

# Scalar Implicatures: Are There Any?

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## The cast of characters

- A few run-of-the mill examples of scalar implicatures: Numerals, *some*, and *or*.

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There are three cups in the closet.  
There are exactly three cups in the closet.



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Her right foot or her left foot is in the water.  
Either her right foot or her left foot is in the water (not both).



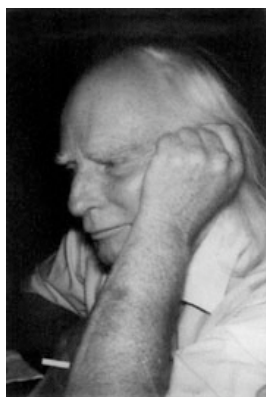
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- Some of her toes are in the water.
- Some, but not all of her toes are in the water.



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## Scalar implicatures in the Gricean program



For Grice, scalar implicatures were a species of generalized conversational implicatures.

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## Scalar implicatures, are there any?

Since the inferences normally accompany numerals like *three* and other logical words like *some* or *or*, it **is tempting** ....

“to view them as **part of the coded content**, with all the analytical mistakes that would follow. It is this normal, general default tendency of interpretation that makes it nonobvious that what we are dealing with here is mere pragmatic inference.”

Levinson 2000: 20.

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## The situation semantics perspective

- Within a situation semantics, it is **very tempting** to analyze at least some of the usual scalar implicatures as being **part of the semantic content** of the lexical items involved.
- It's not that obvious any longer that it would be a serious analytical mistake to do so.

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## Let's start with numerals

“Cardinals certainly seem to be a promising place to begin any brief for an explicit content approach to scalar predication.”

Horn 1992: 172.


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There are exactly  
4 cups



There  
are exactly  
3 cups


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All of her toes are in the water

Some, but not all of her toes are in the water

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Her right foot and her left foot are in the water

Either her right foot or her left foot is in the water (not both).

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## Situation Talk

1. There is a situation in which there are exactly three cups (even though there might be 4 cups in all).
2. There is a situation in which just one of her feet is in the water (even though there might also be a situation in which both of them are).
3. There is a situation in which just some of her toes are in the water (even though there might also be a situation in which all of them are).

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## Quantity

- Claiming that a proposition  $p$  is true in the actual world as a whole or in a salient actual situation is more informative than merely claiming that there is an actual situation in which  $p$  is true.

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## Strong and Weak Assertions

- **Strong Assertions**

The proposition  $p$  is true in the actual world or in a salient actual situation:  $p(w_0), p(s_1), \dots$

- **Weak Assertions**

There is an actual situation in which the proposition  $p$  is true:  $\Box s [s \leq w_0 \ \& \ p(s)]$

- Strong assertions logically imply the corresponding weak assertions. E.g.  $p(w_0)$  logically implies  $\Box s [s \leq w_0 \ \& \ p(s)]$ .

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## The theoretical tool that does the work

- There are good reasons to believe that lexical predicates have situation arguments, rather than, say, both time and world arguments. Moreover, Davidsonian event arguments are special cases of situation arguments.
- Something has to be said, then, in just about any current semantic theory about the fate of situation or event argument positions in the course of a syntactic derivation.

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## Possible fates of situation argument positions

- The positions might be saturated indexically via variables denoting salient actual situations.  
Default in the absence of other salient situations:  
The maximal actual situation, the actual world.
- The positions might be quantified. Default:  
Existential quantification via the usual existential closure operations.

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## Surprising Consequence: No Canceling or Suspending of Implicatures

- Some, in fact all of her toes are in the water.
- Some and possibly all of her toes are in the water.

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## Predictions

- Out of context, Quantity should create a bias in favor of strong assertions. Consequently, scalar implicatures should be perceived in those cases.
- Judgments should be easy to manipulate by creating relevant contexts.

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## Request for a Weak Assertion

**You:** Did anybody use two towels?

**Me:** Yes, I did. In fact, I even used three.

**At issue:** The existence of a situation at the reference time in which somebody used (exactly) two towels.

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## Request for a Strong Assertion

**You:** How many towels did you use?

**Me:** # Two. In fact, I even used three.

**At issue:** The maximal number of towels I used, that is, the exact number of towels I used in the actual world at the reference time.

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## What about negation?



