

# Polarity particles in an inquisitive discourse model\*

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## 1 Introduction

- Across languages, responses to polar questions and assertions are often marked by so-called *polarity particles* (in English: *yes/no*)

- |     |                    |     |                    |
|-----|--------------------|-----|--------------------|
| (1) | Amy left.          | (2) | Did Amy leave?     |
|     | a. Yes, she did.   |     | a. Yes, she did.   |
|     | b. No, she didn't. |     | b. No, she didn't. |

- Basic ideas to be worked out:
  - Both assertions and polar questions express a **proposal** to update the common ground of a conversation in one or more ways<sup>1</sup>
  - Polarity particles mark responses to a given proposal as being **confirming/reversing**, or as being **positive/negative**
- First part of the talk:
  - Develops a precise and sufficiently fine-grained formal notion of proposals
  - Specifies how polarity particles are used to mark responses to a given proposal
- Second part of the talk:
  - Examines the polarity particle systems in Romanian, French, and German, which differ in interesting ways from English

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\*A substantial part of the paper in progress that this handout is based on—the part that spells out the ‘inquisitive discourse model’ in detail—is left out here for reasons of time. Feedback of any kind will be very much appreciated. We are grateful to Adrian Brasoveanu for fruitful collaboration on a closely related project (Brasoveanu *et al.*, 2011).

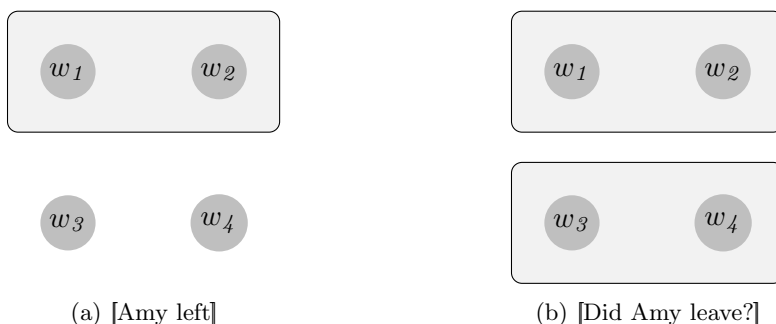
<sup>1</sup>See Groenendijk and Roelofsen (2009); Farkas and Bruce (2010), among others.

## 2 Proposals, responses, and polarity particles

### 2.1 Proposals as sets of possibilities

- We will work within the framework of **inquisitive semantics**<sup>2</sup>
- In inquisitive semantics, the proposition expressed by a sentence does not just capture the informative content of that sentence, but rather, more generally, the proposal that is made in uttering that sentence
- Propositions are defined as sets of **possibilities**
- Each possibility is a set of **possible worlds**, representing a potential update of the common ground
- Example:

The propositions expressed by (1) and (2) are depicted below:



$w_1$  and  $w_2$ : worlds where Amy left

$w_3$  and  $w_4$ : worlds where Amy did not leave

- The proposition expressed by a sentence  $\varphi$  is denoted by  $[\varphi]$
- In uttering a sentence  $\varphi$ , a speaker:
  1. **provides** the information that the actual world is contained in at least one of the possibilities in  $[\varphi]$ , and at the same time
  2. **requests** a response from other participants that provides enough information to establish at least one of the proposed updates

### 2.2 Highlighting

- For many purposes, it is sufficient to simply represent proposals as sets of possibilities
- However, to account for the distribution and interpretation of polarity particles we need a **more fine-grained** formal representation of proposals
- To see this, consider the following three questions:

(3) Is the door open?

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<sup>2</sup>See Groenendijk and Roelofsen (2009); Ciardelli and Roelofsen (2011); AnderBois (2011), among others.

(4) Is the door closed?

(5) Is the door open $\uparrow$  or closed $\downarrow$ ?

