An Introduction to Logical Positivism

The Viennese Formulation of the Verifiability Principle

ALBERTO OYA

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PREFACE

The verifiability principle was the characteristic claim of a group of thinkers who called themselves the Vienna Circle and who formed the philosophical movement now known as logical positivism. The verifiability principle is an empiricist criterion of meaning which declares that only statements that are verifiable by —i.e., logically deducible from— observational statements are cognitively meaningful.

This essay is a short introduction to the philosophical movement of logical positivism and its formulation of the verifiability principle. Its primary aim is to provide students of philosophy with an accessible first overview of this philosophical movement.

After pointing out some aspects of the philosophical background of logical positivism (section 1), I will comment on the reasoning that lead these authors to formulate the verifiability principle (section 2), and I will analyse the debate about how to understand observational language and how observational statements (the so-called 'protocol statements') are verified (section 3). I will also comment on the two main consequences of accepting the verifiability principle: the conception of philosophy as the task of logical analysis and the project of unified science (section 4), and I will explain the different views on ethical language defended by logical positivists (section 5). I will end this essay by identifying the main problems of the verifiability principle and I will explain the core ideas of Carnap's confirmability criterion, which attempts to resolve these problems (section 6 and 7).

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CONTENTS

1. PHILOSOPHICAL BACKGROUND

The Vienna Circle was a group of thinkers that congregated around professor Moritz Schlick in Vienna and who formed the philosophical movement now known as logical positivism. While I will use these two terms indistinctly in this essay, it is interesting to point out that some of the thinkers preferred to call themselves logical positivists to reflect the fact that their philosophy was simply the "[...] convergence of two significant traditions: the positivistic-empirical and the logical" (Blumberg and Feigl 1931, p. 281). Others, however, preferred the term 'Vienna Circle', since 'logical positivism' might wrongly suggest "[...] too close a dependence upon the older Positivists, especially Comte and Mach" (Carnap 1936, p. 422).

Their philosophical activity began around 1924 when Schlick, who is considered as "[...] the founder and leader of the Vienna Circle" (Feigl 1969, p. 21), took up a Chair at the University of Vienna. Curiously enough, none of the members of the Vienna Circle considered themselves to be "pure philosophers" (Hahn, Neurath and Carnap 1929, p. 304), while they all declared that they had the same philosophical orientation —*i.e.*, "a scientific conception of the world". (Hahn, Neurath and Carnap 1929, p. 304)

The common element among the members of the Vienna Circle was their acceptance of the so-called verifiability principle, which declares that the cognitive content of a statement is its method of verification —*i.e.*, the conditions under which the statement is logically deducible from observational statements.

As we will see later, these authors held different views on how to understand observational language and how observational statements (the so-called 'protocol statements') are verified, even while they all unquestionably accepted the verifiability principle.

Although most of its members were still active for some years after, the end of the Vienna Circle as a philosophical movement can be dated to 1936. The rise of National Socialism and Europe's political instability in the 30's forced the Circle to disperse: Schlick was murdered by a student and most of its members emigrated from Vienna. Additionally, by the mid 30's it had become clear that the verifiability principle was too narrow to be a successful criterion for cognitive meaning, given that it deemed as nonsensical statements that are clearly meaningful. The publication of "Testability and Meaning" by Carnap in 1936 marked a point of departure from the original philosophical position of the Vienna Circle —although not from its philosophical orientation— since it can be considered as the first serious attempt to liberalise the verifiability principle. This is why it is important to distinguish between the classical, Viennese formulation of the verifiability principle, which takes verifiability to be a matter of logical deduction from observational statements, and the liberalised versions of the verifiability principle, which discard conceiving verifiability as logical deduction and make inductive inference from observational statements the requirement for cognitive meaning. In this essay, I will focus on the classical, Viennese formulation of the verifiability principle.

A clear precedent of the verifiability principle is classical empiricism, since the intuition behind the verifiability principle is none other than the empiricists' claim that the state of affairs expressed by a proposition must, in the end, be grounded in our experience

(*cf.*, *e.g.*, Schlick 1932–33, p. 86–87). The influence of classical empiricism was explicitly recognised by logical positivists (*cf.*, *e.g.*, Blumberg and Feigl 1931, p. 281; Hahn, Neurath and Carnap 1929, p. 304); Ayer, whose *Language, Truth and Logic* (1936) is often taken as the paradigmatic formulation of logical positivism in the English language, even goes as far as to say that "[...] I sometimes think of *Language, Truth and Logic* itself as being no more than Hume in modern dress" (Ayer 1987, p. 23). It is indeed easy to find this verificationist tendency in Hume's work:

> When we entertain, therefore, any suspicion that a philosophical term is employed without any meaning or ideas (as is but too frequent), we need but inquire, *from what impression is that supposed idea derived*? And if it be impossible to assign any, this will serve to confirm our suspicion. (Hume, 1748/1999, p.99, emph. of the author)

It is also interesting to point out that the logical positivist's concern with clarifying our concepts and freeing philosophy from merely verbal disputes was already present in classical empiricism —consider, for example, Berkeley's claim that

> It were, therefore, to be wished that everyone would use his utmost endeavours to obtain a clear view of the ideas he would consider, separating from them all that dress and incumbrance of words which so much contribute to blind the judgment and divide the attention. (Berkeley, 1710/2003, Intr. §24)

Berkeley, in fact, deserves special attention. His objection to the meaningfulness of the notion of material substance (Berkeley, 1710/2003, I §16–17) clearly shows his verificationist tendency. His claim that we can reach a

relative *notion* of spiritual substance (Berkeley, 1710/2003, I §27), however, seems to reveal that he did not take complete verification —*i.e.*, logical deduction from statements about ideas of experience or sense-data— as a requirement for cognitive meaning.

Apart from empiricism, logical positivism's other major influence was the development in the study of logic that came about at the beginning of the XX century, in particular through the works of Frege, Whitehead, Russell and Wittgenstein, and this was explicitly recognised by logical positivists (*cf.*, *e.g.*, Ayer 1959, p. 5; Ayer 1987, p. 24–25; Blumberg and Feigl 1931, p. 282; Carnap 1928a, p. vi; Hahn, Neurath and Carnap 1929, p. 308; Schlick 1936, p. 341). Schlick himself, for example, said that Wittgenstein was the first to see "with absolute clearness" (Schlick 1930, p. 172) that the task of philosophy was logical analysis, marking "the beginning of a new era in philosophy" (Schlick 1930, p. 172). Later, I will explain in more detail what this new way of approaching philosophy consisted of; for the moment, I simply want to draw attention to the fact that this conceiving philosophy as 'philosophizing', as the activity that aims to clarify our concepts through logical analysis, is one of the most distinctive aspects of the philosophy of the Vienna Circle and can be traced back to Wittgenstein's claim in the *Tractatus Logico-Philosophicus* that

> Philosophy aims at the logical clarification of thoughts. Philosophy is not a body of doctrine but an activity. A philosophical work consists essentially of elucidations. Philosophy does not result in 'philosophical propositions', but rather in the clarification of propositions. (Wittgenstein 1921/2002, §4.112)

