Philosophical analysis of two-valued deductive logic

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In this paper, I propose to conduct philosophical analysis in the following way:

1. First, I will analyze the definition of the concept of argument offered by influential logicians ans show that it is mere propaganda. Their definition is inconsistent with their practice and with the content of their books

2. Next, I will demonstrate that the basic logical structure of deductive arguments as well as the formal concept of validity is paradoxical because it is counter intuitive. It has no form of life and therefore inapplicable in real life argumentation.

3. Then, I will show that the model of sound argument is bogus because its two requirements are inconsistent;

4. Lastly, I will demonstrate that the dogma that logical fallacies can be detected in virtue of the logical form alone without regard to the content is a myth.

Obviously, this is a big landscape in the doctrinal land of the logicians such that even if I am only half-successful, it still would support the recommendations of this paper, that is the study of correct and incorrect reasoning as well as sound and unsound arguments must be construed as language game specific. The use of the term 'argument,' together with its criteria of soundness or correctness in one language game cannot be used to evaluate and criticize the use of the same term in a different language game. In short, we must discard the normative and prescriptive garb of logic, in favor of one that is empirical and descriptive. This would make the study of reasoning and argumentation the proper subject matter of the Social and Behavioral Sciences

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THE GREAT LUDWIG WITTGENSTEIN of the *Philosophical Investigations* asks the most profound question in logic: "In what sense is Logic sublime?" And his interlocutor gives the following answer: It is sublime because *the essence of logic* presents an *a priori order* in language that is *utterly simple*

> it is prior to all experiences, must run through all experiences; no empirical cloudiness or uncertainty can be allowed to affect it—it must rather be of the purest crystal (PI, I § 97).

This a priori order in language is so simple and so crystal clear that it must have a counterpart in the a priori order of the world. It is believed that this a priori order in language must be *isomorphic* with the a priori order of the world (PI, I § 97). Some sort of a logical pre-established harmony must subsist between the basic logical structure of language and the basic logical structure of the world. Moreover, it is legislated that this isomorphism between language and the world can have no exception since it is not only true for this world but it is also true for all possible worlds yet undiscovered.

This ideal, according to Wittgenstein, becomes "unshakeable" because it is like 'wearing a pair of glasses on our nose through which we see whatever we look at. It never occurs to us to take them off" (PI I §103). Because of this illusion, it gives a semblance that "logic [has] a peculiar depth—a universal significance" (PI, I §89); and therefore such an 'ideal must be found in reality" (PI, I §101).

This crystalline purity of logic held philosophers captive (PI, I §115) for countless decades. Those that were captivated by this ideal desperately tried to find it in actual languages (PI, I §105). And when they could not, they became dissatisfied with actual languages. That predisposed them to accept the program to construct an *ideal language* But the word 'ideal', according to Wittgenstein, is misleading because it sounds as if an ideal language is better and *more perfect* than everyday language "as if it took the logician to show people at last what a proper sentence looked like" (PI, I §81). One is tempted to say that it took the logician to show people what a proper argument looked like.

Wittgenstein vehemently repudiates the attempt of the philosophers to construct an ideal language. He believes that 'philosophy must not interfere with the actual use of language; it can in the end only describe it. It could not provide language with any foundation either. Because philosophy must leave everything as it is" (PI, I §124); 'the work of the philosopher is merely to

assemble reminders for a particular purpose" (PI, I §127). In the final analysis, Wittgenstein reminded the philosophers not to think or construct theories— their job is simply to "look and see" (PI, I §66). And when you look and see, you will discover, according to Wittgenstein, a conflict between actual languages and the ideal:

> For the crystalline purity of logic was of course, not a result
> of investigation: it was a requirement. The conflict becomes
> intolerable, the requirement is now in danger of becoming
> empty (PI, I §107).

"Empty" because it has "no form of life!" The language game being proposed is unplayable.

The principal thesis of this paper is to unmask the *malaise* perpetuated by formal logicians about the exaggerated importance of two valued deductive logic. For over countless decades, tens of thousands of students all over the world, have been taught to accept that the only genuine arguments are deductive arguments and anything other than this are *counterfeit arguments*. Unless we unmask these deceptions, we would be co-conspirators to the miseducation of countless students studying the course in two-valued logic. These deceptions have far reaching implication in the social and behavioral sciences. In the first place, logicians claim that the very foundation of the logic and methodology of scientific experiment rest on a logical fallacy called *fallacy of affirming the consequent*. If we accept this fallacy, we will deprive the social and behavioral scientists of any rational procedure for accepting the truth of scientific hypotheses. Acceptance of a hypothesis becomes a matter of logically baseless subjective judgements of practicing scientists. In the second place, the concept of rational and irrational thought, as well as the model of cognition and metacognition was based on the paradigm of two valued deductive logic. A good example is Piaget's model of cognitive development. In this model, two valued deductive logic is offered as the highest form of cognitive growth. Countless curriculum centers, all over the world, (including the ISMED in UP) produced textbooks in science and mathematics patterned after the model of Piaget. From this perspective, if the main thesis of this paper is sound, the miseducation of the youth reaches very staggering proportions worldwide.

I wish to demonstrate that two-valued logic is an aberration that the practitioners have done very badly in what they claim to be doing. Western

logicians have imposed on the philosophical community all over the world spurious logical ideals that have beguiled countless philosophers for many generations. These ideals have been taught and perpetuated in many departments of philosophy all over the world (including the philosophy department in UP Diliman.) By teaching these ideals, philosophers have hoodwinked countless students into believing that this is the only mode of correct reasoning and argumentation such that any deviation from them is considered to be an irrational delirium of some sort. I wish to point out that these ideals, instead of facilitating the understanding of the nature of reasoning or enhancing the ability to compose arguments, have in fact muddled them. Moreover, the said ideals had prevented any serious attempts to study many types and patterns of arguments and reasoning found in numerous language games.

