# Negative inquisitiveness and alternatives-based negation

Robin Cooper[1] and Jonathan Ginzburg[2]

[1] Department of Philosophy, Linguistics and Theory of Science, University of Gothenburg, Box 200, 405 30 Göteborg, Sweden
[2] Univ. Paris Diderot, Sorbonne Paris Cité CLILLAC-ARP (EA 3967), 75004 Paris, France

**Abstract.** We propose some fundamental requirements for the treatment of negative particles, positive/negative polar questions, and negative propositions, as they occur in dialogue with questions. We offer a view of negation that combines aspects of alternative semantics, intuitionist negation, and situation semantics. We formalize the account in TTR (a version of type theory with records) [5, 7]. We sketch an account of the coherence of negative utterances in the dialogue framework KoS [10].

**Keywords:** interrogatives, negation, dialogue, type theory

## 1 Introduction

In the classical formal semantics treatments for questions the denotation of a positive polar interrogative (PPInt) $p?$ is identical to that of the corresponding negative polar (NPInt) $\neg p?$ [15, 14, for example]. This is because the two interrogatives have identical exhaustive answerhood conditions. Indeed Groenendijk and Stokhof (1997), p. 1089 argue that this identification is fundamental. Recent work within Inquisitive Semantics [13, for example] seems to be equivocal about whether this identity should be preserved.[3]

However, other evidence calls the the identification of PPInt and NPInt denotations into question. (1a,b) based on examples due to [17] seems to describe distinct cognitive states. Hoepelmann, in arguing for this distinction, suggests that (1a) is appropriate for a person recently introduced to the odd/even distinction, whereas (1b) is appropriate in a context where, say, the opaque remarks of a mathematician sow doubt on the previously well-established belief that *two is even*. (1c,d) seem to describe distinct investigations, the first by someone potentially even handed, whereas the second by someone tending towards DSK's innocence.

(1) a. The child wonders whether 2 is even.
b. The child wonders whether 2 isn't even.
c. Epstein is investigating whether DSK should be exonerated.

[3] Within Inquisitive Semantics $p?$ is equivalent to $\neg p?$ for $p$ a propositional variable, but this equivalence is not maintained for $\phi?$ and $\neg\phi?$, where $\phi$ is a complex formula. We would like to thank Andzrej Wiśniewski for discussion of this issue.

d. Epstein is investigating whether DSK shouldn't be exonerated.

That root PPInts and NPInts are appropriate in distinct contexts is well recognized in the literature since Hoepelmann and [19]. However, it is not merely the background that differs, it is also the *responses* triggered that are markedly and systematically different. A corpus study of the British National Corpus, whose results are displayed in Table 1, reveals that the two types of interrogatives exhibit almost a mirror image distribution:[4] it suggests that PPInts $p$? are significantly biassed to eliciting p, whereas NPInts $\neg p$? are almost identically biassed to eliciting $\neg p$:

**Table 1**: Distribution of responses to Positive ('Did..?')/Negative ('Didn't..?') polar interrogatives in the British National Corpus

| Question type | Positive answer | Negative answer | No answer | Total |
|---|---|---|---|---|
| `Positive polar` | 53% | 31% | 16% | n = 106 |
| `Negative polar` | 23% | 54% | 22% | n = 86 |

[12], who developed a view of questions as propositional abstracts, showed how such an account, combined with a theory of negative situation types developed in [4], can distinguish between PPInts and NPInts denotations and presuppositions while capturing the identity of resolving answerhood conditions. Their account relied on a complex *ad hoc* notion of simultaneous abstraction. In this paper we consider a number of phenomena relating negation and dialogue, on the basis of which we develop an account of propositional negation in the framework of Type Theory with Records (TTR) [6, 7]. This account extends the earlier results in a type theoretic framework, based on standard notions of negation and abstraction. Along the way we also relate the view of negation to some recent psycholinguistic work. We conclude by sketching an account of the coherence of propositional negation in dialogue.

