

From Within and From Without: Two Perspectives on Analytic Sentences

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ABSTRACT. The analytic/synthetic distinction can be conceived from two points of view: from within or from without; from the perspective of one's own language or from the perspective of the language of others. From without, the central question is which sentences of a foreign language are to be *classified* as analytic. From within, by contrast, the question concerning the synthetic and the analytic acquires a *normative* dimension: which sentences am I not *permitted* to reject—if I want to avoid talking nonsense?

Both perspectives on analytic sentences do not mutually exclude but supplement and illuminate each other. In "Two Dogmas", Quine's criticism of the analytic/synthetic distinction comes from within, whereas in *Word and Object*, Quine repeats his earlier criticism from without. His criticism is directed against Carnap's views on our understanding of theoretical terms. I challenge Quine's criticism in both of its versions and provide two definitions for analyticity that are immune to Quine's arguments. Using the first of these definitions (the one from without) I try to show how it is possible to distinguish (genuine) belief revision from linguistic change—even in case of a scientific revolution.

KEYWORDS: Quine, Carnap, Chomsky, Ramsey; analyticity, synthetic sentences, theories, theoretical terms, Ramsification, holism, Quine-Duhem thesis, behaviorism, normativity.

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I. Two perspectives

Anyone who seeks to describe reality in scientific terms may be led to ask which of the sentences used are made true by this reality and which sentences must already be true in virtue of linguistic rules alone and are therefore devoid of factual content. This is, in rough outline, the question concerning the distinction between analytic and synthetic sentences: a question from the philosophy of science. The analytic/synthetic distinction can be conceived from two points of view: from within or from without; from the perspective of one's own language or from the perspective of the language of others.¹ From without, the central question is which sentences of a foreign language are to be classified as analytic. Here we are concerned with the *description* of a language, i.e. a system of the linguistic habits of speakers.²

From within, by contrast, the question concerning the synthetic and the analytic acquires a *normative* dimension: which sentences am I not *permitted* to reject—if I want to avoid talking nonsense? (Viewed from within, analytic sentences also have a further normative aspect: the speaker's belief system not only must be logically consistent, it also should contain only those beliefs that are logically consistent with all the analytic sentences in the speaker's repertoire).

¹ For brevity's sake, I shall here restrict attention to scientific languages. The reason for this restriction will become clearer in sections II and IV.

² This view of the matter has its place within the philosophy of science with which we will here be concerned. Whether and, if so, how it can be applied to ordinary languages is a question that need not detain us here.

Both perspectives on analytic sentences—the inner and the outer—do not mutually exclude each other. Rather, they supplement and illuminate each other. Much of what may be said about analytic sentences from within can be rephrased from without and thus provide a novel view on the topic, by making us step back as it were. Since intricate normative questions thereby become less important and, as we shall see, are replaced by innocuous questions about causal matters, this change of perspective will make disputes concerning analyticity more tractable: in purely descriptive terms it can be settled more easily who of the participants in the dispute wins her case. Obversely, what may be achieved by adopting the outer perspective can also be viewed from within, whence it acquires a significance for one's own thought and reasoning.

As will become clear in what follows, I have some good news to tell about analytic sentences, news whose import can be appreciated while changing perspectives. Analytic sentences stand in need of good news. For half a century they have been subject to philosophical attack. Even if outside philosophy this has had no noticeable consequences,³ analytic sentences have come in considerable disrepute. Quine's criticism of the very *intelligibility* of the analytic/synthetic distinction has dominated the discussion.⁴ Ever since then the battle has seemed to have been lost.

But the need for this pessimism is only apparent, as the most important of Quine's arguments against the analytic/synthetic distinction is based on a mistake. The mistake can be identified no matter which perspective is being adopted. Before we can identify the mistake, we have to have a closer look at Quine's criticism. This, too, we will do by adopting both the inner and the outer perspective, and we shall begin by looking at the matter from within.

³ See Horwich [CvQo]:95.

⁴ See Quine [TbC], [TDoE], [CLT] and [WO], chapter 2.

II. Quine's criticism from within

Quine has attacked the analytic/synthetic distinction in a very specific philosophical context. He sought to undermine the use Russell and Carnap intended to make of analytic sentences.⁵ These thinkers intended to use the conventionally true, analytic sentences for the justification of other sentences: Russell and Carnap planned to justify *theoretical* sentences, that were considered as uncertain, on the basis of observation sentences, that were considered as certain; the analytic sentences were meant to licence the transition from observation to theory.⁶

This transition was with good reason conceived as problematic. How should we ever arrive at empirical knowledge about, say, myons—if all we can observe is the behaviour of middle-sized measuring instruments in the lab? Myons are far too small and illusive to be observed.

If we could lay down an analytic biconditional whose right-hand side referred to myons and whose left-hand side only contained observation terms, then the gap between observation and theory would be bridged. This at least was what Russell and Carnap hoped for, who were consequently criticized by Quine.

