# In Coherence with the Data

### §1      Meeting the Master Objection

Coherence theories are regularly confronted with the objection that there can be many coherent systems, so that mere coherence is said to be insufficient as either the defining element of truth or even as a working criterion of truth. This objection has been called the "master objection". If someone is taking coherence not only as a criterion supporting the truth of a theory, but as an ingredient to a definition of "true" she has to attack the master objection straight on.

Suppose you start with the set of all statements of a language. Now you construct maximal consistent subsets of this set, given some (standard) logic. You arrive at what? – The set of all possible worlds (descriptions of possible worlds) with respect to the language and logic in question. These sets differ as to what regularities or universal generalizations they support. The question which of these sets (i.e. which of these possible worlds) is the most coherent cannot have an answer – unless there is an *a priori* way to single out the actual world, assuming it to have the most coherent description! That would be strange indeed, since arriving at the best theory of the world would not involve any empirical knowledge whatsoever. So even if there are aspects of coherence besides consistency that serve to exclude some candidate sets as candidates for the best theory, a multitude of candidate coherent sets remains.

A first attempt to reduce the multitude of coherent systems is to require coherence with a privileged set of statements. This has led, for example, Laurence BonJour to include an *observation requirement* in his coherence theory: The privileged set of statements are the observational truths. Suppose there is a set of data or observational truths. Fictions, however coherent, seem to be immediately in trouble to cohere with the data. No one ever met Sherlock Holmes.

But what are the data?

We can start with the data accepted at that very moment. Since this set (of observation statements) certainly is not complete – we are not omniscient – and contains statements to which no facts correspond – we are not immune from error – it has to be allowed to drop some of the members of this set. Which *supposed* data are to be discarded and which data are to be added is already part of the coherent theory building starting from this data set.

Theory building involves that data support theoretical beliefs by causing observational belief.

In the act of perceiving something there might be something else than a proposition. The content of a perception is not a proposition. A state of affairs (something that can be expressed by a proposition) might be referred to, but it is given by an analogical representation. The percept (the scene before our eyes) is a qualia complex (a gestalt). It is propositionally embedded only in frames like

(1)     I see that: ☎.           [a telephone]

In contrast to propositions in the frame

(2)     I believe that p.

the content of (1) after the "that" is no proposition. Therefore it cannot enter directly into relations with other propositions. But the states of perception are the causes of believing propositions. Some truth conditions or ostensive introductions to the proper use of some term directly relate terms to percepts, for example

(3)     "is a smiley" is true of x in English iff x looks like that: ☺

So perceptual input stands in conventional and/or causal relations to observational beliefs or observational statements considered to be true. External facts having to do with the reliability of the believer need not be known to the believer at this stage of theory building.

So in the most simple procedure we proceed as follows:

1. Take all observational statements to be believed true (a set $\Gamma$).

2. Add all non-observational statements (giving us an inconsistent extension $\Gamma^*$).

3. Built maximally consistent sets $\Gamma_1$, $\Gamma_2$… from $\Gamma^*$, given some logic $\lambda$, such that ideally $\Gamma \subseteq \Gamma_i$.

4. Choose between the $\Gamma_i$ by some substantial aspect of coherence (or a set of them applied in some order or simultaneously).

Within steps 4 revisions of the set of believed observational statements may occur.

As substantial aspect of coherence might count "explanatory power", "simplicity (of ontology)" or "multiple connections between sub-theories".

Requiring coherence with the data presupposes some level of data, of observation given independently of the theory choice under consideration (see §4), but it need not presuppose that the data are given to us completely independent of any considerations of coherence (see §3).


## §2     Empirical Equivalent Theories?

If we consider the question how criteria of theory choice work with respect to "empirically equivalent theories", we have to make clear what empirical equivalence is. If empirical equivalence is taken to be the result of having employed all our methodological tools (i.e. our

aspects of coherence), then we have answered the question about the role of the aspects of coherence in theory choice already in the negative. The claim of the existence of empirical equivalent theories is taken thus only a version of the master objection. To avoid this we have to emphasize the "empirical" in "empirical equivalence" and make sure that empirical equivalence occurs at some stage of theory formulation or at some stage at which further theory choice (by some aspect of coherence) is applicable.

