DEONTIC LOGIC WITHOUT MISLEADING ALETHIC ANALOGIES – PART II

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Abstract

Deontic logic should be based less on analogies with alethic modal logics, and more on the logical properties of informal discourse on norms. This second part of the paper is devoted to permissions, conditional rules on obligations and permissions, and deontic possible world semantics.

4. Conditional rules about obligation

In response to criticism by Prior (1954), von Wright (1956) introduced the dyadic ought operator O(A/B), to mean that "A is obligatory under conditions B". This dyadic operator is now generally accepted as the formal expression for conditional obligation.

4.1 Rules and veritable obligations

In most studies of the logic of conditional obligation, insufficient attention has been paid to the distinction between conditionality of veritable obligations and conditionality of rules about obligations. (Cf. section 2.4) Ross contributed somewhat to this confusion by offering "conditional duty" as an alternative term for (veritable) "prima facie duty" (Ross 1930, p. 19). This "confuses two quite different matters... To say, then, that a person has a prima facie duty would appear, therefore, to make a categorical, not hypothetical statement about him or the situation in which he finds himself." (Melden 1972, pp. 483-484).

A veritable obligation states what is obligatory in the actual state of the world. It has nothing to say about what obligations might obtain in other states of the world. For instance, I may have an obligation to meet a friend at the airport. To say that I have this obligation OA is a statement about an obligation in the present state of the world, void of implications for other states of the world. I may further have an obligation

to tell him if I will not turn up. I may furhter have an obligation to tell him if I will not turn up. This is a "conditional" veritable obligation $O(-A \rightarrow B)$. It can also be expressed as disjunctive obligation $O(A \vee B)$. To say that I have this other obligation is, again, a statement void of implications for other states of the world than the one that actually obtains.

The example illustrates the way in which a veritable obligation can be conditional. The entire conditional statement falls within the scope of the ought operator. If it is certain that $-A$, then $O(-A \rightarrow B)$, or $O(A \vee B)$, is obeyed if and only OB is obeyed. However, this does not amount to saying that there is in that case an obligation OB. (Unless the ought operator is constructed to include necessitation, cf. section 3.4.) In the sense of elementary oughtness with which we are concerned here, there may be an obligation $O(A \vee B)$ that can only be realized through realizing B, without there being an obligation OB.

Rules about obligations can be conditional in a way that veritable obligations cannot. The most obvious form for a rule about obligations is that of a *conditional rule*: "If condition C applies to a state of the world, then there is in this state of the world an obligation that A." In this case, the antecedent of the condition falls outside of the scope of the ought operator. In the above example, the two obligations towards the friend at the airplace may both originate in a promise (C) to meet him. Then there are two rules, "If C, then OA" and "If C, then $O(A \vee B)$". The two veritable obligations OA and $O(A \vee B)$ are applications of these rules.

A rule about obligations can also be a *categorical rule*, i.e. of the form: "In all states of the world there is an obligation Y." Categorical obligations may be regarded as a "limiting case" (von Wright 1980, p. 412) of conditional obligations, namely as conditional obligations with empty or logically true antecedants. (Another word for "categorical" would be "absolute". I have avoided this usage, however, since "absolute" is often, although misleadingly, used as a synonym for "over-all".)

In what follows, it will be assumed that all rules about obligations can be expressed in the conditional form. O(A/B) will be used as a short form for conditional rules about obligations.

In the dyadic deontic operator O(A/B), A has to be an action statement of the same kind as the argument of the monadic ought operator. As Gärdenfors (1978, p. 388) has pointed out, however, B can be any statement about factual truths about the world, including statements about actions.

4.2 Rules about prima facie or over-all obligations?

Obviously, there can be conditional rules about prima facie obligations. If I have made a promise, then I ought (prima facie) to do what I have promised. But can there be valid conditional rules about over-all obligations? Most deontic logicians, including Hintikka (1970, pp. 91-92), seem to assume that such is the case.

