

Even and Biased Questions: The Case of Spanish Siquiera.

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This paper examines the behavior of Spanish *siquiera*, a scalar particle that always associates with minimal semantic values. As we will see in sections 2 and 3, *siquiera* is licensed in a number of downward entailing environments, in modal contexts, and in questions, where it triggers a negative bias, just like English *even* does when it associates with a minimal value. Section 1 surveys some relevant background on *even* and the bias that it triggers in questions. Guerzoni (2004) shows that the negative bias triggered by *even* can be captured by assuming that *even* is a low likelihood particle (Karttunen and Peters 1979). We will see in section 3 that the bias triggered by *siquiera* does not seem amenable to the same type of analysis. Section 4 concludes by sketching an analysis of *siquiera* inspired by the ‘domain widening’ theory of *even* presented in van Rooij 2003.

1. *Even.*

Since Karttunen and Peters 1979, *even* is standardly analyzed as a presupposition trigger devoid of any truth-conditional content (Rooth 1985, Wilkinson 1996). Under this view, the sentence in (1), with focus on *Bill*, asserts that Bill likes Mary and conveys the ‘low likelihood presupposition’ that, of all relevant individuals, Bill is the least likely person to do so. If Polly and Molly were the individuals under consideration, *even* would contribute the presupposition that the proposition that Bill likes Mary is less likely than any of the alternative propositions in (2).¹

- (1) Even BILL likes Mary. (Karttunen and Peters 1979: 11)
(2) {that Polly likes Mary, that Molly likes Mary}

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¹Karttunen and Peters (1979) use the term ‘conventional implicature’ for what we would call today a presupposition. They claim that *even* also presupposes that at least one of the alternatives is true. Krifka (1991a), von Stechow (1991) and Rullmann (1997) have challenged this claim. The claim that *even* conveys that the assertion is less likely than *any* of the alternatives or that it is the endpoint of a pragmatic scale (Fauconnier 1975) has also been challenged. Francescotti (1995) argues that *even* conveys that the assertion outranks most of the alternatives, and Kay (1990) that it is less likely than a contextually salient proposition.

The alternative propositions that the low likelihood presupposition makes reference to depend on the placement of focus. With focus on *Mary*, (3a) presupposes that Mary is the least likely person for Bill to give a book to: if the relevant individuals were Polly and Molly, *even* would convey that the proposition expressed by (3a) is less likely than any of the ones in (3b). With focus on *a book*, (3a) presupposes that a book is the least likely thing for Bill to give Mary: if the relevant presents were a ball and a doll, *even* would convey that the proposition expressed by (3a) is less likely than any of the ones in (3c).

- (3) a. Bill has even given Mary a book.
 b. {that Bill has given Polly a book, that Bill has given Molly a book}
 c. {that Bill has given Mary a ball, that Bill has given Mary a doll}

Before proceeding any further, some explicit assumptions about *even* are in order. For the sake of concreteness, we will assume, as in Schwarz 2005, that *even* is a focus-sensitive operator that takes two arguments: a covert free variable ranging over sets of propositions (written as a subscript C) and a proposition (its ‘prejacent’). We will also assume that focused constituents are marked at LF by means of a subscript F . The LF of the sentence in (1) will then look as in (4):

- (4) $even_C$ [[Bill] $_F$ likes Mary]

To capture the focus sensitivity of *even*, we will assume an Alternative Semantics for focus (Rooth 1985, 1992) and impose the condition that the value of C has to be a subset of the *focus value* of the prejacent of *even*. In Rooth’s framework, the focus value of a propositional constituent κ is the set of propositions that contains the proposition expressed by κ as well as all those propositions that can be obtained by replacing the focus-marked constituent in κ with any constituent of the same semantic type. The focus value of the prejacent of *even* in (4), then, is the set that contains any proposition of the form ‘that x likes Mary.’ Under these assumptions, we will say that the semantics maps the LF in (4) to the proposition that Bill likes Mary only when the conditions in (5) are met.²

- (5) a. Focus restriction: $C \subseteq \{p \mid \exists x[p = \text{that } x \text{ likes Mary}]\}$
 b. Low likelihood presupposition:
 i. $\forall p \in C[p \neq \llbracket \text{Bill likes Mary} \rrbracket \rightarrow p >_c \llbracket \text{Bill likes Mary} \rrbracket]$
 ii. $\bigcap C >_c \llbracket \text{Bill likes Mary} \rrbracket]$

²The definedness conditions in (5b) are meant to capture the low likelihood component (Krifka 1995: 227). The abbreviation ‘ $p <_c q$ ’ expresses that proposition p is less likely than proposition q , given the information in the common ground c (the information state that represents the shared beliefs of the parties involved in the conversation.) The condition in (5b-ii) makes sure that the common ground supports the possibility that all individuals under consideration like Mary but Bill doesn’t. If, given the common ground information, it were true that if Bill likes Mary, then everybody else does too, the proposition that Bill likes Mary would not be truly unlikely.

Consider now the sentence in (6) below. With focus on *Bill*, (6) conveys the ‘high likelihood’ presupposition that Bill is the *most* likely person to like Mary. As illustrated in (7), there are two possible LFs for (6). Under the current analysis, LF₁ correctly requires Bill to be the *most* likely person to like Mary, because, under the scope of *even*, negation reverses the polarity of the low likelihood presupposition: assuming that (8) is the value of *C*, the low likelihood presupposition would require Bill to be less likely *not* to like Mary than Polly or Molly. Yet, since presuppositions survive embedding under negation (Karttunen 1973), the interpretation of LF₂ should inherit the presuppositions of (4), and, so, contrary to fact, there should be a reading of (6) under which Bill is required to be the least likely person to like Mary. Either *even* does not always convey low likelihood or (6) cannot have LF₂.