In this paper, I propose to conduct philosophical analysis in the following way:

1. First, I will analyze the definition of the concept of 'argument' offered by influential logicians and show that it is *mere propaganda*. Their definition is inconsistent with their practice and with the content of their books.

2. Next, I will demonstrate that the basic logical structure of deductive arguments as well as the formal concept of 'validity' is *paradoxical* because it is *counter intuitive*. It has *no form of life* and therefore inapplicable in real life argumentation.

3. Then, I will show that the model of sound argument is bogus because its two requirements are *inconsistent;*

4. And lastly, I will demonstrate that the dogma that logical fallacies can be detected in virtue of the logical form alone without regard to the content is a *myth*.

This paper will be primarily concerned with making these cardinal claims plausible. Obviously, this is a big landscape in the doctrinal land of the logicians such that even if I am only half—successful, it still would support the recommendations of this paper, that is the study of correct and incorrect reasoning as well as sound and unsound arguments must be construed as language game specific. This means that we must recognize that the concept of correct reasoning as well as sound argument may differ from one language game to another. The use of the term 'argument,' together with its criteria of soundness or correctness in one language game cannot be used to evaluate and criticize the use of the same term in a

different language game. In short, we must discard the normative and prescriptive garb of logic, in favor of one that is empirical and descriptive. One is tempted to say "don't think", but "look and see!" This would make the study of reasoning and argumentation the proper subject matter of the social and behavioral sciences. So far as I know the study such as the one proposed was never even conceptualized much less attempted.

I feel very strongly that no logician has the right to claim that he, in his arm chair, has discovered, through his system of two-valued deductive logic all conceivable valid argument forms. Logicians cannot claim that these argument forms are so *comprehensive* that *no further discoveries could be* made about the nature of reasoning or argument; and that the universe of discourse of these argument forms is to be found not only in this world, but also in *any and all possible worlds.* And surely they have no right to legislate that argument patterns in other language games which do not conform to their simplistic argument forms are *counterfeit argument.* Cases in point are inductive arguments, moral arguments, evaluative arguments as well as policy arguments to mention only the most conspicuous.

Hocutt[2], for example, arrogantly claims:

> The passing of induction will be mourned by some, but
> I am not among them. I believe the logic of scientific
> inference to be hypothetico-deductive not inductive after
> Mill's fashion In fact, I don't believe there is such a thing
> as inductive logic. Logic is deductive; reasoning is valid
> or invalid. This applies, as my own treatment illustrates,
> even to probability inference, which is strictly deductive
> in form. "Induction" is better thought of as guesswork,
> the formulation of hypothesis to be tested in accordance
> with strict cannons of reasoning.

I have many *unkind remarks* about this kind of attitude in the latter part of this paper. Suffice it to say at this point that I believe that two-valued deductive logic is not sophisticated enough to account for a very complex phenomena of the numerous types of reasoning and argumentation in different language games in the *real world* Likewise, Hocutt is trying to categorize a very complicated pattern of reasoning into a set of simplistic categories of two-valued logic. It seems to me very obvious that what logicians are offering is a Procrustean bed where the extremities of complicated patterns of reasoning are being chopped up fitted snugly into

the very tiny bed of two-valued deductive logic. This observation is substantiated by the fact that the more one examines actual species of reasoning in many language games—in ordinary language, in moral philosophy, aesthetic, religion and the sciences—deductive logic is, in the language of Wittgenstein, *in danger of becoming empty.* We simply need a more complex paradigm in dealing with various types and patterns of reasoning, not only those that are deployed in philosophy, but also in other intellectual disciplines as well. In the language of Wittgenstein, we need to *look and see* without any preconceived idea about what is or what is not a genuine argument. We must move away from a normative to a descriptive approach. The job of the philosopher, if Wittgenstein is to be followed, is simply to describe various types as well as numerous patterns of reasoning and argumentation found in countless language games. This study of the patterns of reasoning and argument becomes the proper subject matter of the Social and Behavioral Sciences. Be that as it may, we are not supposed to legislate what is or what is not as genuine argument. And the result of our investigation *should not be used for future regularization* of the concept of 'argument.' Each use of the concept is *in order as it is* in its own language game! We are *not striving after an ideal* of the concept of argument that is applicable to *any and all possible worlds.* Our aim is a humble one; we want to bring back the use of the concept of *argument* in ordinary language, which is its *original home.*

THE CONCEPT OF ARGUMENT

Let us begin our philosophical analysis with the definition of the term 'argument' offered by famous logicians. Hocutt defines an 'argument' in the following way:

> By an argument, I don't mean a dispute. I mean an attempt to show somebody that a statement is true. The attempt starts with premises already known to be true or believed to be true and declares that these could not be true unless the conclusion, whose truth was in doubt is *true as well.*[3]

Please note that the concept of truth here is empirical and not analytic. It seems obvious that the argument being described here is not deductive. The contention I wish to put forward is this: In a deductive argument, the truth of the conclusion as well as the premise could not be subject to doubt, because the concept of truth in a deductive argument cannot be

empirical. If logicians insist that the premises and conclusion of a deductive argument can be construed as empirical, a swift *reductio* will follow. There will be very serious repercussions in their symbolic system that they would find difficult to accept—for instance, the formal elegance of the concept of *validity* will disappear.

