Human Reason in Context

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Abstract

Philosophers of science often ask a key question: What does it mean when we say that someone has rightly claimed that a proposed theoretical hypothesis is a true explanation of a certain phenomenon in the world? The decline of the justificatory power of perceptual observation has triggered a bifurcation in the study of the nature of justification in science—namely, the logical (or empirical) school and the practical (or social) school. This duality calls for a mediatory account, one that would provide a compromise explanation that accommodates the concerns of these two seemingly contradictory schools. Neurath’s idea of scientific justification qualifies as a mediatory account, but it is incomplete, in that it is ineffective in explaining two problems: the problem of entitlement requirement and the problem of the initial learning of norms. McDowell’s ideas about conceptual capacities and Bildung, and Brandom’s inferentialist approach of conceptual content, which are developed under the ontological presumption that reason and nature are on the same earthly plane, seem to be helpful in bridging the chasm, or even in eliminating it, thereby making Neurath’s account complete. This paper represents an attempt to apply Neurath’s, McDowell’s, and Brandom’s ideas to resolve this key problem in the philosophy of science.

Key words: Scientific Justification, Theory and Data, Hypothetico-Deductive Method of Confirmation, Otto Neurath, John McDowell, Robert B. Brandom

Introduction: The tension between theory and data

Philosophers of science often ask a key question: What does it mean to say that someone has rightly claimed that a proposed theoretical hypothesis is a true explanation regarding a certain phenomenon in the world. In the heyday of logical positivism, philosophers tended to maintain that a scientist is entitled to make such a claim only if he can show that the theoretical hypothesis is meaningful. According to logical positivist doctrine, to show that a theoretical hypothesis is meaningful, we must show that it can be verified by a relevant observation. Or, to put it in the

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linguistic jargon then fashionable, to show that a theoretical statement has cognitive
significance, we must show that it can be somehow connected to or corresponds to a
relevant observational statement expressing the content of experience.

This pursuit of correspondence truth, however, confronted a difficulty when these
philosophers found that the dependence of perceptual experience on theory is so
prevalent that it has a great impact in shaping someone’s behavior in selecting the
“relevant” aspects of his observation—aspects that in turn are used to test the theory
in question.¹ Consequently, a report of empirical evidence is no longer regarded as
possessing decisive power in judging a theory’s validity, because the observation itself
is contaminated by the theory (or other relevant theories) that it aims to demon-
strate, and consequently the theory’s acceptability seems to be dependent on the
theory itself (or other relevant theories).

The decline of the justificatory power of perceptual observation has had an in-
fuence in shaping the ensuing development of scientific philosophy.² Philosophers of
science have become more concerned about the influence of the community’s values
on the actual procedures of hypothesis testing—for example, how the convention of
following a certain theoretical or academic tradition affects someone’s choice of em-
pirical evidence. The upshot is that the discussion of how we can monitor a theory’s
acceptance by means of an empirical boundary constraint thus seems to be super-
seded by the discussion of how social forces may determine a scientist’s decision to
pick a certain aspect of an observation as a theory’s relevant evidential report. To
describe the transformation in a more general sense, it seems that the nature of topics
in the philosophy of science has been changed from one polar extreme (talking about
the logical aspect of hypothesis testing) to the other one: how testing is socially
determined—i.e., the practical aspect of hypothesis justification.

Has any philosopher proposed an account that tries to reconcile these two ex-
treme positions? This question is based on two concerns. On the one hand, it seems,
intuitively, that observation—or, more specifically, empirical observation—somehow
“binds to” or “corresponds to” the objective world. Following this intuition, it is no