- (6) Not even BILL likes Mary. (Karttunen and Peters 1979: 11)
 (7) LF₁: even_C [not [[Bill]_F likes Mary]] LF₂: not [even_C [[Bill]_F likes Mary]]
 (8) {that Polly does not like Mary, that Molly does not like Mary}

Karttunen and Peters (1979) endorse the view that *even* always conveys low likelihood and maintain that LF₂ is not well-formed because *even* is a positive polarity item. This analysis (from now on ‘the Scope Theory’) has been defended in Wilkinson 1996, Guerzoni 2003 and Nakanishi 2006, but it has also come under attack (see, for instance, Rooth 1985, Rullmann 1997, Herburger 2003 and Gianakidou 2007.) Rooth (1985) observes that *even* conveys high likelihood in contexts where negative polarity items are licensed and proposes that the perceived low and high likelihood presuppositions correspond to two different (but homophonous) lexical items. Under this view (from now on ‘the NPI theory’), (6) has the two LFs in (9): LF₁ contains a PPI that triggers a low likelihood presupposition, and LF₂ an NPI that triggers a high likelihood presupposition.

- (9) LF₁: even^{PPI}_C [not [[Bill]_F likes Mary]] LF₂: not [even^{NPI}_C [[Bill]_F likes Mary]]

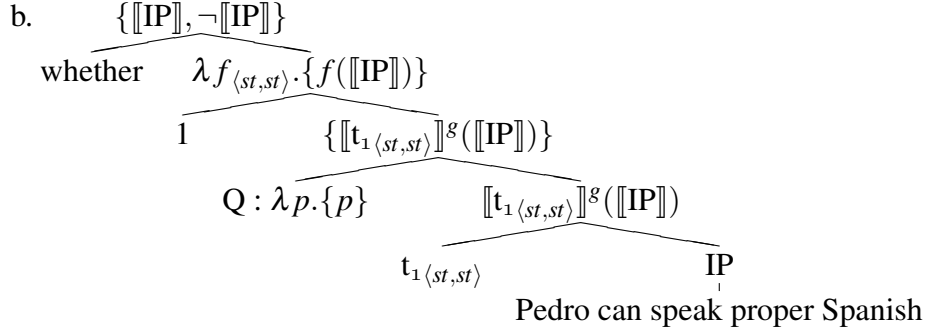
The analysis of the behavior of *even* in questions has recently been taken to provide indirect support for the Scope Theory (Guerzoni 2003, 2004). Questions containing minimizers, like the ones in (10), cannot be used as disinterested information requests because they are ‘negatively biased’ — they convey that the speaker expects a negative answer (Borkin 1971, Ladusaw 1980). Questions containing *even* are similarly biased when *even* associates with a constituent that denotes a minimal value: in a context where Pedro is more likely to speak proper Spanish than proper French or Italian, the question in (11) signals that, contrary to what is expected, the speaker suspects that Pedro cannot speak proper Spanish.

- (10) a. Does Charlie bat an eye when you threaten him? (Borkin 1971: 53)
 b. Did anyone lift a finger to help? (Ladusaw 1980: 186)
 (11) Pedro can’t speak proper French. He can’t speak proper Italian ... Can he even speak proper Spanish?

Guerzoni (2003, 2004) shows that the Scope Theory can derive this bias. She assumes that *yes/no* questions contain a silent *whether*, which introduces a negation

into the semantic representation, and shows that, as a result of the scopal interaction of *even* with this negation, when *even* associates with a constituent denoting a minimal value, the question will have only one answer whose presuppositions will be satisfied in a natural context. To illustrate the analysis, consider (12):

(12) a. Can Pedro speak proper Spanish?



In this derivation, the Q(uestion) operator creates a proto-question (Karttunen 1977) — it lifts the denotation of its sister from a proposition to a set of propositions, the type of questions. A silent *whether* makes sure that this set contains the denotation of the IP and its negation. This silent *whether* is analyzed as in (13): it denotes the characteristic function of the set containing the identity function over propositions and negation. It starts the derivation as the sister of the IP, but moves above Q for type reasons, leaving a trace of type $\langle st, st \rangle$. The sister of the moved *whether* is interpreted by abstracting over that trace: it maps any function f of type $\langle st, st \rangle$ to the set containing the proposition that results from applying f to the denotation of the IP. *Whether* combines with this function via a generalized version of Karttunen’s *Wh*-Quantification Rule (Karttunen 1977: 19), yielding the set that contains the propositions that result from applying the denotation of the IP to the functions in the set whose characteristic function *whether* denotes.

$$(13) \quad \llbracket \text{whether} \rrbracket = \lambda h_{\langle st, st \rangle, t} \cdot \exists g_{\langle st, st \rangle} [\llbracket (g = \lambda p \cdot p) \vee (g = \lambda p \cdot \neg p) \rrbracket \& h(g)]$$

Assuming that *even* is a propositional operator, this LF leaves two possible attachment sites for *even* — right above or right below the trace of *whether*. When *even* scopes under the trace of *whether*, the LF denotes the first set in (14). When *even* scopes over the trace of *whether*, the second. These sets share one proposition (the positive answer to the question), which results from applying *even* to the denotation of the IP. This proposition is defined only in worlds in which it is less likely than any of its alternatives, which are propositions of the form ‘that Pedro can speak proper x ’ (assuming that *Spanish* is focused.) When *even* scopes under negation, as in the first set in (14), the negative answer to the question will inherit the presuppositions of the positive answer. When it scopes over the trace of *whether*, as in the second set in (14), the negative answer to the question will be defined only if the proposition that Pedro does *not* speak proper Spanish is less likely than any of the alternatives, which are propositions of the form ‘that Pedro cannot speak proper x .’ If we assume that Pedro is more likely to speak proper Spanish than any other contextually relevant language, none of the answers to the question in (11) will be

defined when *even* scopes under the trace of *whether*. When *even* scopes over the trace of *whether*, only the negative answer will be defined. The bias, in this account, is due to the fact that the speaker utters a question with only one assertable answer — the negative.

