see whether I, the person who designed the survey, and the participants who took the survey agreed on the scale being used. It was hypothesized

both that the (c) sentences would be viewed favorably in comparison to the (a) and (b) sentences, and that sentences (37) and (38) would score very high on the 1-5 scale, either at or near "5."

The first hypothesis, that the linear (c) sentences should be well received, is almost borne out in the study, with only one NPI in a complement clause, *in the least*, scoring lower than a NPI in inverse scope. The second hypothesis, that the extraneous sentences would receive high scores on the survey, is confirmed in the data. Sentence (37) received a mean score of 4.7, and sentence (38) had a mean of 4.97. This means that the participants in the survey can be assumed to have the same ideas as the person surveying them about what is an acceptable sentence in English, and the survey results can be analyzed similarly according to this common underlying assumption and scale.

4.5 *Problems and Anomalies*

Though the starting hypotheses are confirmed, some of the results of the survey are unexpected in context. These include the low score of *in the least* in a complement clause, the close distribution of *so much as say a word* in the complement clause and inverse scope sentences, and the distribution of *ever* in the inverse scope and topicalized clause sentences.

Compared to the other linear negative complement clause sentences, sentence (35c) with *in the least* scored anomalously low. Since this does not fit with the results from the rest of the survey, it seems that perhaps there was a confounding flaw, such as a poor choice of the particular example sentence used, rather than a drastic difference in how acceptable this NPI is in the topicalized clause context as compared to the other

NPIs surveyed. When the paired t-test is run between (35a) and (35c), the t-value is 0 and the p-value is 1, meaning that there is no correlation whatsoever between how people rated one sentence and how they rated the other. If another survey were done, a different sentence might be used, or even several sentences with *in the least* in a topicalized clause, so that conclusive data could be collected as to whether it is the NPI itself in this context, or just sentence (35c), that is a fairly unacceptable in topicalized clause sentences.

The close distribution of *so much as say a word* in the linear negative complement clause sentence and the inverse scope sentence is difficult to account for. Krifka (1991) writes about the different types of NPIs and the contexts these occur in, and in his article mentions that idiomatic NPIs are often more restricted than non-idiomatic NPIs. He argues that idiomatic NPIs always need to appear under negation, but that sometimes the negation becomes a part of the greater idiom, and the sentence becomes "semantically opaque," (Krifka 1991: 173) so that the idiom and negation cannot be pulled apart. Sentence (34b) is repeated below.

(34)   b.   People who had so much as said a word about the affair were not welcome at the party.

According to Krifka's theory, the "not" in this sentence has become a part of the idiom, so that even though the sentence occurs under inverse scope, it is thought of idiomatically, and considered more acceptable than the other inverse scope sentences because of this. Given the way that this sentence will be interpreted in Section 5, this sentence may better be thought of as being highly idiomatic with respect to its NPI, but not semantically opaque in the way that Krifka proposes. I agree with Krifka that the negative allows for the occurrence of the idiom, but I think that the sentence can still be examined without the negative's becoming a part of the idiom.

The NPI *ever* is the only NPI that participants judged on dissimilar scales for the inverse scope sentence and the topicalized clause sentence, and these sentences are repeated below.

(32)   a.   That Tony ever visited this area, I don't believe.
          b.   A waitress who has ever made a decent cup of coffee doesn't exist
                in this establishment.

Similar to (35a) and (35c), (32a) and (32b) have a very high p-value. *Ever* is the lowest NPI on the inverse scope scale. *Much of a* has a very close average mean, but *much of a* also scores the lowest on of the topicalized clause sentences, so it makes sense that is scores so low on both. *Ever* is rather acceptable in the topicalized clause sentence, so it is odd that it should score so differently in the two contexts. Much like with sentence (35c), the only assumption that can safely be made with the data present is that (32a) is a bad sentence not (only) because of the inverse scope construction, but because the sentence itself has some other confounding factor. Again, we would have to choose different sentences with *ever* in the inverse scope construction in order to test accurately how acceptable this NPI is in inverse scope sentences.

Now that we have explained the problems that the survey and results present, and looked at the raw data and data analysis of the survey, the next step is to figure out what, if anything, these results are able to add to our understanding of NPIs in inverse scope and topicalized clauses.

5.   Applying the Numbers

The first conclusion we can draw from the numbers above is that NPIs in inverse scope make for much more acceptable sentences than NPIs in topicalized clauses. No

NPI in the latter context is preferable to a NPI in the former. What makes one context preferable to the other? After this question is answered, another one must be asked. Are both of these contexts legitimate for NPIs to appear in?