Last, apart from the verifiability principle there were other criteria of meaning which were considered as empiricist, principally operationalism (*cf.*, *e.g.*, Bridgmann 1928) and pragmatism (*cf.*, *e.g.*, James 1907a; James 1907b). Some logical positivists later declared that they had been unaware of these other criteria in the 30's (Feigl 1969, p. 22); however, others were clearly already aware of the existence of pragmatism and operationalism during this period (*cf.*, Carnap 1936, p. 427–428; Lewis 1934, p. 125–126; Schlick 1931, p. 196). What all these criteria, including the verifiability principle, have in common is that in one way or another they all aim to retain the empiricist intuition that a statement not linked to experience is somehow vacuous; their differences lie in the various ways they understand this required connection with experience. Operationalism, which states that a scientific concept is defined by the operations through which it is measured (Bridgman 1928, p. 36), is clearly like the verifiability principle, to the extent that some years later Carnap wrote that they only differed "[...] in minor details and in emphasis" (Carnap 1956, p. 65). With pragmatism, however, the differences are evident. Pragmatism, at least in its classical, Jamesian formulation, aims to preserve the connection with the observable through what James called the "practical cash-value" of the belief in question —*i.e.*, its "[...] value for concrete life" (James 1907b, p. 72–73). Provided he did not deny that truth is a relation of *agreement* of our ideas with *reality* (James 1907a, p. 198), he felt free to conclude that pragmatism represented "the empiricist temper regnant" (James 1907b, p. 51). It is important to bear in mind, however, that here James is using a peculiar notion of 'agreement with reality': an idea agrees with reality when it "[...] helps us to *deal*, whether practically or intellectually, with either the reality or its belongings [...] and adapts our life to the reality's whole setting [...]" (James 1907a, p. 213, the author's emphasis). Clearly, what James called "the practical cash-value" has

nothing to do with logical positivists' claim that the connection with the observable is only due to verifiability, the relation of logical deductibility from observational statements.

2. THE FORMULATION OF THE VERIFIABILITY PRINCIPLE

In the formulation of the verifiability principle we can distinguish, at least dialectically, three different steps. First, identifying the cognitive meaning of a statement with the state of affairs described by it; second, identifying the state of affairs described by a statement with its truth-conditions —*i.e.*, with the state of affairs that would make it true—; and third, identifying truth-conditions with the method of verification —*i.e.*, the conditions under which the description of a state of affairs is logically deducible from observational statements. In their formulations of the verifiability principle, most logical positivists carried out these three steps. It must be remembered, however, that the first two steps are neither specific nor original claims of logical positivism, and that neither of them by themselves implies the verifiability principle; in fact, they are quite intuitive and so it is difficult to reject them. Nonetheless, once these two first steps were taken, logical positivists felt free to go further and formulate the verifiability principle —*i.e.*, that the cognitive meaning of a statement is the conditions under which the statement is logically deducible from observational statements.

Thus, logical positivists argued that the cognitive content of a statement is the expression of a state of affairs (*cf.*, *e.g.*, Carnap 1928b, p. 325). This seems hard to deny: the cognitive content of the statement 'There is one beer in the fridge' is the state of affairs in which there is one beer in the fridge. This by itself, though, has nothing to do with the verifiability principle.

Logical positivists claimed that we cannot understand what state of affairs is expressed by a proposition unless we are able to state its truth-conditions, which happens when that state of affairs occurs. Logical positivists thereby identified the cognitive content of a statement —*i.e.*, the state of affairs expressed by it— with the truth-conditions of that statement —*i.e.*, the state of affairs that would make the state of affairs expressed by that statement true. Identifying the cognitive content of a statement with its truth-conditions seems, at least intuitively, hard to deny; but, again, this by itself has nothing to do with the verifiability principle. This second step is well summarised by Schlick:

> [...] that it is simply impossible to give the meaning of any statement except by describing the fact which must exist if the statement is false. The meaning of a proposition consists, obviously, in this alone, that it expresses a definite state of affairs. (Schlick 1932/33, p. 86–7; *cf.*, also Ayer 1934, p. 337; Blumberg and Feigl 1931, p. 288).

Last, and here we can see the real empiricist contribution and the influence that this development in the study of logic had on logical positivism, the members of the Vienna Circle argued that we can only know what the truth-conditions of a statement are if we are able to state the observable facts that would make it true; in other words, if we are able to state its verification, from which observational statements would be logically deducible. This idea is clearly expressed by Carnap:

> A person S *tests* (verifies) a system-sentence by deducing from it sentences of his own protocol language, and comparing these sentences with those of his actual protocol. The possibility of such a deduction of protocol sentences constitutes

> the *content* of a sentence. If a sentence permits no such deductions, it has no content, and is meaningless. If the same sentences may be deduced from two sentences, the latter two sentences have the same content. They say the same thing, and may be translated into one another. (Carnap 1931, p. 166, emph. of the author; *cf.*, also: Ayer 1934, p. 337; Carnap 1928b, p. 327; Schlick 1932/33, p. 87–88).

Thus, all cognitively meaningful statements are logically deducible from these observational statements, which were called protocol or basic statements and which, at least in the first stages of the formulation of the verifiability principle, were taken to provide the foundations of all our knowledge. As I will explain in the next section, the main point of debate among the members of the Vienna Circle was how observational language should be understood, either in a physicalist way or as a perceptual-language, a debate that is closely related to this alleged foundational nature of protocol statements and the way in which they are supposed to be verified. To understand observational language in a physicalist way is to claim that observational statements can be expressed in physicalist terms without any loss in meaning, whereas to understand observational language as a perceptual-language is to assert that observational statements can be expressed in perceptual terms, also without any loss in meaning.

Once the cognitive meaning of a statement has been identified with its method of verification, there can be two important outcomes. First, all the statements that fail to satisfy the verifiability principle —*i.e.*, that cannot be logically deduced from the set of observational statements— are taken to be cognitively meaningless. As we will see in detail later, this would imply the dissolution of metaphysics, in so far as this is taken by logical

positivists as a discipline that is only capable of producing "isolated sentences" (Hempel 1965, p. 114), sentences that are not logically linked with observational statements. Second, if two statements are logically deducible from the same observational statements, then despite possibly differing in form they have the same cognitive meaning, they posit the same state of affairs (*e.g.*, 'Madrid is 720km south of Barcelona' and 'Barcelona is 720km north of Madrid'). Since the verifiability principle is a criterion only for cognitive meaning, logical positivists could claim that two statements that share the same cognitive content —*i.e.*, they are both logically deducible from the same set of observational statements— might differ with regards to their non-cognitive, evaluative or aesthetic content. Thus, for example, the difference between 'My father's wife is on the phone' and 'My step mum is on the phone' is not explained by any difference in their cognitive content, but in the different evaluative charge of the expressions 'My father's wife' and 'My step mum'.