¹ With respect to the classic discussions of this issue, refer to N. R. Hanson, 1958,
Patterns of Discovery, Cambridge: Cambridge University Press; T. S. Kuhn, 1970,
The Structure of Scientific Revolutions, Chicago: Chicago University Press, Ch. 10;
and P. K. Feyerabend, 1975, Against Method: Outline of an Anarchistic Theory of
Knowledge, London: New Left Books, Ch. 6 and 7.
² In addition to the works mentioned in the previous footnote, for other prominent cases
that constitute a part of the development, refer to: Imre Lakatos and Alan Musgrave
(eds.), 1970, Criticism and the Growth of Knowledge, Cambridge: Cambridge Uni-
versity Press; Larry Laudan, 1977, Progress and Its Problem: Toward a Theory of
Scientific Growth, Berkeley: University of California Press; Ian Hacking, 1983, Rep-
resenting and Intervening: Introductory Topics in the Philosophy of Natural Science,
Cambridge: Cambridge University Press; Philip Kitcher, 1993, The Advancement of
Science, Oxford: Oxford University Press.
wonder that empirical observation is conceived of as reflecting in the observer’s mind the targeted phenomenon’s objective existential status in the world. Consequently, empirical observation can be regarded as possessing a certain justificatory power in judging whether a theoretical hypothesis is true or false.

On the other hand, we also recognize a background condition: the condition that forces from all aspects of the observer’s social environment influence the observer by cultivating his tendency to pick the aspects of the observation he thinks are relevant. Consequently, it is hard for the observer to deny that his empirical observation no longer reflects the objective existential status of a targeted phenomenon but somehow is constrained by these forces. Thus, his empirical observation loses its objectivity in the sense that private, subjective concerns have entered into his observation from the backdoor.

Thus, these two extremes pose a dilemma arising from the tension between two characteristics of the nature of observation (or the content of experience included in it): On the one hand, observation is regarded as providing a rational constraint on theoretical hypothesis, but on the other hand, it cannot offer an unbiased constraint because of the influence on it of social factors. In other words, no single account based on either of the two aforementioned positions is sufficient to provide a plausible reconciliation of this tension. If the diagnosis of the tension holds, a mediatory account standing somewhere between these two extreme positions is called for, an account that would provide a compromise explanation that accommodates these two seemingly contradictory characteristics of observation. This explains why our earlier question—whether anyone has proposed such an account—is pressing.

In recent years, a group of scholars has reinterpreted the philosophical works of Otto Neurath, who was a staunch proponent of the Vienna Circle, the forerunner of the logical positivist tradition. These scholars claimed that Neurath developed a theory of science that successfully accommodated the concerns of both the logical and the practical aspects of the actual procedures of justification. This paper examines Neurath’s idea of scientific justification to see whether it qualifies as a mediatory account. Neurath’s case is especially noteworthy because it demonstrates how a philosopher coming from an extreme tradition was able to overcome his tradition’s limits by providing a succinct formulation that successfully balances the main concerns of the two extreme positions.

But, as we will see, Neurath’s account is incomplete, in that it is ineffective in providing explanations for two problems: the problem of entitlement requirement and the problem of the initial learning of norms. John McDowell’s ideas about conceptual capacities and Bildung, coupled with Robert B. Brandom’s inferentialist theory

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3 The members of the group include Nancy Cartwright, Jordi Cat, Lola Fleck, and Thomas E. Uebel. Their collaboration resulted in the book *Otto Neurath: Philosophy between Science and Politics*, 1996, Cambridge: Cambridge University Press.
of conceptual content, seem to be helpful in making Neurath’s account complete by bridging the chasm. This paper thus represents a preliminary attempt to apply Neurath’s, McDowell’s, and Brandom’s ideas to resolve this key problem in the philosophy of science.

The tension explained? — Neurath’s theory of science

Neurath’s theory of science started by rejecting the Vienna Circle’s mainstream idea of protocol statements. A protocol statement, according to the mainstream idea, is one that expresses the content of experience. Protocol statements should serve as observation reports that can be used in testing theories. The presumption behind the orthodox idea is that there is a fixed correspondence between theory and observation reports. Neurath, however, did not accept this clear-cut correspondence relation between theory and data. Instead, he held that there exists an asymmetry in the degree of precision possessed by the language of theory compared with the language of observation.  

According to Neurath, in our everyday language we use imprecise terms to describe the concrete things we experience. The same pattern appears when we are asked to make observation reports. The fact that we can use only imprecise terms to describe concrete things is derived from yet another fact: that we all experience the concrete world as a congestion of events (Ballungen), and we can consider such a conglomerate only as a whole. As a result, our observational description—i.e., our observation report—of the targeted concrete things is inherently vague.

