

Although at one time it was quite usual to suppose that the principles of logic are “the laws of thought” . . . , Frege’s vigorous critique was so influential that there has been rather little support, of late, for “psychologism” in any shape or form. However, Frege’s arguments against psychologism are, I suspect, less conclusive, and at least some form of psychologism more plausible, than it is nowadays fashionable to suppose.

—Susan Haack¹

1.0 Introduction

In this chapter I revisit the late nineteenth- and early twentieth-century debate about logical psychologism. It is clear that this debate significantly determined the subsequent development of philosophy and psychology alike. Neither the emergence of analytic philosophy from Kant’s idealism² nor the emergence of experimental or scientific psychology from Brentano’s phenomenology³ could have occurred without it. It is also clear that Frege and Husserl routed the “psychologicists.” What is much less clear, and what I want critically to rethink and reformulate, is the philosophical upshot of this seminal controversy.

In section 1.1, I look at what Frege and Husserl say about and against logical psychologism. Logical psychologism boils down to the thesis that logic is explanatorily reducible to empirical psychology. Identifying a cogent Fregean or Husserlian argument against psychologism proves to be difficult, however, because their antipsychologistic arguments are question-begging. In section 1.2, I propose that logical psychologism can be most accurately construed as a species of scientific naturalism, and more particularly as a form of scientific naturalism about logic. If logical psychologism is a form of scientific naturalism about logic, then Frege’s and Husserl’s antipsychologism is also a species of antinaturalism.

This leads me in section 1.3 to go in search of a cogent argument against scientific naturalism, by looking at G. E. Moore's near-contemporary attack on ethical naturalism in *Principia Ethica*. But again our high hopes are dashed to the ground: for Moore's celebrated critique of the "naturalistic fallacy" fails in two ways. First, in arguing against the identification of any natural property with the property Good, Moore assumes an absurdly high standard of property-individuation; and second, although somewhat more ironically, he incoherently combines his antinaturalism with the thesis that intrinsic-value properties are logically strongly supervenient on (or explanatorily reducible to) natural facts. Yet all is not lost—we can go to school on Moore's mistakes. This leads me to the formulation of a new general argument against scientific naturalism. In section 1.4, I apply this general argument specifically to scientific naturalism about logic, and thereby also to logical psychologism.

It is not implausible to take Frege to be the most thoroughgoing opponent of logical psychologism. And Frege has often been taken to be a platonist. So one might easily assume that any rejection of logical psychologism entails logical platonism. According to logical platonism, the "standard" (or Tarskian, referential) semantics of natural language, together with the plausible idea that the semantics of logic should be "homogeneous" or uniform with the rest of natural language, requires (i) the existence of objectively real (intersubjectively knowable, nonmental), abstract (nonspatiotemporal) logical objects, and (ii) the human knowability of these objects. I argue in section 1.5 that logical platonism is false. The fundamental problem with logical platonism is not, however, as Paul Benacerraf has argued in connection with the same problem about the semantics of mathematics, that the causal inertness of abstract objects contradicts the further assumption of a "reasonable epistemology," to the effect that knowledge requires causal contact with the object known. Benacerraf's argument has three questionable steps in it. Instead the fundamental problem is that logical platonism yields the metaphysical alienation of the human mind from logic, which is inconsistent with two very plausible commonsense beliefs: that we humans actually have some logical knowledge, and that logic is intrinsically normative and perhaps even unconditionally obligatory for actual human reasoning processes.

Nevertheless, as I argue in section 1.6, it is possible consistently to hold (i) that logical psychologism is false, (ii) that logical platonism is false, and (iii) that logic is cognitively constructed by rational animals, in the sense that

every rational animal—including every rational human animal—possesses a cognitive faculty that is innately configured for the representation of logic. In other words, logic is explanatorily and ontologically dependent on rational animals, but logical facts are not reducible to the natural facts. The view expressed by (iii) is what I call *the logic faculty thesis*, which in turn is the first of two basic parts of the doctrine of *logical cognitivism*. Given logical cognitivism, we can consistently reject logical psychologism on the one hand while also rejecting logical platonism on the other, and yet in a certain qualified sense still endorse a psychological theory of the nature of logic.

1.1 Frege, Husserl, and Logical Psychologism

According to Michael Dummett's crisp and compelling formulation, recent and contemporary philosophy is "post-Fregean philosophy," in the sense that Frege is arguably the most important figure in the early development of the mainstream Euro-American twentieth-century tradition in analytic philosophy.⁴ It seems equally true that contemporary logic is "post-Fregean logic," in the sense that Frege is arguably the most important figure in the early development of pure—that is, mathematical and symbolic—logic.⁵ These two historical facts are not of course unconnected. As Jean Van Heijenoort observes: "Frege's philosophy is analytic in the sense that logic has a constant control over his philosophical investigations."⁶ So pure logic constantly controls Frege's philosophy, and in turn Frege's logically oriented philosophy constantly controls the analytic tradition. The chain of command is clear. What we need to understand better is the nature of pure logic.

In this section I focus on a fundamental element in Frege's conception of pure logic: his critique of logical psychologism. This critique was later codified and deepened by Husserl. Here are some characteristic samples of Frege's arguments against the psychologists:

Never let us take . . . an account of the mental and physical conditions on which we become conscious . . . of a proposition for a proof of it. A proposition may be thought, and again it may be true; let us never confuse these two things.⁷

We suppose . . . that concepts sprout in the mind like leaves on a tree, and we think to discover their nature by studying their birth: we seek to define them psychologically, in terms of the nature of the human mind. But this account makes everything subjective, and if we follow it through to the end, does away with truth.⁸

[T]he expression ‘law of thought’ seduces us into supposing that these laws govern thinking in the same way as laws of nature govern events in the external world. In that case they can be nothing but laws of psychology: for thinking is a mental process. And if logic were concerned with these laws it would be a part of psychology. . . . Then one can only say: men’s taking something to be true conforms on the average to these laws . . . ; thus if one wishes to correspond with the average one will conform to these. . . . Of course—if logic has to do with something’s being taken to be true, rather than its being true! And these are what the psychological logicians confuse.⁹

Psychological treatments of logic arise from the mistaken belief that a thought (a judgement as it is usually called) is something psychological like an idea. . . . Now since every act of cognition is realized in judgements, this means the breakdown of every bridge leading to what is objective.¹⁰

With the psychological conception of logic we lose the distinction between the grounds that justify a conviction and the causes that actually produce it. This means that a justification in the proper sense is not possible. . . . If we think of the laws of logic as psychological, we shall be inclined to raise the question whether they are somehow subject to change. . . . The laws of truth, like all thoughts, are always true if they are true at all. . . . Since thoughts are not mental in nature, every psychological treatment of logic can only do harm. It is rather the task of this science to purify logic of all that is alien and hence of all that is psychological. . . . Logic is concerned with the laws of truth, not with the laws of holding something to be true, not with the question of how men think.¹¹

Not everything is an idea. Otherwise psychology would contain all the sciences within it, or at least would be the supreme judge over the sciences. Otherwise psychology would rule even over logic and mathematics. But nothing would be a greater misunderstanding of [logic or] mathematics than making it subordinate to psychology.¹²

Even just a quick skim through these texts reveals that philosophically there is quite a lot going on in them. It is evident that in different places Frege employs somewhat different characterizations of logical psychologism, and somewhat different criticisms of it too.¹³ Given this complexity, along with the reasonable hunch that we might find the same or at least a similar complexity in Husserl’s critique of psychologism, I will refrain from glossing the Fregean texts until I have also sketched Husserl’s critique.