After Hocutt presents his definition of an argument, he immediately gives his reader a *caveat:* "Do not confuse an argument with a conditional statement." And to clinch his point, he gives the following example:

> If all people die, you will too.

Such is a conditional statement because—presumably, one does not assert the factual truth of the antecedent and the consequent i.e. the premise and the conclusion—is not assertive. In contrast, Hocutt believes that

> Since all people die, you will too.

is a genuine argument because it asserts the truth of the premise 'Since all people die' and the truth of the conclusion 'you will too'. Hocutt further claims that the truth of the conclusion is made certain by the truth of the premise.

The distinction between a conditional statement and a genuine argument is *clear.* But unfortunately, it does not prove what is wanted, because if one accepts the distinction, it will lead to objectionable consequence: it will deprive the two-valued deductive logic of its *universality*. The advantage of the conditional form rest on the fact that one need not actually provide evidence nor attempt to verify the truth of the antecedent 'All people die'; rather it states that *if* one accepts the truth of the antecedent, then one must accepts also the truth of the consequent. If one does not accept the truth of the consequent, but accepts the truth of the antecedent, then one is contradicting one's self. If the requirement for composing a deductive argument is that one must assert the truth of the premise, then there will be fewer arguments that can be composed by logicians. I venture to say that if we accept their distinction of what is or what is not an argument, many universal statements may not function as premise because as a general rule universal statements cannot be conclusively verified. Furthermore, the requirement that one must assert the truth of the premise in order to succeed in composing an argument, then one must have some empirical evidence for asserting the truth of the premise. And consequently, Hucutt

must do empirical spade work as well in order to compose an argument. Hence logic and epistemology cannot be separated.

Using his own requirement, let us analyze the example of a *genuine argument* he gives above. I believe that Hocutt had no empirical evidence for asserting the truth of the premise 'All people die' because the statement being a universal statement can always be doubted since the complete evidence of its truth, *in principle*, cannot be produced. The premise 'All people die' is simply *not true*. At best it is *highly probable*. Apparently, Hocutt is incognizant that his logic cannot accommodate the concept of probability, since his logic cannot go beyond the parameter of the *principle of excluded middle*. It seems to me obvious that by his own definition he forfeits the right to assert the truth of the premise *not* known to be true and therefore he himself fails to compose a genuine argument. In addition, we have a problematic case where the truth of the premise is much more difficult to demonstrate than the truth of the conclusion. A greater doubt rests on the truth of the premise 'All people die' than in the conclusion *you will too*. It seems to me very clear that Hocutt's example is **inconsistent** with his own requirement of composing an argument. (This criticism is presented in greater detail towards the middle of this paper.)

Interestingly enough, Irving Copi, a very famous and influential logician whose book[4] is used in numerous countries around the globe, makes the same distinction between a conditional statement and an argument as a consequence perpetuates the same blunder exemplified by Hocutt. Copi offers this to exemplify the distinction:

> If objects of art are expressive, they are a language.

This example, according to Copi, is a conditional statement because "no premise is asserted, no inference is made, no conclusion is claimed to be true, thus, there is no argument here". However, according to Copi, the following example is a genuine argument:

> Because objects of art are expressive, they are a language.

Since "(All) objects of art are expressive" is asserted as a premise and objects of art *are a language* is claimed to follow from that premise, it is therefore asserted to be true.[5] Copi then gives us an example of a *quasi-argument*.

> Synonyms are *good* servants but *bad* masters; therefore
> select them with care.

According to Copi, this cannot qualify as a genuine argument because what follows after the 'therefore' is a command, and a command by their epistemic nature has no truth-value. It is neither true nor false (Copi, p. 27). He continues:

> From a strictly logical point of view, the goal of an argument is to take us from true premises to a true conclusion, and since commands —as such— are neither true or false, we shall not regard such *quasi-argument* as argument proper.

Subsequently, Copi transforms it into (sic.) a genuine argument, thus:

> Synonyms are *good* servants but *bad* masters, therefore you *should* select them with care. (Copi, p. 28, emphasis mine)

In Copi's judgment, the conclusion 'you *should* select them with care' has been transformed into an empirical statement by adding 'should'. And since that statement is now an empirical, it then transformed into a *genuine conclusion* that is either true or false. Obviously, Copi misidentifies the premise 'Synonyms are **good** servants but **bad** masters' as an empirical statement, notwithstanding the presence of evaluative terms 'good' and 'bad'. And so the premise being an empirical statement is either true or false. It seems to me a bit bizarre that a logician with the stature of Copi could be so baffled by very elementary distinctions.

I cannot let this error in elementary classification of types of statements pass without any comment. Even my Philo 1 students would not make this mistake! Statements with evaluative terms like 'good' or 'bad' cannot pass as empirical statement and therefore statements of this sort are neither true nor false because they are evaluative statements. If indeed the conclusion 'select them with care' is a command, then surely, it cannot be transformed into an empirical statement by adding 'should'. In fact, what Copi succeeds in doing is to make the statement's imperative nature more conspicuous. While Copi pays very meticulous attention to the premise and conclusion indicators of arguments in ordinary language, he seems quite unacquainted with prescriptive indicators like 'should', 'ought', and 'must'; and evaluative indicators such as 'good' or 'bad', 'right' or 'wrong', and 'correct' or 'incorrect'. Copi could not even make an elementary

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distinction between an empirical statement and an evaluative one and sad to say, between a declarative statement and a prescriptive one. A similar confusion between an analytic statement and an empirical statement pervades throughout his book. I believe that this confusion in elementary classification of types of statements is the consequence of Copi's bias against the nature of moral reasoning and argumentation which he, by his own admission, abhors. And so in the end because of his failure to recognize these elementary distinctions, Copi fails to translate his example into a genuine argument.