## 2 Negation in simple dialogue

(2) a. [child B approaches socket with nail]
A:(1) No. (2) Do you want to be electrocuted?
(2') Don't you want to be electrocuted?
B: (3) No.
A: (4) No.

b. A: (1) Did Merkel threaten Papandreou?
B:(2) No.
A: (3) That can't be true.
C(4): No.

c. A: Marie est une bonne étudiante? B: Oui / #Si.
A: Marie n'est pas une bonne étudiante? B: #Oui / Si.

[4] Our pilot corpus study searched the BNC using SCoRE [21]. For the NPInts the sample reported below consists of all the NPInts of the form 'Didn't . . . ?' that we found. For the PPInts we found 1500 hits of the form 'Did . . . ?'. From these we selected a random sample of 106. The 'no answer' category includes cases where either no response concerning the question was forthcoming or where it was difficult to understand how the information provided resolved the question.

From (2a,b,c) one can extract some fundamental requirements for a theory of negation in dialogue. In (2a(1)) B's initial action provides the background for A's initial utterance of 'No', in which A ultimately expresses a wish for the negative situation type ¬StickIn(B,nail,socket). More generally, we argue that this type of use ('Neg(ative)Vol(itional) 'No') involves the specification of a negative situation/event type, thereby providing motivation for (3a). Additional motivation for this is provided by complements of naked infinitive clauses discussed below and the large body of work on the processing of negation, reviewed recently in [18]. Kaup offers experimental evidence that comprehending a negative sentence (e.g. *Sam is not wearing a hat*) involves simulating a scene consistent with the negated sentence. She suggests that indeed initially subjects simulate an "unnegated" scene (e.g. involving Sam wearing a hat). [23] offer additional evidence supporting the simulationist perspective. However, they argue against the "two step" view of negation (viz. unnegated and then negated), in favour of a view driven by dialogical coherence, based on QUD.

In the aftermath of (2a(1)), (2a(2)) would be a reasonable question to ask, whereas (2a(2')) would be grounds for summoning the social services. This, together with our earlier discussion on PPInts and NPInts motivates (3b). Assuming (2a(2)) were uttered, B's response asserts the negation of the proposition $p_{\text{Want(B,electr(B))}}$. A can now *agree* with B by uttering 'No'. That is, 'propositional' No always resolves to a negative proposition. This partly motivates (3c). Additional motivation for this is the existence in many languages, such as French and Georgian, of dialogue particles which presuppose respectively a positive (negative) polar question as the maximal element in QUD (MaxQUD), as in (2c).

In (2b(2)) B retorts with $\neg p_1$ ($p_1$ = **Threaten(Merkel,Papandreou)**), whereas in (2b(3)) A disagrees with B and affirms $\neg\neg p_1$. Clearly, we need (2b(3)) to imply $p_1$, but this should not be *identified* with $p_1$—C's utterance (2b(4)) can be understood as agreement with A, not with B, hence motivating (3d).

(3) a. **Constructive negation and negative situation types**: $s : \neg T$ implies $s : T'$, with T' a positive type that precludes T

b. **Positive/negative polar question distinction**: p? queries the truth of $p$; $\neg p$? queries the truth of $\neg p$; these questions are distinct though have equivalent resolving answerhood conditions.

c. **Negative propositions**: negative propositions are recognizably distinct from positive propositions.

d. **Equivalence but non-identity of $p$ and $\neg\neg p$.**

## 3 Negation and types

The discussion here builds on the type theoretical dictum: "propositions as types". The idea is that we can consider propositions to be types of situations

(possibly among other things). If a type has at least one witness it corresponds to a true proposition. A type with no witnesses corresponds to a false proposition.

In [8] we considered various options for treating negation in TTR considering negation as complement in possible worlds, intuitionistic negation, classical negation as a variant of intuitionistic negation, infonic negation, and negation in simulation semantics.