In 1894 Frege published a devastating review of the first volume of Husserl’s *Philosophie der Arithmetik*, an investigation into the basic concepts of arithmetic that was heavily influenced by Brentano’s *Psychology from an Empirical Standpoint*. Among other things, Frege accused Husserl of committing the cardinal sin of logical psychologism. Husserl obviously received the message loud and clear, because he never wrote the second volume. By

the turn of the century, however, Husserl had gotten his revenge: he not only converted whole-heartedly to antipsychologism in the late 1890s, thus joining his erstwhile accuser, but he also effectively “out-Frege-ed” Frege by publishing the *Prolegomena to Pure Logic*. As Martin Kusch has shown, the *Prolegomena* had the highly significant double effect of simultaneously (1) establishing the pure logic tradition in early twentieth-century European philosophy, and (2) creating the discipline of experimental or scientific psychology by providing a reason (or more accurately, an excuse) to banish the nonconforming psychologists from the leading German philosophy departments.¹⁴ It also introduced several original points into the debate about logical psychologism. So for both sociological and purely philosophical reasons, the *Prolegomena* rapidly became the bible on antipsychologism. Ironically—and tragically, given Russell’s shattering contemporaneous discovery of the paradox of classes in his own and Frege’s logical systems¹⁵—Frege’s logical and logico-philosophical writings were almost entirely ignored by his contemporaries.¹⁶

The *Prolegomena* is massively documented and carefully argued. Yet in one respect it develops a rather simple story line by dividing philosophers of logic neatly into three groups:

- (i) what we might call the “eternally damned” psychologists (Richard Avenarius, Benno Erdmann, Theodor Lipps, Ernst Mach, J. S. Mill, Christian Sigwart, and Herbert Spencer);
- (ii) the “eternally saved” antipsychologists (Leibniz and Bernard Bolzano—note Frege’s conspicuous absence!); and
- (iii) those precariously balanced between the hell of psychologism and the heaven of antipsychologism (Kant, Johann Herbart, Hermann Lotze, Paul Natorp, and Wilhelm Wundt).

It also contains an interesting and original critique of normative conceptions of logic¹⁷ and ingeniously connects logical psychologism directly with cognitive relativism¹⁸—indeed, Husserl appears to have coined the term ‘relativism’. Of course the main task of the *Prolegomena* is to identify and refute psychologism:

No natural laws can be known *a priori*, nor established by sheer insight. The only way a natural law can be established and justified, is by an induction from the singular facts of experience. . . . [If psychologism is correct, then] logical laws must accordingly, without exception rank as mere probabilities. Nothing, however, seems plainer than that the laws of ‘pure logic’ all have a *a priori* validity. They are established and justified, not by induction, but by apodeictic self-evidence.¹⁹

How plausible the ready suggestions of psychologistic reflection sound! Logical laws are laws for validations, proofs. What are validations but peculiar human trains of thought, in which, in normal circumstances, the finally emergent judgments seem endowed with a necessarily consequential character. This character is itself a mental one, a peculiar mode of mindedness and no more. . . . How could anything beyond empirical generalities result in such circumstances? Where has psychology yielded more? We reply: Psychology certainly does not yield more, and cannot for this reason yield the apodeictically self-evident, and so non-empirical and absolutely exact laws which form the core of all logic.²⁰

The psychologistic logicians ignore the fundamental, essential, never-to-be-bridged gulf between ideal and real laws, between normative and causal regulation, between logical and real necessity, between logical and real grounds. No conceivable gradation could mediate between the ideal and the real.²¹

These points are, manifestly, very similar in content to Frege's and reveal a similar multifariousness. The *Prolegomena* has two advantages over Frege's critique of logical psychologism, however. First, Husserl deftly compresses the different versions of psychologism into a single formula:

Let us place ourselves for the moment on the ground of the psychologistic logic, and let us assume that the essential theoretical foundations of logic lie in psychology. However the latter discipline may be defined . . . it is universally agreed that psychology is a factual and therefore an empirical science.²²

Second, he also deftly compresses the different worries about psychologism into a single objection:

The basic error of Psychologism consists, according to my view, in its obliteration of the fundamental distinction between pure and empirical generality, and in its misinterpretation of the *pure* laws of logic as *empirical* laws of psychology.²³

Here we can see that what Frege and Husserl both reject by rejecting logical psychologism is the claim that empirical psychology provides "the essential theoretical foundations of logic." I take it that a science *X* contains the essential theoretical foundation of a science *Y* if and only if *Y* can be explanatorily reduced to *X*. Explanatory reduction is the strongest sort of reduction. As standardly construed, reduction can be either (i) explanatory or (ii) ontological.²⁴ Explanatory reduction involves expressing the "higher-level"—or less basic—concepts of one science in terms of the "lower-level"—or more basic—concepts of another, without any appreciable loss of meaning or cognitive significance. Assuming that concepts pick out corresponding properties,²⁵ and that facts are instantiations of properties, then an explanatory reduction entails either the identity of higher-level properties/facts with

lower-level properties/facts, or else the logical strong supervenience (which at this point we can construe as asymmetric or one-way logically necessary dependence—I will spell out the notion of logical strong supervenience more explicitly in section 1.2) of higher-level properties/facts on lower-level properties/facts. Logical strong supervenience is consistent with the identity of higher-level and lower-level properties or facts and is also consistent with their nonidentity. But in either case, an explanatory reduction of Y to X shows that the concepts and corresponding properties/facts of Y are “nothing over and above” those of X . Ontological reduction, by contrast, involves showing only that higher-level properties/facts are identical with lower-level properties/facts. So given an ontological reduction of Y to X , there can still be an “explanatory gap” between Y and X , in the sense that concepts and corresponding properties/facts of Y are not analytically definable in terms of the concepts and corresponding properties/facts of X . For example, it is possible to claim that mental properties are identical with physical properties (say, of the brain), while also asserting that there is an explanatory gap between mentalistic concepts and physicalistic concepts.²⁶ Thus every explanatory reduction is also an ontological reduction, but a reduction can be ontological without also being explanatory.