In contrast, in the language of theory, we use precise terms to represent concrete things in perceptual reality. These precise terms are used to construct a theoretical system, or theory. We use the theory, not to mimic all the details of the concrete phenomenon in question, but rather to represent its most salient features and the relations among these features. A theoretical term is said to be precise in that it is connected in a theoretical system to other theoretical terms by following a logical order that is guaranteed by the exact axiomatic definition of each term. The exact axiomatic definition of each term should represent the content of the most fundamental elements from which either the concrete phenomenon or our experience is composed. Based on the description of the characteristics of the two different languages, Neurath’s query is as follows: How can we correlate an exact and precise theoretical hypothesis, which is derived from a system of hypotheses, with a vague observation

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4 For the topics discussed in this section, refer especially to: Nancy Cartwright et al., 1996, sections 2.5 and 2.6, pp. 142–166; and sections 3.3, 3.4, and 3.5, pp. 188–256. For Neurath’s original discussion of the topics, refer to: “Protocol Statement” in Neurath, Otto, 1983, *Philosophical Papers 1913–1946*, Robert S. Cohen and Marie Neurath (ed. and transl.), Dordrecht: Reidel, pp. 91–99.
report? Or, how is an exact theoretical hypothesis to be judged by a vague protocol statement? Neurath’s idea is that, in cases of conflict between a theoretical hypothesis and a protocol statement, contrary to what is normally supposed—namely, that the theoretical hypothesis should be revised or discarded—it is always open to decision whether to change the hypothesis or to change the protocol statement. The situation would be even more serious as different theorizers have different perspectives on what constitutes the most important features of the concrete phenomenon in question, resulting in the construction of many theoretical systems, all of them supposed to be compatible with the same vague observation report. According to Neurath, if this is the case, then the mainstream idea that there is a fixed relation between a theoretical hypothesis and a protocol statement would collapse, and so the idea of such a fixed relation would be regarded as an imaginary philosophical construct.

But should we stop using observation reports to justify a theory simply because of the query about the non-existence of the fixed relation? Neurath knew that people won’t change the pattern of justifying the theories that they usually follow; what instead should be changed is the meta-theory that is used to explain the actual procedures of hypothesis testing. According to Neurath, the traditional hypothetico-deductive (H-D) model doesn’t do the job, because this model can tell only half the story. In other words, the traditional H-D model can reconstruct only the logical aspect of the procedure—i.e., the procedure of using observation reports as a rational constraint to justify a theoretical hypothesis. For the other part of the story—i.e., the practical aspect of the justification procedure—the H-D model is impotent. Practical issues about justification procedures include deciding which protocol statement should be used for evidential reports, deciding which one should be changed in case of conflicts between theory and data, and so on. Neurath’s theory of science aims to bridge the gap by reconstructing a more complete picture of the actual procedures of hypothesis justification.

Neurath started by discussing what a protocol statement should look like. His idea can be schematized as follows:5

Protocol\(\text{thought}[^{\text{stimulation state\{\text{'fact'}\}}}]\) (1)

This schematized protocol statement can be further decomposed in the following way:

(i) the institutional condition: \(\text{protocol}[^{\text{thought}[^{\text{stimulation state\{\text{'fact'}\}}]}]}\)
(ii) the doxastic condition: \(\text{thought}[^{\text{stimulation state\{\text{'fact'}\}}]}\)
(iii) the stimulation condition: \(\text{stimulation state\{\text{'fact'}\}}\)
(iv) the factual condition: \text{‘fact’}

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5 Nancy Cartwright et al., 1996, pp. 160–1. Also refer to Thomas E. Uebel, 1993, “Neurath’s Protocol Statements: A Naturalistic Theory of Data and Pragmatic Theory of Theory Acceptance, Philosophy of Science, 60, pp. 587–607.
The implication derived from the decomposed formula is that, before a singular sentence describing the fact can be accepted as a protocol statement, each condition specified in each level of embedding must be fulfilled. Fulfilling condition (iv) means that there is a fact. Fulfilling condition (iii) means that someone is somehow stimulated by the fact. Simply satisfying condition (iv)—i.e., the bare presence of the fact—doesn’t entitle anyone to claim anything. It is when condition (iii) is also satisfied—i.e., someone is stimulated by the fact—that the entitlement requirement obtains. Thus, conditions (iii) and (iv) together constitute the entitlement requirement in the sense that the observer has actually observed the fact and is entitled to claim the right to conduct in the later stage whatever testing procedure is stipulated in the traditional H-D method.