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## Strong and Weak Denial

- A **weak denial** is the negation of a strong assertion: e.g.  $\neg p(w_0)$
- A **strong denial** is the negation of a weak assertion:  
 $\neg \exists s [s \leq w_0 \ \& \ p(s)]$

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## Weak Denials

1. It's not true that there are (exactly) 3 cups in the closet, there are 4.
2. It's not true that some (but not all) of her toes are in the water, all of them are.
3. It's not true that her right foot or her left foot (but not both) are in the water, they both are.

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## It's logical negation, then

- **Kempson 1986:** Implicature-denying negation is the familiar logical negation, it's not metalinguistic negation.

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## Levinson's wrinkle

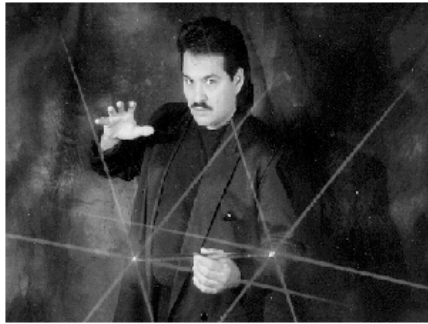
“...under the prevailing theory, implicatures do not arise under negation (Gazdar 1979, Hirschberg 1985, Horn 1989). Thus, at least if the negation in question is the ordinary truth-functional operator, there could be no implicature to deny!”

Levinson 2000: 212.

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## The Magic of Strong Denial

- Under Strong Denial, scalar implicatures disappear on their own.



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## Strong Denial: Numerals

- a) It's not true that there are three cups in the closet.
- b) **Predicted truth-conditions:** There is no actual situation in which there are exactly three cups in the closet.
- c) Suppose there are 4 cups in the closet. Then there has to be a subsituation in which there are exactly three cups in the closet. But then (b) can only be satisfied if there are less than 3 cups in the closet.

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## Strong Denial: *Some*

- a) It's not true that some of her toes are in the water.
- b) **Predicted truth-conditions:** There is no actual situation in which some, but not all of her toes are in the water.
- c) Suppose there is a situation in which all of her toes are in the water. It follows (unless she has only one toe) that there has to be a subsituation in which some, but not all of her toes are in the water. But then (b) can only be satisfied if none of her toes are in the water.

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## A presupposition not just for toes

- If *some shoe* is to implicate 'not all of the shoes', *some shoe* should come with the presupposition that there is more than one shoe.

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## Strong Denial: *Or*

- a) It's not true that her right foot or her left foot is in the water.
- b) **Predicted truth-conditions:** There is no actual situation in which her right foot or her left foot, but not both are in the water.
- c) Suppose there is a situation in which both of her feet are in the water. It follows (unless one of her foot is part of the other) that there has to be a subsituation, in which just one of her feet is in the water. But then (b) can only be satisfied if neither one of her feet is in the water.

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## Looking beyond feet

- 1) Paula didn't paint a still life or bananas.
  - Suppose what Paula did was paint a still life that had bananas in it. She didn't paint bananas independently of painting the still life (Kratzer 1989).
  - **Predictions of our analysis:** If (1) is felicitous at all on our scenario, it comes out true when *not* is interpreted as strong denial. This seems right.

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## Predictions

- Out of context, Quantity should create a bias in favor of strong denials. Scalar implicatures should typically be judged to be absent in those cases.
- Judgments should be easy to manipulate by creating relevant contexts.

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## Strength reversal in conditional assertions

- Strong antecedent: weak conditional  
 $p(w_0) \sqsupset q(w_0)$
- Weak antecedent: strong conditional  
 $\sqsupset [s \leq w_0 \ \& \ p(s)] \sqsupset q(w_0)$

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## Expected Bias

- Out of context, Quantity should lead to a bias for weak antecedents in conditionals and weak restrictions for universal quantifiers. Scalar implicatures would then be felt as ‘suspended’.
- It should not be hard for relevant contexts to override the bias.

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## Children and family benefits

1. Any mother with three children qualifies for a maternity leave.
2. Any mother with three children is happier than any mother with four.

Levinson 2000: 204

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## Student performance

1. Students who saw some of those generalizations were given positive recommendations for Graduate School.
2. Students who saw some of those generalizations worked with a TA until they saw all of them.