Empirical psychology is the same as experimental or scientific psychology. At the end of the 19th century, of course, scientific psychology was only in its infancy. And even today it remains an open question whether (and if so, in what sense) special sciences like cognitive psychology are reducible to the fundamental sciences: biology, chemistry, and especially physics.²⁷ For my purposes, however, empirical psychology can be indifferently construed as an introspective science of the mental (“introspectionist psychology”), as a social science of the mental (“folk psychology” in Wundt’s original sense of that term), as a behavioral-ethological science of the mental (“behavioral psychology”), as a computer-driven science of the mental (“computational psychology”), as psychobiology, as psychochemistry, or as psychophysics. The bottom line for Frege and Husserl, and the bottom line for me, is the psychologist’s assertion that logic has its essential foundations contained in, and is therefore explanatorily reducible to, empirical psychology.

In direct opposition to logical psychologism, Frege and Husserl both explicitly insist that logic is *pure*, by which they mean that logic is necessary, objectively true, fully formal or topic-neutral, and a priori. This is nicely captured in Frege’s assertion in the *Foundations of Arithmetic* that

[w]hat is of concern to logic is not the special content of any particular relation, but only the logical form. And whatever can be asserted of this, is true analytically and known a priori.²⁸

Thus Frege's and Husserl's Ur-objection to logical psychologism is that it obliterates the fundamental distinction between the necessary, objectively true, fully formal or topic-neutral, and a priori character of pure logic on the one hand, and the contingent, belief-based, topic-biased, and a posteriori character of empirical psychology on the other, thereby wrongly reducing the former to the latter.

That Ur-objection in turn breaks down into these four sub-objections:²⁹

- (1) *Modal downsizing* Psychologism wrongly reduces the necessity and strict universality of logical laws to the contingent generality of empirical laws.
- (2) *Cognitive relativism* Psychologism wrongly reduces objective logical truth to mere (individual, socially constituted, or species-specific) belief.
- (3) *Topic bias* Psychologism wrongly reduces the full formality or topic-neutrality of logic to the topic bias of (individualistic, socially constituted, or species-specific) mental content.
- (4) *Radical empiricism* Psychologism wrongly reduces the apriority of logical knowledge to the aposteriority of empirical methods of belief-acquisition and belief-justification.

Of course it is one thing to have some serious worries about logical psychologism, and quite another to have compelling arguments against it. Suppose that psychologism entails modal downsizing, cognitive relativism, topic bias, and radical empiricism. Does it follow automatically that psychologism is false? No. Notice that the formulation of each sub-objection includes the crucial word 'wrongly'. This begs the question. Pointing out that logical psychologism entails modal downsizing, and so on, does not amount to a refutation unless one has independent arguments to show that logic *really is* necessary, objectively true, topic-neutral, and a priori; or unless one has independent arguments to show that one or more of the four reductions leads directly to falsity or absurdity. But as far as I can determine, Frege and Husserl only ever *assert* that logic is absolutely necessary, and so on, and never try to prove those claims independently; nor do they ever make any serious attempts to reduce the psychologistic reductions to falsity or absurdity. Therefore, even if they are entirely correct about the nature of logical psychologism and its consequences, ultimately they provide no *noncircular*

arguments against psychologism, which is to say that ultimately they provide no *cogent* arguments against psychologism.

1.2 Antipsychologism as Antinaturalism

Historically considered, logical psychologism is the product of mid- to late-nineteenth-century European philosophy, especially including three overlapping subtraditions: (i) the German neo-Kantian tradition; (ii) the positivist tradition in England, France, Germany, and Austria; and (iii) J. S. Mill's empiricism, as expressed in his *System of Logic*. By the middle of the twentieth century, moreover, these three subtraditions had achieved a stable fusion or synthesis with the pragmatic tradition in the United States. This stable synthesis of neo-Kantianism, positivism, empiricism, and pragmatism is epitomized by the writings of Quine.³⁰ In turn, the underlying theme and theoretical engine of the three-headed tradition that originally gave rise to logical psychologism, hence equally the underlying theme and theoretical engine of Quine's synthesis, is scientific naturalism.³¹

Scientific naturalism includes four basic elements: (1) anti-supernaturalism, (2) scientism, (3) physicalist metaphysics, and (4) radical empiricist epistemology. I will look briefly at each of them in turn.

(1) *Anti-supernaturalism* is the rejection of any theoretical appeal to non-physical, nonmaterial, or nonspatiotemporal entities, properties, and causes (e.g., platonic universals or God). The motivating thought here is that only what is either specifically material, or more generally part of the spatiotemporal and causal order of things, can be truly real.

(2) *Scientism* says that the *exact sciences*—mathematics and the fundamental natural sciences, especially physics—are the leading sources of knowledge about the world, the leading models of rational method, and collectively the basic constraint on all other sciences and on the acquisition and justification of all genuine knowledge. In other words, nothing in the world falls outside the theoretical purview of the exact sciences.

(3) *Physicalist metaphysics* says that the physical facts strictly determine all the facts. Let the term 'the physical facts' stand for every fact in the world about the instantiation of physical properties. There are two types of physical facts, and two corresponding types of physical properties. First, there are *basic* physical facts, or facts about the instantiation of the first-order physical

properties of fundamental physical entities, processes, and forces, which in turn are the proper objects of the fundamental natural sciences.³² And second, there are *nonbasic* physical facts, or facts about the instantiation of second-order physical properties that specify how first-order physical facts are causally configured or patterned in relation to one another: more precisely, these nonbasic physical facts are all *functional organizations* of one sort or another. The nonbasic physical facts are logically strongly supervenient on the basic physical facts. So, otherwise put, according to the scientific naturalist thesis of physicalist metaphysics, all facts are either identical to or logically strongly supervenient on the basic physical facts.

(4) *Radical empiricist epistemology* says that all knowledge whatsoever originates in individual sensory experience, derives its significant content from sensory experiential sources, and is ultimately verified and justified by empirical means and methods alone. In other words, all epistemic facts are strictly determined by—are logically strongly supervenient on—the sensory experiential facts.

To summarize, then, scientific naturalism says (a) that reality is ultimately whatever the exact sciences tell us it is, (b) that all properties and facts in the world are ultimately nothing over and above first-order physical properties and basic physical facts, and (c) that all knowledge is ultimately empirical.

As will already be evident, the technical notion of logical strong supervenience³³ is important to my treatment of logical psychologism, so I had better pause to spell it out a little more carefully. The “very idea” of supervenience is that it captures a modal dependency relation between types of properties that is somewhat weaker than identity, hence consistent with the denial of identity between properties of the relevant types, and thereby consistent with “property dualism” of some sort. So we can separate properties into two distinct classes: the *lower-level* or more basic properties, and the *higher-level* or less basic properties. Call the lower-level properties “A-properties” and the higher-level properties “B-properties.” Then we can say that B-properties supervene on A-properties if and only if:

- (1) necessarily, anything that has some property *G* among the B-properties also has some property *F* among the A-properties (or equivalently: no two things can share all their A-properties unless they also share all their B-properties; or again equivalently: no two things can differ in any of their B-properties without also having a corresponding difference in their A-properties); and
- (2) necessarily, anything’s having *F* is sufficient for its also having *G*.