5.1   Context Preference

Borrowing from de Swart (1998) and her use of Grice's (1975) theory of the Cooperative Principle and conversational maxims, NPI preference can be interpreted within the context of the maxims of Quantity and Relation. Using de Swart and the contrastive interpretation of inverse scope, we remember that the "speaker" (writer) of a sentence is being pragmatically more productive when the sentence is to be interpreted with inverse scope, thus forcing the "listener" (reader) to assign an inverse scope reading to a sentence. This was shown in de Swart's paper with sentence (33a), repeated here along with its implicature.

> (33)   b.   A doctor who knew anything about acupuncture was not
>   available. →
>   A doctor was available, but not one who knew anything about
>   acupuncture

This sentence is pragmatically more meaningful than its surface syntax or semantics would suggest. A semantically negative statement carries a positive informative value, such as *a doctor was available, but not the one that was being sought*. As was pointed out earlier, this implicature assumes coinciding pragmatic knowledge between the speaker and listener, the knowledge here being that *doctors*, and not *no doctors* were available. How this affects this theory in relation to the sentences being studied will be addressed later in this section.

In order to test de Swart's theory, it is necessary to apply the theory to the sentences that were in the survey and see whether there are similar implicatures arising from a contrastive interpretation that can apply to each inverse scope sentence.

(32)　b.　A waitress who has ever made a decent cup of coffee doesn't exist in this establishment →
A waitress existed in the establishment, but not one who had ever made a decent cup of coffee.

(34)　b.　People who had so much as said a word about the affair were not welcome at the party →
People were welcome at the party, but not people who had so much as said a word about the affair[8]

(35)　b.　Surgeons who are in the least inclined to save people aren't available in this hospital →
Surgeons are available, but not ones who are in the least inclined to save people

(36)　b.　Teachers who have much of a chance of survival in public schools don't exist these days →
Teachers exist now, but not ones who have much of a chance of survival in public schools

We see that in each sentence, an implicature with a positive informative value is available.

Let us now look at topicalized clause sentences, and see what implicatures can be drawn. We will use the same NPI, *anything*, to try and form a similar implicature. Sentence (33a) is repeated below, with the attempt to force a similar implicature onto the sentence.

(33)　d.　That she might have known anything about the murder beforehand, I really don't believe →
She might have known something about the murder beforehand, but I really don't believe it

---

[8] It is this implicature that arguably keeps the idiom in sentence (34b) from being semantically opaque, as Krifka (1991) proposes. The idiom lends greater legitimacy to the sentence as a whole, but the negative cannot combine opaquely with the idiom, since an implicature is available where the negative and the idiom are separated.

The contrastive interpretation does not allow for a positive informative value to be assigned to the sentence. The problem here is that the two statements in (33d) have equivalent positive informative value, so there is no more informative value in the implicature than there was in the original sentence. The other topicalized clause sentences from the survey are repeated below, to see whether contrastive implicatures are available in these sentences.

(32) d. That Tony ever visited this area, I don't believe →
Tony could have visited this area, but I don't believe it.

(34) d. That Sally so much as said a word to Suzy, I choose not to believe
→ Sally could have said something to Suzy, but I don't believe it.

(35) d. That he's in the least involved in that scandal, it's just not
plausible →
He could be involved in the scandal, but it's not plausible

(36) d. That she has much of a shot of getting into Princeton, it doesn't
seem possible →
She could have a shot of getting into Princeton, but it doesn't seem
possible

In every case, the implicature provides no more positive information than does the sentence itself.

A new argument has presented itself, and can be argued as a new theory. That is, NPIs in inverse scope are preferable to NPIs in topicalized clauses because of the positive informative value that the former sentences imply which the latter sentences fail to allow. This theory is, like de Swart's, subject to constraints. It must be considered within the confines of coinciding pragmatic knowledge between speaker and listener, where speaker and listener assume the existence of the subjects of the inverse scope sentences. When this pragmatic constraint is obeyed, then the new theory can be considered acceptable.

5.2 *Context Legitimacy*

A modified Diagram C is presented below, labeled Diagram D.

Diagram D

5.0	<u>ever/"38"</u>
4.9	
4.8	
4.7	<u>much of a/"37"</u>
4.6	
4.5	
4.4	<u>anything</u>
4.3	
4.2	<u>so much as say a word</u>
4.1	*so much as say a word*
4.0	
3.9	
3.8	*in the least*
3.7	
3.6	*anything*
3.5	<u>in the least</u>
3.4	
3.3	*much of a*
3.2	*ever*
3.1	
3.0	**ever/anything**
2.9	
2.8	
2.7	**in the least**
2.6	**so much as say a word**
2.5	
2.4	
2.3	
2.2	**much of a**

Diagram D shows the distribution of the medians of all of the sentences surveyed. As in Diagram C, the italicized NPIs are the NPIs in inverse scope and the bold are NPIs in topicalized clauses. The underlined NPIs are NPIs in complement clauses and the two sets of quotes surround the extraneous sentences, (37) and (38).