Nevertheless empirical equivalence is more than having two theories share a body of data. Empirical equivalence also concerns the predictions that can be derived in these theories respectively. If observational information is defined as the information present in observation statements (of the level concerned, cf. §4), empirically equivalent theories are those which have the same amount of observational information. Two theories can have the same *amount* of observational information although the one leaves out some data the other one explains, and *vice versa*. In this sense empirically equivalent theories do not have to agree on all data! On the narrow notion of empirical equivalence (i.e. sharing all predictions) two theories can have a problem simultaneously, because one prediction (made by both of them) turned out to be false. On the wider notion of empirical equivalence we would say that two theories are still empirically equivalent if the severity of their problems with different predictions turning out wrong is comparable.

The question is whether there can be empirically equivalent theories in one of these senses, both of which satisfy some aspect of coherence, but which logically exclude each other.

The *Duhem-Quine-Thesis* states that no single statement implies evidential consequences all by itself, but only within the body of a theory. This is also the coherentist`s view. And since the consequences of a statement have to be established relative to a theory something is wrong with foundationalism. Nevertheless it is *wrong* to conclude from this that we (always) have a choice whom to blame in case of a failure of a prediction. The route from the theoretical background to evidential consequences is implication, but in the case of disconfirmation coherence principles like explanatory power might be so strong as to select only one culprit, without an equally good option to rebuild some other part of the theory. Coherence is a theory about the kind of inferential relations within a theory (i.e. these being not hierarchical). It is *not* primarily a theory about alternatives in revision!

Suppose that any explanation in theory T can be matched by others in theory T* which fit the data equally well. How are we to decide which is true? Success in predicting data does – by assumption – not help us. We may employ some standards of systematicity. Suppose now, second assumption, that once again we come to several equally good explanatory systems. We

may try now a standard of simplicity. This is justified since by assumption both theories considered are equally reliable, any meta-justification referring to the reliability of a practise based on the theories is going to fail in discriminating between them. We could stick to those explanations which are close to our typical explanation up to now, but can this prejudice be justified? So it seems that we face the alternative of just sticking to our idiosyncratic standards – leading straight to relativism – or to point to some *a priori* standard of sufficient reason (whether this will be a rich notion of explanatory power alone or a set of coherence principles).

## §3 Foundationalism Regained?

There is a functional/trancendental argument for the *prima facie* truth of observational beliefs [1]: If our observational beliefs were not true most of the time communication, successful action, introduction of language would be impossible. Since these are obviously possible and cannot be reasonably put into question we may assume that our observational beliefs are true most of the time. That is having an observational belief is a reason to taking is *prima facie* to be true. We might explain observational beliefs as the result of complex cognitive processes, but assuming them to be true does not require knowing this cognitive theory.

The mistake of foundationalism is to posit beliefs which are completely justificatory independent of other beliefs. That is obviously false, as the information that you are under the influence of drugs puts the truth of your observational reports into doubt. In pure foundationalism the data are neutral with respect to any theory. This makes it almost impossible to give up a supposed datum. One has to assume some (physiological) malfunction (in the brain) of the observer. Adherents of a moderate foundationalism (like Robert Audi) take up some ideas of coherentism and use the concept of negative evidential dependence, which means that an observational belief can be undercut by additional knowledge as to non-normal circumstances. The observational belief, which otherwise is *prima facie* taken to be true, is retracted. This feedback on the observational belief can happen only at its entering into the body of belief.

There are two stages at which considerations of coherence enter. First there is the stage at which the observational belief is about to enter into body of belief. Observational beliefs entering causally into a body of beliefs is important for any theory of knowledge inclined towards naturalism. Beliefs – at least in a computational theory of the mind – depend causally on other beliefs. Assume there is a network defined by causal relations/dependencies. In such a network justificatory relations can be causal relations although there is no hierarchy of

justification. Dependence might exist inasmuch as some input into the network causes changes which give rise to beliefs which, therefore, depend on the input. "Data" might be just another word for "input" in such a system.