This two-part supervenience relation is what Jaegwon Kim aptly calls “strong supervenience.”³⁴ The label is apt because we can characterize at least two modally weaker supervenience relations by slightly modifying the concept of strong supervenience. On the one hand, we can characterize a *weak* supervenience³⁵ by dropping the second occurrence of ‘necessarily,’ thus making the supervenience an intraworld or merely coextensive relation instead of an interworld or cross-possible-world relation. And on the other hand, retaining the cross-possible-world character of supervenience, we can instead characterize what I will call a *moderate* supervenience by asserting feature (1) alone without feature (2). According to moderate as opposed to strong supervenience, it is merely the case that there can be no *B*-property difference without an *A*-property difference.³⁶ The crucial difference between moderate supervenience and strong supervenience is that strong implies the *existential modal dependence* of *B*-properties on *A*-properties, whereas moderate does not. So the relation of moderate supervenience is consistent with the existence of possible worlds in which the *A*-properties exist but the *B*-properties do not.

Now back to strong supervenience itself. In this context, feature (1) of strong supervenience is known as the *necessary covariation* of the *A*-properties with the *B*-properties, and feature (2) is known as the *upward dependence* of the *B*-properties on the *A*-properties. If we further assume that the *A*-properties are first-order physical properties and that the *B*-properties are, at least when taken at face value, nonphysical properties of some sort (say, mental properties, normative properties, or modal properties), then this yields a materialist or physicalist strong supervenience.³⁷ It is also sometimes held—for example, by Kim—that a properly reductive physicalist strong supervenience must incorporate the proviso that feature (1) and (2) are further constrained by nomological connections running between the *A*-properties and the *B*-properties.³⁸ When this extra constraint is added, materialist strong supervenience is called *superdupervenience*,³⁹ because it captures the idea that the lower-level or basic physical properties necessarily determine the higher-level properties in a thoroughly lawlike and adequately systematic fashion. Given superdupervenience, the higher-level properties are really “nothing but” or “nothing over and above” the lower-level physical properties. Or in other words, the higher-level properties are *fully reducible* to the lower-level physical properties, without being identical to them.

The notion of full reduction brings me to the notion of *logical* strong supervenience. Logical strong supervenience means that the two occurrences of “necessarily” in the formulation of strong supervenience are to be read as “logically or analytically necessarily,” as opposed, for example, to either “nonlogically or synthetically necessarily” or “physically, nomologically, or naturally necessarily,” which pick out more restricted modalities.⁴⁰ As David Chalmers has pointed out, the philosophical importance of the notion of logical strong supervenience is precisely its entailment of (indeed, necessary equivalence with) the notion of explanatory reduction.⁴¹ If *B*-properties logically strongly supervene on *A*-properties, then *B*-properties follow logically or analytically from *A*-properties and thereby provide a reductive explanation of those properties, because an ideally rational thinker could, from her (possibly a posteriori) knowledge of the *A*-properties together with her (possibly a posteriori) knowledge of any nomological connections between the *A*-properties and the *B*-properties, *logically infer or deduce* all the *B*-properties.⁴² Otherwise put, the explanatory reduction is the result of *conceptual analysis* (possibly assisted by empirical investigation).

I will call the total conjunction of all the basic physical facts and all the sensory experiential facts *the natural facts*. Then scientific naturalism can be most compactly expressed as the thesis that *all facts logically strongly supervene on the natural facts*. This formulation captures the anti-supernaturalism, scientism, physicalist metaphysics, and radical empiricist epistemology of scientific naturalism all in one go. Three further things should be noted about scientific naturalism, however.

First, it needs to be reemphasized that although scientific naturalism is consistent with the identity of higher-level properties with lower-level properties, it does not absolutely require the identity but rather only the logical strong supervenience of the former on the latter. So scientific naturalism is consistent with various nonidentity theses such as, for example, that functionally defined mental properties are not identical with first-order physical properties, or that evolutionarily grounded normative properties are not identical with first-order physical properties.

Second, although scientific naturalism generally requires that the lower-level or *A*-properties on which the higher-level or *B*-facts logically strongly supervene must be contingent facts, those *A*-facts can be *either* first-order physical facts *or* sensory experiential facts. So although the scientific naturalist by virtue of her physicalist metaphysics is committed to the thesis that all facts ultimately logi-

cally strongly supervene on the first-order physical facts, she need not hold that the sensory experiential facts are themselves identical to the first-order physical facts: the sensory experiential facts can be nonidentical with but still logically strongly supervenient on the first-order physical facts.

Third and finally, it is crucially important to recognize that not everything that goes by the name of “naturalism” is scientific naturalism. So I want especially to emphasize that what I am calling “scientific naturalism” does not capture *every* form of philosophical naturalism, but only those views that are in the exact-science-oriented tradition of the neo-Kantians, the positivists, Mill, and Quine, and those that are explicitly or implicitly committed to anti-supernaturalism, scientism, physicalist metaphysics, and radical empiricist epistemology, as well as the logical strong supervenience of all facts on the natural facts. Many weaker forms of philosophical naturalism also exist,⁴³ and some of these are perfectly consistent with the view I will eventually spell out and defend: logical cognitivism. Indeed, as we will see, logical cognitivism explicitly accepts anti-supernaturalism, and also asserts a nonreductive explanatory and ontological dependence of logic on the innate cognitive capacities of rational animals. It is obvious that necessarily, all rational animals—whether human or nonhuman—are animals. Then, since animals, as sentient living organisms, are surely *natural* beings if anything is, we can quite accurately say that logical cognitivism implies what I will call an *embodied rationalistic naturalism* about logic, although it rejects scientific naturalism as defined above.

In any case, the concept of scientific naturalism allows us to achieve a deeper reading of the psychologistic thesis. As we have seen, logical psychologism is the thesis that logic is explanatorily reducible to empirical psychology. And we have also seen that the explanatory reduction of logic to empirical psychology entails scientific naturalism about logic. Thus logical psychologism is nothing more and nothing less than a species of “naturalized logic,” or a form of scientific naturalism about logic.⁴⁴ Scientific naturalism, in turn, is the thesis that all facts are logically strongly supervenient on the natural facts.

Now, in my opinion, the most philosophically illuminating formulation of logical psychologism is the thesis that logic is logically strongly supervenient on the natural facts. This is because although there are in fact more recent versions of scientific naturalism about logic that do not appeal specifically to empirical psychology⁴⁵—thereby showing indirectly the overwhelming

historical success of the Frege–Husserl critique of logical psychologism, even in the face of the rise of scientific naturalism in the latter half of the twentieth century—these do not differ at all from logical psychologism in respect of their basic explanatory, ontological, epistemological, or methodological commitments. Correspondingly, then, the antipsychologism proposed by Frege and Husserl is for all intents and purposes equivalent to the following direct denial of scientific naturalism about logic: logic is *not* logically strongly supervenient on the natural facts.