An important point must now be made: the verifiability principle requires that we are able to state what the truth-conditions of a statement are, but not what its truth-value is. In other words, we must be able to know how the statement could be deduced from protocol statements, but not whether the statement is actually deduced or not. What is required to have cognitive meaning is that the statement is verifi*able*, not that it is (now and by us) verifi*ed* (Blumberg and Feigl 1931, p. 296; Carnap 1928a, p. 290; Feigl 1934, p. 422). This is what Schlick tries to capture with his distinction between the *empirical possibility* and the *logical possibility* of verifying a statement (Schlick 1935b, p. 415–417; Schlick 1936, p. 351 and *passim*). It may be empirically impossible to verify a certain statement (due to empirical facts like our own human nature, our technical limitations or the natural laws of our world), but there could still be the logical possibility of verifying it —*i.e.*, we

can still indicate how the statement must be deduced from observational statements if it were to be true. With this distinction, the verifiability principle seems to be able to accommodate statements that, while they cannot be verified by us now, clearly posit an observable state of affairs. Since in the 30's the possibility of travelling to the moon was not taken as a logical possibility, the canonical examples of such statements given by logical positivists were statements about the other side of the moon (*e.g.*, 'There are two volcanoes on the other side of the moon'). In Schlick's words:

> For the question 'What is the other side of the moon like?', could be answered, for instance, by a description of what would be seen and touched by a person located somewhere behind the moon. The question whether it be physically possible for a human being —or indeed any other living being— to travel around the moon does not even have to be raised here; it is entirely irrelevant. Even if it could be shown that a journey to another celestial body were absolutely incompatible with the known laws of nature, a proposition about the other side of the moon would still be meaningful. (Schlick 1936, p. 354)[1]

Logical positivists' treatment of logic and mathematical statements deserves special attention. Since it was agreed that such statements could be neither refuted nor proved by observational statements, logical positivists did not

[1] It is interesting to point out here that according to Schlick, natural laws are empirical facts: "Even if the impossibility of solving a certain question is due to a Law of Nature, we shall have to say that it is only empirical, not logical, provided we can indicate how the law would have to be changed in order to make the question answerable. After all, the existence of any law of Nature must be considered as an empirical fact which might just as well be different" (Schlick, 1935b, p. 416).

consider them as empirical statements. This committed these authors to claiming that logic and mathematical statements are cognitively meaningless, since they cannot satisfy the verifiability principle (*cf.*, *e.g.*, Ayer 1946/1971, p. 100–102; Blumberg and Feigl 1931, p. 288; Carnap 1939, p. 61). The problem is that one cannot simply say that such statements are completely meaningless: in one way or another, they seem to provide knowledge. In response, logical positivists maintained that logic and mathematical claims were a matter of analyticity —*i.e.*, statements that do not describe the world, although they do "serve for the transformation" of cognitive statements, and which are true or false only by virtue of their meaning (Carnap 1932a, p. 76).

In taking this route, these authors were led to the question of what 'analyticity' meant and there were different attempts among logical positivists to explain this. Ayer, for example, claimed that "[...] a proposition is analytic when its validity depends solely on the definitions of the symbols it contains [...]" (Ayer 1946/1971, p. 105) and he argued that analytic statements, while devoid of cognitive content, are not nonsensical since they give us new knowledge by bringing the implications of our linguistic usage to light (Ayer 1946/1971, p. 105–106). Moreover, according to Ayer, although logic and mathematical claims are analytic statements, the possibility of discovering new logic and mathematical truths is allowed since there are linguistic implications that we are not able to detect at a glance because we do not have an all-powerful mind (Ayer 1946/1971, p. 114).

I do not intend to enter into debate about the adequacy of this account of analyticity; the point I would like to make here is that although logical positivists (in so far as they embraced a tautological account of mathematical and logical statements) were committed to accounting for the

statements that made them meaningful but devoid of cognitive content, this does not imply that they were committed to a particular account of analyticity. In other words, while they were committed to accommodating the statements that were assumed to be non-cognitively significant but still meaningful, they were not committed to a particular way of doing so. Thus, even if as Quine argued in his "Two Dogmas of Empiricism" (1951) we lack a successful account of analyticity, strictly speaking this would not constitute a knock-down argument against the verifiability principle (although, it could be said to diminish its plausibility): it could always be argued that there is an explanation lacking, which we must find.

3. OBSERVATIONAL LANGUAGE AND THE EPISTEMIC PRIMACY OF PROTOCOL STATEMENTS

The question as to how to understand observational language was the main point of debate among the members of the Vienna Circle (Ayer 1987, p. 26). This debate is important, partially because it shows that the Vienna Circle was not a completely uniform movement, but mainly because the question as to how to understand observational language soon turned into debate about the foundations of knowledge and the notion of truth. In fact, as we will see, this debate is highly interesting since it reveals the internal difficulties that arise if we want to take the verifiability principle as a criterion for cognitive meaning: if we take observational language to be some kind of perceptual-language, it seems that we are steered to solipsism and the problem of private language, whereas if we take observational language to be a physicalist-language, apart from being committed to providing a physicalist account of psychological language (which seems to be problematic, at least in the behaviouristic terms that logical positivists tried to use), we are forced to adopt a coherentist view about truth and hence give up the empiricist's chief claim that all our knowledge is grounded in experience.

The view that all observational statements can be expressed in perceptual terms seems to fit well with the claim that all cognitively meaningful statements are tested by being verified through —*i.e.*, logically deduced from— protocol statements, whereas protocol statements are directly tested by being faced with the given, the content of our sense-experience (Ayer 1936/37, p. 229; Schlick 1935a,

p. 404). Hence, protocol statements are to provide the foundations of all our knowledge, since they are taken as the atomic facts of our language, the ultimate objects of the truth-functions of all our cognitively meaningful statements (Schlick 1934, p. 213 and 221).

Neurath, the chief advocate of the physicalist approach –*i.e.*, the claim that observational language is expressible in a physical language— argued that observational language cannot be understood as a perceptual-language.[2] First, because if observational language is taken to be a perceptual-language, then we are committed to solipsism, since observational language becomes "[...] a purely subjective one, suitable for soliloquy only [...]" (Carnap 1937, p. 11; *cf.*, also Neurath 1932, p. 96–97). And second, because to say that a statement can be directly tested through facing it in order to sense-experience it is to make a metaphysical (hence, meaningless) assertion: if verifiability is to be identified with the procedure of logical deductibility, it cannot involve anything other than statements, since only statements are subject to logical analysis (Neurath 1931/32, p. 292–293).[3] In Neurath's words:

> Language is essential for science; within language all transformations of science take place, not by confrontation of language with a 'world', a totality of 'things' whose variety language is supposed to reflect. An attempt like that would be metaphysics. *The one scientific language can speak about itself, one part*

[2] Do not confuse physicalism with materialism: physicalism is a thesis about the nature of observational language, not a metaphysical claim about the nature of things. In Neurath's words: "Physicalism does not hold the thesis that 'mind' is a product of 'matter' but that everything we can sensibly talk about is spatially and temporarily ordered" (Neurath, 1931a, p. 325).

[3] This was denied by Ayer (Ayer 1963, p. 185-186), who contested that there is nothing mysterious in directly comparing our protocol statements with the content of our experience.

> *of language can speak about the other*; it is impossible to turn back behind or before language. (Neurath 1931b, p. 54, emph. of the author).