Again, the second question that the data begs is whether both inverse scope and topicalized clauses are legitimate environments for NPIs. The topicalized clause sentences seem possible semantically, in that the linguist can imagine a situation where "inverse scope" occurs in this specific subset of NPI constructions, but there is little

evidence to show that speakers accept sentences like this. Of course, given the results of the survey, we cannot say that these sentences fail completely, or they would probably have means of "1." But compared to the surveyed extraneous and linear complement clause sentences, the topicalized clause sentences scored rather poorly, as is represented in Diagram D. The NPI in topicalized clause structure cannot be taken as a banned English construction, but it is certainly not a preferable English construction.

From the literature studied in this paper, it seems that in order for inverse scope to occur, whether in the context of "inverse scope," or in the more specific context where there is a NPI in a topicalized clause, the inverse scope must be pragmatically motivated. Perhaps the sentences with NPIs in topicalized clauses need to be pragmatically motivated within a conversation, and studying bare topicalized clause sentences outside of any dialogue will never produce the felicitous responses from someone being surveyed that they would if they were studied in context. This process cannot be viewed directly, but is seen indirectly through the survey conducted. Native speakers are hesitant to give topicalized clause sentences the lowest score of "1," because they know such a sentence is possible, but the speakers also do not give the sentence a very high score, because the particular pragmatic motivation for such a sentence does not occur in the survey.

6.   Conclusions

Combining the study of existing literature as well as the study of native speaker intuitions on sentences, it is clear that sentences with negative polarity items in inverse scope are preferable to sentences with NPIs in topicalized clauses. This can be explained through Grice's maxims of Quantity and Relation and de Swart's application of these to

elucidate implicatures in inverse scope sentences, which are not available to sentences with NPIs in topicalized clauses. It has also become clear that sentences with NPIs in inverse scope and topicalized clauses, though perhaps intelligible, are not always as coherent and acceptable to native speakers as linguists might expect them to be.

Pragmatic motivation is the theme which is carried through in the licensing of NPIs in inverse scope and topicalized clauses. This pragmatic motivation can come from coinciding pragmatic knowledge when a sentence has inverse scope. Sentences with negative polarity items in inverse scope are never as acceptable as linear negative sentences with NPIs, but the sentences are still considered rather acceptable due to their positive informative value. Sentences with NPIs in topicalized clauses do not allow for the same coinciding pragmatic motivation as inverse scope sentences, and must be assumed to have some other pragmatic motivation within discourse. This process of external pragmatic motivation was not viewed directly at any point, but is assumed to occur because native speakers do not rate the topicalized clause sentences studied at a "1," which would mean no situation could make the sentences acceptable, but neither do they rate them as high as any other type of sentence studied. Speakers know that these types of sentences are possible, but they are not willing to consider the sentences very acceptable outside of a discourse in which a particular sentence is pragmatically motivated. This concept of pragmatic motivation is the thread which ties together both the literature studied as well as the research conducted and new theories formed on NPIs in inverse scope and topicalized clauses.

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Appendix A: Survey 1
The following survey was taken by 21 people in April of 2006 for the purposes of a prior study. The participants were given the following:

To complete the survey, please read each sentence on the next page, and consider how much you like it. I'm asking you to leave behind anything you learned about in grammar school, and just see if a sentence "feels right" to you. If it's a perfectly fine sentence, and you wouldn't bat an eye if you heard or spoke it, give it a **10** in the **1-10 (Bad-Good)** column. If the sentence is horrible, and you can't even figure out what it means, or you can't imagine a situation in which it would make sense, give it a **1** (no zeros, please). For anything in between, give it a number in between, depending on how bad or good you think it is. There are no right or wrong answers, so don't sweat over whether you're going to give something a 3 or a 4.