Quine's attack was based on confirmation-holism (on the so-called Quine/Duhem thesis): a sentence containing theoretical terms—a sentence from the center of a theory, e.g. a sentence about myons—cannot be put to any empirical test in isolation. Only complete theories, i.e. totalities of a sufficiently large number of theoretical sentences standing in logical relations to each other, can be confronted with experience; only theories can be confirmed or disconfirmed empirically.⁷

⁵ See Horwich [CvQo]:102/3.

⁶ See Russell [RoSt]; Carnap [LAW], [MP].

⁷ Cf. Duhem [ZSPT]:245-49, 266/7, 276, 290 and Quine [TDoE]:41/2; [oEES]:313; [WO]:64; [TI]:10/1; [PoT]:13/4; [FMoE]:70/1; [TDiR]:268, 272.

According to Quine, there is no hope to find an analytical biconditional of the kind that Russell and Carnap wanted to employ. For, such a biconditional would allow us to proceed from the observation of individual meter readings to theoretical claims about myons. Quine's criticism of this idea is compelling. Assume that in the course of an experiment we observe meter readings other than those predicted by our theory. Which sentence from our theory should we give up in these circumstances? We could give up the assumption that the measuring instruments in our lab function properly; we could modify our general theory of measurement; we could postulate factors that interfered with the measurement; we could revise hitherto unassailed background assumptions; or we could reject the very sentence that we aimed to confirm. According to Quine, it is of crucial importance to realize that our observations do not force any definite decision here. In the light of recalcitrant experience we can retain any sentence of our theory, if only we make appropriate changes elsewhere in the system.⁸

So far Quine's holism merely undermines analytic *reductionism*. Why should it be at odds with the analytic/synthetic distinction in general? Here again the Quine/Duhem thesis plays the villain's part. If in the light of recalcitrant experience we can be led to make changes in a variety of different places within our theoretical system, then none of the sentences making up this system is sacrosanct. Which sentences we give up and which sentences we immunize against recalcitrant experience ultimately depends on no more than our theoretical preferences concerning e.g. the system's elegance, simplicity or overall economy. The sentences which we are not, as a matter of fact, ready to give up need not be analytic.⁹

⁸ Quine [TDoE]:43.

⁹ Quine [TDoE]:43. And conversely, what qualifies as analytic and is allegedly immune to revision based on experience can be revised just as all the rest (Quine [TDoE]:43)—if only the resultant overall system fits the data in ways more elegant, simpler and more economic than its predecessor. In what follows I shall take the liberty to ignore this complement thought.

Let us consider two examples from the history of physics. My first example comes from Goethe's protest against the Newtonian theory of colours and light. In my reading of the *Farbenlehre*, Goethe wanted to give a repudiation not so much of Newton's theory itself but rather of Newton's claim to have *experimentally refuted* the homogeneity of the sun's light. Goethe thought it is impossible to produce experiments for settling questions as abstract as the question concerning the nature of light.¹⁰ That is to say, Goethe claimed to be permitted to hold the following sentence come what may:

- (1) The sun's white light is homogeneous (i.e., it is not composed of rays of light that differ in colour).

Although this sentence can be immunized against recalcitrant experimental findings such as Newton's (and although it was immunized so by Goethe), the sentence is not analytic; it says something informative about the world, and thus, should be classified synthetic.

You may say that Goethe's protest against Newton is not a good case of scientific rationality; wasn't Goethe perversely irrational in ignoring Newton's prismatic experiments? No; he did not ignore these experiments. He repudiated Newton's *interpretations* of the experiments. None of Newton's experiments was sufficient to force Goethe into giving up his firm belief in the homogeneity of light. Whatever experimental results had been produced by the Newtonians, Goethe was able to retain sentence (1) and account for recalcitrant experiences by way of making changes elsewhere in his theory. And Goethe's adjustments for recalcitrant prismatic experiences have been far less *ad hoc* than is often assumed. For example, Goethe points out that if Newton wants to infer the negation of sentence (1) from prismatic experiments, i.e., if Newton wants to infer:

- ¬(1) The sun's white light is not homogeneous, rather it is composed of rays of light that differ in colour,

¹⁰ See, for example, Goethe [LA] I 5, §30.

then Newton has to *presuppose* certain abstract claims about *rays* of light. Now, of course, you cannot directly perceive rays of light; what you see in the prismatic experiments are coloured pictures of (at least) *two* dimensions.¹¹ Nothing you can see forces you to join Newtonian talk about rays of light (which are supposed to be extended in *one* dimension only). But if you refuse to follow Newton's idealizations concerning rays of light, you are also free to reject Newton's claim $\neg(1)$ which says that the sun's white light is composed of different rays of light.

And again, even if you agree on the sort of mathematical idealizations which are necessary for Newton to get off the ground, you can still dissent from Newton's claim $\neg(1)$. This is so because the claim's empirical justification depends on further background assumptions which were spotted by Goethe and which you can dispute if you do not wish to assent to Newton's claim $\neg(1)$. The claim's justification depends on the assumption that darkness does not play a genuine causal role in the prismatic experiments.¹² This is an assumption concerning the absence or presence of disturbing factors—an assumption which you cannot establish independently of the very prismatic experiments the assumption is made for. There is no experiment which forces you to believe that experiments performed in Newton's dark chamber are pure and undisturbed while similar experiments performed in daylight are impure, due to disturbing factors. You are free to repudiate such an assumption; and if you repudiate it, you may infer from the prismatic experiments, not that the sun's white light is composed of heterogenous rays (that differ as to colour and refrangibility), but that black darkness is composed of heterogenous rays (that differ as to colour and refrangibility).¹³

In sum, Newton's experimental findings alone do not and cannot possibly determine our thinking as to the nature of light; our scientific decision is not determined until we

¹¹ Goethe [LA] I 5, §217.

