Original Paper

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The Descriptive-Normative Dichotomy and the So Called Naturalistic Fallacy

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Abstract: Investigating the genesis and justification of norms in a theoretical way requires a clear-cut distinction between normative and descriptive discourse. From a philosophical perspective, the descriptive-normative dichotomy can itself be understood either in a descriptive (or 'reportive') or in an normative (or 'stipulative') way. In the first case such a dichotomy is understood as the factual border between descriptive and normative discourse in a given language; exploring this border is a hermeneutic enterprise. In the other case it is understood as a boundary between descriptive and normative discourse to be implanted in a language which is developed in order to fit certain purposes, in particular theoretical purposes; this implanting procedure is a matter of regimentation. In this paper I will deal shortly with the first question of hermeneutics and then in more detail with the second question of regimentation. In the final part of the paper I will distinguish different types of naturalistic fallacies resulting from disregarding descriptive-normative dichotomies.

Keywords: Naturalistic fallacy, is/ought, deontic logic

1 Introduction

When connected with a certain gesture or a stern look or uttered with a specific undertone, e.g. by a member of the security staff, the utterance of the sentence type 'Nobody is smoking in this room' is used prescriptively or normatively and expresses a prohibition. When you are asked what the security officer said and you answer: He expressed a ban of smoking by saying 'Nobody is smoking in this room', your utterance is not normative but merely pseudo-normative since it merely quotes a normative utterance and, by doing so, states a mere fact. But the utterance of the sentence type 'Nobody is smoking in this room' can itself also be a mere description of a state of affairs, e.g. when it serves as an information to

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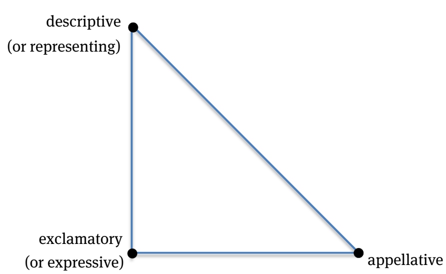
an inspector who is checking whether our university's ban on smoking in class rooms is being observed.

This is another example of the same kind, this one taken from the Austrian law: §75 of the Austrian criminal law states: “Wer einen anderen tötet, ist mit Freiheitsstrafe von zehn bis zwanzig Jahren oder mit lebenslanger Freiheitsstrafe zu bestrafen.” As part of the Austrian law this sentence is normative or prescriptive; it expresses an order to the Austrian jurisdiction to prosecute certain deeds and to punish the perpetrators in a certain way. As part of a textbook of Austrian law or as an answer of a professor of law to a student's question about §75 of the Austrian criminal law, however, the same sentence type is used in a purely descriptive way.

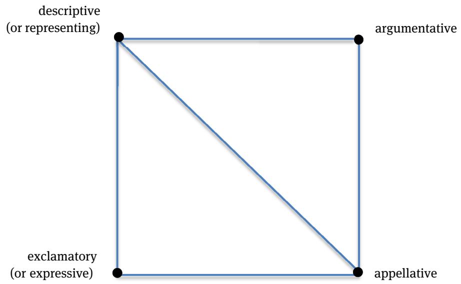
What can we learn from these examples? One and the same linguistic expression, one and the same string of letters or words, can be used and is in fact used in everyday language sometimes in a merely descriptive and sometimes in a normative way. My first—hermeneutic—question will be: How can we find out whether a linguistic expression, e.g. a sentence, is used in a descriptive or in a normative intention?

2 How to Detect the Descriptive-Normative Dichotomy in a Given Language (Hermeneutics)

Distinguishing different usages and functions of language has a long tradition in the theory and philosophy of language. Karl Bühler (1965, 28), e.g., has become famous for his triangle of linguistic functions in which he distinguishes the descriptive (or representing) from the exclamatory (or expressive) and also from the appellative function of a linguistic sign. The exclamatory and the appellative function are already present in the languages of animals, whereas the first, i.e. the descriptive function, being a ‘higher’ linguistic function, is characteristic of the human language.



Karl Popper has added to Bühler's triangle as a fourth function the argumentative function of language. This function is, according to Popper, even more peculiar to human language than its descriptive function (cf. Popper 1973, 137f., 261ff.; 1994, 196f.; 1997, 427f.). In adding it, he turned Bühler's 'linguistic triangle' into the following square:



In his so-called 'later philosophy', Ludwig Wittgenstein (1953, §23) expanded this picture by emphasizing that there is not merely a fixed number of linguistic functions, but rather an indefinite variety of so-called *language games*. The linguistic functions as characterized by Bühler or Popper present, at the very best, merely a rough typology of the variety of language games. The term 'language *game*' reminds us that we can *do* a lot of things with words, as the programmatic title of a well-known book by John Austin (1955) indicates.

The descriptive function of language is one of the three functions in Bühler's linguistic triangle and one of the four functions in Popper's linguistic square. This simple function, however, embraces a great variety of different language games, all of which serve the purpose of describing something in some way or another. Similarly the normative use of language can be analyzed into a whole range of normative language games, such as commanding, prohibiting or permitting, recommending, evaluating etc. The normative force of an utterance need not be verbally expressed. It can be expressed by a gesture of our body language (by raising one's fist, for instance, or—in a more civil manner—by wagging one's finger), by facial expression (e.g., by means of a stern look or by raising one's eyebrow), or by mere intonation.