Fulfilling condition (ii) implies that the observer uses certain relevant concepts to describe the fact in question. These relevant concepts may be borrowed from, say, a certain academic tradition that the observer belongs to, or they may be derived from other sources that the observer thinks reliable. The protocol statement must be publicly accepted or recognized before it can be accepted as such, so, by requiring condition (i) as one of the necessary conditions for qualifying a protocol statement, the complete embedded formula expressed in formula (1) implies that even the protocol statement is an institutionalized product. Conditions (ii) and (i) together constitute the requirement of intersubjectivity in that the protocol statement (or data report) in question must be a public matter that is widely accepted within a certain community—i.e., as is pointed out by Uebel, “In order to link this sociological commonplace with the philosophical or meta-theoretical investigations into the nature of scientific theories Neurath imposed the institutional evidence condition.”

As we can see from this description, Neurath’s formulation for the underlying structure of protocol statements spells out the steps that must be followed for the conventional determination of the admissibility of scientific data claims. Neurath’s formulation uses, on the one hand, conditions (iii) and (iv) together as its epistemological component and, on the other hand, conditions (i) and (ii) together as its sociological component to form a “mutual containment” strategy. The strategy is called mutual containment for the following reason: By applying this strategy, we use conditions (iii) and (iv) as a set of empirical rational constraints to ensure that the content picked by the observer to admit into the protocol statement is really what is perceived by the observer because, according to condition (iii), the observer is entitled to do that. But, as we may know from the earlier discussion, there is a problem of non-fixed relation between scientific data claims and theories, so how is the observer to decide that the content he picked is the right one? The observer makes this deci-

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6 Ibid., Uebel, 1993, p. 593.
7 For the name of the strategy, I follow Uebel’s suggestion in Nancy Cartwright et al., 1996, pp. 161–2.
sion within the social and institutional background and so fulfills conditions (i) and (ii).

It may seem that Neurath’s theory of science is more effective than the naïve correspondence theory of truth, in that Neurath’s approach lives up to our standard that a successful mediatory account should accommodate the concerns of both the logical and the practical aspects of the actual procedure of justification. But as effective as it may be, two questions can be raised with respect to each aspect of the procedure: First, in our discussion about the entitlement requirement in Neurath’s formulation of the protocol statement, we mentioned that an observer is entitled to claim his right to conduct the traditional H-D testing procedure only when he actually observes the fact. But we did not provide a meta-account to explain why (and by what mechanism) the observer can regard himself as possessing such an entitlement. Neurath’s theory seems to owe us an explanation of this point.

Second, recall that the intersubjectivity requirement obtains only when the observer can conceptualize what he has observed and makes a report that is publicly accepted. But, why does the observer know initially how to make an observation report that is widely accepted by the members of his community? One answer is that in making his report the observer will follow the norms for such reports, norms he has socially constructed from communication among the members of the community. But the problem is that the observer must know the norms before he can follow them. In other words, where do the norms initially come from? Once again, Neurath seems to owe us an account on this point.

It is at this point that McDowell’s and Brandom’s ideas can be of great help. Let’s see how they work in responding to these questions.

**Chasm nearly bridged: — McDowell’s idea of conceptual capacities supplemented with Brandom’s inferentialist theory of conceptual content**

As mentioned in the preceding section, according to Neurath, the observer experiences the phenomenon by way of a stream of concrete details of the phenomenon as a whole. Neurath used the word *Ballungen*—i.e., congestions—to characterize the terms we use in everyday life and to emphasize that these terms are imprecise, having no definite boundaries for their meaning.