- The propositions expressed by these questions all consist of the **same two possibilities**, the possibility that the door is open, and the possibility that the door is closed
- Yet, if we consider the distribution and interpretation of polarity particles in responses to these questions, we find striking differences:

(3) Is the door open?

a. Yes  $\Rightarrow$  open

b. No  $\Rightarrow$  closed

(4) Is the door closed?

a. Yes  $\Rightarrow$  closed

b. No  $\Rightarrow$  open

(5) Is the door open $\uparrow$  or closed $\downarrow$ ?

a. # Yes

b. # No

- In order to capture these contrasts, we will make a distinction between **highlighted** and non-highlighted possibilities<sup>3</sup>
- Intuitively, highlighted possibilities are the ones that are **explicitly mentioned**
- In particular:
  - (3) highlights the possibility that the door is **open**
  - (4) highlights the possibility that the door is **closed**
  - (5) highlights **both** of these possibilities
- This is depicted in figure 1, where:
  - $w_1$  and  $w_2$  are worlds where the door is **open**
  - $w_3$  and  $w_4$  are worlds where the door is **closed**
  - **highlighted** possibilities are displayed with a **thick border**
- Highlighted possibilities serve as **antecedents** for subsequent **anaphoric** expressions
- Polarity particles are such anaphoric expressions
- Assume that *yes* and *no* are interpreted as follows (to be refined)
  - A *yes* answer to an initiative  $\psi$  **presupposes** that there is **exactly one highlighted alternative** for  $\psi$ .
  - If this presupposition is met, *yes* confirms this highlighted alternative.

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<sup>3</sup>See Roelofsen and van Gool (2010); Pruitt and Roelofsen (2011); Farkas (2011).

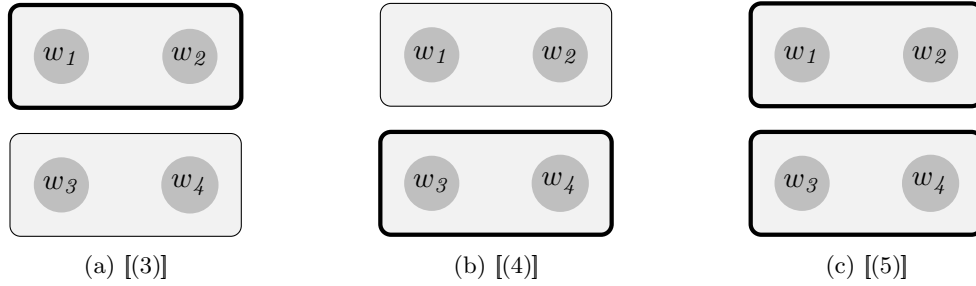


Figure 1: The possibilities proposed and highlighted by (3), (4), and (5).

- A *no* answer simply rejects all the highlighted possibilities for  $\psi$ .
- Then the contrast between (3), (4), and (5) is accounted for
- In the case of (3), there is **exactly one highlighted alternative**. So:
  - *yes* is licensed; it confirms the highlighted alt, conveying that the door is open;
  - *no* denies the highlighted alternative, conveying that the door is closed.
- In the case of (4), there is again **exactly one highlighted alternative**. So:
  - *yes* is licensed; it confirms the highlighted alt, conveying that the door is closed;
  - *no* denies the highlighted alternative, conveying that the door is open.
- In the case of (5), there are **two highlighted alternatives**. So:
  - *yes* is not licensed—its presupposition is not met;
  - *no* signals that the door is neither open nor closed, which is contradictory.
- Some additional predictions:
  - Polarity particles can only be used in responses, **not ‘out of the blue’**
  - Polarity particles can **not** be used **in response to *wh*-questions**, assuming that such questions do not highlight any possibilities

### 2.3 Positive and negative possibilities

- The distinction between highlighted and non-highlighted possibilities is not yet sufficient for a full account of polarity particles
- To see this, consider the following contrast:
 

(6) Susan failed the exam. a. Yes, she failed. b. *No, she failed.	(7) Susan didn’t pass the exam. a. Yes, she didn’t pass. b. No, she didn’t pass.
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- (6) and (7) are entirely **equivalent** in the system considered so far:
  - They express exactly the same proposition

