ON APPROACHES TO RESOLVE CHISHOLM'S PARADOX: A CRITIQUE

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ABSTRACT: This paper focuses on Chisholm's paradox and offers to resolve some ambiguities concerning a philosophical comparative analysis using two logical frameworks in which the paradox can be formalized. In the standard system of deontic logic, the Chisholm paradox is one of the most interesting and challenging paradoxes among all. The paradox, ever since its discovery, has been shown to affect many if not most deontic systems. Various approaches like Van Fraassen's dyadic deontic approach, Peter L. Mott's counterfactual conditional approach etc. were formulated to avoid inconsistency in the formal representation of Chisholm set of sentences. The aim of this paper is to focus on the ambiguities in the above approaches and to highlight a serious problem in the attempt of Judith Wagner while resolving the paradox. Judith Wagner argued that Peter L. Mott's solution is unsatisfactory as it allows for general factual detachment. Here, we argue that Wagner's solution faces serious challenges when it comes to fulfilling minimal adequacy conditions, and shifting the operator can only temporarily fix the problem. In this paper, first, we discuss the approaches and then attempt to highlight the respective ambiguities in them.

KEYWORDS: Chisholm paradox, deontic logic, counterfactual conditional system

1. Introduction and Motivation

Deontic logic is the formal study of the normative concepts of obligation, permission, and prohibition. Despite various logical approaches in analyzing the relation between these normative notions, it is not completely free from paradoxes. Although there are various interesting paradoxes in the standard system of deontic logic, the Chisholm paradox is the most notorious one (Von Wright 1951, 1968, 1970). Roderick M. Chisholm was the first to propose it (see Chisholm (1963)), and it was further discussed in detail by David Lewis in D. Lewis (2013). Lewis is of the view that the appropriate representation of certain obligations resists, leading to the paradoxes in SDL. Lewis emphasizes on the inadequacy of expressing conditional obligations using $O(p \rightarrow q)$ or $p \rightarrow Oq$. These deontic expressions are popularly known as 'contrary to duty obligations'. Contrary to duty obligations, there are special kind of conditional obligations where the antecedent is forbidden by the other norm.

Paradoxes usually set limitations on the logical system within which they are addressed. A paradox is a seemingly valid argument, but we find it difficult to accept the conclusion. This highlights how we tend to consider paradoxes as showcasing a limitation in logic. Chisholm paradox gives us a clue that the phenomenon we want to analyze is not being modeled properly. The Chisholm paradox arises when we try to formalize certain intuitively consistent sets of ordinary language sentences (called Chisholm sentences). These are sets of sentences that include at least one sentence that relates to a contrary-to-duty obligation. These sentences are represented by means of ordinary counterparts available in various monadic deontic logics, such as standard deontic logic (SDL) and other related systems. This paradox can also be treated as a formalization issue that should be handled with pragmatic means. Although different logics deal with the Chisholm paradox differently, surprisingly, the Chisholm paradox can be used to focus the discussion on the strengths and limits of the logical systems in which it has been or can be expressed.

1.1 Chisholm Paradox

Chisholm takes the following four English sentences[1] which are intuitively consistent, yet formalization of these sentences in SDL leads to a contradiction.

(1) It ought to be that a certain man goes to the assistance of his neighbours.

(2) It ought to be that if he does go then he tells them he is coming.

(3) If he does not go then he ought not to tell then he is coming.

(4) He does not go.

In the deontic literature, we find that there are several approaches available to resolving the Chisholm paradox. Each approach has its own merits and demerits, and hence makes this paradox more interesting. Von Wright in Von Wright (1951, 1968, 1970) explicitly discussed the importance of Chisholm's paradox and provided a dyadic deontic approach to the syntax of conditional obligation. David Lewis in D. K. Lewis (1973) and D. Lewis (1974), Sven Danielsson and B. Hansson in Danielsson (1969), Hansson (1970) respectively, provide formal semantics for conditional obligation. Lennart Åqvist provides systematic presentations as well as analogue systems for deontic conditionals in the Leibniz-Kangerian-Andersonian vein (Åqvist 2002, 1987). There are many important and influential alternative models for CTDs, each offering some interesting variants of the former more standard picture (see Fraassen (1972), Jones and Pörn (1985), Loewer and Belzer 1983). Brian F. Chellas in Chellas (1974, 1980) and Lou Goble in Goble (1990) offer influential alternative approaches that do not use an undefined dyadic deontic operator. Instead, they opt for representing deontic conditionals using a non-material conditional along with a