The distinction between normative and descriptive speech in natural language is not a mere matter of syntactical form but concerns the utterance of a linguistic form by a speaker at a certain time and place, i.e. it concerns the speech *act* in question and is therefore of a pragmatic nature.

How can we distinguish between these two kinds of speech acts? John Searle (1975) has proposed what he called '*direction of fit*' as *a criterion for distinguishing between normative and descriptive speech acts*. If what we say ('our language') and what is the case ('the reality') do not match each other, we have two options: we can either change what we say in such a way that it fits what is the case, or we can change what is the case in such a way that it fits what we say. In the first case our speech act is descriptive in nature, characterized by the *language-to-reality direction of fit*; and in the second case our speech act is normative in nature, characterized by the *reality-to-language direction of fit*.[1] Let me explain this distinction by means of an example which originally was given by Elizabeth Anscombe (1963, 56) and which I have slightly modified: Let us take a simple shopping list (L1) and the bill of a supermarket (L2) with exactly the same items as those on the shopping list; between the two lists we will describe the items on the band-conveyer (R) which we collected in the supermarket with the intention to follow our shopping list.

shopping list (L1)	reality on the band-conveyer (R)	bill (L2)
1 loaf of bread	**1 loaf of bread**	1 loaf of bread
1 cucumber	**1 cucumber**	1 cucumber
2 bottles of beer	**3 bottles of beer**	2 bottles of beer
1 mug	**1 mug**	1 mug
1 melon	——	1 melon

We will find that in our shopping we made two mistakes (by picking up a third bottle of beer and forgetting about the melon).

Neither of the two lists does fit the items we collected on the band-conveyer. Since the cashier's 'piece of language' L2, i.e. the bill, does not match the 'piece of reality' R, the cashier will correct the bill by changing '2 bottles of beer' into '3 bottles of beer' and cross '1 melon' off the bill because there is no melon on the band-conveyer. Thereby the cashier turns the provisional bill L2 into L2* and makes the bill fit to reality.

1 Searle uses the terms '*word-to-world* direction of fit' and '*world-to-word* direction of fit'.

reality on the band-conveyer (R)	bill (L2*)
1 loaf of bread	1 loaf of bread
1 cucumber	1 cucumber
3 bottles of beer	3 bottles of beer
1 mug	1 mug
——	——

This is an example of the language-to-reality direction of fit and shows that we or rather the cashier interprets the bill descriptively.

On the other hand: Since the ‘piece of reality’ R, consisting of the items on the band-conveyer, does not match our ‘piece of language’ L1, i.e. our shopping list, we do not change the shopping list, but the reality R into R*. In order that it fits our shopping list, we bring back to the shelves the third bottle of beer which we had taken with us by mistake. We also pick up the melon we had forgotten and put it on the band-conveyer.

shopping list (L1)	reality on the band-conveyer (R*)
1 loaf of bread	**1 loaf of bread**
1 cucumber	**1 cucumber**
2 bottles of beer	**2 bottles of beer**
1 mug	**1 mug**
1 melon	**1 melon**

Thus we make the reality fit our shopping list. This is a clear example of the reality-to-language direction of fit and shows that we understand our shopping list normatively.

This should give a rough idea of Searle’s *direction of fit* criterion for distinguishing normative from descriptive speech in everyday language and communication. This way of distinguishing between normative and descriptive speech has the benefit that as a by-product it establishes why descriptive speech is cognitive in the following sense: performing it is—under normal circumstances—combined with the intention that it corresponds to reality, and it in fact does correspond or fail to correspond to reality. In normative speech, however, we do not even intend that our utterance corresponds to reality, but we rather perform it under the supposition that it does not correspond to reality.

3 How to Implant the Descriptive-Normative Dichotomy in a Regimented Language (Regimentation)

3.1 The First Kind of the Descriptive-Normative Dichotomy

The *direction of fit* criterion can be of help in telling normative from descriptive speech in everyday communication. It is, however, far from being theoretically satisfactory. Within a natural language it will never be possible to draw a sharp demarcation between normative and descriptive speech. This is only possible for a language with a clear formal structure, i.e. a regimented language, as Quine calls it, or a formalized (or symbolic) language evolving from it. The results of a theoretical investigation carried out for a regimented or symbolic language can then be transferred, even if only approximately, to the corresponding investigation of our speech and communication in everyday language.

In a regimented normative language (RNL) we must not leave the expression of prescriptivity to the circumstances of an utterance such as gestures or intonation which usually are only present in the moment of the utterance. We must rather express the normative components in a regimented normative language verbally or syntactically by making available certain elements of the vocabulary of RNL for this purpose.[2]

Two kinds of sentence forming functors can be considered for this purpose, viz. *either* predicates *or* sentential operators. *Predicates* are those sentence forming functors (such as 'is angry' or 'is a philosopher') that require names (such as 'Saul Kripke') to be completed to a sentence (such as 'Saul Kripke is angry' or 'Saul Kripke is a philosopher'). *Sentential operators* are those sentence forming functors (such as 'it is not the case that' or 'it is possible that') that require sentences (such as 'Saul Kripke is an Austrian' or 'Saul Kripke is ingenious') to be completed to a larger sentence (such as 'it is not the case that Saul Kripke is an Austrian' or 'it is possible that Saul Kripke is ingenious'). Sentences that are construed exclusively of predicates and names, the connectives of propositional logic—'it is not the case that' ($\neg$), 'and' ($\wedge$), 'or' ($\vee$), 'if–then' ($\rightarrow$) and 'if and only