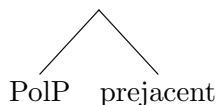
- They highlight exactly the same possibility
- Still, they do not license the same polarity particles
- This contrast can only be accounted for semantically if we make our notion of propositions/proposals even more fine-grained
- ...fine-grained enough to reflect the relevant difference between (6) and (7)
- To this end, we will make a distinction between **positive** and **negative** possibilities
- Negative possibilities are introduced by sentential negation
- [not  $\varphi$ ] consists of a single [H,–] possibility: the complement of  $\bigcup[\varphi]$
- Examples:
  - [Susan failed the exam] consists of a single [H,+] possibility
  - [Susan did not pass the exam] consists of a single [H,–] possibility
  - In both cases, the possibility involved consists of all worlds where Susan failed
  - However, in one case this possibility is positive, in the other it is negative
- Polarity phrases presuppose positive/negative antecedents, just like pronouns presuppose masculine/feminine antecedents
- Polarity particles in English do **double duty**:
  - They may signal whether the antecedent possibilities are **confirmed** or **rejected**
  - or whether the antecedent possibilities are supposed to be **positive** or **negative**
- In (6-a-b):
  - *yes* signals that the response is **confirming** or that the antecedent is **positive**
  - *no* is **not licensed** because it can only be used to signal that the response is **rejecting** or that the antecedent is **negative**
  - Neither is the case here: the response is confirming and the antecedent is positive
- In (7-a-b), *yes* signals confirmation, while *no* signals that the antecedent is negative

## 2.4 Absolute and relative polarity features

- To capture the idea that polarity particles do double duty, we assume that they are used to **realize** either an **absolute** or a **relative polarity feature**<sup>4</sup>
- An **absolute** polarity feature marks a response as being **positive** or **negative**
- A **relative** polarity feature marks a response as having the **same** absolute polarity as the antecedent, or the **reverse**
- Absolute polarity feature values: [+] and [–]
- Relative polarity feature values: [SAME] and [REVERSE]

	response	relation with antecedent
[SAME,+]	+	same
[SAME,-]	-	same
[REVERSE,+]	+	reverse
[REVERSE,-]	-	reverse

- Thus, in total there are four possible feature value combinations:
- Polarity features are hosted by a syntactic node called **PolP**
- Syntactically, PolP always attaches to a clausal node, which we call its **prejacent**



- The prejacent may be partially or fully elided
- To be specified:
  - The semantic contribution of the four possible feature combinations in PolP
  - Feature realization rules:
    - \* which particles can be used to realize which features, and
    - \* given a certain feature combination, which features are to be realized

## 2.5 Interpretation of feature combinations in PolP

- The semantic contribution of features in PolP is purely **presuppositional**
- If the presuppositions of PolP are met, it expresses the **identity function**,  $\lambda p.p$
- [SAME,+]  
  - presupposes a unique [H,+]<sup>5</sup> alternative  $\alpha$  on the Table
  - presupposes that its prejacent **confirms** this alternative:  $[\text{prejacent}] = \{\alpha_{[+]}\}$
- [SAME,-]  
  - presupposes a unique [H,-] alternative  $\alpha$  on the Table
  - presupposes that its prejacent **confirms** this alternative:  $[\text{prejacent}] = \{\alpha_{[-]}\}$

<sup>4</sup>See Pope (1976); Farkas and Bruce (2010); Farkas (2010).

<sup>5</sup>We assume a discourse model in which a discourse context includes a stack of propositions, representing the proposals under consideration. This stack of propositions is called the Table. For convenience, we refer to alternatives that are contained in the *first* proposition on the Table simply as the ‘alternatives on the Table.’ The discourse model will be spelled out in the full paper (in progress). It will integrate inquisitive semantics with the model of Farkas and Bruce (2010), which in turn builds on much earlier work, e.g., Hamblin (1971); Stalnaker (1978); Carlson (1983); Ginzburg (1996); Clark (1992); Roberts (1996); Gunlogson (2001); Asher and Lascarides (2003); Büring (2003).

- [REVERSE,+]  
 – presupposes a non-empty set of [H,-] alternatives A on the Table  
 – presupposes that its prejacent **rejects** all these alternatives: [prejacent] =  $\{\overline{\bigcup A_{[+]}}\}$
- [REVERSE,-]  
 – presupposes a non-empty set of [H,+]  
 alternatives A on the Table  
 – presupposes that its prejacent **rejects** all these alternatives: [prejacent] =  $\{\overline{\bigcup A_{[-]}}\}$

## 2.6 Realization rules

- Which particles can be used to realize which features?

In English:

- [SAME] and [+] can be realized by *yes*
- [REVERSE] and [-] can be realized by *no*
- Thus, polarity particles in English do **double duty**  
 – they are used to realize both absolute and relative polarity features
- Given a certain feature combination, which features are to be realized?