	1-10 (Bad-Good)	Sentence
1		Professors who have ever visited this area are not available.
2		That Emily thinks the issue matters, I don't believe.
3		Kids these days don't know anything.
4		Nurses who cared were not available.
5		I don't like to go to the store anymore.
6		Workers who even like this job are not available.
7		That the President cares at all about people who are starving, I don't believe.
8		Soldiers who minded saving people were not available.
9		That you can possibly sew a dress, I don't believe.
10		Wow, did she ever have a nice body.
11		Teachers who have much of a chance of survival are not available.
12		That Tony has ever visited this area, I don't believe.
13		That she so much as said a word to her parents, I don't believe.
14		Those kids don't have much of a chance of survival.
15		Firemen who can possibly save a child were not available.
16		It's hard to find teachers who care anymore.
17		That you even like to teach, I don't believe.
18		If you so much as say a word, I'll kick your ass.
19		That your girlfriend minds eating chocolate, I don't believe.
20		Firemen who so much as said a word were not available.
21		People who have any sympathy don't show it like they used to.
22		That the lice have much of a chance of survival, I don't believe.
23		If she cares at all, she's not showing it well.
24		Social workers who cared at all were not available.
25		She even had a nose job to lessen her ugliness.
26		That he cares about social justice, I don't believe.
27		I don't think it matters, what you think.
28		Doctors who saved people anymore were not available.
29		That her oldest son takes the bus anymore, I don't believe.
30		Surgeons who are in the least inclined to save people are not available.
31		Professors who thought the job mattered were not available.
32		That he is in the least inclined to go to that party, I don't believe.
33		I don't want to do this survey anymore.

Results of Survey 1

The results of the survey were as follows. The sentences that are not in the results are left out because these were "extraneous" sentences whose results did not contribute to the study:

#	Participant																					Mean
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	
1	7	3	7	4	3	3	2	6	7	8	7	8	5	4	7	5	2	3	6	6	10	5.380952
2	8	5	6	2	2	2	1	6	2	3	3	9	4	5	2	3	2	2	4	8	6	4.047619
4	10	5	8	7	6	10	10	9	8	7	10	6	8	7	10	10	9	8	8	7	8	8.142857
5	10	10	10	10	10	10	10	10	10	10	9	9	10	8	10	10	10	9	10	9	10	9.714286
6	9	6	6	8	3	5	7	7	8	10	8	7	7	5	7	8	2	5	8	7	6	6.619048
7	6	5	7	3	4	7	4	6	6	4	5	7	7	5	4	7	2	3	6	7	7	5.333333
8	4	3	8	3	3	1	4	4	5	10	7	7	6	2	6	7	4	4	7	7	6	5.142857
9	8	5	7	5	3	7	4	6	6	5	7	6	7	5	5	3	2	3	4	7	7	5.333333
11	9	6	4	5	3	1	2	8	7	9	5	6	8	3	8	9	1	3	8	7	7	5.666667
12	8	5	6	4	3	4	5	4	6	5	3	6	7	5	1	4	1	3	6	8	7	4.809524
13	8	6	9	4	3	4	3	6	6	5	7	6	6	5	4	4	1	2	6	7	9	5.285714
14	10	10	10	10	7	10	9	8	8	10	10	10	9	5	10	10	9	8	9	9	9	9.047619
15	6	4	6	1	3	1	3	7	4	9	5	7	6	4	8	9	5	2	5	7	6	5.142857
17	6	6	6	6	3	5	4	6	6	6	5	6	7	5	7	7	3	3	4	6	7	5.428571
18	10	9	10	10	10	10	10	9	10	10	9	9	10	8	10	10	9	10	10	10	8	9.571429
19	5	6	2	6	3	1	3	6	6	5	5	5	7	5	7	5	2	1	4	4	6	4.47619
20	7	3	4	6	2	1	2	3	5	7	5	7	7	3	9	4	1	1	6	4	6	4.428571
22	7	6	5	6	2	2	2	4	6	5	7	6	7	2	7	3	1	2	4	7	6	4.619048
24	9	8	4	6	3	1	2	5	7	8	7	5	6	8	8	10	6	7	7	8	8	6.333333
26	7	5	4	6	2	2	2	5	6	6	7	6	7	7	7	4	2	3	4	8	6	5.047619
28	3	3	3	1	3	1	2	7	4	7	3	4	4	2	7	7	2	1	4	5	5	3.714286
29	5	5	4	6	3	1	2	5	6	5	5	7	6	2	7	3	2	1	4	7	6	4.380952
30	3	6	5	6	3	1	7	3	7	9	7	8	7	5	5	7	1	5	7	3	6	5.285714
31	9	5	8	5	5	3	8	8	8	10	7	7	7	7	9	10	3	4	7	5	7	6.761905
32	1	6	3	5	2	1	2	5	5	6	5	6	6	4	5	4	4	3	5	5	6	4.238095

inverse scope sentences

topicalized clause sentences

"extraneous" sentences

Appendix B: Survey 2
The following survey was taken by 30 people in the fall of 2006 for the purposes of this study. The participants were given the following:

Thank you for participating in this survey! In order to write my thesis in Linguistics, I need *your* feedback on what you think about the following sentences. Don't be afraid to go by your gut and rate a sentence according to your first instinct. Please disregard all grammar marks if you're looking at this on your computer screen. Remember, I'm not looking for you to critically analyze the sentences, just for how you "feel" about a sentence. Thanks!   ~Sara D'Angio

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Please rate the following sentences on a scale of 1-5, where 1 is a sentence that is so awkward as to be unintelligible and 5 is a sentence that is perfectly fine.