2 The reason for this requirement is quite obvious: The sentences of a language which suits theoretical or quasi-theoretical purposes must be understandable independent from their utterances by certain persons in certain situations at certain times and places, because these circumstances are not accessible for most of the users of the language in question. (An analogous requirement must be met whenever we switch from oral to written discourse.)

if' ($\leftrightarrow$)—and the quantifiers of predicate logic—'for at least one x' ($\exists x$) and 'for every x' ($\forall x$)—have a characteristic logical feature: Two elementary logical laws are applicable to them, viz. (1) the law of *existential generalisation* which allows us to infer 'For at least one x, x is so-and-so' ($\exists xFx$) from 'a is so-and-so' (Fa); and (2) the law of *substitutivity of identicals*, which allows us to infer 'b is so-and-so' (Fb) from 'a is so-and-so' (Fa) and 'a is identical with b' ($a = b$). The validity of these two logical laws is no longer guaranteed, however, in a language which allows the expression of modalities (such as possibility and necessity) or propositional attitudes (such as believing, searching, loving, etc.). A normative language is of the same kind, i.e., the two logical laws mentioned before are no longer guaranteed to hold also in a normative language. We will therefore be well-advised to represent the normative components in RNL not by predicates (because the two logical laws mentioned can be applied to the singular terms which are their arguments) but by sentential operators such as 'it is obligatory that' (O), 'it is permitted that' (P) or 'it is forbidden that' (F), for example.

For the sake of simplicity I will restrict myself to these normative or deontic functors and ignore other kinds of normative functors, e.g. evaluative expressions (such as 'good', 'bad', 'better' etc.). In addition, from now on I will use the symbols I have introduced instead of the phrases they abbreviate in order to shorten my presentation. (From now on it is therefore no longer the regimented normative language RNL but the corresponding symbolic normative language SNL that is primarily concerned instead.) In SNL—as in RNL—we can strictly define syntactically what is a formula of SNL—or a sentence of RNL, respectively—, and we can distinguish different types of formulas of SNL (and correspondingly also of sentences of RNL), viz.:

(1) *elementary normative formulas* such as:
$O(A)$, $P(A)$, $F(A)$, $O(\neg A)$, $O(A \rightarrow B)$, $P(A \wedge \neg B)$ etc.
(2) *purely normative formulas* that are built up from elementary normative formulas by means of connectives such as:
$O(A \vee B) \rightarrow P(A)$, $O(A \rightarrow \neg B) \wedge P(B)$, etc.
(3) *mixed formulas* containing a normative as well as a descriptive component such as:
$A \rightarrow O(B)$, $P(A \wedge B) \vee \neg B$, etc.

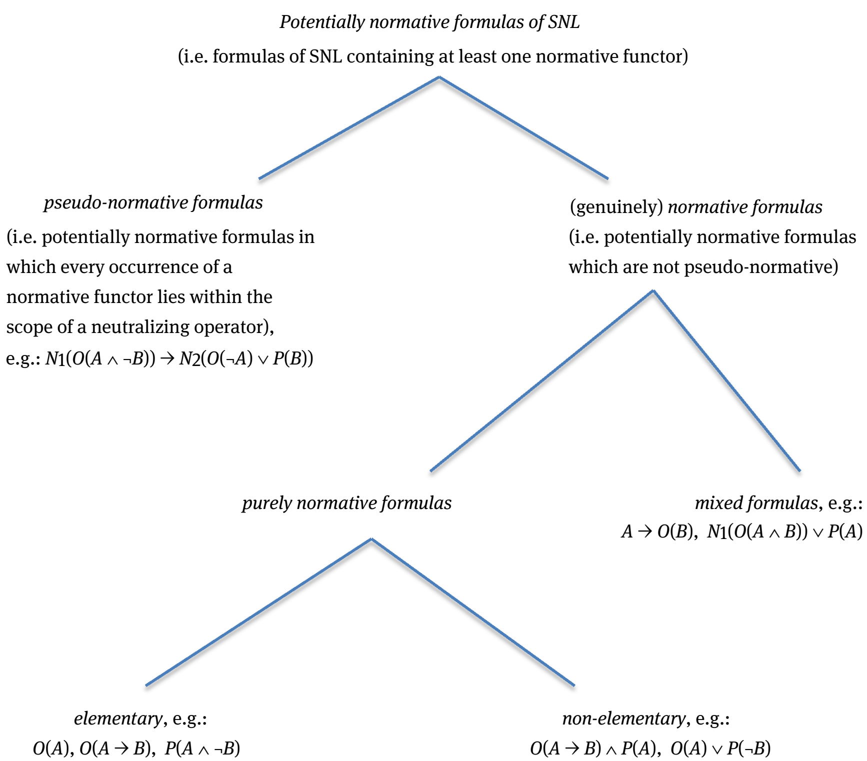
(In these and the following examples of formulas the letters 'A', 'B', … are used as sentential variables for purely descriptive formulas.)