[1] I am taking Lennart Åqvist, Åqvist and Hoepelman (1981) version of Chisholm sentences.

unary deontic operator. James E. Tomberlin also discussed a very influential informal discussion of various approaches to deontic conditionals in Tomberlin (1981).

Before we proceed to the formalization of Chisholm sentences, a brief summary of syntax and semantics of SDL is given below.

2. Syntax and Semantics of SDL

SDL is simply the normal modal logic KD (i.e., the logic of the class of serial kripke frames). The classical box and diamond □, ◊ are replaced by O, P which means that "it is obligatory that" (O) and "it is permissible that" (P). The language is backed up by Kripke-style perfect world semantics, where accessibility is encoded as 'is deontically better than' relation.

The language of SDL is just a propositional language plus a monadic operator O. SDL is defined by adding to propositional logic the axiom schemata (K) and (D), and the rule (NEC/RND).

TAUT, All theorems of propositional logic.

MP $\vdash A$ and $\vdash A \rightarrow B$ then $\vdash OB$

(K) $O(A \rightarrow B) \rightarrow (OA \rightarrow OB)$

(D) $OA \rightarrow PA$

(NEC) If $\vdash A$ then $\vdash OA$

(ECQ) $(A \vee \neg A) \rightarrow B$

(AND) $(OA \vee OB) \rightarrow O(A \vee B)$

(CONS) $OA \rightarrow \neg O \neg A$

(RM) If $\vdash A \rightarrow B$ then $\vdash OA \rightarrow OB$

(RE) If $\vdash A \equiv B$ then $\vdash OA \equiv OB$

The semantics of SDL is based on a Kripke-style possible worlds semantics with an actual or designated world (Kripke 1963). An SDL-model is a quadruple

$\langle W, w_0, R, v \rangle$, where W is a set of worlds, $w_0 \in W$ is the actual world, R is a serial accessibility relation on W and v: $W^a \times W \rightarrow \{0, 1\}$ is an assignment function. The valuation $v_M: W^O \times W \rightarrow \{0, 1\}$, associated with the model M, is defined as follows:

(C, a) where $A \in W^a$, $v_M(A, w) = 1$ iff $v(A, w) = 1$

(C, $\neg$) $v_M(\neg A, w) = 1$ iff $v_M(A, w) = 0$

(C, $\vee$) $v_M(A \vee B, w) = 1$ iff $v_M(A, w) = 1$ or $v_M(B, w) = 1$

(C, $\wedge$) $v_M(A \wedge B, w) = 1$ iff $v_M(A, w) = v_M(B, w) = 1$

(C, →) $v_M(A \rightarrow B, w) = 1$ iff $v_M(A, w) = 0$ or $v_M(B, w) = 1$

(C ≡) $v_M(A \equiv B, w) = 1$ iff $v_M(A, w) = v_M(B, w)$

(C O) $v_M(OA, w) = 1$ iff $v_M(A, w') = 1$ for every w' such that Rww'

(C P) $v_M(PA, w) = 1$ iff $v_M(A, w') = 1$ for some w' such that Rww'

A model in SDL, $M = \langle W, w_0, R, v \rangle$ verifies A, $M \models A$, iff $v_M(A, w_0) = 1$.

While logically formulating the chisholm set of sentences, we suppose that O stands for 'it is obligatory that', g stands for 'a certain man goes to the assistance of his neighbours' and t for 'he tells that he is coming'. Now we get from (1)-(4),

(1a) Og

(2a) $O(g \rightarrow Ot)$

(3a) $\neg g \rightarrow O(\neg t)$

(4a) $\neg g$

By applying the deontic distribution to (1a) and (2a) we obtain (Ot), i.e. the man ought to tell his/her neighbours that he is coming, and by applying modus ponens to (3a) and (4a), we get $O(\neg t)$. This leads to the fact that he ought not to tell them he is coming, but these two conclusions, when combined, are inconsistent with the principle of non-contradictory obligations.[2] Therefore, the formalization of sentences from (1) to (4) is not correct.

