An existential semantics for habituals*

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Abstract

This paper focuses on a new observation concerning the interaction of approximatives (*almost*, *barely*) and habitual sentences: habituals can only be modified by *almost* when negated. Based on the distribution of approximatives with nominal quantifiers, I take this pattern as evidence that habituals have an underlying existential force, and acquire their quasi-universal meaning via scalar strengthening.

1 Introduction

The main empirical contribution of this paper is the observation that, although habituals[1] can be modified by both *almost* and *barely*, the former requires sentential negation. I illustrate this point with data from Brazilian Portuguese (BP), a language that has dedicated habitual morphology.

(2) a. O João quase não checa o email quando tá de férias.
the John almost NEG checks the email when is.3S.HAB on vacation
'John almost doesn't check his email when he's on vacation.'

b. *O João quase checa o email quando tá de férias.
the John almost checks the email when is.3S.HAB on vacation
*'John almost checks his email when he's on vacation.'

c. O João mal checa o email quando tá de férias.
the John barely checks the email when is.3S.HAB on vacation
'John barely checks his email when he's on vacation.'

It's well-known that approximatives place restrictions on their complements. Baron [4], who provides the state-of-the-art treatment of approximatives, formalizes these restrictions in terms of monotonicity: *almost* can only modify operators that are downward-entailing on their

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[1] There is a growing consensus in the literature that constructions that have been historically labeled 'habituals' don't form a unified class. In recent work, Cable [5] distinguishes between habituals that express unrealized dispositions (like *Mary handles the mail from Antarctica*), and 'actualized habituals', which describe habits that have been realized in the actual world. It seems that *barely* and *almost-not* can only modify the latter:

(1) a. ?Mary almost doesn't handle the mail from Antarctica.
b. ?Mary barely handles the mail from Antarctica.

This speaks in favor of Cable's [5] hypothesis that purely dispositional habituals and actualized habituals involve different LFs even in languages that don't show this distinction overtly.

left argument, while *barely* requires left upward-entailing operators.[2] These constraints neatly capture the complementary distribution of *almost* and *barely* with nominal quantifiers, shown in (3).

(3) a. Almost every student came to the meeting. ✓*almost* ∀
b. Almost no student came to the meeting. ✓*almost* ¬∃
c. *Almost some student came to the meeting. **almost* ∃
d. Barely any student came to the meeting. ✓*barely* ∃
e. *Barely every student came to the meeting. **barely* ∀

In light of these facts, the paradigm in (2) provides evidence that habitual sentences involve existential quantification. This conclusion is rather puzzling: intuitively, habituals seem to have (quasi-)universal force. Before discussing how these seemingly conflicting facts can be reconciled, let me say a word about the broader significance of this observation.

Habitual sentences give rise to Homogeneity effects, as first noticed by Ferreira [9]. That is, a bare habitual, like (4a), has a universal reading, but its negated form (4b) has the force of a negated existential. Habituals are also known to tolerate exceptions—(4a) could be truthfully uttered even if John doesn't *always* smoke when he's anxious; exception tolerance, or non-maximality, is a hallmark of constructions that display Homogeneity. Finally, a universal quantifier can remove the Homogeneity of (4a); unlike (4a), (4c) doesn't tolerate exceptions to John's behavior.

(4) a. John smokes when he's anxious.
i. ≈John *always* smokes when he's anxious.
ii. ≉John *sometimes* smokes when he's anxious.
b. John doesn't smoke when he's anxious.
i. ≉John doesn't *always* smoke when he's anxious.
ii. ≈John *never* smokes when he's anxious.
c. John *always* smokes when he's anxious.

These facts find analogs in the behavior of definite plurals, the most well-understood example of Homogeneity effects in natural language:

(5) a. The semantics students came to the meeting.
i. ≈*Every* semantics student came to the meeting.
ii. ≉*Some* semantics students came to the meeting.
b. The semantics students didn't come to the meeting.
i. ≉Not *every* semantics student came to the meeting.
ii. ≈*No* semantics student came to the meeting.
c. *Every* semantics student came to the meeting.