This formulation may seem to have an air of paradox. Suppose that one assumes, along with Frege and Husserl, that logic is necessary, objectively true, topic-neutral, and a priori. Then logic is logically derivable from anything and everything, and even logically derivable from nothing at all, and thus it is trivially true that logic is logically strongly supervenient on the natural facts. Then Frege and Husserl are denying a trivial truth! But as we have seen, one cannot simply *assume* that logic is necessary, objectively true, topic-neutral, and a priori without begging the question; and of course this is just what the defender of logical psychologism or of any other version of scientific naturalism about logic *denies*: the psychologist or other logical scientific naturalist is claiming that logic is *neither* necessary, *nor* objectively true, *nor* topic-neutral, *nor* a priori, precisely because logic is explanatorily reducible to the natural facts. So in asserting antipsychologism, Frege and Husserl are denying a substantive and controversial thesis.

1.3 Moore, Antipsychologism, and Antinaturalism

We are currently in search of a cogent argument against logical psychologism, because Frege’s and Husserl’s famous antipsychologistic arguments, sadly, beg the question. I have proposed that logical psychologism is a species of scientific naturalism. It makes good sense, then, to look at leading arguments against scientific naturalism. But where to look?

All things considered we probably cannot do better than to go back to G. E. Moore’s writings, since Moore was a near-contemporary of both Frege and Husserl, since he explicitly argued against both psychologism and naturalism, and since those arguments later became part of the conventional wisdom of the analytic tradition. Given his unfamiliarity with the works of Frege at that time, Moore appears to have more or less independently invented antipsychologism, although in a nonlogical context. In his amazing

essays “The Nature of Judgment” (1898) and “The Refutation of Idealism” (1903), and in the even more amazing *Principia Ethica* (1903), he went after psychologism in two ways: from the standpoint of epistemology, and from the standpoint of ethics.

Moore’s first concern is with psychologistic epistemology in the neo-Kantian, neo-Hegelian, and Millian traditions. His objection is that their epistemology involves a fundamental confusion between two senses of the “content” of a cognition: (i) content as that which literally belongs to the conscious mental act of cognizing (the psychologically immanent content, or act-content); and (ii) content as that at which the mental act is directed, or which it is “about” (the psychologically transcendent content, or objective content). The communicable meaning and truth value of the judgment belong strictly to objective content. But psychologism assimilates the objective content to the act-content. This is what Moore glosses as

the fundamental contradiction of modern Epistemology—the contradiction involved in both distinguishing and identifying the *object* and the *act* of Thought, ‘truth’ itself and its supposed *criterion*.⁴⁶

Given this “contradiction,” the communicable meaning and truth value of the content of cognition are both reduced to the point of view of a single subject. The unpalatable consequences are that meaning becomes unshareably private (which is a form of topic bias) and that truth turns into mere personal belief (which is a form of cognitive relativism).

Moore’s *Principia* contains another and much more famous objection to psychologism. His general target is what he explicitly calls “naturalism” in ethics:

[Naturalism] consists in substituting for ‘good’ some one property of a natural object or of a collection of natural objects; and in thus replacing Ethics by some one of the natural sciences. In general, the science thus substituted is one of the sciences specially concerned with man. . . . In general, Psychology has been the science substituted, as by J. S. Mill.⁴⁷

And his objection centers on the famous naturalistic fallacy:

[T]he naturalistic fallacy . . . [is] the fallacy which consists in identifying the simple notion which we mean by ‘good’ with some other notion.⁴⁸

[The naturalistic] fallacy, I explained, consists in the contention that good *means* nothing but some simple or complex notion, that can be defined in terms of natural qualities.⁴⁹

In other words, according to Moore ethical naturalism is the claim that the property⁵⁰ of being good is identical with some simple or complex natural

property (which for our purposes we can construe as either a first-order physical property, a second-order physical property, or a sensory experiential property); and the naturalistic fallacy consists precisely in accepting such an identification of properties. So far, so good—awful pun intended. But now for the sad part of the story.

Most post-Moorean analytic philosophers have accepted Moore's characterization of ethical naturalism as well as his antinaturalistic conclusions; yet his main argument in support of its putative fallaciousness—the “open question argument”—is generally held to be a notorious failure. Here is the argument:

The hypothesis that disagreement about the meaning of good is disagreement with regard to the correct analysis of a given whole, may be most plainly seen to be incorrect by consideration of the fact that, whatever definition be offered, it may always be asked, with significance, of the complex so defined, whether it is itself good.⁵¹

We must not, therefore, be frightened by the assertion that a thing is natural into the admission that it is good: good does not, by definition, mean anything that is natural; and it is always an open question whether anything that is natural is good.⁵²

For convenience I will call the fundamental ethical property of being good *the Good*. The open question argument says that any attempt to explain the Good solely in terms of some corresponding natural property *N* (say, the property of being a pleasurable state of mind) falls prey to the decisive objection that even if *X* is an instance of *N* it can still be significantly asked whether *X* is good: that is, it can be significantly postulated that *X* is an instance of *N* but is not good. Moore's rationale for this is that the only case in which it would be altogether nonsensical to postulate that *X* is an instance of *N* but is not good is the case in which it is strictly impossible or contradictory to hold that *X* is not good, that is, when *X* is, precisely, good. So if it is significant to ask whether *X* is *N* but not good, then *N* is not identical to the Good. And Moore finds it to be invariably the case that it is significant to ask whether *X* is *N* but not good, hence invariably it is the case that *N* is not identical to the Good. He concludes that the Good is an indefinable or unanalyzable nonnatural property, and that it is a fallacy to try to identify the Good with any natural property.

The open question argument is doomed, I think, because of a mistake Moore has made about the individuation of properties. The problem as I see it is that the argument implies a criterion of property-identity that is absurdly strict.⁵³ Familiar criteria for the identity of two properties include (i) equivalence of

their analytic definitions, (ii) synonymy of their corresponding predicates, and (iii) identity of their cross-possible-worlds extensions. But Moore's criterion is importantly different:

[W]hoever will attentively consider with himself what is actually before his mind when he asks the question 'Is pleasure (or whatever it may be) after all good?' can easily satisfy himself that he is not merely wondering whether pleasure is pleasant. And if he will try this experiment with each suggested definition in succession, he may become expert enough to recognise that in every case he has before his mind a unique object, with regard to the connection of which with any other object, a distinct question can be asked. Everyone does in fact understand the question 'Is this good?' When he thinks of it, his state of mind is different from what it would be, were he asked 'Is this pleasant, or desired, or approved?' It has a distinct meaning for him, even though he may not recognize in what respect it is distinct. Whenever he thinks of 'intrinsic value', or 'intrinsic worth', or says that a thing 'ought to exist', he has before his mind the unique object—the unique property of things—which I mean by 'good'. . . . 'Good', then, is indefinable.⁵⁴