1. _____ I really like eating green eggs and ham.

2. _____ That she has much of a shot of getting into Princeton, it doesn't seem possible.

3. _____ A doctor who knew anything about acupuncture was not available.

4. _____ That Sally so much as said a word to Suzy, I choose not to believe.

5. _____ A waitress who has ever made a decent cup of coffee doesn't exist in this establishment.

6. _____ I don't believe that she is in the least adequate for the position.

7. _____ Teachers who have much of a chance of survival in public schools don't exist these days.

8. _____ That he's in the least involved in that scandal, it doesn't seem possible.

9. _____ I don't think that I've ever been so surprised!

10. _____ People who had so much as said a word about the affair were not welcome at the party.

11. _____ Surgeons who are in the least inclined to save people aren't available in this hospital.

12. _____ That she might have known anything about the murder beforehand, I really don't believe.

13. _____ I don't want any apple juice.

14. _____ It doesn't seem possible that Anne would so much as say a word concerning the gossip.

15. _____ That Tony ever visited this area, I don't believe.

16. _____ I can't imagine that she has much of a chance of passing the chemistry test.

17. _____ I really don't believe that he let anything stop him on his rise to stardom.

Results of Survey 2

The results of the survey were as follows.

#	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	Participant														
1	4	5	4	4	3	5	5	5	5	5	5	5	5	5	5
2	3	4	2	2	3	2	1	2	2	1	2	1	4	3	3
3	3	5	3	5	4	3	3	3	5	2	3	4	4	4	4
4	3	4	2	3	1	1	1	2	3	1	3	2	3	3	2
5	3	5	2	4	4	2	2	2	4	2	3	3	5	3	2
6	3	5	1	4	1	5	4	5	5	5	4	4	2	3	2
7	3	5	3	4	3	2	4	4	3	1	5	5	4	4	2
8	3	4	2	2	1	2	2	3	3	1	3	3	5	2	2
9	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
10	4	5	3	2	3	5	4	5	5	1	2	4	3	5	4
11	3	5	3	4	1	2	1	5	3	2	2	4	5	4	3
12	3	4	3	2	1	2	2	3	3	2	3	3	4	4	5
13	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
14	2	5	4	5	3	4	4	5	4	3	4	4	4	4	5
15	3	4	3	2	2	2	2	4	3	2	3	3	5	3	5
16	5	5	5	5	5	5	4	5	4	5	4	4	5	5	5
17	4	5	4	4	4	5	5	5	4	4	5	4	5	4	5

#	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	Mean	Median
	Participant																
1	4	5	5	5	5	5	5	5	5	5	5	5	3	4	5	4.7	5
2	2	2	1	2	4	2	2	2	2	1	2	2	2	3	2	2.2	2
3	3	4	3	4	5	3	4	1	3	2	5	4	4	4	4	3.6	4
4	2	2	3	3	4	3	2	4	3	4	2	2	2	3	4	2.567	3
5	3	3	4	4	5	3	3	3	3	2	2	4	4	3	5	3.233	3
6	4	5	3	5	4	4	5	1	2	4	3	3	2	4	3	3.5	4
7	2	1	2	4	5	4	4	2	3	3	4	3	3	3	4	3.3	3
8	3	5	2	3	4	3	3	2	3	3	2	2	2	3	3	2.7	3
9	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4.967	5
10	2	5	5	5	5	5	5	5	4	4	4	4	5	4	5	4.067	4
11	2	4	5	4	4	3	5	5	2	4	4	4	5	3	4	3.5	4
12	2	3	3	3	4	4	4	3	4	3	2	3	2	3	4	3.033	3
13	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	4.967	5
14	4	4	4	5	5	5	4	4	4	4	4	5	5	3	5	4.167	4
15	2	2	1	3	4	4	4	4	4	3	2	2	2	4	3	3	3
16	4	5	4	5	5	5	5	5	5	3	5	5	5	5	4	4.7	5
17	5	5	3	5	5	5	4	5	3	4	4	5	5	3	5	4.433	5

inverse scope sentences
topicalized clause sentences
linear complement clause sentences
"extraneous" sentences