Features that are more **marked** have higher ‘realization needs’

- (8)
- [-] is marked relative to [+]
  - [REVERSE] is marked relative to [SAME]
  - The absolute polarity of [REVERSE] responses is marked because it **contrasts** with the polarity of the antecedent

- Main predictions

- (9)
- [SAME,+]  
can only be realized by *yes*
  - [REVERSE,-]  
can only be realized by *no*
  - [SAME,-]  
can be realized by *yes* or *no*
  - [REVERSE,+]  
can be realized by *yes* or *no*

- (10)
- In the case of [SAME,-] we expect a **preference** for *no* over *yes* because [-] is more marked than [SAME]
  - In the case of [REVERSE,+]  
**both features have high realization needs**;  
across languages we see different strategies to satisfy these needs

- In English, [REVERSE,+]  
polarity phrases must have an explicit prejacent with **verum focus**, reflecting the **contrastive** positive polarity of the response:

- (11)
- A: Peter didn’t call.  
 B: Yes, he DID. / No, he DID.

- The full paradigm:

- (12) A: Peter called. / Did Peter call?  
 B: Yes, he did. / \*No, he did. [SAME,+]
- (13) A: Peter called. / Did Peter call?  
 B: \*Yes, he didn't. / No, he didn't. [REVERSE,-]
- (14) A: Peter didn't call. / Did Peter not call?  
 B: Yes, he didn't. / No, he didn't. (preference for *no*) [SAME,-]
- (15) A: Peter didn't call. / Did Peter not call?  
 B: Yes, he DID. / No, he DID. (contrastive stress obligatory) [REVERSE,+]

### 3 Polarity particles cross-linguistically

- Given the assumed distinction between absolute and relative polarity features, we expect to find languages with different polarity particle systems
- In particular, we expect languages where particles don't do double duty, as in English
- We also expect to find different realization strategies in the case of [REVERSE,+]
- In this section we will consider several **languages with three polarity particles**:
  - A language with two absolute particles and a specialized [REVERSE] particle (Romanian)
  - Several languages with a specialized particle for [REVERSE,+]  
 \* based on an adversative [REVERSE] morpheme (German)  
 \* or based on a special [+] morpheme (French, Swedish, Danish)

#### 3.1 A dedicated [reverse] particle: the case of Romanian

- Particle inventory: *da*, *nu*, *ba* (Farkas, 2011)
- Realization rules for Romanian: realization **potential** of polarity particles
  - *da* realizes [+]
  - *nu* realizes [-]
  - *ba* realizes [REVERSE]
- Realization rules for Romanian: realization **needs** of polarity features
  - Absolute features must be realized, either by a particle or by the prejacent clause
  - [SAME] is never realized
  - [REVERSE] is always realized in [REVERSE,+] responses
  - [REVERSE] is optionally realized in [REVERSE,-] responses to assertions
  - [REVERSE] is never realized in [REVERSE,-] responses to questions



- *da* realizes [+]

(16) [SAME,+]  
 A: Paul a telefonat./A telefonat Paul? ‘Paul called./Did Paul call?’  
 B: Da/\*Nu, (a telefonat). ‘Yes / \*No (he called).’

(17) [REVERSE,+]  
 A: Paul nu a telefonat./Nu a telefonat Paul? ‘P did not call./Did P not call?’  
 B: Ba da/\*Nu, (a telefonat). ‘Yes, he DID.’

- *nu* realizes [–]

(18) [SAME,–]  
 A: Paul nu a telefonat./Nu a telefonat Paul? ‘P did not call./Did P not call?’  
 B: Nu, (nu a telefonat). ‘No, (he didn’t call).’

(19) [REVERSE,–]  
 A: Paul a telefonat./A telefonat Paul? ‘Paul called./Did Paul call?’  
 B: Nu, (nu a telefonat). ‘No, (he didn’t call).’

- *ba* realizes [REVERSE]

(20) [REVERSE,+]  
 A: Paul nu a telefonat./Nu a telefonat Paul? ‘P did not call./Did P not call?’  
 B: Ba (da)/\*nu, (a telefonat). ‘Yes, he DID.’

