

Negative Islands Aren't Islands

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1. Negative ("inner") islands

Negative islands have been the subject of quite a lot of debate in the recent literature.* The first systematic discussion of the phenomenon is Ross (1984), who uses the term "inner islands". Since then, the topic has been discussed by, among others, Rizzi (1990), who tries to give a syntactic account of negative islands, and Szabolcsi and Zwarts (1991; 1993), who argue that they are semantic in nature.

In this talk, I have two main goals. The first is to argue that negative islands can be explained in terms of a maximality-effect that is built into the semantics of questions, comparatives, and other constructions that exhibit negative island effects. Since this maximality is a matter of the semantics of these constructions, I agree with the general point made by Szabolcsi and Zwarts that negative islands are a semantic and not a syntactic phenomenon, although the specifics of my proposal are quite different from theirs. My second goal is to demonstrate that the maximality effect is not restricted to movement constructions. The same effect can also be brought about by focus and by gapping, phenomena which do not involve movement. Therefore, referring to the effect as an "island" effect is strictly speaking a misnomer. Negative island effects are of a fundamentally different nature than "real" island effects like the complex

* This paper is the text of the talk I gave at the 1994 Annual Meeting of the LSA in Boston, and as such it exhibits the limitations of length and style typical of a conference presentation. Only some small stylistic changes have been made in order to improve readability. The topic of this paper is treated at much greater length in my dissertation (Rullmann 1994). I would like to thank Barbara Partee, Angelika Kratzer, Margaret Speas, Jim Cathey, Ginny Brennan, and Donna-Jo Napoli for critical discussion of the ideas presented here.

NP constraint. In this talk I will therefore use the term "negative island" in a purely descriptive sense.

In (1), I give a basic example of the contrast I will be concerned with:

- (1) a. I wonder how tall Marcus is.
b. ★ I wonder how tall Marcus isn't.

(1a) is fine, but in (1b) the negation somehow blocks the extraction of the wh-phrase *how tall*. Not all wh-expressions are sensitive to negative islands, however. The extraction of *which opponent* in (2b) is unproblematic:

- (2) a. I wonder which opponent Marcus can beat.
b. I wonder which opponent Marcus can't beat.

Negative islands are "selective" in the sense of Postal (1992): they block the extraction of some *wh*-phrases, but not others.

The negative island effect is not only caused by negation, but by all downward entailing expressions, as shown in (3). By contrast, upward entailing expressions like those in (4) do not block extraction:

- (3) a. ★ I wonder how tall Marcus *isn't*.
b. ★ I wonder how tall *no player* is.
c. ★ I wonder how tall *few players* are.
d. ★ I wonder how tall *less than ten players* are.
e. ★ I wonder how tall *at most ten players* are.

- (4) a. I wonder how tall Marcus *is*.
b. I wonder how tall *this player* is.
c. I wonder how tall *every player* is.
d. I wonder how tall *most players* are.
e. I wonder how tall *many players* are.

As a reminder, Ladusaw's (1979) definitions of upward and downward entailing expressions are given in (5):

- (5) f is upward entailing if $\forall X, Y [X \subseteq Y \Rightarrow f(X) \subseteq f(Y)]$.
 f is downward entailing if $\forall X, Y [X \subseteq Y \Rightarrow f(Y) \subseteq f(X)]$.

The fact that the expressions that induce negative islands form a semantically well-defined class is by itself an indication that negative islands are a semantic, and not a syntactic phenomenon.

2. Negative islands in comparatives

The discussion about negative islands in the literature has focused predominantly on questions. However, negative island effects can also be observed in other *wh*-constructions such as comparatives. The comparatives in (6) and (7) show the same contrast as the questions in (3) and (4):

- (6) a. ★ Marcus is taller than Lou *isn't*.
 b. ★ Marcus is taller than *no player* is.
 c. ★ Marcus is taller than *few players* are.
 d. ★ Marcus is taller than *less than five players* are.
 e. ★ Marcus is taller than *at most five players* are.
- (7) a. Marcus is taller than Lou *is*.
 b. Marcus is taller than *this player* is.
 c. Marcus is taller than *every (other) player* is.
 d. Marcus is taller than *most players* are.
 e. Marcus is taller than *many players* are.