The first-hand solution may appear while considering the possibility of the scope of the obligation operator. In (2a), 'ought' appears at the beginning, but in (3a) it appears in the middle. However, it should be formalized in similar ways that the obligation operator is attached either to the entire conditional or it's consequent. So, there are two possibilities; one (3a) should be replaced by $O(\neg g \rightarrow \neg t)$ and the other (2a) should be replaced by $(g \rightarrow Ot)$.

Possibility I	**Possibility II**
(1a) Og	(1a) Og
(2a) $O(g \rightarrow Ot)$	(2a') $(g \rightarrow Ot)$
(3a') $O(\neg g \rightarrow \neg t)$	(3a) $\neg g \rightarrow O(\neg t)$
(4a) $\neg g$	(4a) $\neg g$

It is clear from the above possibilities that the representations of Chisholm sentences in English from (1) to (4) are mutually consistent. These sentences, taken

[2] Principle of non-contradictory obligations: It is not true to say for any p, that both p should occur and should not occur.

together, do not lead to contradiction. But Lennart Åqvist in Åqvist (1967) argued that for the minimal criteria of adequacy and for an adequate solution to the paradox, a basic requirement needs to be fulfilled. This requirement states that the entailment between (3), (4) and 'He ought not to tell them he is coming should be preserved. We will discuss this requirement in detail later in this paper. However, we find that this requirement is not satisfied here. According to Åqvist, the solution should interpret (and formalize) statements (1) to (4) so that none of the four is a logical consequence of the other. Here (3a') is a provable consequence of (1a), although (3) is not a consequence of (1). Similarly, in the possibility II, (2a') is provable from (4a). So, in either way, it poses a serious challenge.

One more possibility is that (2a) and (3a) both should be replaced by (2a') and (3a'). For this, the symbolization can be stated as follows:

Possibility III

(1a) Og

(2a') $g \rightarrow Ot$

(3a') $O(\neg g \rightarrow \neg t)$

(4a) $\neg g$

Here, (2a') follows from (4a), though it is not acceptable. Thus, any of the above formalizations is not suitable for the Chisholm set of sentences. However, the Chisholm scenario is not yet adequately modeled within SDL. We fail to obtain the desired conclusion that he ought not to tell that he is coming. Unsurprisingly, most authors are of the view that the Chisholm set is just not adequately formalizable in SDL. Since we accept the original formulation and we are aware that reformulating (2a) or (3a) will not solve much of the pile of troubles SDL has, we will now try to focus more on the other alternatives.

This leads us to examine some major approaches in the domain of conditional obligations. However, we found two prominent approaches to consider, first, the dyadic deontic approach by Van Fraassen, and the latter is due to Peter L. Mott's counterfactual conditional approach. We discuss these approaches and emphasize the ambiguities concerning both approaches with the expectation to provide a better understanding of the Chisholm paradox. The idea behind this kind of solution is that we can resolve the paradox when we combine deontic logic with counterfactual logic (D. K. Lewis 1973). A contrary-to-duty obligation will then be interpreted as a kind of conditional obligation that involves a counterfactual conditional.

3. Dyadic Deontic Approach by B. Van Fraassen

According to Van Fraassen, statements that are obligatory given certain conditions are statements of conditional obligations and presented with a dyadic deontic operator $O(/)$; if $O(A/B)$ can be read as under conditions satisfying B, it is obligatory that A is satisfied (Van Fraassen 1973). The monadic operator is also definable in terms of dyadic by Von Wright with Van Fraassen: $O(A) = O_{df}(A/B \rightarrow B)$, that is, absolute obligations turn out to be obligations conditional on tautologous conditions. Fraassen proposes that the relation be- between 'ought' and 'better' is for the better relation, the set of outcomes that satisfy A is better than the set that satisfy B if some element of the former has a value higher than any found in the latter; symbolically $B(A/B)$. So, in this sense, $O(A/B)$ is exactly equivalent to $B(A \& B/\neg A \& B)$. He also gives a set of axioms and rules for the logic of conditional obligation (see Van Fraassen (1973)).

