Questions and Propositions: A Separation

Does analyzing questions require entities distinct from propositions? Both Hamblin and Karttunen gave arguments for distinguishing questions as an ontological category from propositions—([Hamblin 1958]) 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 ([Karttunen 1977]) 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 [Nelken and Shan 2006]) and most influentially work in Inquisitive Semantics (IS) ([Groenendijk and Roelofsen 2009]). 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 develop a semantic ontology for questions and propositions within the framework of Type Theory with Records (TTR) [Cooper 2012] and embed it in a theory that can capture combinatorics of dialogue moves [Ginzburg 2012].

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 ([Vendler 1972, Ginzburg and Sag 2000]) 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*. The well formedness of these coercion processes require 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.* (There is some variability on judgements with 'ask' here, given dialects

that arguably allow for speech act-type complements (Krifka 2001, McCloskey 2006)).

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 present a type theory distinguishing propositions and questions while accounting for their combinatorial possibilities without complex type shifting as in [Groenendijk and Stokhof 1989]. The type theory formulated in TTR builds on (i) (**Boolean splitting**): $s : T_1 \wedge / \vee T_2$ iff $s : T_1$ and/or $s : T_2$ and (ii) **Negative types**: $a : \neg T$ iff there is some T' such that $a : T'$ and T' precludes T. (essentially: there is no a such that $a : T$ and $a : T'$). Both assumptions are motivated in part by data concerning negative perception complements [Barwise 1981]. Both propositions and questions are modelled as records: the former constructed from a situation and a record type—$prop(s, T)$, and *true* iff $s : T$; the latter built from a situation and a dependent type—$q(s, (T1)T2)$, *resolved* iff either (i) for some $a : T_1$ $s : q(a)$, **or** (ii) $a : T_1$ implies $s : \neg q(a)$. Given this and **Boolean splitting**, straightforward definitions of conjunction and disjunction on propositions and questions ensure that truth and resolvedness distribute over these connectives. Negation on a proposition $prop(s, T)$ yields $prop(s, \neg T)$. Questions cannot be negated given their structure—"negative questions" involve questions relating to negative propositions rather than negations of positive questions. Such negative questions are crucially distinct in this system from the corresponding positive question, following [Cooper and Ginzburg 2012].

We 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.