In our version of *intuitionistic negation* the negation of type $T$ is viewed as the type of functions $(T \to \bot)$ where $\bot$ is a necessarily empty type. In terms of TTR we say that $\{a \mid a : \bot\} = \emptyset$ no matter what is assigned to the basic types, thus giving $\bot$ a modal character: it is not only empty but *necessarily* empty. If $T$ is a type then $\neg T$ is the function type $(T \to \bot)$. This works as follows: if $T$ is a type corresponding to a proposition it is "true" just in case there is something of type $T$ (i.e. a witness or proof) and "false" just in case there is nothing of type $T$. Now suppose there is a function of type $\neg T$. If there is something $a$ of type $T$ then a function $f$ of type $\neg T$ would have to be such that $f(a) : \bot$. But $\bot$, as we know, is empty. Therefore there cannot be any function of type $\neg T$. The only way there can be a function of type $\neg T$ is if $T$ itself is empty. Then there can be a function which returns an object of type $\bot$ for any object of type $T$, since, $T$ being empty, it will never be required to return anything.

This gives us a notion of negative type, that is a function type whose range type is $\bot$, which can be made distinct from positive types (which could be anything other than a negative type, though in practice we use record types as the basis for our propositions). In this way we fulfil (3c) by making negative types distinct from non-negative types. However, the proposals made in [8] did not yet give us a *type* of negative propositions. The problem is that for any type $T$ there are infinitely many corresponding negative types $(T \to \bot)$, $((T \to \bot) \to \bot)$ and so on. All of these are types and therefore, if we allow a type *Type* of types[5] they will all be of type *Type*. Things become a little more complicated when we want to talk of some particular collection of types closed under negation as we do below. If $\mathcal{T}$ is a type of types then we shall use $cl_\neg(\mathcal{T})$ to represent the type of types whose witnesses are the closure of the set of witnesses of $\mathcal{T}$ under $\neg$. We shall also use $map_\neg(\mathcal{T})$ to represent the type $\mathfrak{T}$ such that $\neg T : \mathfrak{T}$ iff $T : \mathcal{T}$. This gets us a type whose witnesses involve one iteration of negation over the types belonging to $\mathcal{T}$, leaving out the types we started with, that is, a type of negative types.

Given this, and following [10], we introduce situation semantics style Austinian propositions into TTR [5, 7]. These are objects of type (4a). An example of an Austinian proposition of this type would be (4b). Here *RecType* is the type of record types as defined in [5, 7]. Denoting (3a) by *AusProp*, the type of Austinian propositions, we can say that *NegAusProp*, the type of negative Austinian propositions, is (4c).

(4) a. $\begin{bmatrix} \text{sit} & : \mathit{Rec} \\ \text{sit-type} & : cl_\neg(\mathit{RecType}) \end{bmatrix}$

[5] We can do this if we are careful to avoid paradoxes, for example by stratifying the types as we do in [5, 7].

b. $\begin{bmatrix} \text{sit} & = s \\ \text{sit-type} & = \left[\text{c}_{\text{run}}\text{:run(sam)}\right] \end{bmatrix}$

c. $\begin{bmatrix} \text{sit} & : \mathit{Rec} \\ \text{sit-type} & : \mathit{cl}_{\neg}(\mathit{map}_{\neg}(\mathit{RecType})) \end{bmatrix}$

Truth for these Austinian propositions involves a notion of Austinian witness which in turn involves a notion of incompatible types. Two types $T_1$ and $T_2$ are *incompatible* just in case for any $a$ not both $a : T_1$ and $a : T_2$, no matter what assignments are made to basic types. Incompatibility thus means that there is necessarily no overlap in the set of witnesses for the two types. In order to be fully viable *incompatibility* needs to be further restricted using a notion of *alternativehood* [3]. In some cases what the alternatives amount to is fairly straightforward and even lexicalized—classifying the table as *not black* requires evidence that it is green or brown or blue, say. But in general, figuring out the alternatives, as Cohen illustrates, is of course itself context dependent, relating, as we will exemplify below, to QUD.