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## Cookies

1. If he consumed some of those cookies, he must be a saint. One would be enough to put you off the rest.
2. If you ate some of the cookies and no one else ate any, then there must still be some left.  
Levinson 2000: 205.

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## Conclusion so far

- It might be a mistake to analyze the ‘scalar implicatures’ of *some*, *or*, and the numerals as being part of semantic content, but it is **not a serious analytical** mistake.

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## If scalar implicatures were part of the semantic content....

[[**three cups**]] =  $\lambda P \lambda s. / \{x: \text{cup}(x)(w_s) \ \& \ P(x)(s)\} / = 3$

[[**some toes**]] =  $\lambda P \lambda s. \lambda x [\text{toe}(x)(w_s) \ \& \ P(x)(s)] \ \& \ \lambda x [\text{toe}(x)(w_s) \ \& \ \neg P(x)(s)]$

[[**or**]] =  $\lambda p \lambda q \lambda s. [[p(s) \ \& \ \neg q(s)] \quad [q(s) \ \& \ \neg p(s)]]$

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## No projection mechanism

- If scalar implicatures were part of the semantic content of weak scalar items, no separate projection machinery would have to be posited for them.

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## No suspension or cancellation of scalar implicatures

- There would be a straightforward account of the standard cases of ‘implicature cancellation’ or ‘suspension’: There would be no such process to begin with.

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## Pragmatic Intrusion is expected

- Major topic in Relevance Theory (e.g. Sperber & Wilson 1986, Carston 2002)
- Levinson 2000: There are many constructions where the truth-conditions of a whole sentence depend on the conversational implicatures of its parts.

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## Intrusion of Scalar Implicatures: Definite Descriptions

1. The man with two children near him is my brother; the man with three children near him is my brother-in-law.  
Levinson 2000: 218.
2. You should buy the car with four doors rather than the one with two; it's more useful and the price is good.  
Levinson 2000: 219.

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## Other scalar implicatures?

- The soup was warm.
- **Weak reading:** There is a degree  $d$  such that the soup was warm to degree  $d$ , and  $d$  is in the warm, but not in the hot range for soups.
- **Strong reading:** The maximal degree  $d$  such that the soup was warm to degree  $d$  is in the warm, but not in the hot range for soups.

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## But, but, but....

- There is also evidence that scalar implicatures are **not** part of the semantic content of weak scalar items.

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## Universal Lexicalization Constraint

- *not all*                    \**nall*  
*not always*                \**nalways*  
*not... and...*            \**nand*
- Since *some* carries the scalar implicature ‘not all’, there is no lexical item expressing ‘not all’.
- Horn 1989, Levinson 2000.

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## Languages with just a few number words

- Many Australian languages have only 3 number words.
- Guugu Yimithirr  
< *guunduu*, *gudhirra*, *nubuun* >  
Glossed as: ‘three or more, a few’, ‘two’, ‘one’.
- Dixon 1980:108. Levinson 2000: 90.

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## Persistence Constraint

- Separating semantic content and implicatures would allow us to hold on to the Persistence Constraint of Kratzer 1989, at least as far as semantic contents are concerned.
- **Persistence Constraint:** Any proposition that is the semantic content of an expression in a natural language is persistent. A proposition is persistent iff whenever it is true in a situation  $s$ , it is also true in all situations of which  $s$  is a part.

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## Can we have it all?

- Can we preserve Horn's Lexicalization Constraint, Levinson's Numeral Constraint, Kratzer's Persistence Constraint, account for Levinson's Pragmatic Intrusion facts **and** get away without any special projection mechanism for scalar implicatures?

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## The solution: locality of pragmatic intrusion

- Chierchia (forthcoming) argues that conversational implicatures are computed **locally**.
- What is local? Chierchia conjectures that **scope sites** provide the right notion of locality.

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## A more radical move: Superlocal computation of implicatures

- Scalar implicatures are not part of the semantic content of weak scalar items, but are computed **as fast as possible**.
- They might thus enter the semantic computation together with the corresponding weak scalar items. This might create **the impression** that they are part of the semantic content of those items.

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## Consequences of Superlocality

- We still have a chance to get away without any special projection machinery for conversational implicatures.
- We still have an explanation for the pervasive pragmatic intrusion facts.
- We can maintain Horn's Universal Lexicalization Constraint, and Levinson's explanation for the Australian numerals.