Ross argued for the opposite opinion, denying that there can be any general principles for over-all duties. (Cf. Jack 1971) In *Foundations of Ethics* he wrote:

> "*Prima facie* obligation depends on some one aspect of the act; [over-all] obligation or disobligation attaches to it in virtue of the totality of its aspects... In the same way if we want to formulate universal moral laws, we can only formulate them as laws of *prima facie* obligation, laws stating the tendencies of actions to be obligatory in virtue of this characteristic or of that." (Ross 1939, pp. 84 and 86)

The single aspect (or at least finite number of aspects) sufficient for a prima facie duty can be expressed as a conjunction of statements about the world. The "totality" of the state of the world, however cannot be so expressed.

As was pointed out by Frankena, it is "very difficult to find a rule which one would insist could never be rightly broken" (1952, p. 194). Further, it does not seem possible to enumerate all the conditions that could invalidate a certain rule. A possible answer to this might be that each (over-all) rule implying an over-all duty should be seen as implicitly presupposing the conditions not explicitly stated. However, the weakness of this answer will be evident if we consider the process whereby these implicit conditions can be discovered. They can hardly be discovered by scrutiny of the rule in question alone. Typically, they will be discovered by the inclusion into the discourse of some other moral principle(s), considered under the circumstances to have stronger influence.

As an example, suppose that I have undertaken to meet my six year old nephew, who will be arriving alone at the railway station to live in my home for a few days. Then I ought to turn up in time as promised, according to (among others) the moral principle (R1) that one should fulfil what one has undertaken towards other human beings. On my way to the

railway station, however, I see people gathering around an accident victim. If I can help him through artificial respiration, I seem to be excused from my obligation to be at the station in time.

By what moral reasoning do we arrive at this conclusion? If R1 is seen as a conditional rule for over-all obligations, it must be seen as containing the implicit condition "but not if you can save a life by breaking the promise". R1, augmented with this condition, will be called R1*. The alternative view is of course to see R1 as implying only a prima facie duty, in this case overruled by the prima facie duty (R2): "If you can save a life, do it."

As far as I can see, normal moral reasoning would have the form of weighing R1 and R2 against each other. I can see no plausible way of arriving at R1* from R1 without considering either R2 or some other moral principle that is independent from R1 and that has the same implications as R2 in this particular case.

Suppose further that I recognize the accident victim as a person suffering from a deadly disease transmitted by blood. He is bleeding from his mouth, and I myself have a sore lip. In this case I am not obliged to save his life by the mouth-to-mouth method. Then, if the ambulance is on its way and there is nothing else that I can do to help him, I am – again – obliged to meet my nephew in time. This can easily be accounted for by a third prima facie rule R3 (namely the prima facie permission not to put oneself in a danger of life). A further extension of an over-all rule R1** ("unless that would endanger your own life") would make the latter still more complicated.

The example could be carried still further, but it should suffice to show that conditional rules about over-all duties would have to be limitlessly complex. In particular, "weak" moral rules would have to contain implicitly all the stronger moral rules that could influence their validity in different circumstances. Thus there could not, for instance, be any moral rule about the keeping of promises that did not contain stipulations about murder, rape, the prevention of wars, etc. This is not a plausible way of accounting for moral reasoning.

Before leaving the subject we should consider the following passage by Al-Hibri:

> "[L]et us consider the following situation: $S_n = \{C_1, C_2, \ldots C_n\}$, where $C_1, \ldots C_n$ are morally significant circumstances. Suppose that

upon deliberation (or inspection), we assert that $O(A/C_1)$. It follows by the above discussion that $O(A/C_1)$ is a statement of *prima facie* obligation because it rests on C_1 and not on all the other morally significant circumstances in S_n as well. Suppose now that we proceed with our deliberations to conclude that $O(B/C_1 \& \ldots C_n)$. Well clearly this statement is one of actual obligation because it rests on the totality of the morally significant circumstances in S_n. But now, just as clearly, this actual obligation is conditional too, resting as it does on $C_1 \& \ldots C_n$.