He continues:

> For an argument to be present, one of the asserted propositions must be claimed to follow from other propositions asserted to be true, which are presented as grounds for, or reasons for believing the conclusion (Copi, p. 28).

I like this description of an argument because it is *not counter-intuitive*. But this description applies only to an argument with empirical content and *not* to a deductive argument. And, as we shall see below, Copi is not consistent with his own definition of an argument. For instance, if, as Copi claims, "from a strictly logical point of view the goal of an argument is to take us from true premise to true conclusion", one may ask: What about an argument with false premises and false conclusion? Is this not an argument too from a *strictly logical point of view?* Obviously from his definition, it is not! Yet his book is replete with countless examples of valid arguments with false premises and false conclusions. But of course he can claim that these types of arguments are not from a strictly logical point of view!

Let us sharpen our understanding of the concept of argument by considering the great divisions, that is, deductive and inductive arguments. Some logicians, but not all, accept these two types of arguments; others reluctantly accept these two types but put very low credibility on inductive arguments. Almost all logicians have ruled moral and policy arguments to be quasi-argument and, as a consequence never did become matters for serious study. We all know how important moral arguments are in the business of living and how important policy arguments are, especially for the Third World countries. Yet no logician has attempted any serious study of these types of reasoning.

Copi, without blinking an eye, claims that:

> A deductive argument is valid when its premises, if true,
> do provide conclusive grounds for its conclusion, that is,
> when the premises and conclusion are so related that it
> is absolutely impossible for the premises to be true unless
> the conclusion is also true. Every deductive argument is
> valid or invalid (Copi, p. 51).

The classic example of a deductive argument according to Copi is as follows:

> All humans are mortal.

> Socrates is human.

> Therefore, Socrates is mortal

In contrast, an inductive argument:

> ...involves the claim, not that its premises give conclusive
> grounds for the truth of its conclusion, but only that they
> provide some support for it Inductive arguments are
> neither "valid" nor "invalid" in the sense in which these
> terms are applied to deductive arguments. Inductive
> arguments may of course be evaluated as better or worse,
> according   to the strength of the support provided
> their conclusion by their premises, that is by the degree
> of likelihood or probability which these premises confer
> upon their conclusion (Copi, p. 51).

Neidorf[6] believes that the dichotomy "between deductive and inductive argument depends upon the character of the logical relation between the premises and conclusion not upon the content of the proposition themselves." I wish to demonstrate that in theory and in practice a deductive argument is one where the empirical truth of the premises are *irrelevant* to the empirical truth of the conclusion. This means that a deductive argument *cannot assert anything factually true or factually false*. The three requirements for composing an argument are: (1) an argument is valid when its premises, if true, do provide conclusive grounds for its conclusion; (2) the premises and conclusion are so related that it is absolutely impossible for the premises to be true unless the conclusion is also true; and (3) the truth of the premises must provide for the grounds

for or the reason for believing the truth of the conclusion. I shall demonstrate that these requirements are nothing but a beguiling propaganda in order to make deductive logic relevant in real life argumentation.

Neidorf is correct when he says that factual content has nothing to do with the quality of a deductive argument. But without the factual content, nothing can be perceived to follow from the truth of the premises to the truth of the conclusion. And nothing can be perceived to be the *grounds for* or the *reason for believing* in the truth of the conclusion.

What logicians are silent about is that the criterion for valid as well as invalid argument is simply the *random manipulation* of the truth-values of the premises and the conclusion. And if in all the possible arbitrary assignments of truth-values of the premises and conclusion, one does not come up with a combination where the premises set is true and a conclusion is false, then the argument form is *valid*. If one does, then the argument form is *invalid*. But the truth being manipulated here is *analytic*, one which is empty, bereft of no empirical content. Copi's requirement that the truth of the premises must provide for *the grounds for* or the *reason for believing* the truth of the conclusion is *irrelevant* to a deductive argument but *indispensable* to an inductive argument. An inductive argument cannot be evaluated for its strength without considering its empirical content.

Logicians are either hushed or unenlightened about a paradox, namely: if one has an argument where the premise set is false, the *requirement of invalidity cannot possibly obtain*. If one accepts Hocutt's admonition that logic is deductive only and hence reasoning is either valid or invalid, one cannot accept his definition of an argument. The attempt to compose an argument, according to Hucutt, starts with premises known to be true so that the truth of the premises can be transmitted to the truth of the conclusion. Unfortunately, if one starts with a premise set known to be true, there is a *greater chance* that one's argument will turn out to be *invalid* than if one starts with a false premise set! Consequently, if the aim of an argument were validity, and nothing else, then the best counsel would be to start with a false premise set!

Furthermore, one critical aspect of the definition of an argument needs important clarification: In what sense does the truth of one proposition *follow* from another? What is the nature of this following relation? I believe that deductive logicians are either misled or they are purposely

deceiving us. In two valued deductive logic, any true conclusion will follow from any true or false premise set. And if one has a false premise set, any true or false conclusion can follow from it. However, what we are being prevented from doing is to have a false conclusion follow from a true premise set. That is the only restriction! It seems obvious that the concept of one proposition following another was given an empirical interpretation quite *illicitly.* Copi's description of an argument in which the premise set are presented "as grounds for, or reasons for believing the conclusion" is nothing but *propaganda.*

In a deductive argument a premise set that is false is *more versatile.* In the language of Copi, it can provide for *more conclusive grounds for* or *more reasons for* a conclusion because it can have either a false or a true conclusion, and still remain valid. Let me reiterate that an argument with a false premise set *cannot be invalid,* because invalidity is construed as an argument where the premise set is true and the conclusion false. This is the model of an *invalid* argument. I shall substantiate many of these criticisms in details in the next section of this paper.