Moore's criterion is that two properties are identical if and only if the intentional contents of the states of mind in which the properties are recognized are phenomenally indistinguishable.⁵⁵ Consequently, even two properties that are by hypothesis definitionally equivalent—for example, the property of being a bachelor and the property of being an adult unmarried male—will come out nonidentical according to this test. The intentional content of the state of mind of someone who says or thinks that *X* is a bachelor is clearly phenomenally distinguishable from that of the same person when she says or thinks that *X* is an unmarried adult male. I might not wonder even for a split second whether a bachelor is a bachelor, yet find myself mentally double-clutching as to whether a bachelor is an unmarried adult male. But then according to that test it is not nonsensical to ask whether *X* is an unmarried adult male but not a bachelor: from which we must conclude by Moorean reasoning that the property of being a bachelor is indefinable, and that it is a fallacy to try to identify any property with any other property, *including the property that expresses its definition*. Obviously this cannot be correct. It is patently absurd to constrain property identity so very, very tightly.⁵⁶

Moore's antinaturalism also contains another less noticed but equally serious difficulty. This difficulty stems from his explicit commitment to a certain strict modal connection between intrinsic-value properties and natural facts:

I have tried to shew, and I think it is too evident to be disputed, that such appreciation [of intrinsically valuable, or good, qualities] is an organic unity, a complex whole;

and that, in its most undoubted instances, part of what is included in this whole is *a cognition of material qualities*, and particularly of a vast variety of what are called *secondary* qualities. If, then, it is *this* whole, which we know to be good, and not another thing, then we know that material qualities, even though they be perfectly worthless in themselves, are yet essential constituents of what is far from worthless [A] world, from which material qualities were wholly banished, would be a world which lacked many, if not all, of those things, which we know most certainly to be great goods.⁵⁷

[I]f a given thing possesses any kind of intrinsic value in a certain degree, then not only must that same thing possess it, under all circumstances, in the same degree, but also anything *exactly like it*, must, under all circumstances, possess it in exactly the same degree. Or, to put it in the corresponding negative form: it is not *possible* that of two exactly similar things one should possess it and the other not, or that one should possess it in one degree, and the other in a different one.⁵⁸

According to Moore (1) every intrinsic-value property has some complex set of natural qualities as its “essential constituents,” and (2) for any natural thing that “possesses any kind of intrinsic value in a certain degree, then not only must that same thing possess it, under all [logically possible] circumstances, in the same degree, but also anything *exactly like it*, must, under all [logically possible] circumstances, possess it in exactly the same degree.” In other words, intrinsic-value properties are both *constituted by* and *logically strongly supervenient on* natural properties. It follows that the Good is, incoherently, both natural and nonnatural. I say “incoherently” rather than “inconsistently” because, as we have seen, strictly speaking it is possible to say that two sets of properties are nonidentical even though one of those sets of properties is logically strongly supervenient on the other set of properties. But since logical strong supervenience implies explanatory reduction, and since the philosophical upshot of Moore’s ethical antinaturalism is surely not the mere *nonidentity* of the Good with any other property, but rather the *explanatory irreducibility* of the Good to any other property, his overall view is in conflict with itself.

We have just seen that Moore’s antinaturalism is a double failure. But all is not lost, for this double failure teaches us two important lessons. First lesson: do not make your argument against scientific naturalism rest on questionable assumptions about property-individuation or property-identity! Second lesson: you must attack the logical strong supervenience thesis of scientific naturalism directly! Taking these two post-Moorean dicta to heart, here is a new general argument against scientific naturalism.

Prove: That scientific naturalism is false

1. Scientific naturalism asserts that facts about strict modality (e.g., facts about logical necessity, certainty, and obligation) logically strongly supervene on the natural facts. (Premise.)
 2. So, if scientific naturalism is true, then in every logically possible world in which the natural facts exist, facts about strict modality exist (From (1).)
 3. But natural facts are logically contingent facts, that is, they logically could have been otherwise. (Premise.)
 4. If the natural facts logically could have been otherwise, then it is logically possible that facts about strict modality do not exist. (From (3).)
- (Elucidation of step 4: This does not mean that necessarily, if there is a change in the lower-level properties/facts, then there is also a corresponding change in the higher-level properties/facts. Rather, it means that necessarily, if there is a change in the lower-level properties/facts, then *possibly* there is also a corresponding change in the higher-level properties/facts. If, as logical strong supervenience implies, there is a logically necessary covariation relation between the higher-level properties/facts and the lower-level properties/facts, then it must be the case that changes in the lower-level properties/facts are *logically consistent with* corresponding changes in the higher-level properties/facts. For example, if the higher-level properties/facts happen to be identical with the lower-level properties/facts, then obviously changes in the lower-level properties/facts will also yield changes in the higher-level properties/facts.)
5. Logical strong supervenience is a strict modal relational fact. (Premise.)
 6. So, if the natural facts logically could have been otherwise, then it is logically possible that logical strong supervenience does not exist. (From (4) and (5).)
 7. If it is logically possible that logical strong supervenience does not exist, then it is logically possible that it is logically possible that all the natural facts remain the same and strict modality does not exist. (From (6).)
 8. If it is logically possible that it is logically possible that all the natural facts remain the same and strict modality does not exist, then it is logically possible that all the natural facts remain the same and strict modality does not exist. (From (7).)
 9. So, if scientific naturalism is true, then strict modality does not logically strongly supervene on the natural facts. (From (1) and (8).)
 10. So, if scientific naturalism is true, then scientific naturalism is false. (From (1), (2), and (9).)
 11. Therefore, scientific naturalism is false, by reductio. (From (10).)

The key elements in this argument are the concepts of logical strong supervenience, strict modality (whether logical, epistemic, or deontic), logical contingency, and the plausible modal principle deployed in step (8)—directly derivable from one of the axioms of C. I. Lewis’s modal system S4—that if it is logically possible that it is logically possible that S , then it is logically possible that S (or in the Hughes and Cresswell symbolism, $MMp \supset Mp$).⁵⁹

Correspondingly, the key move in the argument is to display the absurd consequences of making facts about strict modality logically strongly supervenient on the natural facts. The very idea of strict modality implies *logical independence from any particular logically possible world, including the actual world*, while contrariwise the very idea of logical strong supervenience on the natural facts implies *logical dependence on the actual world*.

1.4 Antinaturalism as Antipsychologism

We should probably remind ourselves where we are in the overall argument of the chapter. In section 1.1, we saw that Frege and Husserl desperately wanted to reject logical psychologism—the thesis that logic is explanatorily reducible to scientific psychology—but that in fact they presented no cogent arguments against it. In section 1.2 we saw that logical psychologism is a species of scientific naturalism, and consequently that antipsychologism is antinaturalism. In section 1.3 we saw that Moore’s open question argument against naturalism fails. And in section 1.4 I offered a new general argument against naturalism that is designed to avoid Moore’s mistakes. Now it is time to apply that same general argument specifically to scientific naturalism about logic.