It seems likely that habituals and definite plurals are simply different exponents of Homogeneity, and thus deserve a unifying account. The observation in (2) adds a desideratum to this account: it should include an operator that is upward monotonic on its restrictor. To my knowledge, the only existing account that meets this criteria is Bar-Lev [3], according to which Homogeneity effects arise when an existential distributive operator (∃-DIST) undergoes

[2] I'm omitting some complications posed by *barely* that are not immediately relevant to the discussion in this paper. I refer the reader to Baron's dissertation for a detailed explanation of how his account can be extended to other uses of approximatives, including cases in which they modify adjectives and numerals.

strengthening. The paradigm in (2) provides support for the presence of this operator in the syntax. Therefore, the discussion in this paper may not only contribute to our understanding of habituals, but also to the debate about the proper derivation of Homogeneity effects in natural language.

2 Proposal

2.1 An existential semantics for habituals

As I mentioned above, the facts in (2) can be straightforwardly captured by extending Bar-Lev [3]'s treatment of definite plurals to habituals. A crucial feature of this account is that sentences with definite plurals have a weak, existential semantics, contributed by the distributive operator $\exists$-DIST$_D$, which is obligatorily adjoined to the sister of plural DPs. A sentence like (6a) has the LF in (6b):

(6) a. The girls danced.
b. [The girls][$\exists$-DIST$_D$ danced]

Definite plurals are non-quantificational and simply denote the maximal element in a plurality. That is, if there are two girls under discussion, say, Anna and Mary, $[\![\text{the girls}]\!] = \text{Anna} \sqcup \text{Mary} = \text{Anna} \vee \text{Mary}$. The role of definite plurals in this analysis is to restrict the domain of the variable D to the atomic parts of the plurality it denotes. $\exists$-DIST$_D$ has the lexical entry in (7a).

(7) a. $[\![\exists\text{-DIST}_D]\!] = \lambda P.\lambda x.\exists y \in D \cap Part_{AT}(x)[P(y) = 1]$
b. $Part_{AT}(x) = \{y : y \sqsubseteq_{AT} x\}$

The final meaning of (6a) is obtained via scalar strengthening, which is carried out by a covert exhaustification operator, whose lexical entry is given below.

(8) $[\![\text{EXH}]\!](C)(p) \Leftrightarrow \forall q \in IE(p, C)[\neg q] \wedge \forall r \in II(p, C)[r]$

When applied to an alternative set C and a proposition p, EXH negates all innocently excludable (IE) alternatives, and asserts all innocently includable (II) alternatives to p in C. IE alternatives are formed by intersecting all maximal subsets of C that can be negated consistently with the prejacent. The II alternatives are formed by the intersection of all maximal subsets of C that can be asserted consistently with the prejacent and with the negation of the IE alternatives. This complex algorithm is designed to ensure that exhaustification does not lead to a contradiction, and that all alternatives in C receive a truth value whenever possible.

With the basic ingredients of Bar-Lev [3]'s account on the table, we're ready to switch our focus back to habituals. As we saw, in sentences like (6a), definite plurals act as restrictors to the domain of $\exists$-DIST$_D$. What could be playing the same role in sentences with habituals? Non-quantificational temporal adverbials, like *on Fridays*, and clauses headed by *when*, *before* and *after* seem to be good candidates:

(9) a. John smokes when he's anxious.
b. John meditates before a meeting.
c. John smokes after drinking coffee.
d. John exercises on Fridays.

Of course not every habitual sentence includes an overt restrictor like the ones above. Very often, this restrictor is recovered from the context. For example, B's reply in (10) would be

naturally understood as being restricted to the times when B watches the World Cup. In some cases, it's not clear that there is a restrictor at all. I delay a discussion of these cases to §4.

(10) A: Are you gonna watch the World Cup?
B: No, I get too emotionally invested.

For concreteness, I assume the simplified LF in (11) for (9d).

(11) [On Fridays][$\exists$-DIST$_D$ John exercises]

To pursue the analogy with Bar-Lev's [3] account of definite plurals, I assume non-quantificational temporal adverbials, like 'on Fridays' denote a plurality of times. I furthermore adopt a toy model containing only two Fridays, so $[\![\text{on Fridays}]\!] = i_1 \vee i_2$. The alternatives to (9d) are obtained by replacing the domain variable D with its subsets.