(21) [REVERSE,–]  
 A: Paul a telefonat. ‘Paul called.’  
 B: (Ba) nu, (nu a telefonat). ‘No, (he didn’t call).’

- Absolute features must be realized (by particle or preadjacent):

(22) a. A: Paul nu a telefonat. ‘Paul did not call.’  
 B: \*Ba. / Ba da. / Ba, a telefonat. ‘Yes, he DID.’

b. A: Paul a telefonat. ‘Paul called.’  
 B: \*Ba. / Ba nu, (nu a telefonat). / Ba, nu a telefonat. ‘No, he DIDN’T.’

- Realization of [REVERSE] in different types of responses:

– In [REVERSE,+] responses, [REVERSE] is **always** realized: see (20)

– In [REVERSE,–] responses to **assertions**, [REVERSE] is **optionally** realized:

(23) [REVERSE,–] in reactions to assertions  
 A: Paul a telefonat. ‘Paul called.’  
 B: (Ba) nu, (nu a telefonat). ‘No, he DIDN’T.’

– In [REVERSE,–] responses to **questions**, [REVERSE] is **never** realized:

- (24) [REVERSE,-] in reactions to questions  
 A: Nu a telefonat Paul? ‘Did Paul call?’  
 B: \*Ba nu/Nu, (nu a telefonat). ‘No, he didn’t.’

- The Romanian polarity particle system and our markedness considerations

- The existence of languages with a dedicated [REVERSE] particle and no dedicated [SAME] particle is in line with our markedness considerations
- We predict that there are no languages exhibiting the opposite pattern—a dedicated [SAME] particle but no dedicated [REVERSE] particle
- The behavior of the [REVERSE] particle is also in line with our markedness considerations:
  - \* [REVERSE,+] is more marked than [REVERSE,-] and thus has higher realization needs
  - \* **Assertion reversal** is more marked than **question reversal**: the former leads to a ‘conversational crisis’, while the latter doesn’t.

- Main contrasts with English

- Presence of a dedicated [REVERSE] particle
- No overlap in the use of *da* and *nu*, because these polarity particles don’t do double duty
- High realization needs of [REVERSE,+] are satisfied by obligatory [REVERSE] particle

- Predictions concerning other three polarity particle systems with a dedicated [REVERSE] particle:

- Realization of [+] could be optional, because [+] is relatively unmarked
- In this case, solo [REVERSE] would be possible in [REVERSE,+] responses (Hungarian)
- Realization of [REVERSE] could be obligatory throughout

### 3.2 A dedicated [reverse,+] particle: the case of French and German

- Languages with basic absolute polarity particles may have a special [REVERSE,+] because no absolute polarity particle can realize both features and yet both have high realization needs.
- Special [REVERSE,+] particles may consist of a special [+] particle or a special [REVERSE] particle.

#### 3.2.1 Languages with a special [+] particle for [reverse,+]: French

- Polarity particles in French: *oui*, *non*, *si*
- Features realized by each particle:

- *oui* realizes [+]

- (25) [SAME,+]  
 A: Claude est à la maison. ‘Claude is at home.’  
 B: Oui, (elle y est). ‘Yes, (she is.)’

- *non* realizes [–]

(26) [SAME,-]  
 A: Claude n'est pas à la maison. 'Claude is not at home.'  
 B: Non, (elle n'y est pas). 'No, (she isn't).'

– *si* realizes [REVERSE,+]

(27) [REVERSE,+]  
 A: Claude n'est pas à la maison. 'Claude is not at home.'  
 B: Si, (elle y est). 'Yes, she IS.'

(28) [REVERSE,-]  
 A: Claude est à la maison. 'Claude is at home.'  
 B: \*Si/Non, (elle n'y est pas). 'No, (she isn't).'

### 3.2.2 Languages with a special [reverse] particle for [reverse,+]: German

- Polarity particles in German: *ja*, *nein*, (*ja*) *doch*

- Features realized by each particle:

– *ja* realizes [+]

(29) [SAME,+]  
 A: Katharina ist zu Hause? 'Katharina is at home.'  
 B: Ja, (sie ist zu Hause). 'Yes, she is.'

– *nein* realizes [-]

(30) [SAME,-]  
 A: Katharina ist nicht zu Hause. 'Katharina is not at home.'  
 B: Nein, (sie ist nicht zu Hause). 'No, she isn't.'