$$(14) \quad \{[\text{even}_C(\text{IP})], -[\text{even}_C(\text{IP})]\}, \{[\text{even}_C(\text{IP})], [\text{even}_C](\neg[\text{IP}])\}$$

The Scope Theory provides a very elegant account of the negative bias triggered by *even*, then. This raises a natural typological question: to what extent can this account derive the negative bias triggered by other scalar items in other languages? This paper contributes to answering this question by examining the behavior of Spanish *siquiera*, a high likelihood scalar particle.

2. Spanish Scalar Particles: *Siquiera*.

Spanish has a number of scalar particles: *hasta*, *incluso*, *ni*, and *siquiera*. *Hasta* and *incluso* convey low likelihood and are positive polarity items (Schwenter 2002). *Ni* is a negative concord item (henceforth ‘NCI’) (Herburger 2003) that conveys high likelihood (the version of (15a) with *ni* is deviant if Pedro is not likely to speak Chinese.) Like other NCIs in Spanish, which is a ‘non-strict’ negative concord language, *ni* requires the preverbal negative marker *no* in unembedded episodic sentences when it occurs in postverbal position; in preverbal position, *ni* excludes *no*, as (15) illustrates.³ Given its intimate connection with negation and its high likelihood component, one could be tempted to identify *ni* with Rooth’s NPI *even*. However, the distribution of Spanish NCIs does not follow the distribution of English NPIs of the *any* type (Penka 2007), and the distribution of *ni* doesn’t either (Guerzoni 2004): like other NCIs, *ni* is licensed under *doubt* or *without*, but not under factive emotives, in the antecedent of conditionals, the first argument of universal nominal quantifiers, or in questions.

- (15) a. Pedro no habla *(ni) chino.
 Pedro not speaks NI Chinese
 ‘Pedro doesn’t even speak Chinese.’
- b. Ni Pedro (*no) habla chino.
 NI Pedro no speaks Chinese
 ‘Not even Pedro speaks Chinese.’

Ni frequently co-occurs with *siquiera*, as in (16). The addition of *siquiera* to *ni* does not seem to bring about any meaning change: just like (15a), (16) conveys (i) that Pedro does not speak Chinese, and (ii) that he is likely to do so. This is reminiscent of what happens when *even* is added to a minimizer in a negative

³The term ‘non-strict negative concord’ is established in Giannakidou (2000). ‘#(X)’ / ‘*(X)’ are used to indicate that a sentence is deviant/ungrammatical without X. ‘(#X)’ / ‘(*X)’ indicate that a sentence is deviant/ungrammatical with X.

context (Pott 1859, Schmerling 1971, Heim 1984): the versions of (17) with and without *even* also feel equivalent.⁴

- (16) Pedro no habla ni siquiera chino.
Pedro not speaks NI SIQUIERA Chinese
'Pedro does not even speak Chinese.'

- (17) Pedro did not (even) lift a finger to help Mary.

Since it frequently co-occurs with *ni*, it should not come out as a surprise that *siquiera* has only been discussed in the semantic literature in connection with this NCI (Herburger 2003, Guerzoni 2004). However, as we have just seen, *ni* does not require *siquiera* and, as we will see next, *siquiera* does not require *ni* either. *Siquiera* is deviant in positive episodic sentences (both in preverbal and postverbal position, unlike *ni*), as (18) illustrates, but it is licensed in a variety of 'negative' environments, where it can occur without *ni*. The naturally occurring examples in (19) show that *siquiera* is licensed by sentential negation (19a), by preverbal NCIs (*nadie, ningún, nunca*) (19b), and under the scope of the 'negative' preposition *sin* ('without') (19c). These examples are arguably all cases where *siquiera* is licensed by sentential negation, since NCIs (both preverbal and postverbal) have been argued to be licensed by a covert form of sentential negation (Zeijlstra 2004, Penka 2007), which *without* constituents can host (Penka 2007: 58). We also find *siquiera* under the scope of *doubt* (20), and *apenas* ('hardly') (21).

- (18) (* Siquiera) Pedro habló (* siquiera) portugués.
SIQUIERA Pedro speaks SIQUIERA Portuguese

- (19) a. Ese sinvergüenza que se hace pasar por "director de orquesta y
that scoundrel that se makes pass for director of orchestra and
compositor" no sabe siquiera leer música.
composer not knows SIQUIERA read music
'That scoundrel that pretends to be an orchestra conductor and a compos-
itor does not even know how to read music.'
(personales.ya.com/remocpi/El_superultramegaego_de_Luis_Cobos.htm)
- b. La mayoría de nosotros {nunca / *alguna vez} habíamos estado
The majority of us {never / at some point} had been
siquiera en una comisaría de policía y de repente llegamos a un
SIQUIERA in a station of police and suddenly got to a
penal de máxima seguridad.
prison of maximum security
'Most of us had never even been to a police station and, suddently, we
arrived at a maximum security prison.'
(Alegría, C. *et alt.* (1992) *Fuga de Canto Grande*, UCA Editores, p. 54)

⁴Thanks to Larry Horn for pointing out to me that the observation that negative sentences containing a minimizer are equivalent to their counterparts containing *even* traces back to Pott (1859: 410). See Horn (1989: 452-453).

c. Creía que María la Coja estaría en el estudio, pero había
 he thought that María the Lame would be in her studio but she had
 desaparecido sin dejar siquiera una nota.
 disappeared without leaving SQUIERA a note
 ‘He thought that María the Lame would be in her office, but she had dis-
 appeared without even leaving a note.’
 (R. del Pozo, *La novia* (1995) Plaza y Janés, Barcelona.)

