

## Polarity particles and the anatomy of negative quantifiers

**The question.** Sentences involving ‘negative quantifiers’, exemplified in (1), have been treated either as involving an indefinite expression within the scope of sentential negation (the N(egative) I(ndefinite) approach - Penka 2007, Zeijlstra 2004, Abels and Marti 2010, Tubau 2008 a.o.) or as involving negative quantifiers occurring in otherwise positive sentences (the N(egative) Q(uantifier) approach - Zanuttini 1991, Haegeman and Zanuttini 1996, de Swart and Sag 2002 a.o ).

- (1) a. None of the men stepped forward.  
b. Susan never saw this movie.

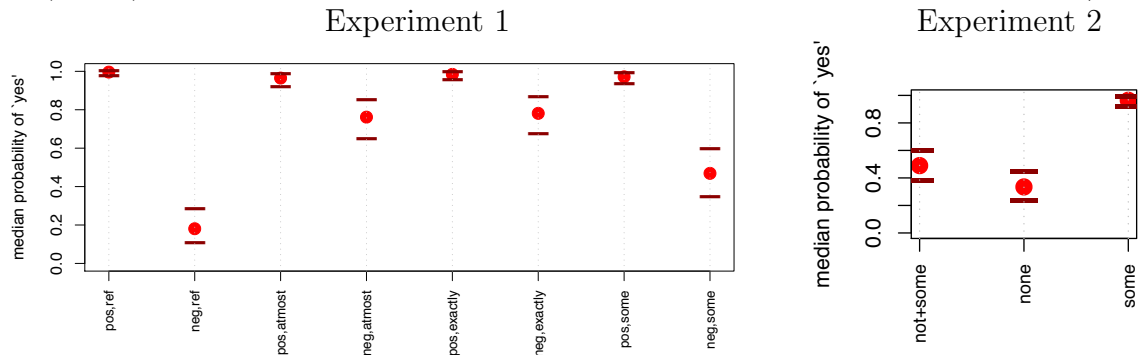
This paper provides novel experimental evidence for the NI approach, based on data involving polarity particles in English, and thereby offers a new tool for diagnosing sentence level ‘negativity’.

### Experiment 1: particles in responses to positive and negative sentences.

53 subjects were asked to choose between *yes* and *no* in agreeing responses to positive and negative sentences involving referential or quantificational subjects, exemplified below:

- (2) A: Some of the men stepped forward.  
B: {**Yes**, no} some of them did.  
(3) A: Some of the men didn’t step forward.  
B: {**Yes**, **no**} some of them didn’t.

The results show a robust contrast between responses to positive sentences and responses to negative sentences, indicated by bold face: the former only allow *yes*, while the latter allow both particles. This is shown in the left figure below, which provides the estimated preferences / probabilities for a ‘yes’ response for **positive** and **negative** sentences with various types of subject NPs: **referential** and quantificational NPs headed by **at most** *n*, **exactly** *n* and **some** determiners. The figure displays the median probability of *yes* (the red dots) and the 2.5% and 97.5% quantiles (the dark red bars) indicating the 95% intervals around these probabilities. These estimates and intervals are based on a mixed-effects logistic regression model with polarity (**pos**, **neg**) and NP type (**ref**, **atmost**, **exactly** and **some**) as fixed effects and intercept-only random effects for subjects (no items random effects because they account for no variation in the dependent variable). The medians and quantiles are based on the Bayesian estimates of the corresponding posterior distributions (given low-information priors:  $N(0, 100^2)$  for each of the fixed effects and  $Unif(0, 100)$  for the standard deviation of the random-effects normal distribution).



**Analysis.** We assume that sentences are marked as positive or negative by the presence of an *aff(irm)* or a *neg(ate)* operator in  $\Sigma P$ . These operators determine the *inner polarity* of a sentence. Polarity particles like *yes* and *no* are anaphoric and show sensitivity to the inner polarity of their antecedent, i.e., the sentence they react to (see Farkas 2011). Responses are marked by two binary features, a *relative polarity* feature, whose value is

[SAME] or [REVERSE], and an *absolute polarity* feature, whose value is [+] or [-]. Relative polarity features characterize the response as confirming or reversing the antecedent; absolute polarity features characterize the response as asserting a positive or a negative sentence, and thereby also determine the inner polarity of the presupposed antecedent.

- (4) a. [SAME,+] responses presuppose a positive antecedent, i.e., a sentence whose inner polarity is *aff*, and confirm that sentence.
- b. [SAME,-] responses presuppose a negative antecedent, i.e., a sentence whose inner polarity is *neg*, and confirm that sentence.

The relation between polarity features and particles in English is assumed to be as in (5), a cross-linguistically frequent pattern (see Pope 1976). These assumptions give rise to the generalization in (6), which is supported by the results of Experiment 1:

- (5) a. [+] and [SAME] can be realized by *yes*
- b. [-] and [REVERSE] can be realized by *no*
- (6) a. [SAME,+] responses allow *yes* and disallow *no*
- b. [SAME,-] responses allow both *yes* and *no*

In [SAME,+] responses there is no feature that can be realized by *no*, while in [SAME,-] responses [SAME] can be realized by *yes* and [-] can be realized by *no*. The paper presents a fuller picture that accounts for polarity particles in reversal moves as well.

**Predictions concerning negative quantifiers.** This account of polarity particles gives rise to the following prediction. Whenever it is possible to use *no* in a response that *confirms* a given assertion, the inner polarity of that assertion must be *negative*. This is so because if the inner polarity of the assertion were positive, then a confirming response would be characterized as [SAME,+] and neither of these features can be realized by *no*.

Now, turning back to our initial question, note that NI accounts predict that the responses in (7) and (8) will pattern with (3), while NQ accounts, in the absence of additional stipulations, predict that the responses in (7) and (8) will pattern with (2).

- (7) A: None of the men stepped forward.  
B: {Yes, No} none of them did.
- (8) A: Susan never saw this movie.  
B: {Yes, No} she never did.

**Experiment 2: testing the predictions.** We tested these predictions by asking 53 subjects to choose between *yes* and *no* in confirming responses to assertions involving nominal or adverbial negative quantifiers, as in (7) and (8), and in confirming responses to assertions involving nominal or adverbial existential quantifiers, with or without sentential negation, as in (2) and (3), and the adverbial counterparts thereof. The results (see the figure on the right, previous page) show that sentences with negative quantifiers, whether nominal or adverbial, pattern with negative sentences in robustly allowing both *yes* and *no* responses. The possibility of *no* responses here contrasts sharply with the results for responses to positive sentences with positive existentials, where *no* is virtually ruled out. The results of a third experiment testing responses to assertions that involve negative quantifiers in object rather than subject position confirm those of Experiment 2.

**Conclusion.** We conclude that sentences involving negative quantifiers in standard English should be treated as *negative* sentences on a par with ordinary negative sentences exhibiting sentential negation. NI accounts achieve this straightforwardly and therefore the data we give here provides additional evidence for these accounts. With respect to polarity particles, the data provides evidence for the necessity of correlating *yes* and *no* in English with both absolute and relative polarity features in the manner proposed here.