¹² Compare Goethe [LA] I 5, §253, §506 *et passim*.

¹³ I shall spell out elsewhere the details of how Goethe developed the hypothesis of what one could call heterogeneity of *darkness*.

subscribe to Newton's background assumptions, such as those two which we have been looking at (concerning mathematical idealization and disturbing factors). As we are free to refuse subscribing to those assumptions, we are also free to dissent from Newton's conclusion $\neg(1)$. To be sure, it may be more reasonable to opt in favour of Newton's theory of light and colour rather than in favour of Goethe's own theory. It is reasonable to opt for Newton's theory due to considerations of simplicity, elegance, and beauty. Even so, it is not (*pace* Newton) the experimental results alone that decide the matter.

My second example is less exotic than the previous one; it concerns a scientific sentence that was held not by the most famous German poet of all times, but by the most famous physicist from the 20th century—Albert Einstein:

(2) Reality is deterministic.

Intuitively speaking, Einstein's sentence (2) is definitely synthetic, not analytic, because it has factual content; it says something informative about reality. Even so, no conceivable experiment can force us to give it up. For whatever the experimental results will turn out to be, we can always retain the sentence and account for the recalcitrant experience by making (if need be *ad hoc*) changes elsewhere in our theory. Einstein has done so until the very end of his life.¹⁴

Accordingly, recalcitrant experience leaves Einstein's sentence unassailed in the very same way as in case of Goethe's sentence; both sentences can be held true come what may, and thus, seem to behave like analytic sentences. But according to our semantic intuitions, the two sentences are still synthetic, not analytic. *For this reason*, or so Quine argues, *the intuitive distinction between analytic and synthetic sentences cannot coherently be drawn.*

¹⁴ For a detailed discussion of this example, see Müller [SA]:§9.20ff.

Quine's conclusion is of course premature. Until now only a weaker claim has been established. It has merely been shown that the following criterion does not suffice for the demarcation of analytic sentences:

- (D1_c) A sentence is *confirmation-analytic* if it is confirmed come what may (i.e. if I am permitted to retain it under any experiential conditions, or alternatively, if no conceivable experience refutes it).

In this definition I have prefixed the term with which we are primarily concerned, i.e. "analytic", with the term "confirmation" in order to highlight that the definition only indicates one possible way in which the concept of analyticity might be thought to be understood, a way that Quine has indeed shown us to lead nowhere.

III. Change of perspective

Let us briefly summarize the results of the preceding section. According to *confirmation-holism*, the definition of *confirmation-analyticity* (D1_c) does not yield an adequate explication of our intuitive notion of analyticity. Why not? Because the concept of analyticity is less comprehensive than that of confirmation-analyticity. The sentences:

- (1) The sun's white light is homogeneous (i.e., it is not composed of rays of light that differ in colour);
- (2) Reality is deterministic,

could be confirmation-analytic; but they certainly are not analytic.

Can we improve upon the definition of confirmation-analyticity, making the concept it defines less comprehensive so as to avoid the problems that holism saddled us with? Thus far, Quine's argument does not rule out such an improvement. This finding, however, at most suffices to establish parity. A defendant of the analytic/synthetic distinction would

have won his case only if he could present a definition of analyticity that yields the correct results even under the constraints of Quine's confirmation-holism.

Before we will give a definition that meets this condition, we shall follow Quine and change the perspective on the problem. Until now we have viewed the problem from within, as did the Quine of "Two Dogmas of Empiricism" (1951). We were concerned with the epistemic value of my experience, my observations and experiments; we were asking: Which of the sentences I assent to are confirmed or disconfirmed in light of this or that experience? Quine's confirmation-holism has a normative dimension: I am *permitted* to retain sentence (1), or sentence (2), in the light of any experience whatsoever.¹⁵

In the decade following the publication of "Two Dogmas" Quine externalized his holism and thus his criticism of the analytic/synthetic distinction. Ever since *Word and Object* (1960), Quine no longer viewed speakers from the inner perspective but from without.¹⁶ The epistemologically normative discussion no longer is pivotal. Instead of being concerned with the *justification* of a given sentence in the light of certain experiments or observations, we now confine attention to the description of the verbal reactions of speakers to external stimuli. Claims about epistemic justification are replaced by behaviouristic *descriptions*.

This change of perspective does not alter the nature of the holistic problem, however; the problem just appears in a different guise. In its new guise the problem no longer appears to be one about justification but one about causal relations. Talk about causes replaces talk about epistemic reasons.