- (20) No existen planes de hacer tal cosa. Dudo que siquiera alguien lo
 not exist plans to do such thing I doubt that SQUIERA somebody it
 haya planteado.
 has proposed
 ‘There aren’t plans to do such a thing. I doubt anybody could have even
 proposed it.’ (<http://archives.postgresql.org>)
- (21) Los representantes de los empleados apenas hemos sido capaces
 The representatives of the employeers hardly have been capable
 siquiera de ponernos en contacto con la dirección del centro.
 SQUIERA of putting-us in touch with the direction of-the center
 ‘We, the employee representatives, have hardly had a chance to even get in
 touch with the center’s management.’ (<http://blog.eldelweb.com>)

Minimizers, *ni*, and other NCIs are licensed in the contexts in (19-21). How-
 ever, *siquiera* is also licensed in environments that allow for NPIs of the English *any*
 type (Krifka 1991b) but exclude *ni* and other NCIs: the antecedent of conditionals
 (subjunctive (22), but also indicative), *before* (but not *after*) clauses (23), the stan-
 dard clause of excessive (*too*) (but not of assecutive (*enough*)) constructions (24),
 and questions (matrix, as in (25), but also embedded.)

- (22) Si el fútbol atendiera siquiera un poco a la lógica, el Barcelona
 if the soccer follo:subj SQUIERA a bit to the logic, the Barcelona
 arrollaría al Getafe.
 would crush to-the Getafe
 ‘If soccer followed logic even a bit, the Barcelona would crush the Getafe.’
 (prensa.vlex.es/vid/rijkaard-dice-supo-27753021)
- (23) Gabriel había cruzado la calle { antes / (*después) de } siquiera
 Gabriel had crossed the street { before / after of } SQUIERA
 pensar en lo que estaba haciendo.
 think in what that he was doing
 ‘G. had crossed the street before even thinking about what he was doing.’
 (S. Laurens (2006) *Un amor secreto*, (J. Fondebrider, trans.) Ediciones B,
 Mexico, p.110)
- (24) El clima del viernes era { demasiado / *bastante } malo para
 The weather of-the Friday was { too / *enough } bad to
 siquiera intentar un lanzamiento.
 SQUIERA try a launching

'The Friday weather was too bad to even try a launching.'
(www.reforma.com/ciencia/articulo/716689/)

- (25) ¿Has leído siquiera el título del post?
have read SIQUIERA the title of-the post
'Have you even read the post title?' (<http://vagos.wamba.com/>)

Finally, *siquiera* is licensed in a number of modal constructions where *ni* is not licensed: under the future tense (26), in imperatives (in requests and orders (27a), and also in offers (27b)), in optatives (often with the adverb *ojalá* 'I wish that', as in (28)), with necessity modals (*tener que* 'have to' (29a) or *deber* 'ought to' (29b)), and also with directive propositional attitudes (30).

- (26) ¡Tú y yo, Rusca, comeremos siquiera una vez al día lo bueno de
you and I Rusca will-eat SIQUIERA one time at-the day the good of
la tierra!
the earth
'You and I, Rusca, will eat good produce at least once a day.'
(Sampedro, J.L. (1985) *La sonrisa etrusca*, Alfaguara, Madrid.)
- (27) a. Déme siquiera un vaso de agua, médico de mierda.
give-me SIQUIERA a glass of water, doctor of shit
'Give me at least a glass of water, you crappy doctor.'
(Vallejo, Alfonso (1980) *Eclipse*, La Torre, Madrid [Corpus R.A.E])
b. Hala, mujer, toma un café con leche siquiera.
come-on, girl, have a coffee with milk SIQUIERA
'Come on, girl, have at least a *café con leche*!'
(Merino, J.M., (1987) *Novela de Andres Cho*. Mondadori, p.113)
- (28) a. Ojalá siquiera una mínima parte de los trabajadores y
I wish SIQUIERA a minimum part of the workers:masc and
trabajadoras respondieran de la forma en que lo han hecho ellos.
workers:fem answer:subj of the form in that it have done they
'I wish at least a minimum part of the workers answered the same way
they did.' (madrid.indymedia.org)
b. Desearía que FM me indicara con anticipación siquiera de
I would like that FM to-me indicate:subj with anticipation SIQUIERA of
diez días que la fecha está próxima.
ten days that the date is:ind soon
'I'd like FM to remind me at least ten days in advance that the date is
coming soon.' (www.lawebdelprogramador.com. Forum: 08/01/2009)
- (29) a. La compañía tiene que pagar siquiera el 60 por ciento del salario
the company has to pay SIQUIERA the 60 per cent of-the salary
completo promedio.
complete average

‘The company has to pay at least sixty per cent of the average complete salary.’ (espanol.news.yahoo.com)

- b. El contenido en C orgánico debe ser siquiera un 0.6% superior
the content of C organic should be SIQUIERA a 0.6% superior
al del referido horizonte.
to-the of-the mentioned horizon

‘The content of organic C should be at least a 0.6% higher than the content of the forementioned horizon.’ (<http://www.unex.es/edafo/FAO/>)

- (30) Los conservadores han pedido (...) que se modifique siquiera
The conservatives have asked (...) that se modify:subj SIQUIERA
puntualmente el Título VIII ...
punctually the Title VIII ...