The formalization of the Chisholm set of sentences in the dyadic deontic system is as follows:

(1f) $O(g/B \rightarrow B)$

(2f) $O(g \rightarrow t/B \rightarrow B)$

(3f) $O(\neg t/\neg g)$

(4f) $\neg g$

By approaching towards solution of Chisholm paradox what we get is

(5f) $O(t/B \rightarrow B)$

(6f) $O(\neg t/B \rightarrow B)$

It is very clear that the conjunction of (5f) and (6f) is a negative deducible theorem (axiom AC 2[3]) in Fraassen's system. Now, there are two possibilities: either we block the entailment of (1f) and (2f), which gives (5f) or we should block the entailment of (3f) and (4f), which gives (6f). Here (1f) is an absolute obligation and (4f) is also a simple negative sentence, so we cannot do much but we can interpret (2) in two ways, first considering as an absolute obligation (i.e., 2f) and second as a conditional obligation (2f').

(2f') $O(t/g)$

However, we get similar contradictory results from (2f) and (2f'), that is, from both we get (5f). Now, if we take (3f) in conjunction with (4f), we would not get (6f), i.e. $O(\neg t/B \rightarrow B)$. Because in the Van Fraassen system, it is not provable that

[3] Axiom AC2: $O(A/C) \rightarrow \neg O(\neg A/C)$

$$O(A/C) \rightarrow [C \rightarrow O(A/B \rightarrow B)] \qquad (1)$$

It seems that with the support of the dyadic deontic conditional, the paradox is suitably settled. However, in order to resolve the good samaritan paradox in the dyadic system of Van Fraassen, James E. Tomberlin in Tomberlin (1981) argues that unless the above theorem (1) is included, the good samaritan paradox would not be fixed.

Here, the main problem centers around the expression (2), which is quite ambiguous. It is not clear from Fraassen's system whether it is a statement of conditional obligation or absolute obligation. If (2) is taken as a statement of conditional obligation, then O(A/B) does not entail B. Although it seems admissible that in attempt to fix good samaritan paradox in Fraassen's system, there is an inevitable need of (1) (see in Tomberlin (1981)) and if we take (1) as a theorem in this system, we would not be able to resolve the Chisholm paradox. He argued that not only formalization is problematic, but also that the system itself has some implausible theorems. So, it is apparent that there are shortcomings in Fraassen's critique of paradoxes, and therefore, a more paradox-tolerant system is required.

4. Counterfactual Conditional Approach by Peter L. Mott

Since we have seen that Fraassen's dyadic approach falls short of adequate resolution of the paradox. This leads us to look for a counterfactual approach. I argue that the counterfactual solution to the Chisholm paradox has many attractive features compared to other approaches. Although the counterfactual approach provides a fairly satisfactory answer to some examples of the contrary-to-duty paradox, it is still not totally free from some serious problems.

Peter L. Mott suggested in Mott (1973) that the problem of conditional obligation is not deontic, but is genuinely a problem of material implication. He argues that to avoid inadequacy, a stronger conditional connective should be employed. According to him, augmenting deontic logic with counterfactual conditionals (SDLC), is the best solution to the paradox. Mott argued that SDLC, the standard deontic logic augmented with David Lewis counterfactual conditionals (D. K. Lewis 1973), is the appropriate logic to deal with deontic conditionality. We represent counterfactual conditional as ($p \;\square\!\!\rightarrow q$), where p is an antecedent (which is always false), and q is the consequent. The counterfactual 'if it were the case that p then it would be q' is true under two conditions. The first is that it is vacuously true when actualizing the antecedent is impossible. When the antecedent is possible, then the counterfactual is true when in all the antecedent permissible worlds the consequent is true. The extended standard deontic logic (SDLC) is similar to SDL except that the deontic operator is replaced by a counterfactual operator.

