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## **ABSTRACTS OF THE PAPERS**

### **REASONING WITH IMPERATIVES USING CLASSICAL LOGIC**

**Joseph S. Fulda**

Traditionally, imperatives have been handled with deontic logics, not the logic of propositions which bear truth values. Yet, an imperative is issued by the speaker to cause (stay) actions which change the state of affairs, which is, in turn, described by propositions that bear truth values. Thus, ultimately, imperatives affect truth values. In this paper, we put forward an idea that allows us to reason with imperatives using classical logic by constructing a one-to-one correspondence between imperatives and a particular class of declaratives.



## **REASONING WITH IMPERATIVES USING CLASSICAL LOGIC**

**Joseph S. Fulda**

### **§1.— Translation**

Consider the imperative issued on the streets of a city, «Give me ten dollars.» This is not a complete rendering of what the speaker intends: «Give me ten dollars or else....» is a more complete representation. The sanction that follows is indicated by an ellipsis, since the imperative mood encompasses both requests and commands of all sorts. Thus, if the man is a beggar, we might have «Give me ten dollars or I will starve,» while if the man is a dangerous criminal, we might have «Give me ten dollars or I will shoot.» Thus it is proposed to represent the imperative «Do x» with the declarative «If you don't do x, then sanction s,» where s may be a sanction applied against the speaker (the beggar case) or the listener (the criminal case). The sanction may also be applied against an innocent third party, as with the emperor who kills your family or the Klingons who kill innocent civilians. And, the sanction may be very weak: Mere displeasure is often the only sanction for ignoring a polite request. Regardless, however, of whether the sanction is severe or trivial, and against whom it is applied, it is always there, lurking in the background.

Very often «or else» indicates an exclusive disjunction, in which case the proposition corresponding to «Do x» is «If you do x, then sanction s will be avoided» & «If you don't do x, then sanction s.» In this case, the proposition corresponding to the imperative is a biconditional, rather than a simple conditional. Sometimes, the speaker intends not that the action be performed and the sanction avoided, but that the action not be performed and the sanction applied, as when an impossible action is demanded solely that the sanction can be applied or when the IRS requires reporting illegal income, only so that if the illegal activity is ultimately discovered, the list of charges in the indictment can include tax evasion.

Other times, the sanction will be null. «Excuse me!» someone says, but there is no sanction against him or the person accidentally bumped against if he is not excused. (There may be a sanction for the bumping itself, but not I think for the request to be excused.) In that case, we have «If you don't excuse me, then T» as the declarative corresponding to the imperative and it is a tautology. Another way to view such cases is to regard them as interjections, rather than (semantic) imperatives: Interjections do not change truth values, even through the mediation of actions (except when they are themselves actions of a sort).

Still other times, perhaps most times, the sanction will not be known to the listener and may not even be known to the speaker. This is entirely unproblematic: We require of a translation scheme only that it get what is being

translated as right as a human listener would get it, no more. So when a criminal approaches a man on the street with a demand for ten dollars and has no idea what he will do if the demand is refused, we have, simply, a propositional function, rather than a proposition — and that is entirely proper, since it represents accurately the intention behind the statement that has been uttered. Since most speakers use imperatives whose consequences are at times unclear to (at least) those to whom they are directed, it should disturb no one that the logician working on a theory of translation for imperatives should fare no better.

While a literature search has not revealed a detailed implementation of a sanction-based system, Anderson (1958), in his reduction of deontic logic to a form of modal logic, does mention the possibility of using a «penalty (reward) in a suitably broad sense» as a basis for understanding a system so reduced.

The present theory also makes sense out of contradictory imperatives, such as those of the wife who at times urges her husband to do his duty and go to war to defend his country and at other times urges him to stay home with her and their children and fulfill his domestic obligations. We translate the apparently contradictory «Go to war» & «Don't go to war» as «If you don't go to war, you'll be abdicating your duties as a citizen» & «If you do go to war, you'll be abdicating your responsibilities to me and our children.» Since the sanctions are different, we don't have a contradiction at all, but rather an instance of the Constructive Dilemma.

One might, of course, have the following discourse:

- (1) If you don't go to war, you'll be abdicating your duties as a citizen.
- (2) If you go to war, you'll be abdicating your responsibilities as a husband and father.

Therefore, (3) Don't go to war.

But this, too, is no contradiction, for the sanction in (3) is (at least) the displeasure of the speaker having considered both (1) and (2), which is very probably different from (arguably stronger, arguably weaker) the sanction in (2) alone. Finally, Kant's categorical imperative — an imperative which is often said to exclude the possibility of an «or else...» — does not, in fact, present a problem for our translation scheme: The sanction is simply blighting one's soul or something such.