‘The Conservatives have asked that the Eighth Title be modified at least minimally.’ (*El Mundo*, 10/30/1996 [Corpus R.A.E])

In all these modal cases, *siquiera* naturally translates as *at least* (Bosque 1980: 166). The contrast between the NPI contexts (where *siquiera* naturally translates as *even*) and the modal contexts (where it translates as *at least*) is reminiscent of the behavior of Greek *esto*, which sometimes translates as *even*, and sometimes as *at least* (Giannakidou 2007). Like the concessive uses of *at least* described in Nakanishi and Rullmann (2009), *siquiera* associates in these examples (like in the previous ones) with constituents that denote highly likely scalar values, and evokes a contrast with other more desirable alternatives. Consider, for instance, the example in (26) above: it can be naturally uttered in a scenario in which the speaker knows that she and Rusca will not eat good earthy food more than once per day, which would be more desirable. Likewise, the sentence in (27a) can be uttered by somebody convinced that the doctor will not give her more than a glass of water; it may be fine for the speaker of (28) if a substantial amount of the workers will not have responded the way she wants; (29a) is naturally uttered in a scenario in which the company does not have to pay more than 60% of the average salary; and (30) is compatible with the Conservatives being happy if the Eighth Title is not modified substantially.

3. *Siquiera* in Questions and the Scope Theory.

Having looked at the distribution of *siquiera*, we will now come back to its behavior in questions. The examples in (31) below show that, as we pointed out before, *siquiera* is licensed in questions, both matrix (31a) and embedded (31b):

- (31) a. ¿Hiciste siquiera el intento de probar estas soluciones?
did SIQUIERA the attempt to try these solutions
‘¿Have you even made an effort to try these solutions?’
(<http://www.forosuse.org/forosuse/archive/>)

- b. Me pregunto si tú siquiera sabes lo que significa ser iconoclasta.
 to-me ask:1s if you SIQUIERA know it that means to be iconoclast
 ‘I wonder whether you even know what it means to be an iconoclast.’
 (www.antesdelfin.com/foro/printthread.php?t=12102)

We now note that these questions convey a negative bias. They are not appropriate in contexts in which the speaker suspects that their true answer is positive. Consider, for instance, (32a). While this question allows for tags like *verdad* or *no* (‘right?’) that indicate a positive bias — that the speaker is seeking to confirm her belief that her addressee did in fact attempt to try out the solutions — its counterpart with *siquiera* does not. Similarly, (32b) is compatible both with a parenthetical that conveys that the speaker suspects that the true answer is positive and with one that conveys that he suspects that it is negative. Its counterpart with *siquiera*, however, is deviant with the former.

- (32) a. ¿Hiciste el intento de probar estas soluciones, {verdad, no}?
 did the attempt to try these solutions {truth, no}?
 ‘You have made an effort to try these solutions, {right, no}?’
- b. Me pregunto si tú sabes lo que significa ser iconoclasta —
 to-me ask:1s if you know it that means to be iconoclast —
 sospecho que sí / no.
 suspect that yes / no
 ‘I wonder whether you even know what it means to be an iconoclast — I suspect that you do / that you don’t.’

In questions, like in declarative sentences, *siquiera* conveys that its prejacent is likely. It also signals that the issue is settled for the alternative (less likely) propositions. Consider, for instance, (31a), which is taken from an internet computer user forum post. The author of the post is complaining about his addressee asking for help, because he thinks that his problem could have been solved by carrying out the solutions that other users already suggested. He believes that his addressee has not carried out those solutions, since he would not be asking for help otherwise. By using *siquiera*, he signals that he also believes that his addressee did not do something easier: at least *attempt* to give these solutions a try. In (31b) *siquiera* behaves in a similar way. The sentence in (31b) is part of a response to a post by “the iconoclast.” The author of (31b) infers from the choice of nickname that his addressee claims to be an iconoclast. He thinks he is not. The use of *siquiera* signals that he suspects that he does not have the weaker property of knowing what an iconoclast is.

We have seen in section 1 that the Scope Theory provides a very elegant account of the negative bias triggered by *even* when it associates with likely prejacentes (Guerzoni 2004). However, this account does not directly carry over to *siquiera*. The reason why this is so has to do with the environments in which *siquiera* is licensed. The Scope Theory analyzes *even* as a low likelihood scalar particle — when

even conveys high likelihood, it is because it outscopes a polarity reversing expression at LF. The analysis of the negative bias of *even* is based on this assumption: in questions, when *even* associates with a likely prejacent, it can still outscope the (implicit) negation in the negative answer and convey a satisfiable presupposition. To extend the analysis to *siquiera*, then, we need to analyze this scalar particle as a low likelihood item. Since *siquiera* always seems to convey high likelihood, we are also forced to assume that it always scopes over a polarity reversing operator. This assumption is problematic: it may turn out to be true for some, but not for all of the environments in which *siquiera* is licensed, since, as we saw in the previous section, *siquiera* is licensed in upward entailing environments, like the nuclear scope of necessity modals.

For the sake of illustration, let us assume that *siquiera* is a low likelihood focus sensitive propositional operator, as in (33):

- (33) a. LF: $siquiera_C [\dots [\phi]_F \dots]$
 b. Focus restriction: $C \subseteq \llbracket [\dots [\phi]_F \dots] \rrbracket^f$
 c. Low likelihood presupposition:
 i. $\forall p \in C [p \neq \llbracket [\dots [\phi]_F \dots] \rrbracket \rightarrow p >_c \llbracket [\dots [\phi]_F \dots] \rrbracket]$
 ii. $\cap C >_c \llbracket [\dots [\phi]_F \dots] \rrbracket$

Let us now consider the sentence in (34):

- (34) Según su médico, Pedro tiene que ir a la piscina *siquiera* una vez por semana.
 according to his doctor, Pedro has to go to the pool SIQUIERA one time per week
 ‘According to his doctor, Pedro has to go swimming at least once per week.’