The occurrence of a normative functor in a formula or sentence does not automatically, however, guarantee that the formula or sentence in question is itself normative. Prefixing a purely normative sentence such as 'it is forbidden that somebody carries out euthanasia' by a phrase such as 'John said that' results in a strictly descriptive sentence, viz. 'John said that it is forbidden that somebody carries out euthanasia'. I will call phrases of the kind 'x says that', 'x believes that' etc. which turn normative into descriptive sentences '*neutralizing phrases*'. We will represent them in SNL by the sentential functors $N_1, N_2, \ldots$, generally N, which we call '*neutralizing operators*'. After having included neutralizing operators into SNL, we can now give a more 'realistic' survey on the formulas of SNL. We start with formulas containing at least one normative functor. Since containing at least one normative functor is a necessary, but not a sufficient, condition of a formula of SNL to be itself normative, we will call these formulas '*potentially normative*'. If each normative functor contained in a potentially normative formula is neutralized,[3] the formula is merely *pseudo-normative*; otherwise, i.e. if at least one normative functor in a formula is not neutralized, it is a genuinely *normative* formula.

(4) This is an example of a *pseudo-normative formula*:
$N_1(O(A \wedge B)) \rightarrow N_2(O(\neg A) \rightarrow P(B))$
(5) The following formula is *genuinely normative*:
$N_1(O(A \wedge B)) \rightarrow (O(\neg A) \rightarrow P(B))$
In fact it is—according to our earlier definition—a *mixed formula*, whereas
(6) the following formula is *purely normative*:
$O(A \wedge B) \rightarrow (O(\neg A) \rightarrow P(B))$

The following schema should help to get a rough survey on the disctinctions between different categories of formulas of SNL.

3 That the occurrence of a normative functor F in a formula A is neutralized means (technically defined) that this occurrence of F lies in A within the scope of a neutralizing operator N. The scope of a neutralizing operator (or of any other sentential operator) N in a formula A is thereby defined, analogously to the scope of a quantifier, as the smallest formula immediately following N in A.



Distinctions such as those which I have introduced merely by example but nevertheless (hopefully) exemplarily for SNL are indispensible for a language which has a normative function and which at the same time pursues theoretic or quasi-theoretic purposes as in law and in ethics. These distinctions can be transferred to the regimented language RNL without any loss; a transfer to everyday language, however, is possible only approximately.

The descriptive-normative dichotomy established in this way for SNL (or also for RNL, respectively) via the formation rules for formulas of SNL (or sentences of RNL, respectively) provides a precise and effective criterion for distinguishing between normative and descriptive formulas (or sentences, respectively). This criterion belongs to the grammar of the language in question, and we can therefore call this kind of descriptive-normative dichotomy a mere *grammatical dichotomy*.

3.2 The Second Kind of the Descriptive-Normative Dichotomy

For theoretical reasons it is essential that we can sharply distinguish between normative and descriptive speech on a mere grammatical level without taking into account the circumstances of a concrete speech act. But is this enough? Can we leave the distinction between the normative and descriptive speech on a mere grammatical level as explained under 3.1? Why should we not bring them afterwards together again by reducing—e.g. via a definition—the (meaning of the) normative components of a language to (the meaning of) their descriptive components? Why should we not simplify our language by reducing normative speech in its meaning and function to descriptive speech?

G. E. Moore and his followers reproached those who leave the distinction between the normative and descriptive speech on the mere grammatical level and reduce afterwards the meaning of the normative components of a language to the meaning of their descriptive components for committing what they called a naturalistic fallacy. Moore thought—as the story goes (cf. Frankena 1939; Stevenson 1968)—that such a reduction yields a contradiction and can therefore be disproved by a *reductio ad absurdum* or *indirect proof*. The classic example Moore used in his argument was the basic evaluative predicate 'good' whereas I will use instead in my reconstruction the normative sentential operator 'it is forbidden that' which I will take, for the sake of argument, as my basic normative functor.[4] The *non-reductionist thesis* Moore has allegedly proved was that a basic normative functor cannot be reduced to a purely descriptive expression, e.g. by defining it in terms of purely descriptive functors. The assumption of his indirect proof from which he allegedly derives a contradiction was the opposite of what he was going to prove, i.e. the thesis of *Reductionism*. It goes as follows:

A basic normative functor P (such as, e.g., 'it is forbidden that') has the same meaning as a purely descriptive expression D (such as, e.g., 'the majority of the society disapproves that'); stated as a definition, it runs as follows:

(1) It is forbidden that p: $\leftrightarrow$ the majority of the society disapproves that p [this is the reductionistic assumption of the indirect proof]

4 That a normative functor is basic means in this context that it is not defined in terms of other normative functors. Since the normative operators 'O', 'F' and 'P' are interdefinable, we can choose each of them as our basic functor.