Again, downward entailing expression cause negative island effects, but upward entailing expressions don't. Although, as I said, these facts haven't gotten much attention in recent discussions of negative islands, they have been noted in the literature about the semantics of comparatives. In particular, von Stechow (1984) has discussed such cases at some length, although of course he didn't use the term negative islands to refer to them.

Von Stechow shows that the reason why the presence of a downward entailing element in a comparative clause makes the sentence unacceptable, lies in the semantics of the comparative

construction. He argues that comparative clauses denote **maximal** degrees, and he offers evidence for this claim which is independent of the negative island facts.

That maximality is involved in the semantics of the comparative construction can be seen in examples like (8a) and (b):

- (8) a. Lou can jump higher than Derek can jump.
b. Lou will make more money than a linguist can make.

(8a) means that Lou can jump higher than the **maximum** height that Derek can jump. Note that it is not sufficient for Lou to be able to jump higher than **some** height that Derek can jump. Suppose for instance that Derek can jump four feet high. Then it is also the case that he can jump three feet high, but in order for (8a) to be true in that situation, it is not sufficient that Lou can jump higher than three feet. He must be able to jump higher than four feet. The same point can be made about (8b). This sentence is only true if Lou will make more money than the **maximum** amount that a linguist can make.

The maximality of the comparative clause is made explicit in (9) with the help of an operator *max*, which is defined in (10):

- (9) a. Lou can jump higher than $\max(\lambda d[\text{Derek can jump } d\text{-high}])$.
b. Lou will make more money than $\max(\lambda d[\text{a linguist can make } d\text{-much money}])$.

(10) **Definition of the maximality operator *max*:**

If D is a set ordered by \geq , then $\max(D) = \iota x[x \in D \wedge \forall x' \in D[x \geq x']]$.

In representations like (9), d is a variable over degrees, which corresponds to the syntactic gap in the position of a degree-word in the comparative clause. d is bound by a lambda operator, forming a set of degrees. The operator *max* maps this set of degrees onto its maximal element, that is, the element of the set that is greater than or equal to all other elements of the set. If the set does not contain such a unique maximal element, *max* is undefined.

Returning to the negative island effect, we can now see what is wrong with an example like (11a):

- (11) a. ★ Marcus is taller than Lou isn't.
b. Marcus is taller than $\max(\lambda d[\text{Lou isn't } d\text{-tall}])$.

Suppose that Lou is 6 foot tall. Then he isn't 8 feet tall, or 9 feet, or 10, or 11, etc. That is, there is no upper bound to the set of degrees d such that Lou isn't d -tall, so *max* will be undefined with respect to that set. This means that the denotation of the comparative clause in (11a) is going to be undefined, which explains why the sentence is bad.

The same reasoning applies to (12a), and to the other examples involving downward entailing expressions:

- (12) a. ★ Marcus is taller than no player is.
b. Marcus is taller than $\max(\lambda d[\text{no player is } d\text{-tall}])$.

3. Maximality in questions

Although von Stechow only discusses (what we would now call) negative islands in comparatives, his analysis can be extended to questions.

The point that I raised earlier about the corresponding comparatives equally applies to questions like (13a) and (b):

- (13) a. How high can Derek jump?
b. How much money can a linguist make?

(13a) asks for the **maximal** height that Derek can jump. Similarly, someone who utters (13b) wants to know what the **maximal** amount of money is that a linguist can make. "\$10,000" would be false as an answer to (13b), because there are linguists who make more than that, even though, of course, it is true that a linguist can make \$10,000.

The interpretation that I propose for (13a) and (b) is represented rather informally in (14):

- (14) a. What is the degree d such that $d = \max(\lambda d'[\text{Derek can jump } d'\text{-high}])$?
b. What is the degree d such that $d = \max(\lambda d'[\text{a linguist can make } d'\text{-much money}])$?