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8 For the works of John McDowell relevant to this paper, refer to: *Mind and World*, 1994, Cambridge, MA: Harvard University Press; “Two Sorts of Naturalism, in Rosalind Hursthouse, Gavin Lawrence, and Warren Quinn (eds.), 1996, *Virtues and Reasons: Philippa Foot and Moral Theory*, Oxford: Clarendon Press, pp.149–79; and “Gadamer and Davidson on Understanding and Relativism, in Jeff Malpas, Ulrich Arnswald, and Jens Kertscher (eds.),2002, *Gadamer’s Century: Essays in Honor of Hans-Georg Gadamer*, Cambridge, MA: MIT Press, pp.173–94. For the relevant works of Robert B. Brandom, refer to: 1994, *Making It Explicit: Reasoning, Rep-
What follows from the idea of Ballungen is the problem of a non-fixed relation between data and theory. But Neurath did not explain the following: Even though our observational data reports are composed of the fuzzy terms, we, after all, know the way to use these terms to write an observation report and even use this report to judge the adequacy of a certain theory. What we want to know at this juncture is why we, as normal human beings, are able to actively know how to organize what we have seen and use imprecise terms to describe the targeted conglomerate of events, and, furthermore, how we have the idea that we are entitled to describe the targeted phenomenon and to use the description to judge a theory about it.

Normally, our first impression regarding experience may look like the following: Just as a blank paper passively obtains a mark from a stamp, our mind is, metaphorically, passively imprinted with the experience of seeing something by the action of seeing that thing. Empiricists use this image to claim that someone is entitled to describe something and to test the theory of it only if the person actually observes it. But, as Ballungen is concerned with both the concepts and the terms we use in observational reports, the entitlement requirement cannot so easily be fulfilled. That is, simply seeing something does not qualify the observer to conduct description and justification; further reason is required. What, then, is that? What is the additional requirement that, by fulfilling it, entitles our action?

The status of human experience is not exactly like the status of a stamped paper. When experience is imprinted with the information received from the targeted phenomenon, experience, at the same time, exerts an operation that filters out the manifold impressions of the targeted phenomenon and leaves us only the materials that we will use to respond to the world, such as the materials (albeit they have fuzzy edges, according to Neurath) that we will finally record in our observation report, which will be used for our later empirical testing. At this juncture, two points are surprising: First, even though what we faced are Ballungen (congested events), our experience can organize these jumbled occurrences and generate the materials for our observation report. Second, it seems that we have the idea that we are quite capable of conducting theory justification. Question: Where do this ability and this idea come from? McDowell’s idea about the conceptual capacities of experience offers a first step towards the answer for the first question.

According to McDowell, experience can be characterized as possessing two elements: its receptivity and its spontaneity. Impressions that we obtain from the
world are the products of receptivity; but at the time when we are obtaining these
impressions, spontaneity gives conceptual content to these impressions by means of
its conceptual capacities. Consequently, our experience possesses conceptual content.
We say that conceptual capacities can help to resolve the problem of entitlement in
that, first, the *spontaneity (or conceptual capacities) of experience* explains why *we
have the ability* to sort out fuzzy-edged information input and generate those mate-
rials that we want for an observation report. Second, it is the *conceptual content of
experience*, which is bestowed by conceptual capacities, that grants us the idea that
we are entitled to be ready to conduct theory justification. But, an immediate meta-
question is: how do conceptual capacities operate so that the conceptual content
that they confer to experience makes us to believe that we are entitled to conduct
justification? If we regard the practice of giving an observation report—i.e., a case
of the practice of an operation of the conceptual capacities—as a kind of *discursive*
(that is, *concept-using*) practice, then it seems that Robert Brandom’s inferentialist
theory of conceptual content is readily of help in providing an account of the micro-
mechanism of the discursive practice—i.e., the micro-mechanism of the operation of
the conceptual capacities’ conferral of conceptual content to experience—that can be
used to answer the question.