From assumption (1) together with two additional assumptions—(2) and (5) below—Moore arrives at a contradiction (or rather at two sentences which contradict each other) in the following way:

(2) The sentence 'The majority of the society disapproves that *p*, but [i.e.: and] it is not the case that it is forbidden that *p*' is not contradictory.[5] [additional assumption]
(3) The sentence 'The majority of the society disapproves that *p*, but it is not forbidden that *p*' has the same meaning as the sentence 'The majority of the society disapproves that *p*, but it is not the case that the majority of the society disapproves that *p*' [follows from definition (1)].
(4) The sentence 'The majority of the society disapproves that *p*, but [i.e.: and] it is not the case that the majority of the society disapproves that *p*' is contradictory. [by propositional logic]
(5) If two sentences S_1 and S_2 have the same meaning and S_1 is contradictory, then S_2 is contradictory too. [additional assumption]
(6) The sentence 'The majority of the society disapproves that *p*, but [i.e.: and] it is not forbidden that *p*' is contradictory. [follows logically from (4), (3) and (5)]

This concludes the indirect proof, since (2) is the negation of (6). Herewith the thesis of reductionism, i.e. assumption (1) of the indirect proof, is disproved: A basic normative functor therefore cannot have the same meaning as a purely descriptive expression.

There is a snag in this argument however: How can we know that the additional assumption (2) is true? Even if we could empirically show that every competent speaker of the English language agrees with it: Given we stipulate (1) by definition, (2) is no longer true. Moore's argument suffers, so to speak, from 'proving too much': The same argument could be used to declare null and void every definition. I therefore cannot accept Moore's argument as a disproof of reductionism or as a conclusive refutation of what he called a naturalistic fallacy.

There is, however, a plausibility argument against reductionism which is closely related to Moore's argument: Reducing the normative speech to descriptive speech and thereby committing a naturalistic fallacy of the type Moore had in mind, amounts to refraining altogether from normative speech. We would only

5 Moore stated this premise with the help of the concept of an open question. Since this concept is little common, I modified the premises in such a way that the common logical term 'contradictory' plays the leading role in it. This modification is due to Ayer (1946, 138f.).

continue to use normative words and symbols but without any normative 'force' or meaning. By reducing normative to descriptive speech we turn its genuinely reality-to-language direction of fit into a language-to-reality direction. In important areas of human life such as, e.g., law and morality, however, we cannot do without genuinely normative speech. If we reduce normative speech to descriptive speech we can give up from the beginning our efforts to distinguish them on the grammatical level.

The descriptive-normative dichotomy which results from not allowing the reduction of normative formulas or sentences to purely descriptive formulas or sentences, respectively, via, e.g., definitions, goes beyond the mere grammatical dichotomy that was explained under 3.1. Since definitions play an exemplary role in such reductions, we will call this kind of a descriptive-normative dichotomy a *definitional dichotomy*.

3.3 The Third Kind of the Descriptive-Normative Dichotomy

Even if we must not reduce normative to descriptive speech we might wonder whether we cannot deduce our normative views from descriptive premises and thereby vindicate them by objective reasons. The law that one cannot or must not logically derive a normative sentence (such as an ought-sentence) from a set of purely descriptive sentences (so-called is-sentences) is often referred to as 'Hume's Law' since Hume has allegedly proclaimed it.[6] To whomever we attribute this law, however, it involves another kind of descriptive-normative dichotomy, namely a *logical dichotomy*.

Those who derive normative conclusions from merely descriptive premisses (or ought statements from mere statements of facts) and thereby violate the logical descriptive-normative dichotomy are very often accused of committing also a naturalistic fallacy, in this case not a fallacy of reduction but a *fallacy of inference or deduction*. Against this reproach, several attempts have been made to show that it is possible to derive correctly an ought-sentence (as a classic example of a normative sentence) from is-sentences (representing descriptive speech). Some of these attempts, however, can be found guilty of ignoring already the grammatical or the definitional descriptive-normative dichotomy. This is true, e.g., even of John

6 There used to be a vehement controversy, however, on the question whether Hume really advocated this kind of the descriptive-normative dichotomy thesis. The famous passage in Hume's work which allegedly supports this view is rather ambiguous (cf. Hudson 1969). Here, however, I will avoid the merely historical question as to whether Hume was or was not an exponent of this version of the dichotomy thesis.

Searle's famous derivation of the sentence 'John ought to pay Smith $100' from 'John utters the words 'I, John, promise to pay you, Smith, $100''. The real question is whether it is possible in a regimented or symbolic language such as RNL or SNL with a clear demarcation between normative and descriptive sentences, i.e. in a language which respects the grammatical as well as the definitional descriptive-normative dichotomy, to derive correctly an ought-sentence from is-sentences or whether this is impossible.

It would obviously be invalid to derive an ought-sentence $O(A)$ from the *corresponding* descriptive sentence A that describes a hard fact. What is at stake here, however, is a more general question: Can there be any normative sentence which is correctly derivable from purely descriptive sentences? Or put in semantic terms: Can a normative sentence ever logically follow from a set of purely descriptive premises?

Even in the first half of the 20th century, the majority of experts (among them Henri Poincaré and Karl Popper) took it for granted that the answer to this question must trivially be 'no' and the logical dichotomy thesis be trivially true. The reason they gave for this view was that the conclusion of a valid argument can contain nothing what is not contained already in its premises. *Semantically* understood this means that the *logical content* of the conclusion of a valid argument cannot be greater than the logical content of its premises. This is true, but does not in any way answer our question whether there can be a valid argument with a normative conclusion and purely descriptive premises, i.e. whether the logical content of a normative sentence always exceeds the logical content of any consistent set of purely descriptive sentences. If we understand the afore-mentioned reason for the logical dichotomy thesis *syntactically*, however, it means that there cannot be a *term* in the conclusion of a valid argument which does not occur already in at least one of its premises. But this is true only for classical syllogisms and fails already for elementary modal logic as vindicated by simple counter examples; 'it is possible that A' follows logically, e.g., from A.