¹⁵ The Quine/Duhem thesis can be seen to have an additional normative dimension once it is realized that it *recommends* to scientists not to follow the rules set by reductionism (or operationalism), but to handle their language in more liberal ways and if necessary even to reject some of their definitions. In the light of the Quine/Duhem thesis Einstein was fully justified in rejecting some of the putatively analytic (because stipulated) equations from Newtonian physics.

¹⁶ See Quine [WO], chapter 2. How these two perspectives are related is indicated by Quine in [WO]:64.

Again, Quine considers and subsequently rejects an attempt to explicate analyticity. This time the *explicans* is called "stimulus-analytic" instead of "confirmation-analytic":

(D1_s) A sentence is *stimulus-analytic* if the speaker assents to it come what may (i.e. if the speaker is disposed to assent to the sentence under any stimulations, or alternatively, if no conceivable stimulation could prompt the speaker to dissent from the sentence).¹⁷

This definition results from the original definition (D1_c) through a change of perspective, viz. by means of replacements of the following kinds:

confirmation-analytic	→	stimulus-analytic
I (from within)	→	the speaker (from without)
to confirm	→	to prompt assent
to be permitted to retain the sentence	→	to remain disposed to assent to the sentence.

Since in both definitions one and the same idea is expressed in slightly different ways three times over, I would now like to render them less cumbersome even if we thereby lose some of the nuances:

(D2_c) A sentence is confirmation-analytic if the sentence is confirmed and if no conceivable experience would refute it.

(D2_s) A sentence is stimulus-analytic if the speaker assents to the sentence and if no conceivable stimulation would prompt the speaker to dissent from it.

It should now be evident that the first definition expresses, in the terms of normative epistemology, the same that the second definition expresses in behaviourist-descriptive

¹⁷ Quine [WO]:66.

vocabulary. In the next section we shall see how Quine undermines the new, behaviourist-descriptive attempt at explicating analyticity too, once more by drawing on holistic insights.

IV. Quine's criticism from without

According to Quine the definition (D2_s), just as its counterpart (D2_c), is too comprehensive to serve as an adequate explication of the concept of analyticity. In order to drive this point home, Quine presents us with a rather silly-looking example. No conceivable stimulation will prompt a normal speaker to dissent from the sentence

(3) There have been black dogs.¹⁸

Whatever course her experience may take, the speaker's *background theory* will make her disposed to affirm that there have been black dogs. Although it may sound a little preposterous to call assumptions about dogs *theoretical* (which is why we shall turn to another example in due course), Quine's point seems clear. Once more his criticism is based on the Quine/Duhem thesis which this time, however, is not conceived from within (confirmation-holism) but from without (as what I will call *stimulus-holism*):

Whether a speaker does or does not assent to a given sentence does not always causally depend on the momentary stimulation of the speaker. There are sentences (from the center of the speaker's theory) for which there is no pattern of stimulation that is causally relevant to the speaker's verdict on the sentence.¹⁹

In contrast to its epistemologically normative predecessor this version of Quine's thesis is purely descriptive; it makes use of causal notions instead of normative notions (like

¹⁸ Quine [WO]:66.

¹⁹ Compare, for example, Quine [WO]:64.

justification, confirmation, etc.) It refers to speakers in the third person and not in the first person. That means that the thesis of stimulus-holism results from confirmation-holism by means of the same substitutions that transformed the definition of confirmation-analyticity into the definition of stimulus-analyticity.

This parallel suggests that Quine's original criticism (directed against the explanatory adequacy of confirmation-analyticity) can be rephrased accordingly so as to apply with equal force after the outer perspective has been adopted. The concept of stimulus-analyticity is too comprehensive to capture our *explicandum*. Let us go back to our first example, which does more justice to the philosophical power behind Quine's criticism than his own example concerning black dogs. The following sentence was stimulus-analytic for Goethe without being analytic in the intuitive sense:

- (1) The sun's white light is homogeneous (i.e., it is not composed of rays of light that differ in colour).

No conceivable stimulation would have prompted Goethe to dissent from this sentence.²⁰ And yet, Goethe would not have conceived of his dispute with the Newtonians as a mere struggle about words. On the contrary, he was convinced to use the words contained in (1) in just the same way as his opponents.

We should be a bit more explicit about a Quinean notion which plays a crucial role behind the stage of our reasoning from the outer perspective: the notion of *prompted* verdict (i.e., of prompted dissent or prompted assent). The notion is a causal, not a temporal notion. A stimulus is said to prompt a speaker to, say, dissent from a sentence if the speaker dissents from the sentence, not only *after* being stimulated, but also, *because* of the stimulus in question.²¹

²⁰ For present purposes, it does not matter whether this is ultimately a caricature of the historical Goethe.

²¹ See Quine [WO]:32-37; compare [WO]:62-64.

Let us look at an example. If the speaker dissents from a sentence such as

(4) The crocuses are out,²²

then this *can* be due to present stimulation, deriving from the sad, colourless state of the speaker's garden. (In such case the stimulation does prompt the speaker to dissent from the sentence). But it can also happen that the speaker dissents from the sentence while sitting in front of the fireplace; in this case some pyromanical stimulation precedes the speaker's verdict *without causing it*; it does not prompt the verdict in question, and is called therefore *irrelevant* by Quine²³ (more explicitly: *irrelevant to the sentence (4)*); after all, that very stimulation is most relevant to the sentence 'There is a fire in the fireplace').