Observational beliefs can be taken to be immediate. They arise because of our causal embeddedness in the environment. We *prima facie* believe them because of our background theory of observation. But this does not make observational beliefs temporally dependent on the theoretical beliefs. The picture is rather that the theory is a possible interrupter in the etiology of beliefs. Usually the observational belief is not interrupted and causes further change in the web of belief. What changes of belief it causes depends on how the observational belief enters into *applications* of regularities. This is the second stage at which considerations of coherence enter. Now the observational belief is part of the data which can be considered the preferred set which theories have to be in coherence with. But depending on the changes in our theories that could be arrived at given that we take the observation to be true we might give up this very observational belief – for the sake of better coherence. This way of giving up an observational belief should not be confused with the mechanism of undercutting mentioned in the first stage.

In the first stage we built the set of observation statements that our other statements have to cohere with. The guideline of including some observation statement is a rule like

> (O)  I believe the observation statement p, because
>
>> (a) it seems to me that p, and
>>
>> (b) it does not seem to me that I do not perceive that p.

A principle like (O) gives us a *prima facie* perceptual foundation of beliefs. Since (b) is not as strong as "it is not the case that I do not perceive that p" we are not back in foundationalism.

If a coherentist (like BonJour) makes the *doxastic presumption* (of assuming access to our beliefs) it seems that he has to admit some further kind of foundationalism: Beliefs about which beliefs we have are the basis of an assessment of coherence. But although beliefs about beliefs stand in need of justification we do not have to have a justification available to *have* these beliefs. The enterprise of justifying our beliefs can start without the meta-beliefs being justified. Beliefs about beliefs will be justified in the course of explaining our belief structure. This explanation, according to the coherentist, sustains the doxastic presumption. It will also explain why creatures like us are more or the less right about their beliefs.

## §4 Observation Language

In a structuralist account of theories the language of theory T can be the observation language for phenomena to explained by another theory T' (of some *more* theoretical level). An even stronger relative notion of observation language can be saved once we consider the two stage process in which coherence considerations apply to observational belief. An observational term might be infected by the theory we eventually adopt as the best account of the data. But this account of the data occurs only at the second stage (i.e. the stage at which the observational statement enters into the body of our statements believed to be true). Rival theories start out with the same set of data, so at this stage at least, the concepts employed in the data cannot depend on the conceptual resources of these theories (at this level). There might be connections between our vocabulary of observation and the vocabulary of undercutting assumptions (the theory of "normal conditions"), but these connections occur at an earlier level of building up our best representation of reality (an earlier level of theory building in a wider sense).

There will be *a lowest level* of theory building, one might presume. So one might suppose a lowest observation language. At this level the observational terms are at most invested with theoretical assumptions of former theories which were taken up into the definitions – if there are any – of the observational expressions. Some of the observational expressions may be free of any theoretical assumptions worth mentioning and may, therefore, be the proper target of conditional learning. At this level we may speak of "stimulus meaning" in the proper sense. We accept some observation statement since we are conditioned to this acceptance response given our causal input. Subjectively an observation statement is true, because it fits our perception of the situation. In intersubjective reasoning we give reasons why we hold observation statements to be true, why the situation is really of the kind described. Doing this we consider whether they fit in at some level of theory building, as it should be.

## §5 Conservatism

Theories are compared with respect to the aspects of coherence synchronically. We accept the empirically adequate theory which is more coherent, whatever else may be its relation to its rivals. It need not entail them. It need not entail their consequences. Since coherence as considered here contains a data requirement, any theory passing the coherence test will *ipso facto* save the phenomena.

With respect to the continuity of science it is desirable that a successor theory can either

(i)     explain the merits and failures of its predecessors (e.g. by paying attention to limiting conditions), or

(ii)    build upon the referential framework of a predecessor (e.g. by claiming to refer to the same entities not withstanding the prior mode of their identification).

If this is possible a theory within such a historical thread is superior to a completely new theory since it inherits a success history.

Coherentists claim that we access our beliefs and that we have access to the principles of coherence. The latter cannot mean that we are fully aware of the consistency or explanatory status of our whole body of beliefs. This is implausible and maybe impossible for us to do because of computational complexity if we consider beliefs which arise because of this meta-knowledge. It is probably psychologically not feasible to access simultaneously a very great number of beliefs from long term memory. We could refuse, however, to accept that knowledge depends on having checked the inconsistency of our whole body of beliefs. The issue of computational complexity might be an argument itself that we proceed *conservatively*: As long as we have no further evidence consistency and other epistemic valuable properties of our body of beliefs are assumed on the basis of only modest computations. Access to the principles of coherence could just mean that in case of argument we appeal to these or similar principles. To be able to reason with these principles need not presuppose to keep track of our whole body of beliefs. The principle of giving just *sufficient* reasons so long as no further justified doubt arises allows to operate on small sub-systems of belief. This could also be expressed as a principle of conservatism. Having reached some conclusion we may reopen our investigation later, but we need a good reason to reopen it. We stay with a theory that has worked so far.