Using the notion of "model" defined in [7], that is, an assignment of objects to basic types and to basic situation types constructed from a predicate and appropriate arguments, we can characterize the set of witnesses for a type $T$ with respect to "model" $M$, $[\check{}\, T]^M$, to be $\{a \mid a :_M T\}$ where the notation $a :_M T$ means that $a$ is a witness for type $T$ according to assignment $M$. We can then say that two types $T_1$ and $T_2$ are *incompatible* if and only if for all $M$, $[\check{}\, T_1]^M \cap [\check{}\, T_2]^M = \emptyset$.[6]

We define a notion of *Austinian witness* for record types closed under negation:

(5) a. If $T$ is a record type, then $s$ is an Austinian witness for $T$ iff $s : T$
b. If $T$ is a record type, then $s$ is an Austinian witness for $\neg T$ iff $s : T'$ for some $T'$ incompatible with $T$
c. If $T$ is a type $\neg\neg T'$ then $s$ is an Austinian witness for $T$ iff $s$ is an Austinian witness for $T'$

The intuitions behind clauses (5b) and (5c) are based on the intuitive account of intuitionistic negation. (5b) is based on the fact that a way to show that $s$ being of type $T$ would lead to a contradiction is to show that $s$ belongs to a type that is incompatible with $T$. (5c) is based on the fact that if you want to show that a function of type $(T \to \bot)$ would lead to a contradiction requires finding a witness for $T$.

We say that an Austinian proposition $p$ is *true* iff $p$.sit is an Austinian witness for $p$.sit-type. Notice that if $p$ is true in this sense then $p$.sit-type will be non-empty, that is, "true" in the standard type-theoretical sense for propositions as types. If $p$ is an Austinian proposition as in (6a), then the negation of $p$, $\neg p$, is (6b):

(6) a. $\begin{bmatrix} \text{sit} & = s \\ \text{sit-type} & = T \end{bmatrix}$ b. $\begin{bmatrix} \text{sit} & = s \\ \text{sit-type} & = \neg T \end{bmatrix}$

[6] Notice that this definition of incompatibility is independent of our definition of negation below.

We obtain the desideratum (3a) in virtue of the requirement involving an incompatible type in (4b). We obtain the desideratum (3c) because negative propositions are distinct from positive propositions. We obtain (3d) because double negations of propositions will be distinct from the original proposition but they will now (contrary to intuitionistic propositions) be truth-conditionally equivalent.

## 4 Alternatives

It is widely recognized that positive Naked Infinitive (NI) sentences describe an agent's perception of a situation/event, one which satisfies the descriptive conditions provided by the NI clause, as in (7a,b). More tricky is the need to capture the 'constructive' nature of negation in negative NI sentences such as (7c,d). These reports mean that $s$ actually possesses information which rules out the descriptive condition (e.g. for (7c) Mary avoiding contact with Bill), rather than simply lacking concrete evidence for this (e.g. Ralph shutting his eyes.). As [4] points out, Davidsonian accounts (e.g. [16]), are limited to the far weaker (7f):

(7) a. Ralph saw Mary serve Bill. b. Saw(R,s) $\wedge$ s : Serve(m,b).
c. Ralph saw Mary not serve Bill. d. Ralph saw Mary not pay her bill.
e. Saw(R,s) $\wedge$ s : $\neg$ Serve(m,b). f. Saw(R,s) $\wedge$ $s :\!\!\not\; Serve(m,b)$

[4] provides axioms on negative SOAs (infons) in situation semantics that attempt to capture this, as in (8a,b). (8a) states that if a situation $s$ supports the dual of $\sigma$, then $s$ also supports positive information that precludes $\sigma$ being the case. (8b) tells us that if a situation $s$ supports the dual of $\sigma$, then $s$ also supports information that defeasibly entails that $\sigma$ is the case.

(8) a. $\forall s, \sigma[s : \overline{\sigma}$ implies
$\exists(Pos)\psi[s : \psi$ and $\psi \Rightarrow \overline{\sigma}]]$
b. $\forall s, \sigma[s : \overline{\sigma}$ implies
$\exists(Pos)\psi[s : \psi$ and $\psi > \sigma]]$

(5) accounts for (8a). In order to cover (8b) we could refine (5) as in (9).