It should be immediately clear from this interpretation that if *prima facie* obligations are conditional upon one aspect of the situation, then actual conditions are in turn conditional upon *all* aspects of the situation." (Al-Hibri 1980, p. 80)

Plausible as this account might seem at first sight, it suffers from the lack of a distinction between (veritable) obligations and rules about obligations. No doubt in each *particular case* (i.e. for each particular state of the world) one can, once a veritable over-all duty has been determined, enumerate all the "morally significant circumstances" that were taken into account in the deliberations leading to its acceptance. From this does not follow, however, that a *rule* can be given in the conditional form, enumerating all the morally significant circumstances that may have to be taken into account in assessing any possible state of the world to see whether the duty in question is valid as an over-all duty. As I hope to have shown above, this is a highly implausible account of moral reasoning. Therefore, the expression O(A/B) will be taken to refer to rules in the conditional form about *prima facie* obligations.

The above analysis of rules about moral duties is equally valid for rules about legal duties. Legal rules are stated in conditional (or categorical) form. A single rule does not in general inform us about our over-all legal duties. That information can only be obtained from the legal system as a whole, with its (meta)rules and procedures for deciding when the different rules are applicable.

4.3 The logical form of conditional rules

In a conditional rule about (prima facie) obligation, the relationship between the condition and the obligation is that the former is sufficient for the latter to obtain. Therefore, conditional rules about obligation can

be adequately expressed by material implication, i.e. we can make the following definition:

(23) O(A/B) holds if and only if $B \rightarrow O_1 A$ is true about all states of the world

The use of material implication for "conditional obligation" has often been rejected on the basis that $B \rightarrow OA$ is always true if B is false. However, this is only a problem if one confuses the statement that $B \rightarrow OA$ is true about this world with the statement that it is a valid rule (i.e. that it is true about all possible worlds).

McArthur (1982) rejected the use of material implication since "a negated conditional obligation, e.g. 'It is not the case that you ought to close the windows if it begins to rain', is not equivalent to the conjunction 'It is beginning to rain and it is not the case that you ought to close the windows.'" (p. 159) However, this equivalence does not hold on the present account, since the former statement refers to a rule about obligations and the latter to a veritable obligation.

The following two principles are valid according to (23). The first of them has been called "strengthening the antecedent" or "augmentation" (Feldman 1983, p. 262):

(24) $O(A/B) \rightarrow O(A/B\&C)$
(25) $O(A/B \vee C) \equiv O(A/B) \,\&\, O(A/C)$

(24), i.e. the inference from "given that B, it ought to be that A" to "given that B and C, it ought to be that A", has been criticized by several authors. The basic counter-argument seems to be that "conditional obligations" can be overridden. David Lewis pointed out the existence of "consistent alternating sequences" like the following: "Given that Jesse robbed the bank, he ought to confess; but given in addition that his confession would send his ailing mother to an early grave, he ought not to; but given that an innocent man is on trial for the crime, he ought to after all..." (1973, pp. 102-103, quoted by Gärdenfors 1978, p. 392. Cf. McMichael 1978 and Schlesinger 1985.) Arguments like this, however, presuppose that conditional rules about obligations can give rise to over-all obligations. As I hope to have shown in section 4.1, this is not a plausible position.

The equivalence

(26) $OA \equiv O(A/B \vee -B)$

has generally been accepted in deontic logic. (Cf. van Fraassen 1972, p. 418.) In the present interpretation of the dyadic deontic operator, the right-to-left part of (26) makes sense, but the left-to-right part amounts to the highly implausible statement that there are no other duties than those that would apply irrespectively of the state of the world. ([1])

von Wright (1964) proposed three axioms for dyadic deontic logic, namely (25) and the following two:

(27) $-(O(A/B) \,\&\, O(-A/B))$

(28) $O(A\&B/C) \equiv O(A/C) \,\&\, O(B/C)$

Neither of these holds with the present interpretation of the dyadic operator. Their implausibility should follow from what was said in sections 3.1, 3.2, and 3.3.