For any representation of Chisholm sentences (1)-(4), Mott gives three adequacy conditions in Mott (1973) which are intuitively appealing and are stated as follows:

C1: The representation of Chisholm sentences needs to be consistent.

C2: The entailment between (3)-(4) and 'he ought not to tell them he is coming' needs to be preserved.

C3: The representation of 'it ought to be that if he does go then he not tell them he is coming' is false.

Mott's formal representation of the Chisholm paradox with satisfying the above conditions, is as follows.

(1a) Og

(2m[4]) $g \;\Box\!\!\longrightarrow\; O\,t$

(3a) $\neg g \rightarrow O(\neg t)$

(4a) $\neg g$

It is interesting to note that Mott uses a narrow-scope obligation operator at both places because, first, the formalization of English-language sentences is misleading due to its grammatical form, and secondly, just by changing the place of obligation operator does not guarantee any alternative and better resolution of the paradox.

Mott symbolizes (2m) with a counterfactual conditional but (3a) with the material implication. It is clear that to satisfy the adequacy condition (C3), he deploys counterfactual conditionals, as they block the vacuous truth of a conditional with a false antecedent. If we take ($g \rightarrow Ot$) instead of ($g \;\Box\!\!\longrightarrow\; Ot$), the vacuous truth of the conditional makes ($g \rightarrow O\neg t$) true and therefore contradicts (C3).

Here, we argue that (3a) is also formalized in the form of counterfactual conditional, but Mott gives no adequate reasons for why we need to maintain such a distinction between (2m) represented as a counterfactual conditional and (3a) as simply the material conditional. Mott later takes both the conditionals as counterfactuals. The Chisholm sentences would look like the following:

(1a) Og

(2m) $g \;\Box\!\!\longrightarrow\; Ot$

(3a) $\neg g \;\Box\!\!\longrightarrow\; O(\neg t)$

[4] To avoid confusion, the sentence number is given as (2m) because it is Mott's version of sentences.

(4a) $\neg g$

in the above formalisation (2m) leads to

$$g \rightarrow Ot \qquad (2)$$

and (3m) implies

$$\neg g \rightarrow O(\neg t) \qquad (3)$$

So by (2) and (4a) we get ($O\neg t$) but we fail to deduce (Ot) from (1a) and (3). Hence, there is no contradiction.

4.1 Judith Wagner's Objection

According to Judith Wagner, ($O \neg t$) is derivable from the above sentences, which means we can derive an unconditional obligation not to tell which is not possible to fulfil (DeCew 1981). It happens only when it must occur before going or not going. Since the Kantian version of 'ought implies can' principle must be fulfilled. As Judith Wagner correctly pointed out in DeCew (1981) that because of general factual detachment allowed by the short scope formalization yields detachment of too many obligations, so if we take a long scope operator $O(p \,\Box\!\!\rightarrow q)$, then we might solve the problem. Hence, Judith Wagner's version of Chisholm's set of sentences is:

(1a) Og

(2w) $O(g \,\Box\!\!\rightarrow Ot)$

(3w) $O(\neg g \,\Box\!\!\rightarrow \neg t)$

(4a) $\neg g$

Assume $O(p \,\Box\!\!\rightarrow q) \rightarrow (Op \,\Box\!\!\rightarrow Oq)$ as an axiom of SDLC, then

$$Og \,\Box\!\!\rightarrow Ot \qquad (4)$$

$$Og \rightarrow Ot \qquad (5)$$

Similarly,

$$O(\neg g) \,\Box\!\!\rightarrow O(\neg t) \qquad (6)$$

$$O(\neg g) \rightarrow O(\neg t) \qquad (7)$$

From (1a) and (4) we get,

$$Ot \qquad (8)$$

But, from (6) and (4a), we do not deduce ($O\neg t$). This means that he ought not to tell that he is coming, given that he does not go. So, the formalization of the long scope operator of an unconditional obligation for him is not the same as 'he is coming, since it is not derivable.

4.2 Remarks on Wagner's Objection and an Alternate Proposal

Although for Wagner the paradox can be formally fixed, we argue that it is subject to errors. Here, we argue that Wagner's Chisholm setting fails to satisfy the minimal adequacy requirements, as mentioned by Åqvist. Åqvist gives the following three minimal requirements of adequacy in Åqvist (1987):

(r1) The solution should provide a formalization of the set of sentences according to which the set is consistent.