Prove: That scientific naturalism about logic is false

- (1) Scientific naturalism about logic asserts that logic logically strongly supervenes on the natural facts. (Premise.)
- (2) So, if scientific naturalism about logic is true, then in every logically possible world in which the natural facts exist, logic exists. (From (1).)
- (3) But natural facts are logically contingent facts, that is, they logically could have been otherwise. (Premise.)
- (4) If the natural facts logically could have been otherwise, then it is logically possible that logic does not exist. (From (3).)
- (5) Logical strong supervenience is a logical relational fact. (Premise.)

- (6) So, if the natural facts logically could have been otherwise, then it is logically possible that logical strong supervenience does not exist. (From (4) and (5).)
- (7) If it is logically possible that logical strong supervenience does not exist, then it is logically possible that it is logically possible that all the natural facts remain the same and logic does not exist. (From (6).)
- (8) If it is logically possible that it is logically possible that all the natural facts remain the same and logic does not exist, then it is logically possible that all the natural facts remain the same and logic does not exist. (From (7).)
- (9) So, if scientific naturalism about logic is true, then logic does not logically strongly supervene on the natural facts. (From (1) and (8).)
- (10) So, if scientific naturalism about logic is true, then scientific naturalism about logic is false. (From (1), (2), and (9).)
- (11) Therefore, scientific naturalism about logic is false, by reductio. (From (10).)

I conclude that logic is not scientifically naturalizable. And since logical psychologism is a form of scientific naturalism about logic, it follows that logical psychologism is false.

1.5 The Perils of Platonism

Frege is not implausibly taken by many philosophers to be the “compleat” antipsychologist, the most thoroughgoing opponent of logical psychologism. This belief is well supported by the Frege quotations we surveyed in section 1.2. Furthermore, Frege is often taken to be logical platonist. According to logical platonism, the “standard” (or Tarskian, referential) semantics of natural language, together with the plausible idea that the semantics of logic should be “homogeneous” or uniform with the rest of natural language, requires (i) the existence of objectively real (i.e., intersubjectively knowable and non-mind-dependent), abstract (i.e., nonspatiotemporal) logical objects, and (ii) the human knowability of these objects. Thus, logical platonism is a version of logical supernaturalism. On the face of it, Frege certainly *seems* to be a logical platonist, and thereby a logical supernaturalist, because he explicitly says in “Thoughts” that logical entities must exist in an ontologically distinct domain he calls the “third realm,”⁶⁰ distinct from the mental and physical realms. So one might easily assume that any rejection of logical psychologism entails logical platonism. Frege scholars—

and here I am thinking specifically of Oxford-trained Frege scholars influenced by Michael Dummett—may demur. But for our purposes it does not matter whether the historical Frege was a logical platonist or not. What matters is the thesis that antipsychologism entails logical platonism. I want to reject this thesis on the grounds that although antipsychologism is true (by the argument I just sketched in section 1.4), nevertheless logical platonism is false. In other words, the thesis asserts a non sequitur.

What is wrong with logical platonism? Philosophers have tended to approach this problem indirectly, by way of mathematical platonism. Mathematical platonism, by the same argument that applied to logical platonism above, says that the semantics of mathematical truth requires the existence of humanly knowable, real, abstract mathematical objects. In response, Paul Benacerraf has put forward a highly influential argument against mathematical platonism, which I have rationally reconstructed as follows:⁶¹

- (1) If mathematical platonism is true, then mathematical objects are causally inert because (i) they are abstract, hence not in spacetime, and (ii) all causally relevant⁶² (not to mention causally efficacious) entities are in spacetime.
- (2) Our best overall theory of knowledge, as applied to mathematics, requires a sense-perception-like capacity to account for our cognitive access to mathematical objects.
- (3) Sense perception requires an efficacious causal link, involving direct physical contact, between the object perceived and the perceiver.
- (4) So, if mathematical platonism is true, then mathematical objects cannot be known by any sort of sense perception.
- (5) Therefore, if mathematical platonism is true, mathematical knowledge is impossible.

There are, however, three apparent problems with Benacerraf's argument.

First, Benacerraf assumes that an entity can be causally relevant only if it is "in" spacetime. This could mean different things, but for the purposes of argument I will take it to mean that the entity has a *unique location* in spacetime. So he is saying that an entity can be causally relevant only if it has a unique location in spacetime. But that seems false. Causal laws and functional organizations, for example, have causal relevance—indeed, fundamental causal relevance—because the existence and application of causal laws is a necessary and sufficient condition of all causal relations, and because functional organizations, which specify patterns or configurations of

causation in the material world, are necessarily instantiated whenever and wherever causal processes occur: yet causal laws and functional organizations are not uniquely located in spacetime. Causal laws obtain without spatial or temporal bias throughout spacetime. And functional organizations are multiply realizable across spacetime. Indeed, causal laws and functional organizations alike are plausibly held to be *abstract* in the sense that they are not uniquely located in spacetime. Yet they are fundamentally causally relevant. So step (1) is questionable.

Second, it is not at all obvious that our best overall theory of knowledge, as applied to mathematics, requires a sense-perception-like capacity to account for our cognitive access to mathematical entities. Let's call this cognitive access "mathematical intuition." To be sure, philosophers have often assumed that mathematical intuition is sense-perception-like. But unless they have some further independent argument, I see no good reason why mathematical intuition could not operate *nonperceptually*: say, like memory, imagination,⁶³ or conceptual understanding. So step (2) is questionable.

Third and finally, even granting momentarily for the purposes of argument that entities can have causal relevance only if they are in spacetime, Benacerraf further assumes that an entity can have an efficacious causal influence on another only by direct physical contact. But that seems false too if we adopt either a counterfactual analysis⁶⁴ or a probabilistic analysis⁶⁵ of causation, since these do not require direct physical contact between cause and effect. So step (3) is questionable.

Therefore, at least on the face of it (but see section 6.5 and section 6.6 for a more in depth analysis of Benacerraf's argument), we need another argument, distinct from Benacerraf's, against mathematical platonism and a fortiori against logical platonism. Such a non-Benacerrafian argument can, I think, be found in the fairly simple idea that logical platonism *metaphysically alienates the human mind from logic*. What I mean is this. The human mind is an animal mind—more specifically, the human mind is the mind of a sentient living organism, a finite mortal creature that is uniquely located in spacetime. But if on the one hand logical entities must exist in a nonmental and abstract or nonspatiotemporal world in the platonic sense of *transcending* spacetime, and on the other hand we humans are animals fully *in* spacetime, then the nature of logic apparently neither presupposes, requires, implies, nor in any other way saliently connects with actual or possible human thinkers. This difficulty will still hold even if the real nature of knowledge

does not require any causal relation whatsoever between the knower and the object known. The predicament that the human mind apparently has no salient connection with logic is what I mean by its metaphysical alienation from logic. I do not mean to imply that the metaphysical alienation of the human mind from mathematics or logic is somehow radically or even basically different from what Benacerraf is driving at: on the contrary, what I mean is that when we peel away some questionable aspects of Benacerraf's argument, the metaphysical alienation of the human mind from mathematics or logic is its simple bottom line. So, in that simple, bottom-line sense, I am fully in agreement with Benacerraf. Nor do I mean to imply that logical platonism definitely *does* metaphysically alienate the human mind from logic, but rather only that *on the face of it* there is an intelligible and important worry that the platonist must respond to.