Given the fact that, as I argue, degree-questions crucially involve maximality, just like comparatives, von Stechow's explanation for the negative island effect also carries over to

questions. So (15a) is out because it asks for the maximal degree d such that Marcus isn't d -tall, and this maximal degree is not defined:

- (15) a. ★ How tall (do you think) Marcus isn't?
 b. What is the degree d such that $d = \max(\lambda d' [\text{Marcus isn't } d' \text{-tall}])$?
 c. $\lambda p \exists d [\sim p \wedge p = \hat{\ }(d = \max(\lambda d' [\text{Marcus isn't } d' \text{-tall}]))]$

In (15c) I have given a more formal representation of the meaning of the question, in the framework of the semantics for questions proposed by Karttunen (1977).

The idea that maximality is involved in questions might seem a little ad hoc. How about questions that do not involve degrees, but individuals, like the *which*-questions in (16a) and (17a)?

- (16) a. Which opponents (do you think) Marcus can beat?
 b. $\lambda p \exists x [\text{opponents}'(x) \wedge \sim p \wedge p = \hat{\ } (x = \max(\lambda x' [\text{Marcus can beat } x']))]$
- (17) a. Which opponents (do you think) Marcus can't beat?
 b. $\lambda p \exists x [\text{opponents}'(x) \wedge \sim p \wedge p = \hat{\ } (x = \max(\lambda x' [\text{Marcus can't beat } x']))]$

I would like to suggest that maximality plays a role in such questions as well, as has been argued on completely independent grounds by Jacobson (1990). As a background, I am assuming a theory like that of Link (1983), in which there are atomic individuals as well as sums, which are partially ordered by a part-whole relation. In such a theory, the maximum element of a set of individuals is the sum of which all the elements of the set are parts. In a question like (16a) maximality will then show up in the form of exhaustiveness of the question. (16a) is a question that asks for the sum of **all** the opponents that Marcus can beat, not just some of them.

Note that maximality will not cause a problem for negative questions that involve individuals, such as (17a). Given a contextually determined set of opponents, the sum of all the opponents that Marcus can not beat will always be defined. This explains the selectiveness of negative islands that I mentioned earlier: expressions denoting degrees are sensitive to negative islands, but expressions denoting individuals are not.

To conclude this section, I want to point out that the account I have outlined cannot be quite as simple as I have suggested so far, in the light of examples such as (18):

(18) How many natural numbers did God create?

Assuming that there are infinitely many natural numbers, we would expect (18) to be just as bad as (15a). But (18) is a perfectly fine question, to which the answer could for instance be "infinitely many". Why then couldn't same kind of answer be given to a question like (15a)?

I think the solution to this problem lies in recognizing the role played by an appropriate notion of informativeness. (18) is a question that - at least in principle - could have more than one possible true answer, depending on how many natural numbers God actually did create. A true answer to (18) is therefore informative, at least for someone who doesn't know how many natural numbers there are. Any true answer to (15a) on the other hand will be completely uninformative, because the answer does not in any way depend on how tall Marcus actually is. The answer would always be something like "infinitely tall", no matter what the world is like. Thus, while (18) is a genuine question which can have an informative answer, (15a) is not.

4. Maximality induced by focus

In the final part of this talk I want to show that the maximality effect that causes negative islands is not restricted to *wh*-movement constructions such as comparatives and questions, but can also be induced by focus, a phenomenon that does not involve movement.

In his 1972 book, Jackendoff pointed out that a sentence like (19), which contains a negation as well as a focused element, is ambiguous between the readings paraphrased in (19a) and (19b):

- (19) Sue didn't take [_F MARCUS] to the movies.
- a. Marcus isn't the person Sue took to the movies.
 - b. Marcus is the person Sue didn't take to the movies.

The ambiguity has to do with whether the background of the sentence includes the negation or not. Assuming the approach to focus developed by Krifka (1991), among others, we can represent the interpretation of a sentence as a structured meaning, that is, an ordered pair of which the first member is the background and the second member the focus:

(20) <B(ackground),F(ocus)>

The background is a function whose domain consists of entities of the same type as the focus. The ordinary, non-structured meaning of the sentence is obtained by applying the background to the focus.

To illustrate this, (21b) shows the structured meaning associated with (21a):

- (21) a. Sue took MARCUS to the movies.
b. $\langle \lambda x[\text{took-to-the-movies}'(s,x)],m \rangle$

Here Marcus is the focus, and the background is the set of people who were taken to the movies by Sue.