(r2) The solution should interpret the sentences in such a way that none of them is a logical consequence of the remaining sentences.

(r3) The solution should countenance the fact that the sentences (1), (2), (3) jointly entail that 'he ought to tell them that he is coming' in some sense of ought.

In Wagner's formalism, $O(\neg g \;\Box\!\!\longrightarrow\; \neg t)$ is a logical consequence of Og, and we deduce that the requirement (r2) is not fulfilled here. From the axiom K[5] and (3w), we get

(5a) $O(\neg g) \;\Box\!\!\longrightarrow\; O(\neg t)$

(6a) $O(\neg g) \rightarrow O(\neg t)$

From Axiom 6, SDLC[6] we have $(A \;\Box\!\!\longrightarrow\; B) \rightarrow (A \rightarrow B)$

(7a) $\neg O(g) \rightarrow \neg O(t)$ (rule (CONS) of SDL ($\vdash OA \rightarrow \neg O\neg A$))

(8a) $\neg(\neg Og) \vee \neg O(t)$ (rule of material implication)

(9a) $Og \vee \neg O(t)$ (double negation elimination)

(10a) $Og \vee (\neg Ot)$ ((1a) and disjunction introduction)

If (3w) is the provable consequence of (1a), then the Chisholm paradox is not adequately treated in Wagner's version and does not receive a fair solution.

Hence, we propose that since the general factual detachment allowed by the short scope operator yields detachment of too many obligations; instead, we need to take the long scope operator $O(p \;\Box\!\!\longrightarrow\; q)$, we might resume the paradox. By reformalizing Chisholm's set of sentences-

[5] Axiom K: $O(A \rightarrow B) \rightarrow OA \rightarrow OB)$

[6] See Mott (1973)

(1a) Og

(2p) $O\,(g \,\square\!\!\rightarrow\, t)$

(3p) $O\,(\neg g \,\square\!\!\rightarrow\, \neg t)$

(4a) $\neg\, g$

Assuming $O(p \,\square\!\!\rightarrow\, q) \rightarrow (Op \,\square\!\!\rightarrow\, Oq)$ as an axiom of SDLC, then

(5p) $\mathrm{Og} \,\square\!\!\rightarrow\, \mathrm{Ot}$

(6p) $\mathrm{Og} \rightarrow \mathrm{Ot}$

Similarly,

(7p) $O(\neg g) \,\square\!\!\rightarrow\, O(\neg t)$

(8p) $O(\neg g) \rightarrow O(\neg t)$

From 1a) and (6p), we get

(9p) Ot

It is evident from the above that from (8p) and (4a) we do not get $O\neg t$. This means that 'he ought not to tell that he is coming, given that he does not go'. In other words, by this formalization of long-scope operator an unconditional obligation for him not to tell that he is coming, is not derivable.

Conclusion

In summary, the paper seeks to resolve the ambiguities concerning the counterfactual analysis of the Chisholm paradox. We started with the nature and scope of the deontic operator within the domain of SDL, and presented the formal representation of a Chisholm set of sentences. The standard system of deontic logic (SDL) and the Chisholm sentences lead to counterintuitive results. These challenges set a limitation on the received view (SDL) in resolving the Chisholm paradox.

In the formalization of Chisholm paradox we observed that shifting the place of the deontic operator is not a viable option. We came across severe formalization issues; still, we think more research is needed which will enable a fine-grained translation of the Chisholm sentences. It is also interesting to note that while the Chisholm paradox involves dynamic normative reasoning, we find that the notion of 'time' is missing. Every action is subject to time, and we believe that logical approaches to solving the Chisholm paradox need to consider time in the semantic analysis of Chisholm sentences. Therefore, an appropriate temporal logics and dynamic logics may address some representational challenges more adequately. The conclusion is that, notwithstanding the many attractive features of the solution to the

Chisholm paradox, there seem to be competing approaches to the paradox that are more promising, and we will leave it to future work.

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