Thus, there can be no *direct verification* of protocol statements about our own sensory-experience through confronting them with the content of our sensory-experience: our statements can only be tested through being verified —*i.e.*, logically deduced from— other statements. According to Neurath, this explains why we are committed to adopting a coherentist view about truth: when assessing the truth of a new statement, we might consider it true when it is not in contradiction with the rest of our already accepted statements (Neurath 1931b, p. 53; Neurath 1931/32, p. 291; Neurath 1932, p. 94–95). Consequently, no statements are more basic or fundamental than others: all statements are of equal value and hence no set of statements can provide the foundations of our knowledge. This coherentist view about truth is well summarised by Neurath when he claims that:

> In unified science, we try [...] to create a *consistent system* of protocol statements and non-protocol statements (including laws). When a new statement is presented to us we compare it with the system at our disposal and check whether the new statement is in contradiction with the system or not. If the new statement is in contradiction with the system, we can discard this statement as unusable ('false'), for example, the statement: 'In Africa lions sing only in major chords'; however, one can also 'accept' the statement and change the system accordingly so that it remains consistent if this statement is added. The statement may then be called 'true'. (Neurath 1932, p. 94–95, emph. of the author).

The first problem of physicalism is that it forgets about the supposed epistemic primacy and the incorrigibility of protocol statements about our own sensory-experience: I take to be epistemically superior the statements with which I express my own perceptions than those with which you express yours, to the extent that whereas I can doubt your perceptual reports, I cannot doubt mine. As Schlick says:

> If all the scientists in the world told me that under certain experimental conditions I must see three black spots, and if under those conditions I saw only one spot, no power in the universe could induce me to think that the statement 'there is now only one black spot in the field of vision' is false (Schlick 1935a, p. 404; *cf.* also Ayer 1936/37, p. 243; Schlick 1934, p. 218–219).

The physicalist responds by claiming that although they can be distinguished in the physicalist language (Carnap 1932b, p. 468), protocol statements cannot be *mine* or *yours*, since the notion of subject is a metaphysical (hence, meaningless) notion —a "chimerical epistemological subject", as Feigl says (Feigl 1934, p. 429). The supposed epistemic primacy of the protocol statements I take to be *mine* is due to pure practical convenience related to psychological (contingent) traits of our human nature (*cf.*, *e.g.*, Carnap 1932b, p. 467; Neurath 1932, p. 97). More specifically, we can reconstruct their argument as follows. The notion of a subject that *owns* sensory-experience is not verifiable —*i.e.*, it is not logically deducible from any set of observational statements— and hence it is a meaningless notion. This argument is clearly expressed by Wittgenstein:

> 5. 631. There is no such thing as the subject that thinks or entertains ideas. [...]
> 5.632. The subject does not belong to the world: rather, it is a limit of the world.

> 5.633. Where in the world is a metaphysical subject to be found? You will say that this is exactly like the case of the eye and the visual field. But really you do *not* see the eye. And nothing *in the visual field* allows you to infer that is seen by an eye. (Wittgenstein 1922/2002, §5.631–5.633, emph. of the author).

These considerations lead logical positivists to claim that the content of sensory-experience is neutral, that it has no owner. However, this was not taken to mean that there is no difference between statements such as 'I am hungry', on the one hand, and 'He is hungry', on the other. As Schlick argued (Schlick 1936, p. 367), we can say that the content of the experiences that seem to affect us have an owner to the extent that their content is related to the content of the other sensory-experiences that constitute what each of us would call 'my body'. This, however, is an empirical, contingent relation. The logical positivists that favoured a physicalist account of observational language thought that this relation could be captured by physicalist language: thus, although I cannot say that there are protocol statements which are *mine*, I can distinguish 'I-protocol' from 'He-protocol'. The point is nicely summarised by Neurath:

> In the universal jargony [*i.e.*, physicalist language] one cannot speak meaningfully of one's 'own' protocol, nor of 'now' and 'here'. In the physicalist language, personal names are replaced by coordinates and coefficients of physical states. One can only distinguish an 'Otto-protocol' from a 'Karl-protocol' but, in the universal jargon, not one's 'own protocol' from 'another's protocol'. The whole problematic connected with one's 'own mind' and 'other minds' does not arise. (Neurath 1932, p. 97, the text inside brackets is mine).

I will not go into further detail, but it is interesting to note that giving a physicalist account of observational language commits us to adopting a physicalist account of psychological language, which is (at least in the behaviouristic terms that logical positivists used) (*cf.*, *e.g.*, Feigl 1934, p. 438; Carnap 1931; Neurath 1931/32, p. 292–293) highly problematic. Defending a physicalist account of psychological language commits us to giving a behaviouristic account of first-person psychological statements —*i.e.*, when I say 'I feel sad', what I am really referring to is my feeling-sad behaviour, not my feeling-sad; and here it could be argued that even if I learn how to use mentalistic language based on physicalist, behaviouristic language, when I employ mentalistic language what I am referring to are my own sensations and not my behaviour (Feigl 1960, p. 342–343).

There is a second, stronger objection to Neurath's coherentism, which consists of claiming that the epistemic primacy of my own protocol statements does not come from the fact that I cannot doubt the perceptual reports about my own sensory-experience, but from the more fundamental logical role that they play in the process of verifying the rest of my cognitive statements. Since protocol statements are in the end the statements from which the rest of cognitively meaningful statements are logically deduced, it seems that we can conclude that they have some sort of epistemic primacy. Neurath was aware of this possible objection, to which he answered that what statements we take to play this more fundamental logical role in the process of verification is a matter of convention, to be decided "on the basis of *extralogical factors*" (Neurath 1934, p. 106; *cf.* also: Carnap 1932b, p. 464–467; Neurath 1932, p. 91). In Neurath's words:

> When we have removed the [internally] contradictory groups of statements, there still remain sev-

> eral group of statements with differing protocol statements that are equally applicable; that are without contradictions in themselves but exclude each other. (Neurath 1934, p. 105, the text inside brackets is mine).

However, the serious problem is that even if we take for granted the fact that what observational statements we take to be more fundamental is a matter of convention and we assume that there is a convincing physicalist account of first-person psychological statements, it is difficult to argue that the verifiability principle in the context of Neurath's coherentism is an empiricist criterion for meaning: the main intuition behind empiricism is that all our knowledge is, in the end, founded on our experience, not on a convention. As Carnap says, someone who denies the possibility of confirming a statement through its confrontation with observation "could not be considered an empiricist" (Carnap 1949, p. 126; *cf.*, also Cornelius Benjamin 1941, p. 569). Of course, strictly speaking, this does not constitute an argument against the adequacy of the verifiability principle: one can simply adhere to it by accepting that it is not an empiricist criterion. However, it does show, first, that the adequacy of the verifiability principle cannot be grounded on the strength of empiricist intuition and, second, that empiricism cannot be construed in physicalist terms.

4. THE TWO MAIN CONSEQUENCES OF THE VERIFIABILITY PRINCIPLE: PHILOSOPHY AS LOGICAL ANALYSIS AND THE PROJECT OF UNIFIED SCIENCE

Accepting the verifiability principle brings about two main consequences of enormous importance. First, philosophy becomes a task of logical analysis, which in turn implies eliminating all metaphysical, non-verifiable, and hence meaningless, sentences, in addition to dissolving many classical philosophical problems that are founded on metaphysical, non-verifiable sentences. Second, the requirement of there being a unified science: if all cognitively meaningful statements are to be logically deduced from statements of observational language, then all statements with cognitive meaning must, in the end, refer to this *same* observational language. In this section I will focus on these two consequences.