4.4 Taking knowledge into account

The rejection in section 4.2 of conditional rules for over-all obligations depends on the purging performed in section 2.1 of the ought operator from epistemic connotations. If epistemic circumstances are taken into account, conditional rules for (knowledge-relative) over-all duties may be formed, namely of the form "If B are all the known relevant facts in the matter, then we should conclude that there is a duty to the effect that A". (24) and (25) are not valid for an operator combining in this way both deontic and epistemic components.

Chishilm (1964) used requirement as a primitive concept and stressed the analogy between requirement and confirmation. This approach was further developed by Schlesinger (1985), whose central claim is that essentially the same logical properties apply to O(A/B) as to Ac(A/B) ("given that B, the hypothesis A is acceptable").

Schlesinger obtains, however, some results that are not plausible. Thus he obtains $O(A\&B/C) \rightarrow O(A/C) \,\&\, O(B/C)$ but not the converse formula $O(A/C) \,\&\, O(B/C) \rightarrow O(A\&B/C)$. (Cf. sections 3.2 and 3.3 above.) A more successful approach along these lines would have to start with separate primitive operators for oughtness and empirical confirmation, instead of combining these two notions into one primitive logical operator.

([1]) As an alternative to (23), O(A/B) could be read as a statement about veritable obligations. Then O(A/B) would mean $O(B \rightarrow A)$, and (26) would be pointless although innocuous.

5. *Deontological principles*

As was indicated in sections 2.3 and 3.8, the set of over-all obligations is a subset of the set of prima facie obligations. Provided that universal consistency is accepted (cf. section 3.1), it may be seen as a "consistent" subset. A more intricate question is whether it is then also a "maximal consistent" subset. This seems to have been the opinion of Ross (1930, pp. 19-20). It would mean that no other moral considerations than obligations (e.g. no prima facie permissions and no considerations of utility) can by themselves defeat a duty. Since over-all duties are assumed to combine conjunctively according to (21), the idea of maximal consistency can be expressed as follows:

(29) If O_1A & $-O_2A$, then there is a B such that O_2B and that A&B is inconsistent.

(29) is a principle giving priority to considerations of duties over other moral considerations. It still allows, however, for other moral considerations to influence the choice between different maximal consistent subsets of the set of prima facie duties. In order to disallow such influence, the deontologist would have to introduce the following metarule on rules about obligations:

(30) Given what rules about obligations (i.e. rules of the form O(A/B)) are applicable, it can be deduced for all formulas A whether O_2A or not.

(29) and (30) may be called *deontological principles*. Neither of them implies the other. I do not hold any of them to be a valid principle. As Ross himself pointed out, the judgment of which prima facie duties are over-all duties is much more complex and less certain than the judgment of which the prima facie duties are. "For the estimation of the comparative stringency of these *prima facie* obligations no general rules can, so far as I can see, be laid down." (Ross 1930, p. 41. Cf. pp. 30-31.)

6. *Permission*

In ordinary language, "when saying that an action is permitted we mean that one is at liberty to perform it, that one may either perform the ac-

tion or refrain from performing it" (Raz 1975, p. 161). In formal philosophy, however "being permitted to perform an action is compatible with having to perform it" (ibid). This convention of formal philosophy will be followed here.

Permissions, like obligations, may be either prima facie or over-all. A prima facie permission may be over-ridden by a prima facie obligation or by another prima facie permission. A prima facie permission may also override a prima facie obligation. For instance, in may cases of supererogation there is an action that prima facie ought to be performed but that the agent has an overriding permission not to perform.