LOGICAL STRUCTURE OF AN ARGUMENT

The basic logical structure of all arguments follows the logical structure of a conditional statement. The matrix below illustrates this:

$$P \rightarrow Q$$

T	T	T
T	F	F
F	T	T
F	T	F

Notice from the above matrix that a conditional statement is false only when the antecedent is true and the consequent is false. In all other combination of the truth-value, the conditional is true. This means that when the antecedent P is false, it matters not whether the consequent Q is either a true or a false the whole conditional is still true. And provided one has a true consequent, it can have either a true or false antecedent. This philosophical analysis of the conditional is known as the *material implication paradox.* While this paradox is well known, the corresponding *paradox of validity* is hardly ever mentioned.

A few qualifications are expedient here. In interpreting a conditional statement, any two true statements, however unrelated in meaning as well as content, can be the antecedent or the consequent. For example:

> Prof. Vera Cruz is a Pilipino.

Since this statement is true, it can imply any true statement like:

> If Prof. Vera Cruz is a Pilipino, then Diliman is in Quezon City.

What the conditional is prevented from doing is to put a true statement as an antecedent and a false statement as a consequent. For instance the conditional below is false:

> If Prof. Vera Cruz is a Pilipino, then Prof. Zerwek is also a Pilipino.

A false antecedent, however, can imply any true or any false statement like:

> If Prof. Zerwek is a Pilipino, then Prof. Vera Cruz is an American.

or

> If Prof. Zerwek is a Pilipino, then Prof Vera Cruz is a Pilipino too.

Both conditionals are true.

This means furthermore that any *counter factual conditional* is always a true conditional considering that in a counter factual the antecedent is always false. A good example is the wishful thinking of many politicians:

> If I were president, I would solve all our national problems.

The point to be made is that the *logical relation* between the antecedent and the consequent of a conditional statement does not have any empirical significance like *causality* or *correlation*, or even any *semantical* relation. The truth-values of conditionals are analytic and not empirical, any attempt to describe a conditional, as having empirical content is nothing but *deception* and *propaganda*.

It seems to me obvious that the correct interpretation of the conditional is *counter-intuitive* and *does not have a form of life*. And yet, the conditional has been perpetuated as the basic logical structure of a deductive argument—as the paradigm of the logical relation between the premises and conclusion. And the funny thing here is that this counter-intuitive nature of the conditional is not taken as a weakness but a source of its strength: It is believed that *logicians have captured the essence, the crystalline purity of deductive argument* by dissociating the logical form, from the content such that *no empirical cloudiness or uncertainty can be allowed to affect it.* Thus, if a logical form is valid, it is claimed to be valid in *all possible interpretations in all possible worlds*, and if invalid (fallacious), in *all possible interpretations in all possible worlds*, it is invalid.

Granting all these the questions that must be asked are: How does a statement follow from another statement by the so-called *material implication?* How can the concept of material implication have any relevance outside the world of forms when it is logically permissible to connect by conditional two true statements (or even two false ones) which are factually or semantically unrelated? Again, the concept is counter intuitive, the concept has no form of life.

For these important questions logicians speak in many hysterical voices since no consensus has been reached so far. Notwithstanding these theoretical defects, logicians use it as a strict standard whereby all forms of argumentation must conform. If an argument pattern does not conform to them, the argument is dubbed 'quasi- argument'. It never occurred to these logicians that the fault might lie in their very own ideals.

SOUND ARGUMENT

One critically important ideal in logic that has been perpetuated by numerous logicians in many logic books is the model of a sound argument. In the language of Nidorf:

> If, in addition to being valid, an argument has true premises, we shall say it is sound. Hence all sound arguments are valid as well; but some valid arguments are sound, some unsound ...(p. 12).

One of the objectives of this paper is to challenge and unmask this model as bogus.

In most logic books the model of sound argument is construed as follows:

1) The argument must be valid; and

2) The premises and conclusion must be factually true.

This model has captivated the minds of so many philosophers for countless decades and has been religiously taught by numerous logicians in many philosophy departments all over the world. The model of a sound argument will provide the link from the world of *a priori logical forms* to the untidy and uncertain empirical world. Without the model of a sound argument, logic will be trapped in the world of forms!

Let us pursue our philosophical analysis of two-valued deductive logic with the concept of *validity*. Note that the logical structure of all deductive arguments follows the logical structure of a conditional statement. This means that the so-called *paradox of material implication* has a corresponding *paradox of valid argument forms*. Consider the table below:

Table of Validity

CASE	PREMISE SET	CONCLUSION	ARGUMENT
Case I	All true	True	Valid
Case II	All true	False	Invalid
Case III	Not all true	True	Valid
Case IV	Not all true	False	Valid

The table of validity shows that there is only one sample of an invalid argument where the premise set is true and the conclusion is false: it is Case II. One should note too that this is the only case where a conditional statement is false. If one inspects the matrix of validity, it is isomorphic with the truth table matrix of a conditional statement. This is the basis for saying that the logical structure of a conditional statement is the same as the logical structure of all deductive arguments.