Now let's go back to Jackendoff's observation that (19) is ambiguous. In a structured meaning theory of focus, the two readings can be represented roughly as in (22):

- (22) a. NOT($\langle \lambda x[\text{took-to-the-movies}'(s,x)],m \rangle$)
b. $\langle \lambda x[\neg \text{took-to-the-movies}'(s,x)],m \rangle$

(22a) means that Marcus is not one of the people that Sue took to the movies, and (22b) means that Marcus is one of the people that Sue did not take to the movies. Note that in (22b), but not in (22a), the negation is part of the background.

Now consider (23):

- (23) Sue doesn't weigh [_F 300 POUNDS].
a. 300 pounds isn't what Sue weighs.
b. ★ 300 pounds is what Sue doesn't weigh.

This sentence is not ambiguous in the same way that (19) is. It can have the reading paraphrased in (23a), but not that in (23b). Actually, it seems that (23b) simply does not make any sense. I want to suggest that (23b) does indeed not make any sense, and that the reason why it does not make sense is the same as the reason why the negative island sentences do not make sense, namely maximality.

How does maximality come into the picture? Consider again (21). It has often been observed that there is a strong tendency to understand focus-sentences as if there is an implicit "only" associated with the focus. So (21a) is commonly understood as if Marcus is the **only** person

Sue took to the movies. I want to stress that I am not sure exactly how this strengthening of the meaning of a focused sentence comes about. One possibility is that it is a conversational implicature, as suggested by Horn (1989, p. 385).

Now this strengthening of the interpretation of a sentence containing a focus can be captured by saying that the focus is the maximal element of the background-set. This is shown in (24):

$$(24) \quad F = \max(B)$$

For (21a), this comes down to saying that the sum of all the people who Sue took to the movies consists of just Marcus, as represented by the formula in (25):

$$(25) \quad m = \max(\lambda x[\text{took-to-the-movies}'(s,x)])$$

This is the same thing as saying that Marcus is the only person Sue took to the movies.

Now consider (26a) and (b), which represent the two readings of (23):

$$(26) \quad \begin{array}{l} \text{a.} \quad \text{NOT}(\langle \lambda d[\text{weigh}'(s,d)], 300\text{-pounds}' \rangle) \\ \text{b.} \quad \langle \lambda d[\neg \text{weigh}'(s,d)], 300\text{-pounds}' \rangle \end{array}$$

If we apply the requirement that the focus be the maximal element of the background-set to "missing" reading (26b), we get (27):

$$(27) \quad 300\text{-pounds}' = \max(\lambda d[\neg \text{weigh}'(s,d)])$$

Here the same problem arises that we saw earlier for the negative islands in comparatives and questions: there is no maximum degree of weight d such that Sue does not weigh d -much.

So (23) does not have the reading paraphrased in (23b) because of the fact that in downward entailing contexts maximal degrees are not defined.

Finally, I would like to draw your attention to another set of data involving gapping, which I think are a special case of the focus examples just discussed. (28) shows that gapping is not affected by the presence of negation if the elements that remain after gapping denote individuals. Contrast this with (29) in which the non-gapped part of the sentence includes a measure phrase. In that case negation does block gapping:

- (28) a. Sue took Marcus to the movies, and Mary, Lou.
 b. Sue didn't take Marcus to the movies, and Mary, Lou.
- (29) a. Marcus weighs 300 pounds, and Lou, 200 pounds.
 b. ★ Marcus doesn't weigh 300 pounds, and Lou, 200 pounds.

I would like to suggest that the ungrammaticality of (29b) can be explained in terms of focus. It is well-known that gapping is a focus-sensitive phenomenon, in the sense that the part of the sentence that is gapped constitutes the background, and the parts that remain after gapping constitute the focus. From that perspective, it is not surprising if we find that the maximality effect that we observed in the focus examples, also shows up in cases of gapping.

5. Conclusion

To conclude this paper, let me reiterate my two main points:

- First, I have argued that so-called negative islands are a semantic phenomenon that can be explained in terms of a maximality effect built into the meaning of *wh*-constructions, such as comparatives and questions.
- Second, I have attempted to show that this maximality effect is not restricted to movement constructions, but can also be induced by non-movement phenomena like focus and gapping.

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