Since we are assuming that *siquiera* is a propositional operator, there are two possible LFs for (34), depending on whether *siquiera* scopes under (35a) or over (35b) the necessity modal:⁵

- (35) a. $\Box siquiera_C [\text{Pedro goes swimming [once per week]}_F]$
 b. $siquiera_C \Box [\text{Pedro goes swimming [once per week]}_F]$

Consider first (35a). The prejacent of *siquiera* in (35a) is the proposition that Pedro goes swimming at least once per week — the sentence in (34) does not claim that Pedro’s doctor wants him to go swimming exactly once per week. Assuming that *una vez por semana* ‘once per week’ is focused, the domain of quantification of *siquiera* in (35a) should be (a subset of) (36):

- (36) {Pedro goes swimming at least two days per week, Pedro goes swimming at least three days per week ... }

⁵We will assume that the phrase ‘according to his doctor’ restricts the domain of quantification of the modal which, in this case, should be the set of worlds compatible with what Pedro’s doctor wants.

Under the current analysis, the LF in (35a) should then presuppose that, given the common ground information, the proposition that Pedro goes swimming at least once per week is less likely than any of the alternative propositions in (36). All the alternative propositions in (36) asymmetrically entail the prejacent of *siquiera*. The relation $<_c$ relates to semantic strength as follows: if propositions p and q are comparable in their semantic strength — if either p entails q or q entails p — then if $p <_c q$, we can conclude that p asymmetrically entails q (because for p to be less likely than q , given the common ground information, there should be less worlds in the common ground in which p is true than worlds in which q is, so the common ground should allow for worlds in which q is true but p isn't, but it should not allow for worlds in which p is true but q isn't) (Krifka 1995: 228). This means that under the analysis in (35a), the sentence in (34) should not be defined for any common ground, because it could only be defined for common grounds that allow for worlds in which, for any $n > 1$, Pedro goes swimming at least n times but not at least once.

Scoping *siquiera* over the necessity modal does not give us the right presupposition either. Under the LF in (35b), *siquiera* requires the proposition that Pedro is required to go swimming once per week to be less likely, given the common ground information, than any of the propositions in the set below:

- (37) {Pedro has to go swimming at least two days per week, Pedro has to go swimming at least three days per week ... }

Yet, the sentence in (34) can be appropriately uttered in a scenario where it is taken for granted that it is false that Pedro's doctor *requires* him to go swimming more often than once per week, and where, therefore, the likelihood of the alternatives is zero.

Of course, in positive episodic sentences, like (38) below, *siquiera* cannot outscope a polarity reversal expression either. If we assume the low likelihood analysis, *siquiera* should still be able to combine with unlikely prejacent. This, however, does not seem to be the case: the sentence in (38) below is deviant even in a context where the dean is the most unlikely relevant person to come to the department party.

- (38) * A la fiesta del departamento vino *siquiera* la decana.
to the party of-the department came *siquiera* the dean
Intended: 'Even the dean came to the department party.'

We need a way to derive the negative bias of *siquiera* that does not hinge upon the assumption that this scalar item contributes low likelihood. In the next section, we will sketch one, largely inspired by the domain widening analysis of *even* put forth in van Rooij 2003, and the extremity condition imposed by minimizers in Krifka 1995.

4. Settledness, Minimality and Extremity.

We will continue to assume that *siquiera* takes two arguments: a covert free variable ranging over sets of propositional alternatives, and a proposition (its ‘prejacent.’) For the sake of illustration, we will also assume, as before, that focus brings about the alternatives and determines their shape, and we will continue to take for granted an alternative semantics for focus (Rooth 1985, 1992), under which expressions have both an ordinary ($\llbracket \cdot \rrbracket^o$) and a focus semantic value ($\llbracket \cdot \rrbracket^f$). With this setup in mind, we put forth the hypothesis that *siquiera* imposes two requirements: the first, which we will call “minimality”, requires the prejacent to be weaker than any of the alternatives, and the second, which I take from Krifka’s analysis of minimizers (Krifka 1995: 239) and call, following him, “extremity”, requires that it be taken for granted that, in all natural common grounds, the proposition that if the prejacent is true, then no other alternative is true as well should not be more likely than the proposition that if the prejacent is true, then some other alternative is true as well.⁶

- (39) a. Where $\llbracket \phi \rrbracket^{o,w} \in D_{\langle s,t \rangle}$, $\llbracket \text{siquiera}_C \phi \rrbracket^{f,g}$ and $\llbracket \text{siquiera}_C \phi \rrbracket^{o,w,g}$ are defined iff the conditions in (i-iii) below are all met:
- i. Focus restriction: $C \subseteq \llbracket \phi \rrbracket^f$
 - ii. Minimality: $\forall p \in C [p \rightarrow \llbracket \phi \rrbracket^{o,w}]$
 - iii. Extremity: it holds in w that for any natural common ground c ,

$$\{w' \mid \llbracket \phi \rrbracket^{o,w}(w') \rightarrow \neg \exists p \in \llbracket \phi \rrbracket^f [p(w')]\}$$

$$\leq_c$$

$$\{w' \mid \llbracket \phi \rrbracket^{o,w}(w') \rightarrow \exists p \in \llbracket \phi \rrbracket^f [p(w')]\}$$
- b. When defined, $\llbracket \text{siquiera}_C \phi \rrbracket^{f,g} = C$, and $\llbracket \text{siquiera}_C \phi \rrbracket^{o,w,g} = \llbracket \phi \rrbracket^{o,w,g}$