The real test of a theory of translation, however, is how it fares when used to evaluate the validity of arguments, an enterprise to which we now turn.

## §2.— Arguments

Consider first the argument scheme:

- (1) Don't let x happen.
- (2) If you do y, then x.

Therefore,

- (3) Don't do y.

This is a clearly valid scheme containing a mixture of declaratives and imperatives, which reduces to:

(1')  $x \rightarrow s$  (2')  $y \rightarrow x$  Therefore, (3')  $y \rightarrow s$

A typical instance of this is:

(1'') Don't let the cat escape.

(2'') If you open the front door, the cat will escape.

Therefore,

(3'') Don't open the front door.

The second argument scheme is similar:

(4) Do x. (5) In order to do x, you must do y. Therefore, (6) Do y.

This is also a clearly valid scheme containing a mixture of declaratives and imperatives, and it reduces to:

(4')  $\sim x \rightarrow s$  (5')  $x \rightarrow y$  Therefore, (6')  $\sim y \rightarrow s$

A typical instance of this is the inference from «Clean up your room» to «Hang up your coat.»

A third valid argument scheme, but one which is far more complex, is:

(7) Do p or q. (8) If you do p, then do r. (9) If you do q, then do s. Therefore, (10) Do r or s.

It may not be presumed here that the sanctions for not doing p, q, r, and s are the same; they may or may not be. Hence this argument scheme reduces to:

(7')  $\sim(p \vee q) \rightarrow x$

(8')  $p \rightarrow (\sim r \rightarrow y)$

(9')  $q \rightarrow (\sim s \rightarrow z)$

Therefore,

(10')  $\sim(r \vee s) \rightarrow (x \vee y \vee z)$ , where x is at least  $y \vee z$ .

A typical instance of this scheme is:

(7'') Either tell her nothing or tell her everything.

(8'') If you decide to tell her nothing, feign ignorance of the entire matter.

(9'') If you decide to tell her everything, tell it in a way that coheres credibly.

Therefore,

(10'') If you neither feign ignorance of the entire matter nor tell her the whole story so that it coheres credibly, you'll be suspected of leaving something out or of lying.

I leave an appropriate context to the imagination of the reader. Notice that our choice of x was simply  $y \vee z$ , but it could well be something stronger (y & z comes to mind, as well as more complicated propositions that entail y, z, or both).

However, the validity of the three schemata above depends critically on the assumption of a common context in which the premises and conclusion are asserted or else we have the usual problem with indexicals. Indeed, without this assumption, even the following argument scheme is invalid:

(11) Do x. Therefore, (12) Do x.

Since it does not follow from «Give me ten dollars or I will starve» that «Give me ten dollars or I will shoot» and since the sanction is, in both the premise and the conclusion, left implicit, the notion of validity for arguments with imperatives read as material (bi)conditionals depends critically on a common context. As another example, consider the imperative «Tell me who did it!» Asked by a curious friend, the sanction for not answering is mere displeasure; asked in a court of law, the sanction for not answering is being found in civil contempt and incarcerated — quite different!

Besides the problem of context, a more subtle problem arises if it is not clear whether the sanction will be applied only if the imperative is ignored or at least when the imperative is ignored, i.e. when it is not clear whether the conditional is a simple conditional or a biconditional. Thus it may appear that the following argument is surely valid:

(13) Give me ten dollars. Therefore, (14) Give me at least five dollars.

However, if the conditional corresponding to (13) is a biconditional, i.e. the sanction will be avoided if the command is obeyed (e.g., the criminal will not shoot if he is paid off), (14) may simply not be sufficient to avoid the sanction.

Verily, our ability to analyze arguments is hampered by lack of knowledge of context, intention, and the like, and this is the situation for declaratives just as for imperatives. If it seems like it is more troublesome for the latter, that is, indeed, the case, since often when imperatives are issued as commands (as opposed to requests) they are an abrogation of the rights and will of others, in which case the context is such that the intentions are necessarily less clear than when two people are having a (consensual) conversation: The situation of the starving beggar can be resolved more easily than the situation of the street criminal, i.e. it is surely a simpler matter to ascertain whether something less than ten dollars will do to satisfy the man's hunger than it is to ascertain what the man with his hand on the trigger will do if he is given less than he demands.

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### REFERENCE

Alan Ross Anderson, «A Reduction of Deontic Logic to Alethic Modal Logic,» *Mind* 67 (1958): 100-103.