As simple as matters seem to be, the point is: A general and strict proof that a sentence of type A is not correctly *derivable* from a set of premises of type B is not possible without reference to a certain *syntactic logical system*, be it an axiomatic system, a system of natural deduction, or whatsoever. And, similarly, a proof that a sentence of type A cannot *logically follow* from premises of a certain type B is only possible relative to a specific *semantic logical* system.

Now the first satisfactory axiomatic system for a normative language was von Wright's system of deontic logic from which the standard systems for normative languages have evolved. It dates back to Wright 1951. And the first satisfactory semantics for such a system is due to Stig Kanger and dates back to Kanger 1957. Kanger developed the first system of what has later been called a possible world semantics.[7] No wonder that the first satisfactory proof for the logical dichotomy thesis was published not before 1977 and that it made essential use of possible world semantics (Kutschera 1977; the most comprehensive study on the logical dichotomy thesis so far is Schurz 1997).

Let me just sketch how to proceed in establishing a proof for the logical dichotomy thesis for our language SNL. First of all, we have to provide the logical dichotomy thesis as it was provisionally stated so far with several qualifications. In its semantic version it was stated as follows: A normative sentence cannot logically follow from a set of purely descriptive sentences. According to a general logical law, however, every sentence or formula will follow from an inconsistent (or unsatisfiable) set of formulas; and a universally valid sentence or formula will follow from any set of sentences or formulas. In order to exclude trivial counter examples of this kind we have therefore to reformulate (the semantic version of) the *logical dichotomy thesis for our language SNL* in the following way:

If the following conditions are fulfilled:

(1) D is a set of purely descriptive formulas (including possibly also pseudo-normative formulas),
(2) D is satisfiable,
(3) P is a purely normative formula, and
(4) P is not universally valid,

then P does not logically follow from D.

In condition (3) we must make the requirement that P is a *purely* normative formula, since if we would allow every normative formula and therefore also a mixed formula to be the conclusion, we would automatically end up again with trivial counter examples to the logical dichotomy thesis. The derivation of a mixed formula $A \vee O(B)$ from a purely descriptive formula A being a case in point.

The proof of the logical dichotomy thesis starts with the construction of two models: since according to condition (2) the set D is satisfiable, there must be a model M_1 in which all the elements of D are true, i.e. get the value 1; and according to condition (4) there must be a falsifying model M_2 for P in which P gets the value 0. We can now always construe a model M_3 which combines the relevant features

7 The invention of modern possible world semantics was and still is commonly, but incorrectly, attributed to Saul Kripke whose work in possible world semantics, however, started later and was published from 1959 on.

of M_1 and M_2 such that in M_3 all members of D get the value 1 and P gets the value 0; and that is exactly what is meant when we say that P does not logically follow from D.

For a standard system of normative (or deontic) logic which is sound and complete with respect to this semantics, we can prove therefore also the syntactic version of the logical dichotomy thesis stating that P is not derivable from D.

In this way the logical dichotomy thesis can be proved for standard systems of our language SNL and similar systems. By the standards of such systems an inference of a non-trivial purely normative sentence from a consistent set of purely descriptive sentences is invalid and constitutes therefore a classical fallacy. Fallacies of this kind are commonly called ‘naturalistic fallacies’. In order to distinguish them from Moore’s naturalistic *reduction* fallacies we may call them ‘naturalistic *inference* fallacies’ (although, in view of the ordinary usage of the term ‘fallacy’ within philosophy, the phrase ‘inference fallacy’ has a pleonastic overtone).

We usually pay regard to the logical dichotomy thesis in the following way: As soon as an argument for a purely normative moral or legal sentence is presented and all of the premises of the argument are purely descriptive, it will be pointed out that according to the logical dichotomy thesis this argument must be invalid. Such an argument can only be saved by taking it as an enthymeme in which one or more premises are tacitly presupposed. This results in the task of searching for the missing premise(s) that turns (or turn, respectively) the enthymeme into a formally valid argument as soon as it is (or they are, respectively) added to its former premises. The following is a relatively simple example of such an incomplete argument or enthymeme which is often used in contemporary works of applied ethics:

1. The concrete being *a* is an embryo of a human being.
2. Every embryo of a human being is itself a human being.
3. Every embryo of a human being is an innocent being.
   Therefore: It is forbidden that someone kills *a*.

The missing normative premise is obviously:

4.* Every innocent human being is such that it is forbidden that someone kills it.