As in Krifka’s alternative semantics for NPIs (Krifka 1995), we will assume that the alternatives grow to the top, where they are accessed by a covert speech act operator that contrasts the prejacent with all other alternatives. Following van Rooij (2003) analysis of *even*, we will assume that this operator, which we will call ‘OP-EVEN_{ASSERT}’, for lack of a better name, requires the alternatives to be all settled in the common ground, i.e. to be either true or false, as illustrated in (40) below. As in regular assertions, both the prejacent and its negation are required to be compatible with the common ground. The intuition behind the settledness condition is that *siquiera* conveys domain widening: (i) it signals that the issue of whether they are

⁶I assume a two-dimensional system (Stalnaker 1978), where sentential constituents are mapped to a proposition with respect to a ‘context’ world w , which I write as a superscript on the brackets representing the interpretation function. I drop this superscript when it is irrelevant. We will assume that common grounds are sets of pairs of worlds and assignments $\langle w, g \rangle$. The operation ‘+’ for a propositional constituent ϕ is understood as follows:

- (i) $c + \llbracket \phi \rrbracket^{o,w,g}$ is defined iff for all pairs $\langle w, g \rangle \in c$, $\llbracket \phi \rrbracket^{o,w,g}(w)$ is defined.
 When defined, $c + \llbracket \phi \rrbracket^{o,w,g} = \{\langle w, g \rangle \in c \mid \llbracket \phi \rrbracket^{o,w,g}(w) = 1\}$

For any common ground c , I use the expression ‘ $W(c)$ ’ to refer to the set of worlds that are in some pair in c . As before, I use C as both the name of the variable and its value.

true or false is settled for all propositions in the domain containing the alternatives, and (ii) it puts forth the claim that that issue is also settled for all propositions in the wider domain that includes the prejacent.

- (40) a. Where $\llbracket \phi \rrbracket^{o,w,g} \in D_{\langle s,t \rangle}$, $\text{OP-EVEN}_{\text{ASSERT}}(\llbracket \phi \rrbracket^{o,w,g})(c)$ is defined iff
 $\forall p \in \llbracket \phi \rrbracket^f [W(c) \subseteq p \vee W(c) \subseteq \neg p]$ (settledness)
 b. When defined, $\text{OP-EVEN}_{\text{ASSERT}}(\llbracket \phi \rrbracket^{o,w,g})(c) = c + \llbracket \phi \rrbracket^{o,w,g}$

Let us now consider (41). Suppose that the relevant alternatives are propositions of the form ‘that Pedro swam at least n times’ (where $n > 1$) — these alternatives satisfy minimality, assuming that the prejacent is the proposition that Pedro swam at least once. Given the definedness conditions of $\text{OP-EVEN}_{\text{ASSERT}}$, for (41a) to be defined, all these alternatives must be taken to be either true or false. If it were common knowledge that Pedro swam at least twice, it would have to be common knowledge that he swam at least once. In that case, (41a) would already be entailed by the common ground, and, hence, it would not be assertable. We conclude that the common ground should entail that Pedro did not swim twice or more often: if Pedro swam at least once, he did so exactly once. For (41a) to be assertable, there should be worlds in the common ground in which Pedro did not swim, and worlds in which he did so at least once — only once, in fact, given the settledness condition. Given this situation, however, updating the common ground with the information provided by (41) would result in a non natural common ground that would entail that Pedro swam only once, and, thus, violate extremity. We will entertain the hypothesis that this is the reason behind the deviance of (41), following the type of logic that Krifka (1995) appeals to in order to explain the deviance of unembedded minimizers in positive episodic sentences.

- (41) a. * Pedro nadó siquiera una vez.
 Pedro swam SIQUIERA once
 b. LF: $\text{OP-EVEN}_{\text{ASSERT}}[\text{siquiera}_C [\text{Pedro nadó} [\text{una vez}]_F]]$

Consider now the two possible LFs for the sentence in (42a) below:

- (42) a. Pedro no nadó siquiera una vez.
 Pedro not swam SIQUIERA once
 b. LF_1 : $\text{OP-EVEN}_{\text{ASSERT}}[\text{not} [\text{siquiera}_C [\text{Pedro nadó} [\text{una vez}]_F]]]$
 c. LF_2 : $\text{OP-EVEN}_{\text{ASSERT}}[\text{siquiera}_C [\text{not} [\text{Pedro nadó} [\text{una vez}]_F]]]$

Let us discuss LF_1 first. Given the scope of *siquiera*, we can assume that, as before, the relevant alternatives are propositions of the form ‘that Pedro swam at least n times’ (for $n > 1$). At the focus semantic level, these alternatives combine pointwise with negation. The alternatives that the definition of $\text{OP-EVEN}_{\text{ASSERT}}$ makes reference to are then propositions of the form ‘that Pedro did *not* swim at least n times’ (for $n > 1$). $\text{OP-EVEN}_{\text{ASSERT}}$ requires all these alternatives to be either true or false. If they were false, the proposition expressed by (42a) (that Pedro did not swim at least once) would not be compatible with the common ground, and,

hence, it would not be assertable. It must be the case, then, that the alternatives that $\text{OP-EVEN}_{\text{ASSERT}}$ sees are all known to be true. Pedro is then known not to have swum twice or more than twice. For (42b) to be assertable, the common ground must be compatible both with the proposition that Pedro did not swim and with its negation — the proposition that he swam at least once. Since Pedro is known not to have swum twice or more often, for (42b) to be assertable, either Pedro didn't swim or he swam only once, a minimal value. The input common ground is a non-natural one, given the extremity condition. Asserting the proposition expressed by (42c) eliminates the possibility that Pedro swam only once, yielding a common ground that satisfies the extremity condition. As for LF_2 , its definedness conditions are different. Given its scope in (42c), *siquiera* would need to invoke alternatives of the form 'that Pedro did not swim n times' that would *asymmetrically* entail 'that Pedro did not swim at least once.' Even if such alternatives existed, for (42c) to be assertable, we would need to assume that they are all false, and, so, the output common ground would violate the extremity condition.