We have seen how logicians define an argument in a *family of ways* yet there is one common denominator, which is the truth of the premises provides the grounds for accepting the truth of the conclusion. Most, if

not all, of their definitions refer to Case I only. What about Case III and IV? In their definition, they are silent about an argument with a false premise set. Yet an argument with a false premise set, as we have shown is more versatile. In fact—if according to Hocutt the aim of an argument is validity—Cases III and IV are more versatile because if the premise set is false, it can have either a true or false conclusion and the argument would still be valid. Moreover, the argument cannot be invalid. Thus, in Case III and IV *anything goes.* These concepts of valid and invalid arguments do not have a *form of life,* is *counter intuitive,* and therefore *unplayable!*

The ideal of a sound argument requires that it must first be valid. The second requirement stipulates that the premises and conclusion must be factually true. These two requirements restricted sound argument to Case I only. Case III and IV, while valid, cannot have samples of sound arguments. What are they good for, then?

The requirement that the premises and conclusion be factually true means that the sentential variables of a valid argument form will be substituted with empirical statements. This requirement appears to be critical because presumably this would provide the procedure for linking the a priori world of logical forms with the empirical world. It is obvious that without his model, logic will be trapped in the world of forms and hence, logicians cannot legislate what is and what is not a genuine argument in the real world. This procedure, however, has devastating consequences, which were not anticipated. And I believe the blunder rest on the deficiency of logician to comprehend a basic epistemic distinction between empirical and analytic statements. They failed to see that the moment the premises and conclusion of a valid deductive argument become empirical statements, they convey their epistemic characteristics. Their truth-values are *true, false, or probable.* And probability values are *infinite.* Since the formal concept of validity is anchored on the *principle of excluded middle,* this concept of validity (or invalidity) cannot apply to an argument with factual content. Empirical statements do no obey the *principle of excluded middle.* Imagine constructing a truth table matrix to determine validity with infinite values. The unintended effect of requiring factual content is that the crystalline purity of logic must give way to the untidy empirical world of uncertainties.

It seems to me obvious that the two requirements decreed to create a sound argument are inconsistent—logicians cannot require both. If a valid

argument form acquires empirical content, the argument losses its claim to validity. No valid argument, therefore, can be sound! To my mind, only analytic statements can be substituted for the sentential variables of a valid argument form. Because analytic statements obey the *principle of excluded middle*.

In view of our discussion above, I cannot help but conclude that the model of sound argument is a bogus attempt to make two-valued deductive logic empirically relevant. We simply cannot allow valid argument forms to have empirical content; if we do, it would raise more problems that it can handle. Let us substantiate this criticism with a concrete example. Let us, for the moment, assume that a deductive argument can acquire empirical content.

Consider the classic example of a sound deductive argument found in almost all logic books:

1. All humans are mortal.

2. Socrates is human.

3. Therefore, Socrates is mortal.

Logicians will tell us that in order to succeed in composing an argument, you must assert the truth of the premises, so that the truth of the conclusion would necessarily follow; if you do not, you have not succeeded in composing an argument. Remember the requirement of Copi, which is, to succeed in composing an argument one must assert the truth of both the premises and the conclusion. One cannot waver and say, *if one accepts the truth*, because this will mean that one has only produced a conditional statement and not a genuine argument. The requirement is: one must assert the truth. However if one asserts the truth, then one must treat the premises and conclusion as empirical statements in order to comply with the second requirement of a sound argument. Is the above argument sound?

Consider premise 1. 'All humans are mortal' being a universal statement, it is difficult to verify conclusively, although it could easily be falsified with certainty by a single counter-example. And since there are still more than five billion human beings alive, premise 1, at best, is only *highly probable*. But we have shown that two-valued deductive logic cannot account for probability values without abandoning its formal concept of validity. In

contrast, the conclusion [3] *'Therefore, Socrates is mortal'* being a singular statement, is conclusively verifiable.

If the aim of an argument according to Copi is to prove the truth of the conclusion, on the basis of the truth of the premise, this classic example fails to do so. The evidence that would prove that Socrates is mortal cannot rest on the probable truth of premise 1 but the evidence must be found elsewhere-- presumably on the testimony and documentary evidences that Socrates was condemned to die by drinking the hemlock. Here, we have a perplexing case of an argument where the required evidence to establish the truth of the premise is much more difficult to produce than the evidence required to establish the truth of the conclusion. Consequently, many deductive arguments that make use of a universal statement either as premises or conclusion would find it difficult to qualify as a sound argument.

I hope it is clear by now that the moment a deductive argument acquires factual content, the claim of validity will be defeated. An empirical statement cannot be substituted either as premises or conclusion of a deductive argument for the simple reason that its epistemic characteristics are different from an analytic statement. Unfortunately, many logicians are probably unaware of the distinction between the epistemic characteristic of analytic and empirical statements. One only has to recall Copi's confusion between a command and an empirical statement.

If we allow the substitution of an empirical statement, many aspects of the formal elegance of deductive logic will have to *yield*, for instance, the truth functional relation of statements. For example, if the statement *All men are mortal* is only highly probable, then the denial *It is not the case that all men are mortal* is not false but only probably false. It seems to me that if the *principle of excluded middle* do not apply, then the *principle of non-contradiction* may not also apply. And if one admits of probability values, the test of validity in terms of the truth table matrix will no longer apply. Remember that validity was conceptualized with the logical posit that the premises and conclusion can have only two truth-values. If we include probability, the distinction between validity and invalidity crumbles. More importantly, the concept of *logical form* in terms of the truth table matrix loses all meaning too Unfortunately, without the model of sound argument, the relevance of logic to actual argumentation in the real word would be sadly lacking----this logic will have no form of life; the language

game would be unplayable in the real world. And so in the end, the classic example of a deductive argument cannot even qualify as a sound argument. In addition, it could not even qualify as a good example of a deductive argument for two reasons: (1) because all the premises are not true and, (2) the truth values premise [1] *'All humans are mortal'*, being only highly probable *only provides support* and not complete evidence to the truth of the conclusion. Notice that this was Copi's description of an inductive argument. It seems that the classic example of a deductive argument, found in almost all logic books, on closer scrutiny turns out to be an inductive argument masquerading as a deductive one! The funny thing here is most of the authors of these logic books abhors inductive argument.