According to Brandom, the concept does not originate in mind, nor is it located
in language. Instead, a concept is manifested in the practice of our using it. The use
of “concept” can be formulated in at least three ways: thinking, saying, and doing.
*Thinking* is regarded as a *cognitive practice* of using a concept. It is triggered by the
*perception* that is caused by our reliable differential disposition responding to various
states of affairs in the world. To think is to undertake a distinctive kind of inferen-
tially articulated commitment—in the case of thinking, a *doxastic commitment*—and
the content of the concept in question is conferred (to experience) by letting the com-
mitment in question be caught up in (to check the role it plays in) reasoning (or an
inferential game of giving and asking for reasons). In other words, the *norm* of the
concept implicit in our cognitive practice (and so in our beliefs or intentional states)
is in this inferential way made explicit, and the concept in question in this sense
acquires its *empirical content*. For the case of saying and doing, by following the
same pattern to regard them respectively as a *cognitive practice* and a form of *human
physical practice* of concept-using, they respectively equip interlocutors with a *pro-
positional commitment* and a *practical commitment* so that the norms of the concepts
implicit in the interlocutors’ linguistic and physical practices are made explicit and
the concepts in question are to acquire their empirical contents. Based on Brandom’s
inferentialist theory, we can thus conclude that it is because of the discursive practice
that we conduct to make explicit the norms that we and other interlocutors follow in
our thinking, saying, and doing, we are therefore granted with the idea that we are
entitled to be ready to conduct theory justification.\(^9\)

Recall where we have come from: We pointed out that the discussion of the requirement of entitlement (including conditions (iii): the stimulation condition and (iv): the factual condition in Neurath’s formulation of the form of protocol statements) to make an observation report and to conduct hypothesis justification in Neurath’s theory of science is incomplete, so we made a detour to search for a supplementary account to close the chasm. We found that McDowell’s idea about conceptual capacities and Brandom’s inferentialist theory of conceptual content can be of help here. By applying their idea and theory, it seems that our right to claim the title to make an observation report and to conduct justification will no longer be based on the mysterious phenomenal given, but rather on the conceptual capacities of our own experience.

**Chasm bridged — McDowell’s idea of *Bildung***

The next issue is the problem that arises when we consider the intersubjectivity requirement for a successful protocol statement. We mentioned that conditions (i): institutional condition and (ii): the doxastic condition together constitute a precondition, and, when our protocol statement fulfills it, the protocol statement is to be widely accepted as an adequate observation report by people within a certain community. But before we can make an observation report that will be accepted by colleagues, we must know beforehand the standard of adequacy for our observation report. Neurath’s account mentions only the fact that if an observation report is to be accepted as such by others, its form or content must live up to the standard or norm that is widely accepted by the community, but what we need here is a further account of how we learn about the standard or norm. Someone may answer that we

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\(^9\) As may be manifested in the famous three-round debate on perception between McDowell and Brandom, it may argue that the suggested hybrid account proposed here by combining these two authors’ ideas to explicate from where the conceptual content comes might not be agreed by them, because these two authors have different positions about how conceptual capacities confer a rational constraint in experiential perception—for McDowell, the rational constraint is already built in perception because the world itself is from the start already engaged with the perception; for Brandom, however, the constraint is derived from the norm that is emergent from the discursive practice among interlocutors. As different as they are in the position about the origin of the rational constraint on perception, our main concern here is to formulate a meta-theoretical account that can be used to explicate, by what micro-mechanism, our idea of being entitled to conduct theory justification is called for, and I think that the hybrid account suggested here is a highly plausible account to deal with the issue. For a detailed historical survey and comment on the three-round debate between McDowell and Brandom, refer to: Barber, Michael D., 2011, *The Intentional Spectrum and Intersubjectivity: Phenomenology and the Pittsburgh Neo-Hegelians*, Athens, OH: Ohio University Press.
gradually build up our knowledge about the norm by our daily communication with
other people in the community. But this answer still fails to explain how we know
the accepted form to use in making our very first observation report that is widely
accepted by the community.

McDowell’s account of “second nature” and Bildung in the context of ethics can
be of help here. According to McDowell, ethical ideas such as virtues and values do
not have to find their justification from outside. Contrary to what Hume thought,
we conduct virtuous behavior not because, by doing so, it will do us good for certain
purposes. Neither do ethical ideas obtain their meaning, as Kant maintained, by
the injection of meaning from the operation of a transcendental structure. McDowell
maintains that the meanings of ethical ideas are not determined externally by any
outside constraint that is alien to subjectivity. On the contrary, ethical ideas do exist
in our earthly world, but their meanings are open only to those people who have
“proper ethical upbringing”—i.e., Bildung. As McDowell writes: “[I]n Aristotle’s
conception, the rational demands of ethics are not alien to the contingencies of our
life as human beings. Even though it is not supposed that we could explain the rele-
vant idea of demandingness in terms of independently intelligible facts about human
beings, still ordinary upbringing can shape the actions and thoughts of human beings
in a way that brings these demands into view.”\(^{10}\) Furthermore, by following Aristo-
tle’s idea about second nature, McDowell maintains that if someone is reared under
proper ethical upbringing, his potential practical wisdom is shaped. Consequently,
his ethical character is partly formed. Practical wisdom becomes the person’s second
nature, so the rational demands of ethics are internalized in that they are within the
reach of human beings.

