On Distinguishing Questions and Propositions

Does analyzing questions require entities distinct from propositions? Both Hamblin and Karttunen gave arguments for distinguishing questions as an ontological category from propositions—([5]) pointing out that interrogatives lack truth values (*It's true/false who came yesterday*), to which one can add their incompatibility with a wider scoping alethic modality (*# Necessarily, who will leave tomorrow?*) whereas ([6]) pointed to the existence of predicates that select interrogatives, but not for declaratives and vice versa: *Bo asked/investigated/wondered/# believed /# claimed who came yesterday, Bo # asked/# investigated/# wondered/ believed /claimed that Mary came yesterday.*

Recently there have been a number of proposals that questions and propositions are of a single ontological category(see [7,8]) and most influentially work in Inquisitive Semantics (IS) ([4]). A significant argument for this is examples like *If Kim is not available, who should we ask to give the talk?* where propositions and questions can apparently be combined by boolean connectives.

In this paper we will consider potential problems for this as a strategy as an analysis for natural language. We argue that although speech acts involving questions and propositions can be combined by boolean connectives they are not closed under boolean operations. Furthermore we argue that the propositions and questions *qua* semantic objects cannot be combined by boolean operations at all. This, together with the examples above, strongly suggests that questions and propositions are distinct types of semantic objects. We give an account of the distinction in TTR (Type Theory with Records, [2]).

We use embedding under attitude verbs as a test for propositions and questions as semantic objects. Here we do not find mixed boolean combinations of questions and propositions. Thus, for example, *wonder* selects for an embedded question and *believe* for an embedded proposition but a mixed conjunction does not work with either, showing that it is neither a question nor a proposition: *The manager *wonders/*believes that several people left and what rooms we need to clean.* The verb *know* is compatible with both interrogative and declarative complements, though ([9,3]) argue that such predicates do not take questions or propositions as genuine arguments (i.e. not purely referentially), but involve *coercions* which leads to a predication of a *fact*. This leads to the expectation that sentences involving decl/int conjunctions such as *The manager knows that John's smart and what qualifications he has* can only be understood where the verb is distributed over the two conjuncts: "knows that John's smart and knows what qualifications he has". Compare *It's surprising that the conference was held at the usual time and so few people registered* and *It's surprising that the conference was held at the usual time and how few people registered*. In the second mixed case there is only a reading which entails that it is surprising the conference was held at the usual time whereas arguably in the first sentence only the conjunction but not the individual conjuncts need be surprising. Embedded conditional questions are impossible: **The manager wonders if Hollande left, whether we need to clean the west wing.*, although, of course, embedded questions containing conditionals are fine: *The manager wonders whether, if Hollande left, we need to clean the west wing.*

Why, then, do apparent mixed boolean combinations appear in root sentences? Our answer is that natural language connectives, in addition to their function as logical connectives combining propositions, can be used to combine speech acts into another single speech act. This, however, can only be expressed in root sentences and speech acts are not closed under operations corresponding to boolean connectives. For example, *John's very smart but does he have any qualifications?* where a query follows an assertion is fine whereas the combination of an assertion with a preceding query is not: **Does John have any qualifications and/but he's smart* is not. This is puzzling because a discourse corresponding to a string of the same separate speech acts works well: *Does John have any qualifications? (no answer) But he's smart.*. Similarly, while we can apparently conditionalize a query with a proposition (*If Hollande left, do we need to clean the west wing*, i.e. "If Hollande left, I ask you whether we need to clean the west wing"), we cannot conditionalize an assertion with a question (**If whether Hollande left/did Hollande leave, we need to clean the west wing*) and neither can we conditionalize a query with a question (**If who left, do we need to clean the west wing?*). However we treat these facts, it seems clear that it would be dangerous to collapse questions and propositions into the same type of semantic object and allow general application of semantic boolean operators. This would seem to force you into a situation where you have to predict acceptability of these sentences purely on the basis of a theory of syntax, although semantically/pragmatically they would have made perfect sense. It seems to us that distinguishing between questions and propositions and combinations of speech acts offers a more explanatory approach.

In the formal development of the paper we will present a theory of Austinian propositions including conjunction, disjunction and negation. The type of Austinian propositions is the record type (1a),where the type $RecType^{\dagger}$ is a basic type which denotes the type of (*non-dependent*) record types closed under meet, join and negation. Truth conditions for Austinian propositions are defined in (1b).

(1a) $Prop =_{def} \begin{bmatrix} \text{sit} & : & Rec \\ \text{sit-type} & : & RecType^{\dagger} \end{bmatrix}$

(1b) A proposition $p = \begin{bmatrix} \text{sit} & = & s_0 \\ \text{sit-type} & = & ST_0 \end{bmatrix}$ is true iff $s_0 : ST_0$

If p:*Prop* and p.sit-type is $T_1 \wedge T_2$ ($T_1 \vee T_2$, $\neg T$) we say that p is the conjunction (disjunction) of $\begin{bmatrix} \text{sit} & = & p.\text{sit} \\ \text{sit-type} & = & T_1 \end{bmatrix}$ and $\begin{bmatrix} \text{sit} & = & p.\text{sit} \\ \text{sit-type} & = & T_2 \end{bmatrix}$ (the negation of $\begin{bmatrix} \text{sit} & = & p.\text{sit} \\ \text{sit-type} & = & T \end{bmatrix}$).