What is the true cause for a speaker's verdict in case the verdict is not prompted by present stimulation? Answer: background information. In our example, the speaker (sitting in front of the fireplace) *remembers* having looked out unsuccessfully for crocuses in the garden; or alternatively, he realizes that it is not yet the season for crocuses.

Background information governs a lot of our everyday verbal behaviour. And in the theoretical sciences its role is still greater. Only a few of our verdicts on claims from the theoretical sciences are caused by present stimulation alone. (This elite class of claims is what Quine calls the *observation sentences*²⁴). Most of the scientific verdicts are not caused by present stimulation alone; background information and background assumptions play a most prominent part in causing what scientist say.

I hope that our digression into Quinean thinking about the different sort of causes for a speaker's behaviour has helped us to see more clearly why it is that Goethe's affirmative verdict on the scientific sentence:

²² Quine's example, see [WO]:36.

²³ See Quine [WO]:36.

²⁴ See Quine [WO]:40-42.

- (1) The sun's white light is homogeneous (i.e., it is not composed of rays of light that differ in colour),

is not caused by any conceivable stimulation whatsoever. Goethe assents to the sentence because it is central in his thinking about colours and light—he assents to it come what may. The sentence is stimulus-analytic in Goethe's idiolect without being analytic in the intuitive sense.

Up to this point I am in agreement with Quine. Adopting the inner perspective, I am convinced by his confirmation-holistic case against the concept of confirmation-analyticity. Adopting the outer perspective, I am convinced by his stimulus-holistic case against the concept of stimulus-analyticity. Both concepts are, for structurally the same reasons, too comprehensive to capture what we call "analytic".

Before I will set out my own strategy to answer Quine's holism-based criticism of the analytic/synthetic distinction, I wish to make some clarifying remarks about the dialectical situation.

First, I have presented Quine's criticism twice in parallel fashion, from the normative inner as well as the behaviourist outer perspective. The criticism does not essentially depend on Quine's endorsement of behaviourism. If he had stayed with the original presentation of his criticism (from the inner perspective), no one would have thought of accusing Quine of basing his meaning scepticism on an all too extreme form of behaviourism.²⁵ This is the main reason why I have chosen to compare those two perspectives in the present paper. I want to convince you that Quine's reasoning against analyticity, synonymy, and meaning does not depend on the outer (behaviourist) perspective which is usually associated with Quine. Quine's best points against analyticity (which is our topic in the present paper)

²⁵ For a similar line see Harman [ItTM]:22/3.

survive the change of perspective.²⁶ They have to be taken seriously even by those who do not wish to think in behaviourist terms at all.

Second, Quine's criticism is primarily directed against those analytic sentences that contain theoretical terms.²⁷ As our ideas about myons, quarks, etc. are certainly not innate, *no* Chomskyan theory about innate structures of language and thought can serve as an antidote against Quine's criticism, no matter what the details of such a theory might be.

(And what about the sentence 'All bachelors are unmarried'? Answer: Sentences of this kind are none of Quine's concern. He is ready to concede that there is a criterion according to which sentences *of these more mundane kinds* qualify as analytic²⁸).

Third, contrary to a wide-spread misunderstanding, Quine's criticism of the analytic/synthetic distinction goes *further* than his criticism of the concept of translation.²⁹ One may be able to provide a well-defined conception of analyticity without having any means to subvert Quine's thesis of the indeterminacy of translation. The converse situation is ruled out, though. Anyone who regards translation as well-defined, and hence maintains that there are interlinguistic synonymies (between arbitrary languages L1 and L2), is *a fortiori* bound to claim to have a concept of intralinguistic synonymy (just let L1 = L2) that would allow her to introduce a concept of analyticity (p is analytic if it is intralinguistically synonymous to 'q → q'; see [WO]:65). In contrast, the concept of analyticity—though affording a concept of *intralinguistic* synonymy (p and q are intralinguistically synonymous if 'p ↔ q' is analytic; see [WO]:65)—does not provide us with a notion of

²⁶ Similar remarks apply to Quine's best points against (intralinguistic) synonymy.

²⁷ See Quine [TDiR]:271 and Putnam [AS]:62.

²⁸ See Quine [RoR]:78-80, [TDiR]:270/1. Cf. as well Quine [CLT]:129.

²⁹ See Müller [SA]:§5.5 - §5.6.

interlinguistic synonymy (because 'p \leftrightarrow q' will be nonsense whenever p and q do not belong to the same language³⁰).

This means: anyone who intends to oppose Quine's meaning scepticism must anyway exploit resources that allow us to distinguish between analytic and synthetic sentences. Thus, as economical considerations suggest, we are well-advised to begin by explaining analyticity. This is what we shall do in the next section.

V. *Two improved definitions*

It is time for the good news that I promised in the beginning. In my view, Quine's criticism, whether it be conceived from within or from without, does not rule out the possibility to improve upon the definitions we have considered so as to ensure that they yield the correct results—even if the constraints are operative which holism imposes.