In what follows, P_1 will be used to denote prima facie permission and P_2 to denote over-all permission. The standard reading is "it is permitted (prima facie/over-all) that". The same formation rule applies to P_1 and P_2 as to O_1 and O_2, i.e. the argument A of P_1A or P_2A must be an action statement. (Cf. section 2.2.)

6.1 Definability in terms of obligation

Obviously, the negation of something that is over-all obligatory cannot be over-all permitted, i.e.:

(31) $O_2A \rightarrow -P_2-A$

Further, what is not over-all obligatory is over-all permitted (or "permitted, all things considered"), i.e.:

(32) $-O_2A \rightarrow P_2-A$

From (31) and (32) follows

(33) $P_2A \equiv -O_2-A$

Thus, over-all permission is definable in terms of over-all obligation. For prima facie permission, however, the situation is different. There can be at the same time a prima facie obligation that A and a prima facie permission that $-A$. Therefore, just as $O_1A \,\&\, O_1-A$ is consistent, the following formula must be consistent:

(34) $O_1A \,\&\, P_1-A$

If P_1A were defined as $-O_1-A$, then (34) would imply the inconsistent formula:

(35) $O_1A \ \& \ -O_1A$

Therefore, P_1 cannot be defined in terms of O_1. Instead, P_1 should be taken as a separate primitive operator.

6.2 The logic of prima facie permission

von Wright (1980, p. 414) suggested that a system with two deontic primitives should contain the two axioms: $Op \rightarrow Pp$ and $Pp \rightarrow -O-p$. The second of these is not plausible for prima facie permission since it would make (34) inconsistent. The first of the two, however, is valid for prima facie permission. A prima facie duty O_1A should be seen as encompassing a prima facie permission to the same effect:

(36) $O_1A \rightarrow P_1A$.

Further candidates for valid principles for P_1 can be obtained from the axioms and theorems of standard deontic logic. The following is a theorem of that theory:

(37) $P_1 (A \vee B) \equiv P_1A \vee P_1B$

von Wright (1951, p. 7) called this the "principle of deontic distribution". Its right-to-left direction, i.e.

(38) $P_1A \vee P_1B \rightarrow P_1 (A \vee B)$

leads to paradoxical consequences similar to those of the principle of disjunctive extension of duties.
($OA \rightarrow O(A \vee B)$, cf. section 3.6.) It implies the formula:

(39) $P_1A \rightarrow P_1 (A \vee B)$

According to this formula, if a person is allowed to smoke, then he is allowed to smoke or kill. (Føllesdal and Hilpinen 1970, p. 21-22). This has been called the "paradox of free choice" (Stranzinger 1978). It is a good reason for rejecting (38). A weakened version of (38), namely

(40) $P_1A \ \& \ P_1B \rightarrow P_1 (A \vee B)$

avoids these difficulties. If someone were allowed to smoke and also allowed to kill, then this person would be allowed to smoke or kill. (40) should be accepted on similar grounds as (18), the corresponding principle for prima facie obligations.

The left-to-right direction of (37):

(41) $P_1 (A \vee B) \rightarrow P_1A \vee P_1B$

implies that all prima facie permissions are indefinitely specified. An action statement D_iA can in practice always be written as a disjunction of at least two other action statements providing alternative ways to bring about the result A. Suppose I have a prima facie permission to pass over farmer Smith's land to the shore. This can be done either by my passing over his corn field (D_iA_1) or by my passing over his wheat field (D_iA_2). Then $P_1 (D_iA_1 \vee D_iA_2)$, but not necessarily $P_1(D_iA_1)$ or $P_1(D_iA_2)$, since my prima facie permission need not be that specified. (The corresponding theorem for over-all permissions, $P_2(A \vee B) \rightarrow P_2A \vee P_2B$, is valid and follows from (21) and (33).)