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## Persistence for Semantic Contents

- We could maintain persistence for propositions that are semantic contents and attribute violations of persistence to the effects of pragmatic intrusion.
- **[[all of her toes]]** =  
 $\Box P \Box s. \Box x [\text{one-of-her-toes}(x)(w_s) \Box P(x)(s)]$
- **[[Exactly 2 of her toes]]** =  
 $\Box P \Box s. / \{x: \text{one-of-her-toes}(x)(w_s) \ \& \ P(x)(s)\} / =$   
 $/ \{x: \text{one-of-her-toes}(x)(w_s) \ \& \ P(x)(w_s)\} / = 2.$

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## No impact of the difference between weak and strong assertions

- If  $p$  is persistent, then  $p(w_0)$  if and only if  $\Box s [s \leq w_0 \ \& \ p(s)]$ .
- **[[all of her toes are in the water]]** =  $\Box s. \Box x[\text{one-of-her-toes}(x)(w_s) \ \Box \text{in-the-water}(x)(s)]$
- **[[exactly 2 of of her toes are in the water]]** =  $\Box s. / \{x: \text{one-of-her-toes}(x)(w_s) \ \& \ \text{in-the-water}(x)(s)\} / = / \{x: \text{one-of-her-toes}(x)(w_s) \ \& \ \text{in-the-water}(x)(w_s)\} / = 2$ .

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## What about non-lexical implicatures?

- Non-lexical scalar implicatures would also have to be projected via otherwise available projection channels: e.g. by projection mechanism for focus meanings (Rooth 1985) or conventional implicatures (Potts 2003).

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## An example of a non-lexical scalar implicature

**Not all** of her toes are in the water.



**Some** of her toes are in the water.

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## Focus dependence

1. Paul didn't eat **ALL** of the eggs.
2. **PAUL** didn't eat all of the eggs.
3. Paul didn't **EAT** all of the eggs.
4. Paul didn't eat all of the **EGGS**.
5. Paul **DIDN'T** eat all of the eggs.

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## No focus dependence

1. Paul ate **SOME** of the eggs.
2. **PAUL** ate some of the eggs.
3. Paul **ATE** some of the eggs.
4. Paul ate some of the **EGGS**.
5. Paul **DID** eat some of the eggs.

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## The focus channel

- There is some indication that non-lexical scalar implicatures might be tied to focus, hence would be projected via the focus interpretation mechanism.
- What exactly is the role of focus in implicature projection? **Fox 2003**.

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## The Chierchia facts

- Chierchia (to appear): A separate projection mechanism for conversational implicatures makes sure they can't take scope over each other. See also Sauerland (to appear) for addressing this issue.

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## Weak scalar items in the scope of other weak scalar items

He took a bath **or** clipped **some** of his toe nails.



He either took a bath and **didn't clip some, but not all of his toe nails**, or else he clipped some, but not all of his toe nails and took no bath.


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## Do those cases come out right?

- ...with some engineering...
- We have to put the right denials in the right places.
- $\neg p \rightarrow q \rightarrow w. [[p(w) \ \& \ \neg \exists s [s \leq w \ \& \ q(s)]]$   
 $[q(w) \ \& \ \neg \exists s [s \leq w \ \& \ p(s)]]]$

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## Taking a bath or clipping toe nails

He took a bath **or** clipped **some** of his  

 toe nails.

He either took a bath and **clipped none of his toe nails**, or else he clipped some, but not all of his toe nails and took no bath.

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## Before worrying about more complicated examples....

- There is some evidence that both indefinites and *or* require a semantics based on lists of alternatives. Zimmermann 2000, Kratzer & Shimoyama 2002, Kratzer 2003.
- Once we have the right semantics for disjunction and for indefinites, the problematic scope relations might no longer exist.

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## Conclusion

- In a situation semantics, we can seriously consider the possibility that conversational implicatures might not have their own projection channel.
- They may attach themselves to lexical items and thus get a free ride with regular semantic composition.
- There is some indication that non-lexical implicatures might be tied to focus, and would thus be projected in whatever way focus meanings are.

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## **No Place for Intruders**

- Why should Nature have created a meaning projection channel for the exclusive use of intruders?
- Without a separate projection channel, scalar implicatures would be expected to grab free rides wherever they can get them.