I shall first present such an improvement upon the definition of stimulus-analyticity:

(D3_s) A sentence p is *narrowly stimulus-analytic* if for all sentences t (e.g. sentences which are possible candidates for the speaker's background theories) and for all conceivable patterns of stimulation σ holds: if the speaker was prompted by σ to dissent from sentence t then σ would likewise prompt the speaker to dissent from the conjunction 'p & t'.³¹

It is fairly easy to see that all narrowly stimulus-analytic sentences are also stimulus-analytic in the sense of definition (D2_s). As we shall see shortly, however, the converse does not hold. According to definition (D3_s), narrowly stimulus-analytic sentences are sentences that, taken in isolation, do not say anything about reality in that they will not gain dissent under any conceivable stimulation. But neither do they say anything about reality

³⁰ See Quine [PoT]:53.

³¹ A further ramification of the definition is suggested in Müller [SA]:§9.27.

when embedded in theoretical contexts. If a sentence that is embedded in arbitrary contexts (by being conjoined with arbitrary sentences t) has no effects on the range of stimulations that prompt a speaker to assent to, or dissent from, the embedding contexts, then this sentence is devoid of any factual content. In short, the sentence is analytic in the intuitive sense.

In order to show how the improved definition is supposed to work I want to go back to our well-known example from Goethe's idiolect:

- (1) The sun's white light is homogeneous (i.e., it is not composed of rays of light that differ in colour).

The sentence should not be classified as analytic in the intuitive sense; and it does not qualify as narrowly stimulus-analytic either, just as desired.

To prove this, we have to name a stimulus which is irrelevant to a certain sentence t (when t is taken in isolation) and yet suffices to prompt Goethe's dissent from the conjunction:

- (5) The sun's white light is homogeneous, *and t*.

What sort of stimulation might have the desired properties? Let us try the very stimulations which derive from Newton's prismatic experiments. As we have seen in section II, Newton's experimental findings do not *force* us to dissent from Goethe's sentence (1) (when taken in isolation). Neither do they force us to assent to Newtonian talk about *rays* of light (which is, as we have seen, far too abstract for being determined by experience alone); neither do they force us into assent to any other item from the list of Newton's background assumptions (e.g., as to disturbing factors; see section II).

Let us repeat these points from the outer perspective. Observing Goethe's verbal behaviour we may say that Goethe assents to his own sentence:

(1) The sun's white light is homogeneous,

and dissents from some of Newton's background assumptions such as:

- (6) There exist rays of light (which are extended in one spatial dimension only);
- (7) Darkness plays no genuine causal role in the prismatic experiments (i.e., when you perform these experiments in a dark room, then your results will be pure and undisturbed).

So much about Goethe's actual verdicts on the sentences (1), (6), and (7). Are these verdicts *prompted* by stimulations that derive from the prismatic experiments? Not at all. I want to claim that no possible stimulus is sufficiently strong for prompting Goethe to assent to (1) or to dissent from (6) and (7). That Goethe's affirmative verdict on sentence (1) is not prompted by any conceivable stimulation whatsoever was one of our results in section IV. Let me briefly repeat that point for Goethe's negative verdicts on sentences (6) and (7). What you see in the prismatic experiments does not *force* you to dissent from claims as to the existence of rays of light, as we have already seen from the inner perspective. From the outer perspective, then, we may say: Goethe dissented from Newton's background idealization not on the strength of present stimulation, but due to careful philosophical analysis.³²

And the same holds good for Goethe's negative verdict on Newton's assumption as to disturbing factors. Both Goethe and Newton have been stimulated by the same prismatic experiments. They disagreed (about the causal role of light and darkness) not due to different stimulation, but because they wanted to opt for different theoretical unities. Goethe dissented from sentence (7) because this was the way he was able to save his sentence (1) from being refuted by Newtonian experimentation. Newton, on the other hand, may be said to have assented to (7) for reasons of theoretical economy.

³² See Goethe, [LA] I 5, §290 - §298.

To sum up what we have said so far, in Goethe's idiolect (as well as in Newton's idiolect) there is no relevant stimulation sufficiently strong for prompting the verdicts on each of the sentences (1), (6), (7). The situation alters dramatically when we conjoin our three sentences. Conjoining sentences may increase semantic mass, says Quine.³³ To put it less metaphorically, stimulations that were irrelevant to each of the conjuncts may become relevant to the conjunction as a whole. (That is the positive part of the Quine/Duhem thesis). And my next claim is that this is exactly what happens when we form the conjunction of the three sentences we have been considering separately up to now:

- (8) The sun's white light is homogeneous (i.e., it is not composed of rays of light that differ in colour). And there exist rays of light. And darkness plays no genuine causal role in the prismatic experiments.