LOGICAL FALLACY

In this section, I wish to challenge the dogma that an argument can be evaluated as fallacious in virtue of its form alone without regard to its content. Consider the well-known *fallacy of affirming the consequent:*

$$P \rightarrow Q$$

$$Q$$

Therefore   P

The argument read: 'If P entail Q, Q, therefore P, for any P and any Q'. It is believed that all arguments with the *logical form* above, *whatever is the content* of P and Q, is *fallacious.* And this claim is true not only in our world but in *all possible worlds* as well. This so called *fallacy of affirming the consequent* has far reaching implications in the logic and methodology of scientific research. Logicians, dabbling in the area of philosophy of the Social and Natural Sciences, often point out the methodology of testing hypothesis in the sciences involve this fallacy. Logicians suggest that rejecting a hypothesis in the empirical sciences is a clear-cut procedure; just deny the consequent, and you have all the logical justification to reject the hypothesis as false. Thus,

$$H \rightarrow C$$

$$\sim C$$

_____

Therefore ~H

If 'H entails C, ~C, therefore ~H, for any H and any C', is valid. But if you affirm the consequent, for instance:

$$H \to C$$

$$C$$

_____

Therefore H

you have committed a *logical fallacy*. Unfortunately for the social and behavioral scientists, the entire apparatus of scientific experimentation rests on this fallacy—*the fallacy of affirming the consequent*.

For instance, if you have a hypothesis, and you deduce a prediction or some other test condition. The scientist then constructs an experiment to test the prediction. If the experiment is a failure, the prediction fails to obtain. The hypothesis is rejected with good logical justification. However, if the experiment is a success, the prediction obtained, yet the scientists cannot accept the hypothesis as true, because to do so would be to commit the *fallacy of affirming the consequent*. Consequently, however numerous he directly replicates or systematically replicates the experiments and, however successful these replications are, the scientist cannot still accept the hypothesis as true on logical grounds And when through a consensus of practicing scientists, a hypothesis is given credibility, logicians still make the scientists suffer some guilt feelings about having committed a logical fallacy. And what seems to be amazing here is that scientists have not challenged the authority of the logicians but instead have accepted this judgment as a matter of dogma.

I wish to demonstrate that this so-called fallacy that underlies hypothesis testing in the Social and Behavioral Sciences is a myth. If we are seduced by this ideal of logic we are predisposed to give this fallacy a self-serving interpretation and hardly would we look for counter-examples. An instance of a self-serving interpretation is given below:

a) If it rains, then the ground would be wet.

The ground is wet.

Therefore, it rained.

Given the truth of the premises, does it follow that it rained? Or course not! But this is not because of the logical form of the argument but because of the empirical relation between the antecedent and the consequent events. A waterlogged ground may be caused by other sources and not necessarily the rain and the rain alone.

Consider another substitution instance that is *not* fallacious:

b) If the figure is a triangle, then it is a geometric figure with three sides and three angles.

The figure is a geometric figure with three sides and three angles.

Therefore, the figure is a triangle.

Or again another example

c) If that man is a bachelor, then that man is an unmarried male.

The man is an unmarried male.

Therefore, that man is a bachelor.

Still another:

d) If that boy is a brother, then the boy is a male sibling.

The boy is a male sibling.

Therefore, the boy is a brother

It is obvious that the same instantiation can be done with many other examples. These examples, to my mind, are genuine counter-examples in order to demonstrate that when the so called invalid argument forms are given empirical content, the argument acquires nuances where philosophical analysis must go beyond inspection of the logical form to determine soundness. In fact, in most cases the logical form becomes irrelevant. What are important are the empirical or semantical relations between or among the premises and the conclusion. Let us transform the fallacy of affirming the consequent to another famous fallacy—*the fallacy of undistributed middle:*

b2) All triangles are geometric figures with three sides and three angles.

X is a geometric figure with three sides and three angles.

Therefore X is a triangle.

c2) All bachelors are unmarried males.

Peter is an unmarried male

Therefore Peter is a bachelor.

d2) All brothers are male siblings.

Jose is a male sibling.

Therefore Jose is a brother.

It seems that as a general rule, logicians do not wish to lose their conceptual grip on their favorite logical ideals. I discovered this when I was testing the reactions of some of my colleagues who are teachers of logic regarding some of my counter-examples. Their comments were almost unanimous. They claim that I have made a mistake in putting my counter-example of brother and bachelor in a conditional form, whereas the proper representation would be a biconditional, because my examples can be taken as definitions of brother and bachelor.

My reply to the comments was 'male sibling' as well as 'unmarried male' is part of the concept of 'brother' and 'bachelor' respectively. And as concepts, they must be analyzed from two aspects—the intention and the extension. If represented in biconditional form, because it is a definition, as suggested, one could be committing the mistake of equating a concept with just one of its aspects—the intention. The concept 'brother' is not equivalent to its intention 'male sibling' because the concept still has an extension, i.e. all the objects for which the concepts stands for. Thus, if represented in biconditional form, we would in effect be asserting that the concept and its intention are identical—an assertion which is absurd. In addition, I believe that one cannot represent definitions, either in the Social and Behavioral Sciences or in ordinary language in a biconditional form. The formal concept of biconditional is restrictive and too narrow because it assumes that the essence of the *definiendum* must be found in the *definience* in order to ensure that there will be mutual entailment between the *definiendum* and *definience*. Furthermore, one logical characteristic of the biconditional will give rise to absurd consequences: that is, when both

elements—the definiendum and the definience of the biconditional are false, the definition will still be true.

