Chapter 11
Foundations for the Logic of Questions and Commands

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ABSTRACT
Recent interest in logics for questions and commands has been prompted partly by a recognition that reasoned argument often involves moves that are not truth-evaluable, and partly by the use of questions and commands in most procedural programming. The authors argue that certain methodological issues must be addressed before we can agree on the purpose and nature of logics for questions and commands. They deny that formulas in such logics should correspond to sentences in ordinary language. They consider how formulas should be interpreted, focusing especially on questions. The authors argue that logics designed to capture the conditions for correct reasoning involving questions require a semantics that treats question-answer pairs as values. This emphasis brings to the fore issues about questions in premise-conclusion arguments. In both premise-conclusion and dialogical argumentation, the authors argue that logic should aim to capture moves in reasoning, not facts about sentences.

INTRODUCTION
The logic that philosophers and mathematicians are most likely to know is classical first-order logic. Many also know higher-order, modal or other extensions of it that are taken to shed light on inferences involving numbers, properties, time, the evolution of belief, obligation and much more. Also widely studied are intuitionistic, relevant, para-consistent, non-monotonic and other logics that formalise restrictions of, or deviations from, classical inference patterns.

Research into these logics has largely ignored interrogatives and imperatives, along with virtually all other speech acts, besides those closely associated with declarative sentences. Or so it is alleged. To rectify matters, various logics for questions or erotetic logics (see Wisniewski, 1995 for a good survey), and logics for imperatives or imperative logics (see Girle, 1996; Segerberg, 1990) have been proposed. We applaud these developments and hold that they clarify the roles of questions and commands in inferences. However, we deny the allegation that the need for these
logics is due to some special connection between more “standard” logics and declarative sentences. Rather, we argue, it arises because these standard logics are best interpreted as attempts to reveal the inferential properties of propositions, rather than of any linguistic expressions or speech acts. These logics are not fit for analysing aspects of language or communication directly, not even when the language is restricted to declarative sentences, or the communication to assertions. This will be discussed in what follows.

In order to study the illocutionary force of sentences, we need logics that look more like the erotetic and imperatival ones currently on offer. We will discuss the main lines of present development, and express regret that a line of development suggested by the work of Henry Hiz (1978) seems to have been bypassed. We agree with Wisniewski (1995) that a logic of questions should not be developed by the reduction of questions to propositions as has been proposed by Stahl and Hamblin and others, or combinations of propositions and commands as has been proposed by Aqvist and Hintikka and others. At the same time, such logics might, in some good sense, be built up from classical, or another “standard” logic, but this does not mean that logics for questions and commands are “extensions of” standard logics. Rather, they are formal systems that track the relationships among illocutionary acts, in order to illuminate reasoning and argumentation.

Once we see this, we are in a good position to consider what features ought to be had by formalisations of arguments involving questions and commands. Following Hiz, in spirit, if not to the letter, we will show how one might develop the notion that question-answer pairs, rather than questions themselves, ought to be the primary units of semantic evaluation, in inferential moves involving questions.

We will have less to say about commands, but we think our treatment of questions extends to them fairly naturally.

**INFERENCES INVOLVING QUESTIONS AND COMMANDS**

Consider an: illustrative declarative sentence.

(1) *The figure drawn on the board is obviously a square*

Much can be said, some of it confidently, about what that sentence entails. We can agree that (1) entails the sentence:

(2) *Something is obviously a square*

and logic has much to say about the formal features of (1) and (2) that explain this. (1) also entails the sentence:

(3) *The figure drawn on the board is a quadrilateral*

although theorists disagree about how to explain this entailment. By contrast, given an interrogative sentence like:

(4) *Is George Washington a capital city?* Logic has had little to say over the centuries about which sentences, if any, it entails and which, if any, are entailed by it. Likewise, for an imperative like:

(5) *Get those dishes washed immediately!*

Some would argue that this is appropriate. Henry Hiz (1978 page 212) says of questions that they “are not consequences of other sentences. They are, therefore, not sentences in the logical sense. For, if consequence is truth preserving, consequences must accept truth values, true or false (or possible or whatever other values you may contrast with true). ... Sentences which are suitable arguments for the consequence relation are sentences in the sense of logic and questions are not among them.” Many will agree. Even if we grant some kind of logical relationship between (4) and

(4*) *Is George Washington a city?* it is far from clear whether the entailment would go from (4) to (4*) or from (4*) to (4), so we might doubt whether there is entailment at all when the only relata are interrogatives. However, it is more difficult to rule out entailment when the only relata are imperatives. It is very tempting to say that from

(5*) *Either make us coffee, or get those dishes washed immediately.* and