(9) If $T$ is a record type, then $s$ is an Austinian witness for $\neg T$ iff $s : T'$ for some $T'$ incompatible with $T$ and there is some $T''$ such that $s : T''$ and $T'' > T$

$T'' > T$ should intuitively mean that the judgement $s : T''$ creates an expectation for a judgement $s : T$. This should mean that $T'$ (the type that is incompatible with $T$ ) is regarded as an alternative for $T$ given $T''$. One way of handling these defeasible inferences is in terms of enthymemes as discussed in [2]. The idea is that among the resources available to an agent in a given situation there is a collection of enthymemes of the form $\lambda r : T_1(T_2)$, that is functions

which map an object $r$ (e.g a situation) belonging to type $T_1$ to another type $T_2$ (which may depend on the object $r$). Such an enthymeme reflects an association between the type $T_1$ and $T_2$. Such resources may be part of the general knowledge that the agent has acquired. For example, Fillmore's [9] examples (10), uttered out of context, depend on such general knowledge.[7]

(10) a. Her father doesn't have any teeth.
b. # Her husband doesn't have any walnut shells.
c. Your drawing of the teacher has no nose/#noses.
d. The statue's left foot has no #toe/toes.

We generally assume that people have teeth but not walnut shells and that humans have one nose but many toes. Such resources may also be local to a restricted domain or even a single dialogue or even part of a dialogue. So, for example, a previous turn in a dialogue is sufficient to create an association between husbands and walnut shells, thus making (10b) acceptable.

(11) A: My husband keeps walnut shells in the bedroom.
B: Millie's lucky in that respect. Her husband doesn't have any walnut shells.

This particular resource is quite likely not going to be used beyond this particular dialogue.

## 5 Polar Interrogatives

We are left with the desideratum (3b). We follow [12] in analyzing polar questions as 0-ary propositional abstracts. We rely on a standard type theoretic notion of abstraction, couched in terms of functional types. For instance, (2a(2)) and (2a(2')) would be assigned the 0-ary abstracts in (12a) and (12b) respectively. These are *distinct* functions from records of type [] (in other words from all records) into the corresponding Austinian propositions. This accords with the need to distinguish the distribution of their expected responses and the information states of questioners asking or agents investigating the corresponding issues:

(12) a. $\lambda r{:}Rec\ (\begin{bmatrix}\text{sit} = \text{s} \\ \text{sit-type} = \left[\text{c} : \text{want}(\text{B}(\text{electrocute}(\text{B})))\right]\end{bmatrix})$

b. $\lambda r{:}Rec\ (\left[\begin{bmatrix}\text{sit} = \text{s} \\ \text{sit-type} = \left[\text{c} : \neg\text{want}(\text{B}(\text{electrocute}(\text{B})))\right]\end{bmatrix}\right)$

As we mentioned in section 4, the witnessing conditions associated with negative situation types could be strengthened as in (9) so that witnessing $\neg T$

[7] (i) from the BNC illustrates an actual context for (10a):
(i)Marjorie: You just get in, have your tea, and Alexandro'll come round, come for a beer. Clive: There's Tony, look. He ain't got no teeth now, look. (BNC, KC2)

involves the existence of $T''$ such that $s : T''$ and $T'' > T$. Hence, wondering about $\lambda r{:}Rec\ (\begin{bmatrix}\text{sit} = \text{s} \\ \text{sit-type} = \neg\text{T}\end{bmatrix})$ involves wondering about whether $s$ has the characteristics that typically involve $T$ being the case, but which—nonetheless, in this case—fail to bring about $T$. The *simple answerhood* relation of [12] recast in TTR will ensure that the exhaustive answer to p? are $\{p, \neg p\}$, whereas to $\neg p$? they are $\{\neg p, \neg\neg p\}$, so the exhaustive answers are equivalent, as needed.[8]

## 6 Characterizing contexts for negation

We have already discussed the contextual presuppositions of dialogue particles like 'No' (NegVol and propositional use), 'Si', and 'Oui'. NegVol 'no' merely presupposes an event/situation concerning which the speaker can express her disapproval. Whereas the propositional uses require the QUD–maximality of p?, where $p$ is the proposition they affirm/negate. In KoS [11, 10, for example], the felicity of these particles in a post-assertoric or post-polar query context is assured by the following update rule:

(13) polar-question QUD–incrementation $=_{def}$

$$\begin{bmatrix} \text{pre} : \begin{bmatrix} \text{spkr: Ind} \\ \text{addr: Ind} \\ \text{p : Prop} \\ \text{LatestMove.cont} = \\ \text{Ask(spkr,addr,p?)} \\ \vee\ \text{Assert(spkr,addr,p)} : \text{IllocProp} \end{bmatrix} \\ \text{effects} : \begin{bmatrix} \text{qud} = \langle \text{p?, pre.qud} \rangle : \text{poset(Question)} \end{bmatrix} \end{bmatrix}$$

What of the VP adverb 'not', in other words sentential negation? The rule in (13) provides a class of contexts in which clauses of the form 'NP ¬ VP' are felicitous, namely ones in which p? is MAX-QUD , where p = cont('NP VP'). However, this characterization is partial, as demonstrated by the corpus examples (14), drawn from ([20]), who collected them from the International Corpus of English (GB).[9] (14a,b) do not explicitly raise the issues, respectively, *Was there a chemical attack on Israel?* and *Is the studio open at that time?*. (14c) is an instance of 'metalinguistic negation' in that it does not dispute content, but form, whereas (14d) is an instance of intra-utterance self–correction:

[8] In an extended version of this paper, we address the issue of how to accommodate an additional understanding/reading NPInts manifest, one that has been known since [19] as the *outside negation* reading, in which there is actually a positive bias to the question. We find the arguments of [22] that such a reading has a metalinguistic nature convincing, though we do not adopt his proposal that such utterances are complex assertion/query speech acts.

[9] `http://www.ucl.ac.uk/english-usage/projects/ice-gb/`

(14) a. The army will only confirm that missiles have fallen in Israel . . . It was not a chemical attack . . . [S2B-015#106] (Pitts' [137] )
b. I haven't got enough hours in the day . . . unless I start teaching at midnight. But the studio's not open then. [S1A-083#170] (Pitts' [141] )
c. A: there's lots of deers and lots of rabbits. B: It's not deers - it's deer. [S1A-006#261] (Pitts' [107] )
d. I might have to do the after-dinner speech at our annual, well, not annual, our Christmas departmental dinner. (Pitts' [112] )

We propose a generalization of (13). The latter licensed expressing $\neg p$ if $p$ has been asserted or $p$? queried, whereas (15) licenses $\neg p$ if q can be posed in the current context and $p$ is about $q$. asking $q$ is a *relevant move* given the current dialogue gameboard:

(15) Given a dialogue gameboard dgb0, a negative proposition $\neg p$ is felicitous in dgb0 iff the move 'A ask q' is relevant in dgb0 where About(p,q) holds.

(15) presupposes substantive notions of relevance or question raising. For the former we appeal to the notion of relevance developed in KoS (see [10]). For the latter see e.g. the framework of *Inferential Erotetic Logic* (IEL) e.g. [24]. We exemplify an account of (14a) with the latter and (14c) with the former.

A key component of the analysis in IEL is the use of *m(ultiple)-c(onclusion) entailment*—the truth of a set X of premises guarantees the truth of at least one conclusion. Given this, the question evocation can be defined as in (16):

(16) $X$ evokes a question $Q$ iff $X$ mc-entails $dQ$, the set of atomic answers of $Q$, but for no $A \in dQ$, $X \models A$

According to this definition (17a) evokes (17b) and (17c) is About (17b).

(17) a. Missiles have fallen in Israel.
b. What kind of missiles were fired?
c. It was not a chemical attack.

In KoS an utterance $u$ by A in which $u1$ is a sub–utterance of $u$ permits B to accommodate in $u$'s immediate aftermath the issue (18a). This is *inter alia* the basis for explaining why (18c) is a coherent follow up to (18b) and can get the resolution (18d).

(18) a. What form did $A$ intend in $u1$?
b. A: There's lots of deers there.
c. B: Deers?
d. Did $A$ intend the form 'deers' in $u1$?