The same idea can be applied to explain the Bildung of scientific practice: If
someone is brought up in a certain kind of scientific tradition with a particular kind
of idea about what a proper scientific practice should look like, then this person would
know how to conduct, say, his experiment in a proper way. Scientists do not learn
by doing; they simply learn by being educated in the scientific tradition they belong
to, and then they practice the norms they learn from their education. The tradition
continues generation after generation by the same pattern of delivering the norms to
the next generation. The norms are part of our world, and the practical wisdom of
these scientists is second nature to them. The same pattern is applied to the learning
of the adequate practice of making an observation report. Recall our question: Why
do we know initially how to make an observation report that is widely accepted by
community members? The answer: We’re brought up in that tradition to know how
to do it.\(^{11}\)

\(^{10}\) Ibid., McDowell, 1994, p. 83.
\(^{11}\) It may argue that the notion of Bildung mentioned here sounds similar to what Kuhn
said about paradigm and scientific community. But, if we accept the hybrid discor-
Conclusion: The tension eliminated — Human reason on the earthly plane of nature

As mentioned earlier, the study of justification in science can be roughly divided into two categories: the logical (or empirical) school and the practical (or social) school. For the logical school, a theory is an artificial construct produced by the operation of human reason to explain a specific phenomenon in the concrete world. An observation report, composed of protocol statements that are based on experiential observation, is used to justify or verify a theory. The observation report is thought to possess such justificatory power because it is widely regarded, among proponents of the logical school, as a reliable channel that the theory can be connected to, or can have a bearing on, the objective concrete world; the observation report is thought to reliably reflect the actual operation of the phenomenon in question.

Thus, for the logical school, it seems that, metaphorically, the operation of human reason (represented by the construction of a theory) must be brought in front of the experiential tribunal (represented by the making of an observation report) so that we can identify whether the operation is of any meaning with respect to the concrete world; that is, the human operation of reason is regarded as having obtained meaning only if the product of the operation can be somehow explained in terms of—or, more strongly, reduced to—the product of the operation of physical laws in the concrete world.

In contrast, the practical (or social) school of the study of justification in science maintains that theoretical hypothesis is normally judged by theory-dependent observation reports; and because the theory, which influences the observation report, is in turn formed under a certain academic or social tradition, hypothesis testing can be regarded as more relevant to social factors than to logical ones.

The tension between the two schools can be expressed in a more succinct way by using McDowell’s idea. The response of these two camps to the problem of the relation between theory and data reflects the way that they respond to a view of nature that they commonly hold. These two camps hold the view that our nature is disenchanted. This means that our nature includes only physical events and the relations among them; there are no normative ideas such as values, truth, meaning, and so on in our nature. The idea of a disenchanted nature was derived during the modern scientific revolution in an attempt to expel subjective and superstitious ideas...
from our modern picture of nature; using McDowell's term to describe it, we can say that nature exists in “the realm of laws,” whose domain is occupied only by objective physical objects and their relations.

What place, then, is held in nature by normative ideas and their relations? Again, to use McDowell's term, they belong to “the space of reasons.” The operation of normative ideas differs from the operation of physical events in the realm of laws, so the structure of the space of reasons is said to be *sui generis* with respect to the realm of laws. There is no room in the realm of laws that any item in the space of reasons can occupy. According to McDowell, the anxiety of modern philosophy originates from the separation of these two categories or, more specifically, from the exclusion of the space of reasons from our nature. The anxiety is that we do not know how to place minds in the world, or how mental constructs have a bearing on the concrete world. The tension between mind and world is reflected in our concrete case in the tension between theory and data. (theory-data-phenomena)