– (*ja*) *doch* realizes [REVERSE,+]

(31) [REVERSE,+]  
 A: Katharina ist nicht zu Hause. 'Katharina is not at home.'  
 B: (Ja) doch, (sie ist zu Hause). 'Yes, she IS.'

(32) [REVERSE,-]  
 A: Katharina ist zu Hause. 'Katharina is at home.'  
 B: \*Doch/Nein, (sie ist nicht zu Hause). 'No, she isn't.'

## 4 Conclusion

- In order to account for the distribution and interpretation of polarity particles we made three crucial distinctions:

- A distinction between highlighted and lowlighted possibilities (semantic)
- A distinction between positive and negative possibilities (semantic)
- A distinction between absolute and relative polarity features (syntactic)

- Polarity particles were taken to realize polarity features
- The particle inventory and realization rules may differ from language to language
- However, we expect that the realization rules of any particular language are in line with the general principle that more marked features have higher realization needs
- [REVERSE,+] is special in this respect, because both features have high realization needs, while it is unlikely that a language has a single particle that realizes both [REVERSE] and [+]
- Across languages, we see different strategies to satisfy the high realization needs of [REVERSE,+]

## References

- AnderBois, S. (2011). *Issues and alternatives*. Ph.D. thesis, University of California Santa Cruz.
- Asher, N. and Lascarides, A. (2003). *Logics of Conversation*. Cambridge University Press.
- Brasoveanu, A., Farkas, D., and Roelofsen, F. (2011). Polarity particles and the anatomy of negative quantifiers. Manuscript, University of California Santa Cruz and ILLC, University of Amsterdam.
- Büring, D. (2003). On d-trees, beans, and accents. *Linguistics and Philosophy*, **26**, 511–545.
- Carlson, L. (1983). *Dialogue Games*. Reidel, Dordrecht.
- Ciardelli, I. and Roelofsen, F. (2011). Inquisitive logic. *Journal of Philosophical Logic*, **40**(1), 55–94.
- Clark, H. (1992). *Arenas of Language Use*. University of Chicago Press, Chicago.
- Farkas, D. (2010). The grammar of polarity particles in Romanian. In *Edges, Heads, and Projections: Interface properties*, pages 87–124. John Benjamins.
- Farkas, D. (2011). Polarity particles in English and Romanian. In *Romance Linguistics 2010: Selected papers from the 40th Linguistic Symposium on Romance Linguistics (LSRL)*. John Benjamins.
- Farkas, D. and Bruce, K. (2010). On reacting to assertions and polar questions. *Journal of semantics*, **27**, 81–118.
- Ginzburg, J. (1996). Dynamics and the semantics of dialogue. In J. Seligman, editor, *Language, Logic, and Computation*, volume 1.
- Groenendijk, J. and Roelofsen, F. (2009). Inquisitive semantics and pragmatics. Presented at the Workshop on Language, Communication, and Rational Agency at Stanford, available via [www.illc.uva.nl/inquisitive-semantics](http://www.illc.uva.nl/inquisitive-semantics).
- Gunlogson, C. (2001). *True to Form: Rising and Falling Declaratives as Questions in English*. Ph.D. thesis, University of California at Santa Cruz.
- Hamblin, C. I. (1971). Mathematical models of dialogue. *Theoria*, **37**, 130–155.
- Pope, E. (1976). *Questions and Answers in English*. Mouton, The Hague.

- Pruitt, K. and Roelofsen, F. (2011). Prosody, syntax, and semantics of disjunctive questions. Manuscript, University of Massachusetts Amherst and University of Amsterdam.
- Roberts, C. (1996). Information structure in discourse. In J. Yoon and A. Kathol, editors, *OSU Working Papers in Linguistics*, volume 49, pages 91–136. Ohio State University.
- Roelofsen, F. and van Gool, S. (2010). Disjunctive questions, intonation, and highlighting. In M. Aloni, H. Bastiaanse, T. de Jager, and K. Schulz, editors, *Logic, Language, and Meaning: Selected Papers from the Seventeenth Amsterdam Colloquium*, pages 384–394. Springer.
- Stalnaker, R. (1978). Assertion. *Syntax and Semantics*, **9**, 315–332.