(12) a. $Alt([\![9d]\!]) = \{[\text{on Fridays}][\exists\text{-DIST}_{D'} \text{ John exercises}] : D' \subseteq D\}$
b. $= \{\text{J exercises at } i_1 \vee \text{J exercises at } i_2, \text{J exercises at } i_1, \text{J exercises at } i_2\}$

Notice (12b) does not contain the conjunctive alternative {J exercises at $i_1 \wedge$ J exercises at i_2}. The assumption that (12b) is not closed under conjunction is crucial to deriving strengthening, as it renders all alternatives in (12b) *II*. As a result, all alternatives are asserted, and $\exists$-DIST$_D$ acquires a universal force.

(13) $[\![\text{EXH}]\!](Alt([\![6a]\!]))([\![6a]\!]) = \text{J exercises at } i_1 \vee \text{J exercises at } i_2$
$\wedge$ J exercises at $i_1 \wedge$ J exercises at i_2
$= \text{J exercises at } i_1 \wedge \text{J exercises at } i_2$

Applying EXH above negation has no truth-conditional effect, as the negated prejacent $\neg$(J exercises at $i_1 \vee$ J exercises at i_2) is already the strongest alternative. That correctly captures the contrast between (5a) and (5b), which is the hallmark of Homogeneity.[3]

The discussion above might raise a concern related to the scope of approximatives and EXH. Recall from §1 that *almost* modifies universal quantifiers and negated existentials, while *barely* modifies only existentials. Now, suppose EXH intervenes between *almost* and $\exists$-DIST$_D$, as shown in (14a). $\exists$-DIST$_D$ would be strengthened into a universal meaning via exhaustification before combining with the approximatives. It is tempting to conclude that, in this configuration, *almost* and *barely* would 'see' $\exists$-DIST$_D$ as a universal, which, given the paradigm in (4), never seems to be the case.[4]

(14) a. *[*almost* [EXH [$\exists$-DIST ...]]]
b. [EXH [*almost* [$\exists$-DIST ...]]]

As I said earlier, Baron [4] states the selectional requirements of approximatives in terms of monotonicity: *almost* can only modify left downward-entailing operators. Even if $\exists$-DIST was strengthened before combining with *almost*, it would still have the formal properties of

[3] In Bar-Lev [3]'s system, non-maximal readings are derived by capitalizing on the context-sensitive nature of implicature calculation. For reasons of space, I cannot discuss these readings here, but Bar-Lev's derivation of non-maximality with definite plurals should carry over straightforwardly to habituals.

[4] This discussion focuses only on *almost* because *barely* encodes negation in its lexical entry (see Baron, [4]). EXH cannot apply under negation (Fox & Spector, [10]), so an LF in which EXH scoped under *barely* would be ruled out on independent grounds.

an existential—after all, strengthening consists in conjoining an existential prejacent with its sub-domain alternatives. I conclude that, if the LF in (14a) is available at all, it leads to trivial truth conditions, and therefore, ungrammaticality.[5]

3 Comparison with previous accounts

I take it that the primary goal of any theory of habituals should be a unification with definite plurals. Based on the interaction of habituals and approximatives, I argued that a theory of habituals must also give them an underlying existential force. In this section, I compare my account to Ferreira [9] and Agha [1], the two existing analyses of habituals that are explicit about their connection with definite plurals.

Ferreira, [9], who first noticed this link, took some important steps towards a unification of the two phenomena, but ultimately fell short of his goal. Ferreira argues that the restrictors of habituals are, themselves, universal distributive operators. Then, to capture the exception-tolerance of habituals, Ferreira [9] needs to resort to a modal-temporal operator (IMP) which the author takes to be present in progressive and habitual sentences.[6] This move is undesirable because, as we saw, definite plurals are also tolerant to exceptions—and they're unlikely to involve any modality.

Agha [1] offers an elegant treatment of habituals based on Križ's [13]'s account of Homogeneity. His proposal shares a number of similarities with the present account. In brief, the author argues that habitual readings are obtained when a sentence radical, which he takes to denote a predicate of times, is applied directly to a tense head or frame adverbial, which denote a plurality of time intervals. One of Agha's goals with his non-quantificational account is to avoid the undesirable consequences of giving habituals a universal meaning. In this respect, our views are very much aligned. However, since Agha's semantics for habituals doesn't involve any quantification, it's not clear how it could capture the pattern in (2).