To clinch my point, I give the following definition:

X is a Zenogill if and only if X an animal with five legs.

Here both definiendum and definience are false; therefore the definition is true. A rather absurd consequence! This is only one of many illustrations wherein the logicians are trying to fit the concept of definition into a logical category of the biconditional quite atrociously. I do not believe that representing definition in a biconditional can capture the nature of definition used in many language games. A good example is definitions where the definience states only a *family resemblance of characteristics* and not an essence. Recall Wittgenstein's example about the concept 'game'.

I offer another counter example that cannot readily be construed as a definition:

e) If it rains, La Mesa Dam will be full.

La Mesa Dam is full.

Therefore, it rained.

This is an argument where, because of its empirical content and *not* its logical form, the truth of the premises does provide the *conclusive grounds for* or the *reason for believing* the truth of the conclusion. If one feels that the argument above has not done this, then I believe one does not really know what an argument is! I grant that the argument form may be invalid, but because of the empirical content, the argument turns out to be *sound*. Notice that this argument satisfies the definition of famous logicians quoted earlier in this paper. Here the concept of what it means for a conclusion to follow from a set of premises is quite visible.

When an argument acquires empirical content, it seems to me very obvious that philosophical analysis should go beyond mere inspection of the logical form to the analysis of the untidy world of empirical claims where probabilities abound. In short, when a deductive argument form acquires empirical content, it has *metamorphosed* into an inductive argument. If formal logicians cannot see this, it is their detriment, not mine!

In closing, may I reiterate what I have accomplished in this paper. I believe that I have given good reasons in support of my four cardinal claims, namely:

1) The concept of 'argument' offered by famous logicians was analyze to be truncated and demonstrated to be nothing but propaganda;

2) The logical structure of the two valued logic was shown to be paradoxical and counter intuitive which has no form of life;

3) The model of sound argument was demonstrated to be obviously bogus because the two requirements are inconsistent;

4) Logical fallacies in virtue of the form a one, was proven by counter examples to be nothing out myths.

Having laid down and justified these claims. Let me now draw some implications most relevant to the conduct of social science research. I believe it is about time that we retire two-valued deductive logic from the conceptual service of philosophy and replace it with other models, or paradigm, if one wishes—best suited to do the job of understanding what reasoning or argument is all about. We must abandon the current practice of teaching logic and embark on developing a course on the nature of reasoning and argument that is language game specific. This course cannot be developed without empirical study. This means that we must shed the normative and prescriptive garb of logic and embark on an empirical study of the nature of reasoning and argumentation. If logic is the study of reasoning, then by all means let us embark on an empirical study of all types of reasoning. This study must pay attention to the nature of reasoning and argumentation in numerous language games. We can begin with the study of evaluative/moral arguments and policy arguments since it has been labeled by logicians as counterfeit arguments; they have not been the subjects of any serious study. Hopefully, after a study of this sort, certain patterns of correct and incorrect reasoning will emerge which can be a course that will replace two-valued deductive logic. I would like to believe that the teaching of such a course must be able to facilitate not only the identification and evaluation of arguments but it must also develop the ability for *meta cognition*, that is, the ability not only to compose arguments but also the ability to evaluate one's argument in preparation for composing counter arguments. This skill, I'm sorry to say, is sadly lacking even among our teachers of logic.

Notwithstanding the historical fame that symbolic logic has enjoyed, it did not accomplish what it set out to do, viz., to facilitate our understanding of the nature of reasoning and arguments.

This paper began with a quotation from Wittgenstein, and it seems proper to end with him. Please allow me to quote from Wittgenstein again, he asked:

> What will become of logic now? After all that is said and done, "its rigor seems to be giving way here"

> But in that case doesn't logic altogether disappear?

> For how could it lose its rigor? Of course not by bargaining any of its rigor out of it. The preconceived idea of the crystalline purity can be removed by turning our whole examination round (PI, I §108)

But Wittgenstein's interlocutor counters:

> Where does our investigation get its importance from since it seems to only destroy everything interesting all that is great and important (PI, I §118)

And Wittgenstein's reply was:

> What we are destroying is nothing but houses of cards and we are cleaning up the grounds of language on which they stand (PI, I §118)

And having cleared up the grounds, we must embark on a new philosophical investigation regarding the nature, pattern of reasoning and types of arguments that is language-game specific. This is a new field of study in social and behavioral sciences. Remember the job of the philosopher is not to *legislate* but to *look and see*. I take this reminder of Wittgenstein to mean that philosophers must do an empirical study such as the one proposed in this paper.

NOTES

[1] Ludwig Wittgenstein, *Philosophical Investigations* (New York: Macmillan Publishing Co., Inc.1968) Translated by G. E. M. Anscombe

[2] Max Hocutt, *The Elements of Logical Analysis and Inference* (Wintrop Publishers, Inc. Cambridge Mass, 1979) pp. xv –xvi.

[3] *Ibid.*, p. 137.

[4] Irving M. Copi, *Introduction to Logic*, (New York: Macmillan Publishing Co., Inc. 6th Edition) p. 27.

[5] *Ibid.*, p. 27.

[6] Robert Neidorf, *Deductive forms* (N.Y: Harper & Row, Publishers,1967) p.8.