4.1. Philosophy as Logical Analysis

As I mentioned before, logical positivists themselves (*cf.*, *e.g.*, Ayer 1959, p. 23–24; Schlick 1930, p. 172) recognised that their understanding of philosophy as the task of logical analysis was inherited from Wittgenstein (Wittgenstein 1922/2002, §4.122; *cf.*, also Russell 1924, p. 47–48). For logical positivists, the task of philosophy was not to formulate systems or doctrines, but to *dissolve* traditional philosophical problems through clarifying and purifying our language (Feigl 1934, p. 421; Hahn, Neurath

and Carnap 1929, p. 306; Neurath 1931b, p. 49; Ramsey 1931, p. 321; Schlick 1925, p. 91; Schlick 1928, p. 142). Thus, their aim was not to offer a philosophical doctrine that aimed to solve a philosophical problem, but to show by the method of logical analysis (Carnap 1932a, p. 77) that the problem was in fact ill-founded.

In understanding philosophy as the task of logical analysis, we can distinguish two different aspects of philosophical activity. First, there is the task of clarifying our concepts through logical analysis, which leads to dissolving all merely verbal disputes. Second, there is the task of identifying which sentences satisfy the verifiability principle and which do not, which leads to dissolving all the classical philosophical problems that are founded on meaningless sentences. It is important to clearly distinguish between these two tasks: whereas the latter is dependent on the success of the verifiability principle, the former can be accepted even if we reject it.

This conception of philosophy was taken to be so radically new that some logical positivists suggested eliminating the term 'philosophy' in favour of expressions such as 'philosophizing' (Neurath 1931a, p. 329–330) or 'the logic of science' (Carnap 1934, p. 6). However, there were others who did not want to go as far. Schlick, for example, preferred to retain the name 'philosophy' because otherwise it would create the impression that philosophy only deals with the language of science, when this is not the case, since philosophy also deals with ethics (Schlick 1937, p. 495–498).

At any rate, it is important to point out that none of the logical positivists took the conception of philosophy as the task of logical analysis to imply the discrediting of philosophy or a denial of its importance; in fact, they

thought that this would elevate philosophy to a more honoured position. As Schlick says:

> The result of philosophizing will be that no more books will be written about philosophy, but that *all* books will be written in a philosophical manner. (Schlick 1930, p. 175)

As a consequence of accepting the verifiability principle, logical positivists declared the elimination of metaphysics. Metaphysics was to be eliminated, not for being useless as classical positivists such as Comte claimed, but for being completely meaningless (Blumberg and Feigl 1931, p. 282; Carnap 1932a, p. 60). Logical positivists understood metaphysics to be the discipline that deals with the transcendent, that which goes beyond the content of our experience (Ayer 1934, p. 335; Schlick 1926, p. 102–211). If metaphysical sentences talk about that which is beyond our experience, then they cannot be verified by —*i.e.*, logically deduced from— our observational language. Thus, logical positivists claimed that by its own definition, metaphysics cannot produce cognitively meaningful statements since they cannot satisfy the verifiability principle. Thus, metaphysical sentences must be regarded as cognitively meaningless expressions, as sentences that aimed to describe a state of affairs but failed to do so.

This conception of metaphysics was contested by Ewing (Ewing 1937, p. 351), who argued that no metaphysical system aimed to deal with the *pure transcendent*: any metaphysical doctrine is supposed to bear, in some way or another, a relation with experience. This could be correct, but it does not affect logical positivists' main objection to metaphysics: no metaphysical claim, even if it bears some sort of relation with experience, can be logically deduced from our observational statements.

Anyhow, since the verifiability principle is restricted to cognitive meaning, logical positivists were not committed to claiming that metaphysical sentences are completely meaningless, like a random sequence of letters could be. Metaphysical sentences can still have some sort of emotive or aesthetic meaning (Ayer 1934, p. 338; Carnap 1932a, p. 78; Feigl 1951, p. 145; Hahn, Neurath and Carnap 1929, p. 306–307; Neurath 1931a, p. 357; Neurath 1931/32, p. 300; Schlick 1926, p. 111; Schlick 1930, p. 174–175). With this, metaphysics was equated to poetry: metaphysics is allowed if and only if we are aware that it is fiction, a mere emotive or aesthetic pastime, but not a description of the world.

The result of this was that quite a few classical philosophical disputes were taken to be dissolved —*i.e.*, showed to be meaningless— since they were grounded on what logical positivists took to be metaphysical, cognitively meaningless (pseudo)statements. Some of these were: the problem of the existence of an external world and the dispute between realists and idealists (*cf.*, Barret 1939; Carnap 1928a, p. 281–286; Carnap 1928b, p. 332–339; Feigl 1934, p. 425–426; Feigl 1969, p.25; Hahn, Neurath and Carnap 1929, p. 308; Neurath 1931a, p. 416–417; Schlick 1932/33, p. 96–105); the problem of solipsism (*cf.*, Carnap 1932b, p. 468; Feigl 1934, p. 424; Neurath 1932, p. 97–99; Schlick 1936, especially sect. V); the mind-body problem (*cf.*, Carnap 1934, p. 18–19; Feigl 1934; Neurath 1931a, p. 360); and the problem of the inverted spectrum (*cf.*, Neurath 1931b, p. 49; Schlick 1926, p. 99–102). Schlick went further than other logical positivists by claiming the dissolution of causality (Schlick 1925, p. 96) and the problem of induction (Schlick 1931, p. 197). Leaving aside the particularities of each of these philosophical problems, the important point is, as I have already said, that all of them were taken to be ill-founded: the problem of the existence of an external world, for

example, was taken to be founded in the metaphysical (hence, meaningless) notion of the external world as something that goes beyond what is given in the experience.

4.2. The Project of Unified Science

The project of unified science emerges from the verifiability principle: if all cognitively meaningful statements are to be logically deduced from observational language, then the statements of all the sciences that aim to have cognitive meaning —*i.e.*, that aim to offer a description of how the world is— *must be* logically deduced from this *same* observational language. This is important: the project of unified science is a consequence of the verifiability principle, not an addenda. This is explicitly recognised by Carnap when he says that:

> *All* empirical sciences (natural sciences, psychology, cultural sciences) acknowledge and carry out in practice the requirement that every statement must have factual content. It makes no difference whether we are concerned with mineralogy, biology, or the science of religion: each statement which is to be considered meaningful in any one of these fields (*i.e.*, which is either considered true or false or which is posed as a question) either goes directly back to experience, that is, the content of experiences, or it is at least indirectly connected with experience in such a way that it can be indicated which possible experience would confirm or refute it; that is to say, it is itself supported by experiences, or it is testable, or it has at least factual content. (Carnap 1928b, p. 328)

According to the project of unified science, although different sciences can reach their statements by using different methods of research, *all* scientific statements are the same kind of thing: a set of "true propositions about reality" (Schlick 1929, p. 140). Two important consequences emerge from this claim. First, all scientific laws are of the same kind and, hence, they are all related, or "interwoven" as Neurath says (Neurath 1931/32, p. 283). Second, if all scientific statements are of the same kind, they are all expressible in the same language: there is a unified language (Neurath 1931/32, p. 284 and 293). This unified language is none other than the observational language from which all cognitively meaningful statements are logically deduced, and which is now identified by the logical positivists who talk about unified science with physicalist language, since it is the only language that is intersensual —*i.e.*, not dependent upon a concrete sense—, and intersubjective —*i.e.*, not dependent upon a concrete speaker (Neurath 1931/32, p. 287; *cf.*, also Feigl 1934, p. 438). Note that if we are to assume that only physicalist language possesses these two features, then, since scientific statements are supposed to be objective and verifiable by —*i.e.*, logically deduced from— observational language, the project of unified science offers a convincing argument for taking observational language to be a physicalist language.