Let us go back briefly to the modal sentence in (34). Given our current assumptions, there are also two possible LFs for this sentence, depending on the scope of *siquiera* relative to the modal, as illustrated in (43a-43b) below. Under the first analysis, in (43a), *siquiera* requires alternatives of the form 'that Pedro swims at least n times' (for $n > 1$). These combine pointwise at the focus semantic level with the modal operator to yield a set of propositional alternatives of the form of 'that Pedro is required to swim at least n times' (for $n > 1$). $\text{OP-EVEN}_{\text{ASSERT}}$ requires all these alternatives to be settled in the common ground. Since they are all stronger than the assertion, we can conclude that they must be false, and, so, the sentence is correctly predicted to be assertable in a context, like the one that we entertained before, in which they are indeed false. Extremity simply makes sure that it is common knowledge that Pedro is less likely to go swimming only once than more often. As before, the reader can verify that LF_2 is associated with an assertion whose output common ground systematically violates extremity.

- (43) a. $\text{LF}_1: \text{OP-EVEN}_{\text{ASSERT}} \square [\text{siquiera}_C [\text{Pedro goes to swim [at least once]}_F]]$
 b. $\text{LF}_2: \text{OP-EVEN}_{\text{ASSERT}} [\text{siquiera}_C \square [\text{Pedro goes to swim [at least once]}_F]]$

Once the current setup is extended to *yes/no* questions, the negative bias can be derived as a way of avoiding a violation of extremity. To see how, let us assume, again, that the focal alternatives that *siquiera* constrains grow to the top, where they are accessed by a covert speech act operator that, in analogy with the case of assertions, asks whether the prejacent is true or false in case all the alternatives that *siquiera* operates over are known to be true or false. As illustrated below, we assume that a *yes/no* question maps a common ground c into a set containing the set of world-assignment pairs in c where the prejacent is true, and the set of world-assignment pairs in c where the prejacent is false (Krifka 1995: 253). An answer to the question is felicitous if it eliminates one of the elements in that set.

- (44) a. Where $[[\phi]]^{o,w,g} \in D_{\langle s,t \rangle}$, $\text{OP-EVEN}_{Q_{\text{YES/NO}}}([\phi]]^{o,w,g}(c)$ is defined iff
 $\forall p \in [[\phi]]^f [W(c) \subseteq p \vee W(c) \subseteq \neg p]$ (settledness)

- b. When defined, $\text{OP-EVEN}_{\text{Q}_{\text{YES/NO}}}(\llbracket \phi \rrbracket^{0,w,g})(c) = \text{Q}_{\text{YES/NO}}(\llbracket \phi \rrbracket^{0,w,g})(c) = \{\{\langle w, g \rangle \in c \mid \llbracket \phi \rrbracket^{0,w,g}(w) = 1\}, \{\langle w, g \rangle \in c \mid \llbracket \phi \rrbracket^{0,w,g}(w) = 0\}\}$

Let us consider the question in (45). We will assume, again, that *siquiera* requires alternatives of the form ‘that Pedro swam at least n times’ (for $n > 1$). $\text{OP-EVEN}_{\text{Q}_{\text{YES/NO}}}$ requires all these alternatives to be either true or false in the common ground. For the question in (45) to be uttered felicitously, we can assume that the issue of whether Pedro swam at least once is not entailed by the common ground. This means that we need to assume that all the alternatives are false, and that that the common ground entails that either Pedro didn’t swim or that he swam only once. This is a question about whether a truly minimal value holds. The partition that the question performs contains two common grounds: one entails that Pedro swam only once, and the other entails that Pedro did not swim. In answering the question, the hearer needs to choose between these two possible common grounds. By answering with a positive answer, the hearer chooses a common ground that entails that Pedro only swam once, and by answering with a negative answer, one that entails that Pedro didn’t swim. The first common ground violates extremity, but the second doesn’t. Since it is being taken for granted that a common ground that violates extremity is not a natural one, the speaker can expect the hearer to choose the negative answer.

- (45) a. ¿Nadó siquiera una vez?
 pro swam SIQUIERA once
 ‘Did he swim even once?’
 b. LF: $\text{OP-EVEN}_{\text{YES/NO}}[\text{siquiera}_C [\text{pro swam} [\text{at least once}]_F]]$

5. To Conclude.

We have surveyed a number of environments where *siquiera* is licensed and pointed out that this particle conveys a negative bias in questions. We have seen that Guerzoni (2004) provides an elegant analysis of the bias triggered by *even* in questions when it associates with a minimal value. Since this analysis hinges on the assumption that this particle lexically conveys low likelihood, it can be taken to provide indirect evidence for the Scope Theory of *even*. Extending this analysis to *siquiera* is tempting. However, we have seen that *siquiera* is licensed in non downward entailing environments, where it does not seem possible to assume that its lexical entry conveys low likelihood. As an alternative, we have sketched an analysis under which *siquiera* invokes alternatives that are stronger than the assertion and requires that the proposition that *only* the prejacent is true should not be more likely than the proposition that the prejacent and some alternative is true.

In this analysis, the alternatives introduced by *siquiera* interact with a speech act operator that imposes a settledness condition. We have seen the effects of this condition in the case of assertions and direct (*yes/no*) questions. It still remains to be seen how other speech acts may be treated. A particularly pressing question is

what happens with *siquiera* in indirect questions, where, as we have seen, it also triggers a negative bias. This question may be addressed by exploiting a suggestion made in passing by Krifka (1995: 255), who suggests that the semantics of sentences containing indirect questions may convey the felicity conditions of the corresponding direct questions. I hope to address the issue in future work.

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