You do not have to consult background assumptions if you want to find your verdict on this conjunction; the conjunction can be tested empirically. And indeed, when you perform some of Newton's prismatic experiments, then you are forced to dissent from (8). Both Newton and Goethe agreed on this; both of them were disposed to dissent from (8) on the strength of prismatic stimulation; they disagreed only as to the appropriate—unprompted—verdicts on the conjuncts in (8): Goethe assented to the first conjunct and dissented from the second and the third one; Newton opted the other way round. This gives us the clue for applying our definition, which run as follows:

- (D3_s) A sentence *p* is *narrowly stimulus-analytic* if for all sentences *t* and for all conceivable patterns of stimulation σ holds: if and only if the speaker was prompted by σ to dissent from the conjunction '*p* & *t*', then σ would likewise prompt the speaker to dissent from sentence *t*.

Goethe's sentence (1) is not narrowly stimulus-analytic in the sense of this definition. Prismatic stimulation prompted Goethe to dissent from the conjunction (8) (playing the role

³³ See Quine [PoT]:17.

of 'p & t') without *prompting* him to dissent from Newton's background assumptions t.³⁴ The prismatic experiments allowed Goethe to dissent from the Newtonian background (6) & (7); they would have allowed him equally well to assent to it.³⁵

In the last sentence I have switched perspective and presented the matter from within. Thereby nothing essential has been changed. For my behaviouristic definition (D3_s) has a counterpart formulated from within:

(D3_c) A sentence p is *narrowly confirmation-analytic* if for all sentences t (e.g. sentences which are possible candidates for my background theories) and for all conceivable experiences ϕ holds: if and only if ϕ told against, then ϕ would likewise tell against sentence t (i.e. if and only if ϕ was evidence telling against 'p & t', then it would also be evidence telling against t).

This definition tightens the criterion given by (D2_c) in just the same way as (D3_s) tightens the criterion given by (D2_s). Quine repudiated the original criteria on the basis of both confirmation- and stimulus-holism. The concepts of narrow confirmation-analyticity and narrow stimulus-analyticity cannot be repudiated on these grounds. On the contrary, both these definitions were precisely designed to cope with holism. In this way, Quine's main argument against the analytic/synthetic distinction has successfully been answered. Contrary to what Quine suggested, the Quine/Duhem thesis does not afford a compelling reason to give up the distinction.

³⁴ In our example the background t is again formed by a conjunction: by the conjunction (6) & (7). Strictly speaking, I have not shown that the prismatic stimulations are not causally relevant to this conjunction. (I have only shown them to be irrelevant to each of its conjuncts). But the additional step is easily taken because the conjuncts (6) and (7) have nothing essential in common. Only after conjoining still another conjunct, i.e., (1), critical semantical mass is reached. See also the next sentence in the main text.

³⁵ Elsewhere I have tried to prove in similar fashion that Einstein's credo (2) from section II is not analytic in the sense of my definition (D3_s), see [SA]:§9.20 - §9.21. Due to Hans Rott's insightful criticism I have come to realize that my attempts of dealing with that difficult example have not succeeded.

VI. From observation to theory

Which sentences, then, are narrowly stimulus- or confirmation-analytic? Logical tautologies and mathematical theorems are the first candidates for analyticity that come to mind. If such sentences are to be narrowly stimulus-analytic (to concentrate on one of our two notions), logicians, mathematicians and their followers would have to behave in certain ways. Do they? I have spelled out elsewhere that we can expect them to—given certain minimal assumptions concerning the speakers' rationality, which derive from an application of Quine's principle of charity.³⁶

Logic and mathematics aside, are there any other cases of narrow analyticity in the sense of my definitions? Are there analytic sentences in physics? It would be beyond the scope of this paper to answer this question in sufficient detail on the basis of an actual example. When one tries to answer the question from the outer perspective, one would have to investigate into the actual verbal behaviour of physicists. What is needed, then, is a linguistic field study at the physics departments. The philosopher of science can at best formulate more or less reasonable assumptions, or hypotheses, as to the result of such field studies. (His job is not so much to find out which sentences from physics are analytic, due to the physicists' actual speech behaviour; rather his job is to give this question a clear sense).

The situation is different when the question concerning analyticity in physics is posed from the inner perspective. Here is the place for normative philosophy of science. Given our notion of narrow confirmation-analyticity, we can discuss whether or not it is reasonable to organize our physical theory in such a way that a certain part of it is analytically true, and thus, devoid of empirical content in any possible context. Although this is a normative business, it would be indeed irresponsible, and risky, if the philosopher of science tried to pursue it without being informed about what is actually going on in physics. My advice is, of course, to switch perspective from time to time.

³⁶ See [SA]:§10.13 - §10.17.