Another theorem in standard deontic logic is:

(42) $P_1(A \& B) \rightarrow P_1A \ \& \ P_1B$

(The converse is not valid in standard deontic logic.) (42) leads to the same problems as does the principle of division for obligations. ($O(A \& B) \rightarrow OA$, cf. section 3.3.) It can be rejected by essentially the same argument. Permissions are not any more divisible than are obligations.

The following is a theorem of standard deontic logic:

(43) $P_1A \vee P_1 - A$

It was called by von Wright (1951, p. 9) the *principle of permission*. "Any act is either itself permitted or its negation is permitted." It is valid for over-all permissions (derivable from (19), (21), and (33)). There is no reason, however, to postulate it for prima facie permissions. It would be equal to a demand that the set of prima facie permissions should be complete, which – in contrast to the set of over-all permissions – it need not be. Prima facie permissions are strong permissions in the traditional sense of being explicit, "an act is strongly permitted if its being permitted is entailed by a norm" (Raz 1975).

The theorem of standard deontic logic

(44) $P_1 (A \vee -A)$

amounts to saying that there is an empty permission. The corresponding principle is valid for over-all permissions, being derivable from (19) and

(33). There is no reason, however, to postulate the existence of the empty prima facie permission. (44) will be rejected on similar grounds as the principle of the empty duty. (Cf. section 3.7.)

The theorem of standard deontic logic

(45) $-P_1 (A\&-A)$

states that no permission should (as an isolated entity) be inconsistent. It is analogous with the principle of self-consistency for obligations, $-O(A\& -A)$, thas was accepted in section 3.1 for both prima facie and over-all obligations. There is, however, an important difference. To demand the impossible is certainly more exacting than to allow it. The latter is, in fact, complete innocuous. (45) does not follow for the defined P_2 operator. There is no reason either to postulate it for the primitive P_1 operator.

Thus, of the candidates studied, only (36) and (40) are plausible principles for prima facie permissions.

6.3 Conditional rules about permission

The essential conclusions in section 4 on conditional rules about obligations also apply to conditional rules about permissions. Thus P(A/B) is a rule about prima facie permissions, and it means that $B \rightarrow P_1A$ is true about all possible states of the world.

Conventionally, "conditional permissions" and "conditional obligations" have been considered to be interdefinable by the formula

(46) $P(A/B) \equiv -O(-A/B)$

(Føllesdal and Hilpinen 1970, p. 27). in the present interpretation, (46) does not hold. ([2]) Its rejection is by no means a disadvantage. As was pointed out by Chellas:

> "It is not clear that this is a faithful representation of conditional permission; $-O(-B/A)$ appears to be more the denial of a conditional prohibition than the conditional affirmation of a permission." (Chellas 1974, p. 27)

([2]) The following argument should make it clear why (46) is not plausible: Suppose O(A/C) and O(−A/D). The from O(A/C), through (24) follows O(A/C&D), and with the help of (36) we can derive P(A/C&D). From O(−A/D), through (24) follows O(−A/C&D) and through (46) −P(A/C&D), leading thus to a contradiction.

7. The semantic approach to deontic logic

The conventional semantics for deontic logic depends on the concept of a "deontically perfect world", i.e. a possible world where all duties are fulfilled. OA is valid if and only if A applies in all deontically perfect worlds. This concept is modelled after alethic modal logics.

The principle of deontically perfect worlds makes the formula $O(A \& B) \equiv OA \& OB$ valid. Thus it implies the above-mentioned (false) principle of division of obligations. Further, it is difficult in this all-or-none version of obligations to give an account of obligations that are the result of the neglect of other duties. If the deontically perfect worlds are possible worlds where everybody fulfils her obligations, presumably neither racism nor violence would exist in any of these worlds. Therefore, there can be a deontically perfect world where nobody fights racism or helps the victims of violence. Thus, according to the definition, there cannot be any duty to do any of these things.