4 Conclusion & open issues

This paper brought new evidence that suggests that habituals have an underlying existential force. I then showed that this otherwise puzzling fact can be neatly accounted for by adopting Bar-Lev's [3] view of Homogeneity as scalar strengthening.

To push the analogy between habituals and definite plurals, I assumed the LF of habituals always includes a restrictor, which can be overt or recovered from the context. This assumption is shared by other accounts, like Ferreira's and Cable's [5]. However, some habitual sentences don't seem to involve a restrictor at all; (16) could be uttered in an out-of-the-blue context to convey that John is a smoker.

(16) John smokes.

[5] Free Choice Items, like *any* in some of its uses, are often treated as existentials that undergo strengthening (see Chierchia, [6], and Dayal, [7], among many others). Free Choice *any* can, however, be modified by *almost*:

(15) You can pick almost any card.

If the conclusion of this section is on the right track, it suggests that, contrary to common wisdom, FCI *any* is a universal. An in-depth discussion of this contentious point is left for future work.

[6] Ferreira's modal treatment of habituals is inspired by Portner's [15] semantics for the progressive.

We could assume examples like (16) include a trivial restrictor ('John smokes [when he smokes]'), but there's evidence that these cases deserve a separate treatment.[7] Habituals like (16) behave differently from the other habituals discussed in this paper in at least one more way: (16) gives rise to the 'same-participant effect' (as noted by Krifka et al. [12], Ferreira [9], [8], a.o.). Unlike (18a) and (18b), (18c) sounds odd because it implies that John smokes the same cigarette multiple times. Integrating examples like (16) into my account is left for future work.

(18) a. When he's anxious, John smokes a cigarette.
b. John smokes a cigarette after dinner.
c. #John smokes a cigarette.

Another issue raised by my proposal concerns some disanalogies between definite plurals and habituals. If these two constructions have such similar semantics, all else equal, they should also behave the same way with respect to modification by *almost* and *barely*. Before addressing this concern, I should point out that my proposal does *not* predict that *almost* or *barely* should be able to attach directly to the definite plural, as in (19).

(19) *Barely the girls danced.

It's fairly uncontroversial to assume that, despite their cross-categorial nature, *almost* and *barely* impose restrictions on the semantic type of their prejacents. More specifically, it seems that *almost* and *barely* take prejacents of a high type, like quantifiers. Definite plurals are normally not assumed to have such high types (see Link [14], Krifka [11], a.o.), so (19) could be ruled out on the basis of a type mismatch.

Examples (20a), (20b) and (20c) deserve more attention. Assuming *almost* and *barely* scope over $\exists$-DIST$_D$ in these sentences, my account predicts (20a) and (20b) should be acceptable and truth-conditionally equivalent, conveying that very few girls danced. It also predicts, all else being equal, that (20c) should be unacceptable. These predictions are not borne out.

(20) a. The girls barely danced.
b. The girls almost didn't dance.
c. The girls almost danced.

Let me start by addressing the acceptability of (20c). It seems that the only available reading of (20c) is counterfactual; (20c) could be paraphrased as 'all girls came close to dancing, but didn't.' Amaral [2] and Rapp & von Stechow [16], a.o., point out that counterfactual readings of *almost* are only possible in sentences with certain mood and aspectual morphemes. This observation suggests that in (20c), *almost* is not modifying $\exists$-DIST$_D$, but rather some intensional operator whose presence is obscured in English. Examples (20a) and (20b), on the other hand, seem to give rise to a reading that could be paraphrased as 'the girls danced very little'. It's not clear which operator *almost-not* and *barely* are modifying in this case. I must leave a more detailed comparison between habituals and definite plurals to future work.

[7] Notice, however, that (16) patterns with other habituals with respect to modification by *almost* and *barely*, which could be taken as evidence that (16) is not a 'dispositional habitual' (see fn.1):

(17) a. *John almost smokes.
b. John almost doesn't smoke.
c. John barely smokes.

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