Symbolically represented, the argument (including the missing premise 4*) has the following form:

1. $\exists x(H\mathrm{x} \wedge Eax)$
2. $\forall y(\exists x(Hx \wedge Eyx) \rightarrow Hy)$

3. $\forall y(\exists x(Hx \wedge Eyx) \rightarrow Iy)$
4.* $\forall y((Hy \wedge Iy) \rightarrow F(\exists zKzy))$
$\therefore\ F(\exists zKza)$

Proving the validity of this argument is an exercise in elementary logic; in a system of natural deduction the derivation which proves the validity of the argument can be presented in the following form:[8]

5.	$\exists x(Hx \wedge Eax) \rightarrow Ha$	2, $\forall$ELIM
6.	$\exists x(Hx \wedge Eax) \rightarrow Ia$	3, $\forall$ELIM
7.	Ha	5, 1, $\rightarrow$ELIM
8.	Ia	6, 1, $\rightarrow$ELIM
9.	$Ha \wedge Ia$	7, 8, $\wedge$INT
10.	$(Ha \wedge Ia) \rightarrow F(\exists zKza)$	4*, $\forall$ELIM
11.	$F(\exists zKza)$	10, 9, $\rightarrow$ELIM

The missing premise is in most cases a mixed sentence or formula such as our premise (4*). Since it 'bridges' the gap between the purely descriptive premises (1)–(3) and the purely normative conclusion it is commonly called a 'bridge principle' as soon as we have good reasons for accepting it. One of the main problems in moral discussions is the question of the acceptability of the bridge principle proposed to fill the gap of an argument which violates the logical dichotomy thesis and thereby commits a naturalistic inference fallacy.

In special cases a universally valid sentence of a logical system can serve as bridge principle. From law, e.g., we know the principle 'Ultra posse nemo obligatur', i.e.: If it is impossible to do *A* it cannot be obligatory to do *A*. This principle is also part of several ethical theories. In order to express it in symbolic form we must extend our language SNL and add to it a symbol for possibility, let say '$\Diamond$'. Then we can express the principle as follows:

$$\neg\Diamond(A) \rightarrow \neg O(A).$$

This of course is logically equivalent with the famous ought-implies-can principle, expressed in symbolic form as: $O(A) \rightarrow \Diamond(A)$.

8 A system of natural deduction contains for each logical operator (i.e. for each connective and each quantifier) a rule by means of which it can be INTroduced and a rule by means of which it can be ELIMinated. On the right of each formula of the derivation above the rule is mentioned by means of which the formula can be derived from formulas in earlier lines whose numbers are indicated together with the name of the rule.

If the bridge principle is a logical law, we do not need it any more as a premise in a valid argument. The question therefore arises whether there are logical systems within which bridge principles such as the ought-implies-can principle are universally valid. For such a system the logical dichotomy thesis would no longer hold. The answer is: Yes, there are so-called multi-modal systems, including normative operators such as 'O' as well as alethic modalities such as '$\Diamond$', within which the ought-implies-can principle is a theorem.

This does not save us from a discussion of the bridge principle, however. Instead of asking how we can justify a specific sentence that we propose as our bridge principle, we have now to ask a much more fundamental question: how can we justify a logical system which includes among its laws the ought-implies-can principle.

In illustration of naturalistic inference fallacies, I have chosen an extremely simple example, almost as simple as a syllogism. In order to show that matters are usually not as simple as in the example above, let us eventually consider another example; although it is barely more complex than the former example, adding a 'bridge principle' alone does in this case not suffice for saving its validity. Here is the argument:

1. Every embryo of a human being is itself a human being.
2. Every embryo of a human being is an innocent being.
3. If someone carries out an abortion, then there is an embryo of a human being that is killed by someone.

   Therefore: It is forbidden that someone carries out an abortion.

The missing normative premise in this case is:

4*. It is forbidden that an innocent human being is killed by someone.

Adding the normative premise 4* alone, however, does in this case not save the argument from being invalid. The following symbolic representation of the argument displays why this is so.

1.	$\forall y(\exists x(Hx \wedge Eyx) \rightarrow Hy)$	
2.	$\forall y(\exists x(Hx \wedge Eyx) \rightarrow Iy)$	
3.	$\exists v(Av \wedge \exists wCwv) \rightarrow \exists y(\exists x(Hx \wedge Eyx) \wedge \exists zKzy)$	
4.*	$F(\exists y((Hy \wedge Iy) \wedge \exists zKzy)$	$\therefore\ F(\exists v(Av \wedge \exists wCwv))$
5.	$\exists v(Av \wedge \exists wCwv)$	Assumption $\rightarrow$INT
6.	$\exists y(\exists x(Hx \wedge Eyx) \wedge \exists zKzy)$	3, 5, $\rightarrow$ELIM
7.	$\exists x(Hx \wedge E\underline{a}x) \wedge \exists zKz\underline{a}$	Assumption $\exists$ELIM
8.	$\exists x(Hx \wedge E\underline{a}x)$	7, $\wedge$ELIM
9.	$\exists x(Hx \wedge E\underline{a}x) \rightarrow H\underline{a}$	1, $\forall$ELIM
10.	$\exists x(Hx \wedge E\underline{a}x) \rightarrow I\underline{a}$	2, $\forall$ELIM
11.	$H\underline{a}$	9, 8, $\rightarrow$ELIM
12.	$I\underline{a}$	10, 8, $\rightarrow$ELIM
13.	$H\underline{a} \wedge I\underline{a}$	11, 12, $\wedge$INT
14.	$\exists zKz\underline{a}$	7, $\wedge$ELIM
15.	$(H\underline{a} \wedge I\underline{a}) \wedge \exists zKz\underline{a}$	13, 14, $\wedge$INT
16.	$\exists y((Hy \wedge Iy) \wedge \exists zKzy)$	15, $\exists$INT
17.	$\exists y((Hy \wedge Iy) \wedge \exists zKzy)$	6, 7–16, $\exists$ELIM
18.	$\exists v(Av \wedge \exists wCwv) \rightarrow \exists y((Hy \wedge Iy) \wedge \exists zKzy)$	5–17, $\rightarrow$INT