We also introduce a notion of *Austinian questions* defined as records containing a record and a *dependent* record type:

(2a) $Who = \begin{bmatrix} \text{x} : Ind \\ \text{c1} : \text{person(x)} \end{bmatrix}$; $Whether = Rec$; (2b) 'Who runs' $\mapsto \begin{bmatrix} \text{sit} = r_1 \\ \text{dep-type} = \lambda r{:}\, Who(\begin{bmatrix} \text{c} : \text{run}(r.\text{x}) \end{bmatrix}) \end{bmatrix}$;

(2c) 'Whether Bo runs' $\mapsto \begin{bmatrix} \text{sit} = r_1 \\ \text{dep-type} = \lambda r{:}\, Whether(\begin{bmatrix} \text{c} : \text{run(b)} \end{bmatrix}) \end{bmatrix}$

Given this, we define the following relation between a situation and a dependent type, which is the basis for defining key coherence answerhood notions such as resolvedness and aboutness (weak partial answerhood, [3]) and question dependence (cf. erotetic implication, [10]):

s resolves q, where q is $\lambda r : T_1(T_2)$, (in symbols $s?q$) iff **either**

(i) for some $a : T_1$ $s : q(a)$, **or**

(ii) $a : T_1$ implies $s : \neg q(a)$

Austinian questions can be conjoined and disjoined though not negated. (We argue that "negative questions" involve questions relating to negative propositions rather than negations of positive questions. Such negative questions are crucially distinct from the corresponding positive question, following [1]). The definition for conj/disj-unction, from which it follows that q_1 and/or q_2 is resolved iff q_1 is resolved and/or q_2 is resolved, is as follows:

$$\begin{bmatrix} \text{sit} & = & s \\ \text{dep-type} & = & \lambda r : T_1\ (T_2) \end{bmatrix} \wedge/\vee \begin{bmatrix} \text{sit} & = & s \\ \text{dep-type} & = & \lambda r : T_3\ (T_4) \end{bmatrix} =$$

$$\begin{bmatrix} \text{sit} & = & s \\ \text{dep-type} & = & \lambda r{:} \begin{bmatrix} \text{left}{:}T_1 \\ \text{right}{:}T_3 \end{bmatrix} (q_1(r.\text{left}) \wedge / \vee q_2(r.\text{right})) \end{bmatrix}$$

In the full version of the paper we will show how the mixed cases involving conjunctions of assertions and queries can be captured in a QUD–based dialogue semantics using an algebraic approach to speech events: whereas 'and' indicates that the following question $q1$ is independent of the current Max(imal element of)QUD; 'but' indicates that $q1$ is not independent, but unexpected given MaxQUD, whereas 'or' presupposes the existence of an issue that both $q1$ and MaxQUD address, hence both are retained as MaxQUD.

[1] Cooper, R., Ginzburg, J. (2012): 'Negative inquisitiveness and alternatives-based negation'. In: Aloni, M., Kimmelman, V., Roelofsen, F., Sassoon, G., Schulz, K., Westera, M. (eds.) *Logic, Language and Meaning, Lecture Notes in Computer Science*, vol. 7218, pp. 32–41. Springer Berlin Heidelberg

[2] Cooper, R. (2012): '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

[3] Ginzburg, J., Sag, I.A. (2000):*Interrogative Investigations: the form, meaning and use of English Interrogatives.* No. 123 in CSLI Lecture Notes, CSLI Publications, Stanford: California

[4] Groenendijk, J., Roelofsen, F (2009).: 'Inquisitive semantics and pragmatics'. In: *Meaning, Content, and Argument: Proceedings of the ILCLI International Workshop on Semantics, Pragmatics, and Rhetoric.*

[5] Hamblin, C.L. (1958): 'Questions'. *Australian Journal of Philosophy* 36, 159–168

[6] Karttunen, L. (1977): Syntax and semantics of questions. Linguistics and Philosophy 1, 3–44

[7] Nelken, R., Francez, N. (2002): 'Bilattices and the semantics of natural language questions'. *Linguistics and Philosophy* 25, 37–64

[8] Nelken, R., Shan, C.C. (2006): 'A modal interpretation of the logic of interrogation'. *Journal of Logic, Language, and Information* 15, 251–271

[9] Vendler, Z. (1972): *Res Cogitans.* Cornell University Press, Ithaca

[10] Wiśniewski, A. (2001): Questions and inferences. *Logique et Analyse* 173, 5–43