Hence, if the statements of a certain science are not logically deducible from this unified language, or if that science does not have the same predictive success as experimental sciences do, then we must conclude that it fails to produce cognitively meaningful statements. I am not saying that predictive success must be taken as a criterion for verifiability: what I am saying is that if physics has some sort of predictive success, then the other sciences must also have this —since they are, in the end, the same science. This explains Neurath's efforts to try to

show that sociology has some sort of predictive success and that its statements can be translated, without any loss in meaning, into physicalist language (*cf.*, Neurath 1931a, p. 326 and 405; Neurath 1931/32, p. 302). It also explains the project of some logical positivists, mentioned previously, of offering a physicalist account of psychological language.

Apart from Schlick, the other logical positivists did not concern themselves with the status of human sciences and the place they might occupy in this unified science. Schlick's view was that if human sciences were to have a theoretical, cognitive goal, then their research method could not be different from the method used in experimental sciences. If the method was different it was because in such cases human sciences were not "[...] occupied in gaining knowledge and discovering real connections [...]" but in reaching some sort of emotive or aesthetic, non-cognitive goal (Schlick 1929, p. 151; *cf.*, also Schlick 1926, p. 102).

5. ETHICAL LANGUAGE

In this section, I will examine how logical positivists analysed ethical language. As we will see below, we can distinguish two main approaches among the members of the Vienna Circle: either they took ethical language to be non-cognitive, purely emotive, or they took it to be cognitively meaningful by trying to reduce it to observational language. Leaving aside the adequacy of these emotivistic and reductionist approaches, I think that it is interesting to draw attention to how these attempts reveal that the members of the Vienna Circle were not completely insensitive to the importance of this kind of language in ordinary practical life. Schlick, for example, considered Socrates as the first "true philosopher" since he was "[...] one who sought the meaning of propositions, and particularly of those by means of which men mutually judge their moral conduct" (Schlick 1937, p. 496). Moreover, Wittgenstein's comments on the *mystical* (Wittgenstein 1922/2002, §6.522) and Carnap's recognition of the fact that questions that fail to satisfy the verifiability principle can still be important for practical situations even if they do not have any theoretical value (Carnap 1928a, p. 297), together with his distinction between object-representation and factual-representation (*cf.*, Carnap 1928b, p. 329–331), can also be read in this way.

The logical positivists who assumed that it was not possible to verify the existence of moral properties were committed to denying moral realism. But the denial of

moral realism is not, strictly speaking, a consequence of the verifiability principle: even in adopting the verifiability principle, one could accept moral realism if he were able to provide a method of verifying ethical judgments; and since verifiability refers here to logical deductibility from observational statements, this would imply that one could provide a naturalistic account of moral properties —*i.e.*, their reduction to the observational. This last is precisely the route taken by the logical positivists who took ethical language to be cognitively significant.

Those that treated ethical statements as cognitively meaningful embraced what Neurath called 'felicitology' (Neurath 1931/32, p. 305–307); that is, the view according to which ethics is to be reduced to "[...] questions of fact; why people hold the principles that they do, what is that they desire, and how their desires can be fulfilled" (Ayer 1959, p. 21–22; *cf.*, also Blumberg and Feigl 1931, p. 293; Neurath 1931a, p. 327–328 and 419; Neurath 1931b, p. 50; Neurath 1931/32, p. 305–307; Schlick 1930, p. 175; Schlick 1939). Thus, for example, an ethical claim such as 'It is morally right to take care of your children' might be reduced to the empirical fact that in taking care of their children, people are usually fulfilling some of their desires and improving their own happiness. Since ethical language is to be reduced to observational, non-ethical language, these authors concluded that ethics could *explain* when something is *valued*, but it could not *establish* when something is *valuable*. In Schlick's words:

> [...] ethics [...] "justifies" a certain judgment only to the extent that it shows that the judgment corresponds to a certain norm; that this norm itself is "right", or justified, it can neither show nor, by itself, determine. Ethics must simply recognize this as a fact of human nature. [...] In

> other words: if, or in so far as, the philosopher answers the question "what is good?" by an exhibition of norms, this means only that he tells us what "good" *actually* means; he can never tell us what good *must* or *should* mean. (Schlick 1939, p. 256–257).

Among logical positivists, Ayer was the one who, in chapter VI of his *Language, Truth and Logic* (Ayer 1946/1971), provided a more detailed emotivist account of ethical language. In his view, moral judgments did not concern matters of fact in so far as they neither described nor represented the world at all, but were merely *emotional responses* to it. Similarly, moral language had no cognitive meaning at all, since it only served to *express* non-cognitive states such as attitudes and feelings and, therefore, its statements could not be analysed in terms of truth and falsehood.

These views are not without problems. The main problem of Schlick's and Neurath's felicific conceptions of ethics was already identified by Ayer. It does not seem self-contradictory to say that X causes the greatest happiness (or the greatest balance of pleasure over pain), but that X is not right. Thus, Ayer concludes, "[...] it cannot be the case that the sentence 'x is good' is equivalent to 'x is pleasant', or to 'x is desired'." (Ayer 1946/1971, p. 107). Emotivism, on the other hand, is founded on the assumption that there is a clear-cut distinction between the evaluative and the cognitive content of ethical language. One common way in which this assumption has been challenged is by appealing to the so-called 'thick concepts' —*i.e.*, concepts with both evaluative and cognitive content. A typical example of a thick ethical concept is 'courageous': when I say that someone is courageous, I am not merely evaluating him positively but also *describing* him as a person who is

not afraid of taking risks. If, as some authors have argued (*cf.*, *e.g.*, Williams 1985/2006, pp. 128–131 and pp. 140–142; Putnam 2002, 34–35), the evaluative and the cognitive content of thick ethical concepts cannot be disentangled, then there is no room for an emotivist account of ethical language.[4]

It goes far beyond the scope of this essay to analyse in detail the adequacy of these proposals. There is, though, an important point to bear in mind. Given the importance that ethics had in ordinary daily life, logical positivists could not simply bite the bullet here and claim that ethical language was completely meaningless, and so they were committed to providing some account of ethical language that was compatible with their acceptance of the verifiability principle. The success of neither of these two positions, however, is linked to the success of the verifiability principle, or vice-versa. This can be seen clearly in the later development of emotivism: leaving Ayer aside, the first serious attempt to formulate an adequate emotivist view of ethical language can be found in Stevenson (*cf.*, especially Stevenson 1937; Stevenson 1944), who did not seem to be too concerned with the verifiability principle (*cf.*, Stevenson 1938, p. 339–341, where he argues that the verifiability principle is an example of persuasive definition).