The logical (or empirical) school represents one polar extreme in our discussion, in that it urges a strategy to resolve this modern anxiety by reducing the space of reasons to the realm of laws—that is, it tries to find the meaning of a theory (an artificial construct built up by the operation of human reason) by checking whether the theoretical implication derived from it can find “a counterpart in the concrete world” (represented by an observation report). In other words, the logical school supposes that mind can have a bearing on the world only if objects constructed by mental operations can be explained in terms of certain physical operations. In contrast, the practical (or social) school represents the other extreme. Its strategy is to adopt at face value the idea that the space of reasons is *sui generis* to maintain that, by placing in the space of reasons the conduct of justification in science, we can make sense of the conduct without referring to the realm of laws. That is, the meaning of the conduct is to be determined exclusively by the interplay of those normative ideas held among the individuals coming from a certain tradition.

Neurath's theory of protocol statements tries to reconcile the positions of the two schools. For Neurath, in the embedding structure of a protocol statement, the innermost two conditions (the factual and stimulation conditions) represent the material conditions that an observation statement must fulfill before it can be claimed to have any bearing on the concrete world; the outer two conditions (the doxastic and institutional conditions) represent the practical conditions that an observation

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12 The term “the space of reasons,” strictly speaking, not McDowell’s; McDowell might have derived this term from referring to Wilfrid Sellars’s idea of “the logical space of reasons” expounded in section 36 of his seminal work: Wilfrid Sellars, 1997 (1956), *Empiricism and the Philosophy of Mind*, Robert Brandom (ed.), Cambridge, MA: Harvard University Press. Thanks are due to an anonymous reviewer’s pointing out the genealogy of the term.
statement must fulfill before it can be widely accepted as an adequate observation statement within a certain tradition. No observation statement is adequate if it fails to fulfill one or more conditions. In other words, a statement is to be regarded as an adequate observation statement and thus can be used for hypothesis testing only if it fulfills the material (or empirical) and the practical conditions.

The conduct of justification in science can thus be interpreted as involving both the space of reasons (related to practical conditions) and the realm of laws (related to material or logical conditions). Even if it is successful, Neurath’s reconciliation is still conducted under the disenchanted view of nature; it still tries to bridge the gap between the space of reasons and the realm of laws, trying to give meaning to the conduct of scientific justification by connecting the two categories in one way or another. But, as we have seen in the preceding section, Neurath’s account is still ineffective by itself in explaining how the observer is entitled to make an observation report and conduct hypothesis testing; the account is ineffective because of its meager idea of “experience.” So, we use McDowell’s and Brandom’s accounts to try to bridge the chasm by using McDowell’s idea of conceptual capacities and Brandom’s inferentialist theory of conceptual content. The question, then, is how we can use McDowell’s and Brandom’s accounts to support Neurath’s account.

It is because McDowell’s account urges us to discard the view of a disenchanted nature and, instead, to accept a view of nature that includes both the space of reasons and the realm of laws. McDowell’s account does not need to deal with the problem of injecting the meaning in the space of reasons into the realm of laws, because, under McDowell’s worldview, meaning (a theoretical construct built up by the operation of human reason) and the operation of physical events are not located at different spaces; rather, they are located within the same nature, and the connection between them is mediated by experiences that are permeated with conceptual content by the way that “the understanding [or the exercise of conceptual capacities] is already inextricably implicated in the deliverances of sensibility themselves.”

Furthermore, as is mentioned in our discussion of Brandom’s inferential approach of conceptual content, the patterns of our understanding with respect to a certain part of the concrete world constitute a portion of our beliefs that must be checked against our entire belief system to see whether the newly formed beliefs or any other beliefs already in the system must be revised in order to maintain the overall cogency of the system. The entire belief system always stands prepared to adjust to the new beliefs, which are derived from our new experiences with respect to other parts of the concrete world. It is in this sense that the space of reasons (conceived as a huge belief system or as the rational part of our world), our experiences (with built-in conceptual contents), and the realm of laws (conceived as the physical part of our

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13 *Ibid.*, p. 46.
world) are all tightly connected. As a result, there is no longer a chasm between the space of reasons and the realm of laws, because both domains now exist on the same earthly plane of nature. In other words, human reason needs to operate, and so to be studied, in its material and social contexts.

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