As Goldman (1977) has shown, possible worlds containing no agents at all pose difficult problems to the semantic of deontic logic. "If a world contains no agents at all, are all our obligations fulfilled in it? If it contains agents who are not counterparts to the agents in this world, are our obligations fulfilled in it?" (p. 242)

The classical possible worlds semantics for deontic logic is not tenable. Several attempts have been made to reform it.

Åqvist (1967) proposed a system of an unending series of obligation operators. O_1 refers to ideal worlds. O_2 refers to what obtains in "ideal extensions" of the actual world, in which all reparational obligations following from violations of O_1 are fulfilled. Since O_2 can be violated, we also have O_3, and O_4 etc. For each O_n there is an accessibility relation. For each O_n the full axiom system of standard deontic logic applies. Castaneda (1981) proposed a somewhat similar system with one ought operator "for each prima facie obligatoriness and one for the overriding ought". Both Åqvist's and Castaneda's systems result in a syntax for the ought operators that is much too strong according to what was shown above in section 3. The indefinite multiplication of oughts does not seem to solve the problems of deontic possible world semantics.

Another approach is to presuppose an underlying ranking or preference ordering of possible worlds, and to let the semantic accessibility relation denote some other notion than that of oughtness. This approach was taken

by David Lewis (1973). As pointed out by Goldman (1977), the essential part of Lewis's semantics is captured in the following, somewhat simplified version: Op is true at world w if and only if there are worlds evaluable from the standpoint of w, and p holds at all worlds that are best from the standpoint of w. Feldman (1983) proposed a similar system, but interpreted the accessibility relation as practical availability instead of evaluability. "Loosely, then, the idea is that [the agent] s ought, as of [time] t, to bring about [the state of affairs] p if and only if there is a p-world accessible to s at t, and there is no accessible not-p world as good as it." (p. 259)

However, both these systems give rise to strong and implausible syntactical principles like the divisibility of duties and the inheritance principle. Lewis's system also has the weakness indicated by Goldman (1977) that is "fails to accommodate the fact that particular obligations flow from contingent facts about the actual world as well as from abstract moral principles." (op. cit. p. 248) For instance, suppose John saves a child from drowning. Then "there is no reason to suppose that John saves the child from drowning in *all* the best worlds: there are worlds – at least as good as any others ... in which John fails to perform this act. There are worlds in which the child does not fall into the pool in the first place." (op. cit. p. 244) On a reasonable account of evaluability, some of these worlds would have to be evaluable from the standpoint of the present world.

A third type of modification of the standard possible world semantics was proposed by Andrew Jones and Ingmar Pörn (1985). They have constructed a system of deontic logic with two accessibility relations, one meaning that a world is ideal in relation to another and the other that it is subideal in relation to another. OA (their Oughtp) is true if and only if A is true in all worlds that are ideal, as seen from the real world, and A is false in at least one world that is subideal, as seen from the real world. In this system the agglomeration principle is valid, but not the principle of division of duties. This is certainly a step towards a more realistic deontic logic. However, on closer scrutiny it turns out that the following principle is valid in their system:

$$(47)\quad -A \,\&\, O(A\&B) \rightarrow OA.$$

This is very close to the principle of division of duties. ($O(A\&B) \rightarrow OA$, cf. section 3.3.) Its invalidity in moral discourse can be seen from the typewriter example of section 3.3. If I have not yet had the fifty dollars

transferred to my own account, then according to (47) I have an independent duty to have them transferred, irrespectively of what I do with the typewriter. (See further Hansson 1988.) It is difficult to see any reason for accepting (47) while rejecting the principle for division of duties.

Sofar, none of the possible world semantics proposed for deontic logic has provided us with a faithful or even reasonable representation of deontic concepts.

Obligation is not a species of necessity. Deontic concepts have a logic of their own that cannot be derived from that of necessity, but can only be discovered through a careful study of the logic of informal discourse on norms.

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