[4] For an overview of how is going on nowadays the debate over thick concepts see the papers collected in (Kirchin 2013).

6. THE MAIN PROBLEMS OF THE VERIFIABILITY PRINCIPLE

One of the main problems of the verifiability principle is that it is committed to accepting that universal statements —*i.e.*, statements of the form 'All As are P'— are cognitively meaningless, since they cannot be logically deduced from any finite set of observational statements (Hempel 1950, p. 112; Hempel 1965, p. 105). Although Schlick bit the bullet here and claimed that universal statements are not cognitively meaningful but are merely "prescriptions for the making of assertions" (Schlick 1931, p. 188), it seems clear that universal statements have some sort of cognitive meaning. The only way left for logical positivists to logically deduce a universal statement such as 'All As are P' from a finite set of observational statements was to try to infer universality from regularity by assuming the premise of the uniformity of nature; this premise, however, cannot be logically deduced from our observational statements, since it is in turn a universal statement.

Related to the problem of universal statements, we find statements involving modality. Since relations of modality cannot be logically deduced from observational statements, the verifiability principle would appear to have great difficulty distinguishing between ordinary universal statements (*e.g.*, 'All As are contingently P') and statements expressing natural laws (*e.g.*, 'All As are (empirically) necessarily P'). As with universal statements, the only way left for logical positivists was to try to find a way to infer modality from regularity. But, again, this would require the premise of the uniformity of nature, which cannot be logically deduced from our observational statements because it is a universal statement.

Denying the cognitive meaning of universal statements made the idea of taking falsability instead of verifiability as a criterion for cognitive meaning attractive (*cf.* Ayer 1936/37, p. 229; Ayer 1959, p. 13–14; Feigl 1969, p. 23). The canonical formulation of the falsability criterion can be found in Popper's *The Logic of Scientific Discovery*: to be cognitively meaningful, it must be possible for an empirical system "[...] to be refuted by experience" (Popper 1935/2002, p. 96). However, not all logical positivists considered the possibility of accepting the falsability criterion. While Schlick seems to take falsability and verifiability to be symmetrical (Schlick 1937, p. 493), Neurath's criticisms of falsability (Neurath 1935, p. 123–125) indicate that not all logical positivists take them to be so. At any rate, the important point is that while it is true that falsability can accommodate universal statements —since from a finite set of observational statements a universal statement can be falsified— it also has the odd consequence that existential statements —*i.e.*, statements of the form 'There is at least one A which is not P'— are rendered meaningless, since they cannot be falsified from a finite set of observational statements (Hempel 1965, p. 105; Neurath 1935, p. 124–125). As in the case of universal statements, the problem arises because it seems undeniable, at least intuitively, that existential statements have some sort of cognitive meaning.

The verifiability principle ran into difficulties when accounting for dispositional properties, properties such as 'soluble' and 'fragile'. Given the verifiability principle, logical positivists were committed to reducing dispositional properties to their observable effects —*i.e.*, to the observational statements that refer to them. And the trouble here is that an object can have a dispositional property even if it never manifests it —*e.g.*, an object can be fragile or soluble even if it never gets broken or

dissolved. How this project of reducing dispositional properties to their observational effects can unravel is unclear, but obviously it cannot do so in the way Carnap proposed in his "Testability and Meaning" (Carnap 1936; Carnap 1937), which was the most serious attempt the logical positivists made in this sense. Carnap aimed to reduce dispositional properties to their observational effects through what he called 'reduction sentences'. Taking the dispositional property of being soluble, Carnap states its corresponding reduction sentence as:

> If any thing x is put into water at any time t, then, if x is soluble in water, x dissolves at the time t, and if x is not soluble in water, it does not. (Carnap 1936, p. 440–441)

If successful, Carnap's so-called reduction sentences would provide us with a way of reducing the subjunctive mode involved in dispositional properties to the indicative, extensional mode of observational language. The problem with Carnap's proposal is, however, that reduction sentences remain silent with regards to objects that are not put into water; and this means that reduction sentences cannot provide us with a complete reduction of dispositional properties to the observational, unless we are going to claim that an object that *would* dissolve *were* it put into water is not soluble because it so happens that it is never put into water (*cf.*, Hempel 1950, p. 119–120; and Hempel 1965, p. 109–110 for criticisms to Carnap's proposal).

A last problem of the verifiability principle is its status: is it an analytical statement, a synthetic statement or a metaphysical claim? The verifiability principle is not an analytical statement because it is not true by virtue of its meaning: we can achieve full understanding of the verifiability principle and still doubt its truth. Neither is the verifiability principle a synthetic, cognitively meaningful

statement because it cannot be logically deduced from any set of observational statements. Thus, the only way left is to argue that the verifiability principle is a metaphysical, cognitively meaningless (pseudo)statement. Logical positivists, however, cannot accept this conclusion since, as Ayer points out, "[i]f the verification principle really is nonsensical, it states nothing; and if one holds that it states nothing, then one cannot also maintain that what it states is true" (Ayer 1989, p. 15; *cf.*, also: Ayer 1934, p. 344).

The only alternative left is to argue that the verifiability principle is a matter of convention, a working hypothesis justified on pragmatic grounds (*cf.*, *e.g.*, Cornelius Benjamin 1941, p. 571–572). This was to be the route taken by those who, some years later, defended liberalised versions of the Verifiability Principle (*cf.*, *e.g.*, Reichenbach 1951, p. 93; Feigl 1963b, p. 311–313). However, in the Viennese formulation of the verifiability principle this way of reasoning is blocked: no pragmatic grounds can be offered for a theory of meaning which forbids what Feigl called "innocuous metaphysics" (Feigl 1963a, p. 42–44) —*e.g.*, the dissolution of the self, the commitment to a physicalist account of psychological language, the meaninglessness of universal statements (or existential statements, if we take falsability instead of verifiability as a criterion of meaning), the meaninglessness of the notion of an external world, the rejection of inductive reasoning, the requirement of unified science, and so on. To forbid innocuous metaphysics is too high a price to pay.

7. THE LIBERALISATION OF THE VERIFIABILITY PRINCIPLE: CARNAP'S CONFIRMABILITY

In light of all these problems, by the mid 30's it had become clear that the requirement of conclusive verifiability —*i.e.*, logical deducibility from observational statements— was untenable and that the verifiability principle needed some sort of liberalisation in order to accommodate universal statements and dispositional properties (*cf.*, *e.g.*, Ayer 1959, p. 13–14; Carnap 1936, p. 425; Carnap 1949, p. 124; Ewing 1937, p. 348; Reichenbach 1938/1957, p. 188; Reichenbach 1951, p. 95–96; Will 1940, p. 185). The most serious attempt to liberalise the verifiability principle was Carnap's confirmability criterion. For this reason, it is interesting to end this essay by explaining briefly what the core ideas of Carnap's proposal were.