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## References

1. Artstein, R., Core, M., DeVault, D., Georgila, K., Kaiser, E., Stent, A. (eds.): SemDial 2011 (Los Angelogue): Proceedings of the 15th Workshop on the Semantics and Pragmatics of Dialogue (2011)
2. Breitholtz, E., Cooper, R.: Enthymemes as rhetorical resources. In: Artstein et al. [1]
3. Cohen, A.: How are alternatives computed? Journal of Semantics 16(1), 43 (1999)
4. Cooper, R.: Austinian propositions, Davidsonian events and perception complements. In: Ginzburg, J., Khasidashvili, Z., Levy, J.J., Vogel, C., Vallduvi, E. (eds.) The Tbilisi Symposium on Logic, Language, and Computation: Selected Papers, pp. 19–34. Foundations of Logic, Language, and Information, CSLI Publications, Stanford (1998)
5. Cooper, R.: Austinian truth, attitudes and type theory. Research on Language and Computation 3, 333–362 (2005)
6. Cooper, R.: Records and record types in semantic theory. Journal of Logic and Computation 15(2), 99–112 (2005)
7. Cooper, R.: Type theory and semantics in flux. In: Kempson, R., Asher, N., Fernando, T. (eds.) Handbook of the Philosophy of Science, vol. 14: Philosophy of Linguistics. Elsevier, Amsterdam (fthc)
8. Cooper, R., Ginzburg, J.: Negation in dialogue. In: Artstein et al. [1]
9. Fillmore, C.J.: Frames and the semantics of understanding. Quaderni di Semantica 6(2), 222–254 (1985)
10. Ginzburg, J.: The Interactive Stance: Meaning for Conversation. Oxford University Press, Oxford (2012)
11. Ginzburg, J., Fernández, R.: Computational models of dialogue. In: Clark, A., Fox, C., Lappin, S. (eds.) Handbook of Computational Linguistics and Natural Language. Blackwell, Oxford (2010)
12. Ginzburg, J., Sag, I.A.: Interrogative Investigations: the form, meaning and use of English Interrogatives. No. 123 in CSLI Lecture Notes, CSLI Publications, Stanford: California (2000)
13. Groenendijk, J., Roelofsen, F.: Inquisitive Semantics and Pragmatics (2009), Presented at the Stanford workshop on Language, Communication and Rational Agency, May 30-31, 2009
14. Groenendijk, J., Stokhof, M.: Questions. In: van Benthem, J., ter Meulen, A. (eds.) Handbook of Logic and Linguistics. North Holland, Amsterdam (1997)
15. Hamblin, C.L.: Questions in montague english. In: Partee, B. (ed.) Montague Grammar. Academic Press, New York (1973)
16. Higginbotham, J.: The logic of perceptual reports: An extensional alternative to situation semantics. Journal of Philosophy 80(2), 100–127 (1983)
17. Hoepelmann, J.: On questions. In: Kiefer, F. (ed.) Questions and Answers. Reidel (1983)
18. Kaup, B.: What psycholinguistic negation research tells us about the nature of the working memory representations utilized in language comprehension. Trends in Linguistics Studies and Monographs 173, 313–350 (2006)
19. Ladd, R.: A first look at the semantics and pragmatics of negative questions and tag questions pp. 164–171 (1981)
20. Pitts, A.: Metamessages of denial: the pragmatics of English negation. Ph.D. thesis, Cambridge University (2009)
21. Purver, M.: Score: A tool for searching the bnc. Tech. Rep. TR-01-07, King's College, London (2001)
22. Reese, B.: The meaning and use of negative polar interrogatives. Empirical Issues in Syntax and Semantics 6, 331–354 (2006)
23. Tian, Y., Breheny, R., Ferguson, H.: Why we simulate negated information: A dynamic pragmatic account. The Quarterly Journal of Experimental Psychology 63(12), 2305–2312 (2010)
24. Wiśniewski, A.: Questions and inferences. Logique et Analyse 173, 5–43 (2001)