The conclusion of the argument is not derivable, however, from 18 and 4*. What we need instead of 18 is 18*:

18.*	$\Box(\exists v(Av \wedge \exists wCwv) \rightarrow \exists y((Hy \wedge Iy) \wedge \exists zKzy))$	
19.*	$F(\exists v(Av \wedge \exists wCwv))$	18*, 4*, Rule $\Box F$

The rule $\Box F$ used for deriving 19* from 18* and 4* is thereby understood in the following way:

Rule $\Box F$: $\dfrac{\Box(A \rightarrow B) \quad F(B)}{F(A)}$

The formula 18* is not derivable from the premises, and this is true, of course, even if we include 4* among them. Formula 18* would be derivable, however, if each of the first three premises would be replaced by the corresponding 'necessitated' formula, i.e. by:

1.* $\Box\forall y(\exists x(Hx \wedge Eyx) \rightarrow Hy)$
2.* $\Box\forall y(\exists x(Hx \wedge Eyx) \rightarrow Iy)$
3.* $\Box\exists v(Av \wedge \exists wCwv) \rightarrow \exists y(\exists x(Hx \wedge Eyx) \wedge \exists zKzy))$

In order to prove the validity of a comparatively simple argument such as the one presented here we already need a multimodal logical system, i.e. a system whose logical vocabulary includes operators for at least two different types of modalities (here: '$\Box$' for the alethic modality of necessity and 'F' for the deontic modality of being forbidden).[9]

4 Three Types of Naturalistic Fallacies

In the treatment of the descriptive-normative dichotomy we have at least three different tasks:

First, we must make clear how to appropriately demarcate normative from descriptive discourse. *Non-cognitivism* is a leading principle of this enterprise, and the *grammatical* descriptive-normative dichotomy results from it.

Second, we must fight against reducing normative to descriptive speech. *Non-reductionism* is the result of this struggle, and the *definitional* descriptive-normative dichotomy is the result.

Third, we must not allow arguments with a purely normative conclusion and exclusively descriptive premises, due to the *logical* descriptive-normative dichotomy. In case such an invalid argument, which violates the logical descriptive-normative dichotomy, is presented, in order to repair it, we must either search for an acceptable bridge principle or for an acceptable logical system in which the required bridge principle is a logical law and therefore redundant as a premise of the argument.

The term 'naturalistic fallacy' was originally coined by G. E. Moore in his *Principia Ethica* of 1903 (Moore 1903). In its strict philosophical sense a fallacy is nothing else but an incorrect inference or an invalid argument.[10] Many commentators therefore have taken and still do take Moore's naturalistic fallacy to be a defective kind of reasoning, namely an incorrect inference of an ethical conclusion from non-ethical premises, or, more generally, an incorrect inference of a normative conclusion (i.e., of a so-called 'ought' or of a statement of value) from purely descriptive premises (i.e., from a so-called 'is' or from statements of fact). They identify naturalistic fallacies with what we have called naturalistic *inference* fallacies.

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9 The rule we have used above combines the alethic operator '$\Box$' with the deontic operator 'F'. There is, of course, a corresponding rule also for 'O'.

10 Sometimes the use of the term 'fallacy' is restricted to those invalid arguments that bear some kind of plausibility and tempt us to accept them. If a fallacy is used with the intention to mislead the addressee it is called a 'sophistry'.

Outside of the area of philosophy, however, the word 'fallacy' is used for any kind of mistake or error, and this wide usage of the term 'fallacy' is often applied also within philosophy. One of the most competent experts on what was called a naturalistic fallacy by Moore, William K. Frankena, has therefore warned against rashly taking a naturalistic fallacy in the sense of G. E. Moore to be a type of defective reasoning, i.e. a naturalistic inference fallacy. He proposes to take it rather as a certain kind of an illegitimate definition or reduction. A naturalistic fallacy is thereby understood as a case of inadequately defining a normative definiendum by a purely descriptive definiens and thereby reducing the former to the latter, i.e. committing a naturalistic *definitional* fallacy as we have called it.

In describing these two kinds of naturalistic fallacies I referred to normative and descriptive sentences, thereby presupposing that we can clearly distinguish between the two, whatever they may be. We have arrived herewith at an even more fundamental kind of naturalistic fallacy that takes place if normative and descriptive expressions are more or less confused and not appropriately distinguished from one another.

This results in distinguishing three types of naturalistic fallacies which can be characterized in the following form:

A *naturalistic fallacy of the first type* is the failure of not adequately distinguishing between a normative and a merely descriptive use of language, i.e. disregarding the *grammatical* descriptive-normative dichotomy.

A *naturalistic fallacy of the second type* consists in defining a normative phrase in terms of purely descriptive phrases and thereby reducing normative speech to purely descriptive speech, i.e. ignoring the *definitional* descriptive-normative dichotomy.

A *naturalistic fallacy of the third type* is a derivation of a normative conclusion from purely descriptive premises, i.e. a violation of the *logical* descriptive-normative dichotomy.

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