As should have become clear, I do not feel confident at the present moment to claim anything definite concerning analyticity in physics. Still I should like to conclude this paper in a spirit slightly more constructive than that. So let us indulge ourselves and speculate a little. My hunch is that Carnap was right in claiming that the analytic part of a theory t can be extracted from the theory by means of its Ramsey-sentence ' $\text{rams}(t)$ ' even if the Quine/Duhem thesis is being assumed.³⁷ Just as Carnap maintained, it may well hold for sufficiently complex theories t that the conditional:

$$\text{rams}(t) \rightarrow t,$$

is analytic. In my terminology, Carnap's conditional might prove narrowly stimulus- and confirmation-analytic. If this is so, then the theory t can be dissected into two parts, a conceptual component and the remainder that expresses the theory's factual content. For, t is logically equivalent to:

$$(\text{rams}(t) \rightarrow t) \ \& \ \text{rams}(t).$$

This might allow us to bridge the gap between observation and theory that we remarked upon in the beginning. The Ramsey-sentence ' $\text{rams}(t)$ ' of a given theory t results from the elimination of the theoretical terms of t , yet it has the same empirical consequences as t itself (Ramsey's Theorem³⁸). That is to say, one can directly observe the empirical evidence that speaks in favour of ' $\text{rams}(t)$ '; and anyone who has made such observations would be permitted to infer, by means of the analytic sentence

$$\text{rams}(t) \rightarrow t,$$

³⁷ For the following see Carnap [PFoP]:270-272; see also my detailed discussion in [SA]:§11.4 - §11.12, which is far from being conclusive.

³⁸ For the proof see Stegmüller [TE]/1:409-411.

to the theory t . (On this view, abduction would turn out to be a *conceptually* mediated inference³⁹).

Even if all this is right, the transition from observation to theory is not validated when applied to individual sentences taken in isolation. In general, t will be a highly complex conjunction of a large number of sentences which contain a variety of theoretical terms and which cannot *individually* be confirmed by any observation. This means: Quine's holism-based criticism of analytic reductionism still stands.

Similarly, the analytic sentences will not be sacrosanct. Speakers who proceed from one theory to its successor may well give up their analytic sentences—say, in the course of a scientific revolution. The speakers will then accept a new theory t^* that is not only incompatible with the old theory t (just as in the case of any belief revision) but also with the weaker analytic sentence ' $\text{rams}(t) \rightarrow t$ '. In such a case, then, the belief revision is accompanied by a linguistic change. This is not the normal case, though.

How is it possible that in the context of Quine's holistic assumptions we seem able to clearly distinguish between belief revision and linguistic change, if according to holism everything is connected with everything else? Let me make two comments in response.

First, holism does not imply that nothing can be distinguished from anything else. For example, it does not imply that a theoretical whole has the same properties as the totality that results if one conjoins a further sentence: in the course of conjoining sentences critical semantical mass may result, as Quine would say; this is the positive aspect of the Quine/Duhem thesis.⁴⁰ It was precisely this aspect that we exploited in defining narrow confirmation- and stimulus-analyticity. Quine's mistake was to overlook the potential of his own doctrine.

³⁹ For some details, see Müller [SA]:§12.3.

⁴⁰ [PoT]:17.

Second, we have reduced the concept of narrow stimulus-analyticity to the totality of the verbal dispositions of individual speakers *at a given time*. (Admittedly, these dispositions cannot all be *discerned* at that time, but they are nonetheless there even if not actualized). Such totality of dispositions concerns the wildest combinations of sentences. Naturally, the individual dispositions change continuously. (For example, someone who learns that a remote relative got married will have dispositions to react on an utterance of 'There is a bachelor' other than those she had before; this alone does not amount to a *linguistic change*).

But we can extract from the dispositional chaos some fixed points—e.g. the narrowly stimulus-analytic sentences whose sudden rejection will alter the totality of dispositions in fundamental ways entirely different from the normal course of things. If in the idiolect of the speaker at some point different sentences are narrowly stimulus-analytic than before, then her idiolect has changed.⁴¹

⁴¹ Does such linguistic change *have* to be accompanied by belief revision, as in the case of scientific revolutions? No. Consider a speaker who systematically substitutes the terms 'electron' and 'proton' for each other throughout his theory and thus arrives at a permutation 'perm(t)' of his original theory t. This substitution does not effect a change concerning empirical content, as 'rams(t)' and 'rams(perm(t))' are logically equivalent. However, the previously analytic conditional 'rams(t)→t' will be replaced by the conditional 'rams(t)→perm(t)' which is inconsistent with the former. I hasten to add that this sort of changing meanings does not occur in actual practice. Even if a student of physics comes up in an exam with a permutation of our actual theory and tries to excuse himself by claiming that the permuted theory is empirically equivalent and thus equally well justified—then he will still fail the exam (I predict). Why would it be justified to not let him pass the exam although he has not claimed anything that is empirically false? My answer is that he should be excluded from academic degrees because he uses some theoretical terms in a wrong way; he has not shown a correct understanding of our physical language.

This last answer is given from the outer perspective insofar as it relates to stimulations, dispositions etc. and is couched in terms of narrow stimulus-analyticity. I leave it to the reader to reconceive it in terms appropriate to the view from within.⁴²

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⁴² I have to thank Isaac Levi for clear and strict criticism. He forced me to be much more explicit (in sections IV and V) than I had planned to. (I am afraid that he will not be satisfied with the result). Many thanks to Hans Rott for most constructive egraphic exchanges on analyticity. Although he and I have not yet reached reflective equilibrium, my paper has benefitted a lot from his questions and objections. I wish to thank Wolfram Hinzen for patience and advice. Last but not least I am grateful to Sven Rosenkranz for the English translation of the first draft of this paper—and for helpful comments on that draft.

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