In his "Testability and Meaning" (Carnap 1936; Carnap 1937), Carnap suggested changing verifiability for confirmability: a statement is not completely verified but is confirmed *to some degree* upon the single instances, and the possibility of being confirmed to some degree is what assures that the statement is cognitively meaningful.

Confirmability is a criterion for cognitive meaning, but not a criterion for truth; hence, neither is it a criterion for epistemic justification. For this reason, the degree of confirmability of the statement does not matter: we are concerned not with the *truth* of the statement, but with its *meaningfulness*. Once confirmability not having to be a criterion for truth was allowed (Carnap 1945, p. 530; Carnap 1949, p. 119–120; Tarski 1944, p. 345), so was the

meaning of a statement being distinguishable from the data that might confirm it —*i.e.*, the meaning of a statement was not to be identified with its method of confirmation. This is the main difference between Carnap's confirmability criterion and the Viennese formulation of the verifiability principle —as we have seen, the Viennese formulation identified the cognitive meaning of a statement with its method of verification.

In contrast with the Viennese formulation of the verifiability principle, the confirmability criterion is understood as an inductive inference from observational statements. This explains Carnap's interest in probability and inductive inference and his efforts to show that inductive inference is a procedure as logical as logical deduction (*cf.*, Carnap 1945; Carnap 1946, p. 590–596). However, it is interesting to note that there were other proposals that aimed to liberalise the verifiability principle that did not make verifiability a logical notion: John Hick, for example, claimed that verifiability was, at least partially, a psychological notion (Hick 1960, p. 54–55).

Carnap's confirmability criterion allows us to skip one of the most obvious and serious objections to the verifiability principle: the problem of universal statements (Carnap 1936, p. 425). However, if, as Carnap does in his "Testability and Meaning" (Carnap 1936; Carnap 1937), we accept the confirmability criterion but still maintain the requirement of the reducibility of all cognitively meaningful statements to observational terms, then there remains the problem of dispositional properties and theoretical entities. The trouble, as I explained in relation to dispositional properties, is that Carnap's so-called reduction sentences fail to provide an adequate reduction of dispositional properties to their observable effects. However, since theoretical entities and dispositional properties are fundamental in scientific practice, one

cannot simply claim that they are meaningless. However, without a successful reductionist account this is what the requirement of reducibility to the observational language amounts to. These considerations made Carnap give up his original aim of reducing all vocabulary to observational language (Carnap 1956, p. 39).

In his later works (Carnap 1956, p. 49–52), Carnap returned to the idea already outlined in his "Foundations of Logic and Mathematics" (Carnap 1939, p. 67–69): a statement is confirmed when it allows us to make successful and observable predictions. This seems to preserve the link between meaning and experience and, at the same time, it seems to respect the meaningfulness of theoretical entities and dispositional terms: even if we cannot reduce them to observational language, we understand their meaning provided they are linked to sensory-experience through their observable effects. The point is that we can conclude that theoretical entities are of the same nature as observational entities provided they bear some relation with the observable (this is the main idea of Reichenbach's so-called 'extension rules'; *cf.* Reichenbach 1951, p. 100).

So, in the end, Carnap's confirmability criterion turns out to be some sort of *abductive argument*: the best explanation for predictive success is the reference of the theoretical entities employed in the derivation of the prediction. We can now clearly see the extent to which the criterion had been liberalised: remember that in the Viennese formulation of the Verifiability Principle, the only procedure allowed was logical deductibility from observational statements.

CONCLUSION

In this essay I aim to reconstruct the classical formulation of the so-called verifiability principle, the characteristic claim of the philosophical movement now known as logical positivism.

The verifiability principle is an empiricist criterion of meaning which states that only statements that are verifiable by —*i.e.*, logically deducible from— observational statements are cognitively meaningful.

At the beginning of this essay, I argue that a clear precedent of the philosophical position defended by logical positivists regarding both the verifiability principle and their conception of philosophy as the task of logical analysis, can be found in the works of classical empiricists such as Berkeley and Hume. The other main influence for logical positivism can be found in the studies of logic, especially those of Frege, Whitehead, Russell and Wittgenstein.

I also compare the verifiability principle with operationalism and Jamesian pragmatism, two philosophical positions that might also be considered as empiricist criteria of meaning. I argue that operationalism and the verifiability principle are extremely similar, whereas the verifiability principle and Jamesian pragmatism seem to have nothing in common except that both aim to preserve the empiricist intuition that a statement not linked to experience is somehow vacuous.

I identify three steps in the formulation of the verifiability principle and I argue that the first two (*i.e.*, identi-

fying the cognitive meaning of a statement with the state of affairs described by it and identifying the state of affairs described by a statement with its truth-conditions) are quite intuitive and hard to dispute. However, these two steps do not imply the verifiability principle. I argue that it is the third step (*i.e.*, identifying the truth-conditions of a statement with the conditions under which the description of a state of affairs is logically deducible from observational statements) that is the genuine claim of the verifiability principle.

I comment on the debate among the members of the Vienna Circle about how to understand observational language, either as a physicalist language or as a perceptual language, and I argue that this debate reveals an important internal problem for those who want to adopt the verifiability principle as a criterion for cognitive meaning: if we take observational language to be a perceptual-language, then we face the problem of solipsism and private language, and if we take it to be a physicalist language, apart from committing us to giving a physicalist account of psychological language which seems problematic, at least in the behaviouristic terms that some logical positivists used, leads us to reject the basic claim of empiricism that experience provides the foundations of our knowledge.

I identify the two main consequences of accepting the verifiability principle: the conception of philosophy as the task of logical analysis and the project of unified science. I comment on logical positivists' claim that the task of philosophy is not to construe systems or doctrines, but to *dissolve* traditional philosophical problems through clarifying and purifying our language. This task, we must remember, has a twofold dimension: first, the task of clarifying our concepts through logical analysis to dissolve all disputes that are merely verbal; and, second, the task of

identifying which sentences are cognitively meaningful by showing which ones satisfy the verifiability principle and which ones do not. The distinction is important because whereas the latter is dependent on the adequacy of the verifiability principle, the concern with clarifying our language and concepts is not, strictly speaking, related to it —actually, the pleasing legacy of logical positivism, if there is one, is this concern with clarifying our language and concepts, which is still, at least among analytic philosophers, taken as one of the main philosophical preoccupations. With regards to the project of unified science, the point I want to make in this essay is that it is a consequence, not a mere addenda, of the verifiability principle.

I also comment on the two different views about ethical language held among the members of the Vienna Circle: emotivism and the so-called 'felicitology'. I point out some of the main problems of these two views, but I argue that the success of neither is linked to the success of the verifiability principle, or vice-versa.

Last, I comment on the main problems of the verifiability principle. In the mid 30's, the severity of these problems led some logical positivists to liberalise the principle by giving up the conception of verifiability as logical deducibility and trying to make of it some sort of inductive inference from observational statements. To exemplify these liberalisation moves, I explain what the main ideas of Carnap's use of confirmability as a criterion for cognitive meaning were, while leaving aside the debate about its adequacy.

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