Conservativity is no aspect of coherence itself, but a principle to shift burdens of proof. Coherentism can account for that.


## §6      Meta-Justification

Starting with the set of observational beliefs accepts that observational beliefs are beliefs of higher epistemic value than others. This presupposes some theory claiming that our perceptions and observational beliefs founded upon them are more the less reliable. That some statement is to be considered as a correct observation statement is not established by some other road to truth besides coherence, but is taken as a *prima facie* assumption, starting with our ordinary assumptions about us and the world we live in. It would go against the spirit of a thorough coherence theory to start with some given truths. It does not go against the spirit of a

thorough coherence theory to assume – on credit, so to say – that ordinary observation is more or the less correct. This theory itself has to be defended within the wider coherent picture of knowledge and human faculties. The whole enterprise proceeding thus stabilizes itself by being the background theory of a successful (scientific) practise. Intervening in reality and being successful supports the theory that was used in the intervention. For a realist there is no cosmic exile beyond that.

The principles of coherent theory building add up to a framework which is quasi-transcendental. Since there are no ultimate foundations in the manner of traditional transcendental philosophy there seems to be a lurking danger of incommensurability. Criteria of theory choice – at least some of them – have to be beyond dispute if we are to decide between theories. The criteria or procedures in question probably result from our explanation of such fundamental notions like "argument", "explanation", "justification". Somebody who proposes a theory within our language has framed the theory already within the body of these very general rules and pre-understandings. Somebody who wants to change our language or speaks another language has to be interpreted. Inasmuch as the interpretation is successful (i.e. we can distinguish his claims from given mere quotes with respect to him) we import our logic and methodological principles – at least in their most general form – unto the supposed theory. In short: Wherever there is a dispute between theories the meta-criteria of coherence are presupposed (as mutually accepted) already! Our success in identifying cases of theory choice or alternatives supervenes on our ability to exploit this common framework of shared concepts. We possess at least an operative/implicit knowledge of this common core. Optimistically speaking: Wherever there is a dispute about theory choice there are the tools to choose (at least in principle). Pessimistically qualifying this: Even if we have this operative faculty to identify or even solve cases of theory choice by (vaguely) appealing to meta-criteria and criteria of coherence we might do a bad job at explaining or even formalizing these concepts.

<div align="center">*</div>

[1]      Strictly speaking you might say that only observation *statements* are true, not beliefs themselves. Read the remarks then as applying to the statements you are disposed to assent to because of your observational beliefs.

**References**

Audi, Robert. *The Structure of Justification*. Cambridge, 1993.

Balzer, Wolfgang. "Holismus und Theoriebeladenheit der Beobachtungssprache", *Erkenntnis*, 10 (1976).

Bender, John (Ed.). *The Current State of the Coherence Theory*. Critical Essays on the Epistemic Theories of Keith Lehrer and Laurence BonJour with Replies. Dordrecht/Boston/London, 1989.

BonJour, Laurence. *The Structure of Empirical Knowledge*. Cambrige MA/London, 1985.

Goldman, Alvin. *Epistemology and Cognition*. Cambridge/MA, 1986.

Harman, Gilbert. *Change in View*. Cambridge/MA, 1986.

Rescher, Nicholas. *Cognitive Systematization*. Oxford, 1979.

Thagard, Paul. "The Best Explanation. Criteria for Theory Choice", *The Journal of Philosophy*, 75 (1978), pp.76-92.

Walker, Ralph. *The Coherence Theory of Truth*. Realism, Anti-Realism, Idealism. London/New York, 1989.

Wright, Crispin. "Critical Study: Ralph C. S. Walker, *The Coherence Theory of Truth*", *Synthese*, 103 (1995), pp.279-302.