Here is the worry. The supposition that the human mind is alienated from logic has two very implausible consequences. If the human mind is not in any way saliently connected with logic, then how could humans ever have knowledge of logic? And if the human mind is not in any way saliently connected with logic, then how could logic ever be normative and perhaps even unconditionally obligatory for human reasoning processes? In other words, if the human mind is metaphysically alienated from logic, then human logical knowledge and human logical reasoning both appear to be impossible. But this is directly inconsistent with two plausible commonsense beliefs: that we human animals do have some logical knowledge, and that logic is normative and perhaps even unconditionally obligatory for our human reasoning processes. These beliefs are, it seems to me, confirmed each time someone teaches an introductory logic class and marks her students' work accordingly. I conclude that until logical platonists have shown us that they have some acceptable way of avoiding the metaphysical alienation of the human mind from logic, we should reject logical platonism.

1.6 Logical Cognitivism Briefly Introduced

Up to this point, my account may seem distressingly negative and critical. Frege and Husserl were basically right about antipsychologism, but their argument against it is wrong; Moore was basically right about antinaturalism, but his argument against it is wrong; scientific naturalism is wrong; scientific naturalism about logic is wrong, so logical psychologism is wrong;

Benacerraf was basically right about antiplatonism, but his argument against it is wrong; and logical platonism is wrong, or at least it is currently unacceptable.

So am I nothing but a nattering nabob of negativity about psychologism and platonism? Fortunately the upshot of this chapter is positive. By way of conclusion and as a segue to later chapters I want to state my own view about the nature of rationality and logic, namely logical cognitivism. This brief introduction is by no means a proper argument for logical cognitivism; that will come later. All I want to do right now is indicate that logical cognitivism is well positioned to build on the results of this chapter; that it has traditional, recent, and contemporary theoretical motivations; and that it is *prima facie* supported by a considerable body of empirical work in cognitive psychology.

Logical cognitivism says (i) that logic is cognitively constructed by rational animals, and (ii) that rational human animals are essentially logical animals. For the moment I will concentrate on the first claim. To say that logic is cognitively constructed by rational animals is to say that rational animals—including all rational human animals—possess a cognitive faculty that is innately configured for representing logic and is the means by which all actual and possible logical systems are constructed. This claim is what I call *the logic faculty thesis*. If the logic faculty thesis is correct, then logic is both explanatorily and ontologically dependent on rational animals. It should be particularly noted that the logic faculty is a mental *faculty* and not a mere mental *capacity*, because it is a modular⁶⁶ capacity for producing mental representations; and it is innate in the dual sense that it is an intrinsic part of the mind of a rational animal and also universally embodied in mature, healthy, fully equipped humans. But the logic faculty is not necessarily restricted to humans. On the contrary, the logic faculty is multiply embodiable, or instantiable across many different biological species, since it seems quite conceivable and thus logically possible that there could be Martian logicians and perhaps even logical animals belonging to other earthly species.

As regards its provenance, the logic faculty thesis is the fusion of three fairly familiar philosophical ideas: (1) the traditional idea, drawn from Kant⁶⁷ and Boole,⁶⁸ that logic is the a priori science of the “laws of thought”; (2) the mid-twentieth-century idea, drawn from Quine, that logic has a universal, indispensable, and unrevisable basis, namely, “sheer logic”;⁶⁹ and (3) the contemporary idea, drawn from Chomsky’s psycholinguistics and Fodor’s

rational psychology, that the human animal carries out all its specifically rational cognitive activities in a fully meaningful inner language or “language of thought,” which in turn is sufficient to account for our cognition of natural language. These three ideas, in turn, seem to be supported by a significant body of empirical work in psycholinguistics and the cognitive psychology of reasoning.⁷⁰

I need to emphasize that I am *not* saying that just because I have dropped some important names and theory-labels it is in any way proven that either the logic faculty thesis in particular or logical cognitivism more generally is true. My job in the rest of this book is to argue from independent grounds that logical cognitivism is true. Right now I want to stress just two points: (1) the *prima facie* intelligibility of logical cognitivism; and (2) the fact that my indebtedness to the laws-of-thought tradition, to the sheer-logic tradition, to the language-of-thought tradition, and to the psychology-of-reasoning tradition, is certainly explicit but not in any way uncritical.

As regards point (1): I will get to that very shortly.

As regards point (2): I do not accept Kant’s idealism or Boole’s theism. Nor do I hold that their very limited conceptions of logical theory are defensible without serious qualification. Also, I am fully aware that the claim that something counts as a “sheer logic” needs to be reconciled on the one hand with the insistent claims of those—paradigmatically, for example, Quine—who take the One True Logic to be classical or elementary logic (or some relatively minor variation on it such as monadic first-order logic),⁷¹ and on the other hand with the equally insistent claims of those who point to the patent existence of a plurality of nonclassical (whether extended or deviant) logics.⁷² I do not accept the biologically based scientific naturalism that is sometimes added to Chomsky’s psycholinguistics.⁷³ I do not accept Fodor’s computational or machine functionalism,⁷⁴ his view that the language of thought must be written in a single code,⁷⁵ or his view that *every* mental module is “informationally encapsulated.”⁷⁶ And I am fully aware that the empirical psychology of reasoning is fraught with controversy, and needs to be critically unpacked and interpreted.⁷⁷

What I am most concerned with right now, in any case, is point (1). I mean that it is perfectly consistent to hold (i) that logical psychologism is false, (ii) that logical platonism is false, and (iii) that logical cognitivism is true. This is because according to my conception of rationality, rational animals are

normative-reflective animals in possession of scientifically–naturalistically intractable notions expressing strict modality, among which are concepts expressing logical necessity, epistemic certainty, and unconditional obligation. The concept of logical necessity in turn belongs to sheer logic via the notion of *consequence* and is contained innately in the logic faculty. So, human beings, precisely insofar as they are rational, not only possess concepts expressing logical necessity but are also capable of making a priori knowledge claims about logic and of taking logic to be normative and perhaps even unconditionally obligatory for their reasoning processes. This, finally, implies that logical cognitivism smoothly conforms to my arguments for the claims that logic is not scientifically naturalizable and that logical platonism is false.

At this point you are no doubt asking yourself this highly relevant critical question: Is logical cognitivism ultimately a form of psychologism? My answer is that it depends on what one means by the word ‘psychologism’. If we are being historically precise and take logical psychologism to be the view that logic is explanatorily reducible to empirical psychology, then logical cognitivism is most definitely *not* a form of psychologism, since psychologism entails scientific naturalism whereas logical cognitivism assumes the denial of scientific naturalism and is nonreductive. Nevertheless, if we allow ourselves a temporary historical imprecision, and for the moment take psychologism to be any theory that asserts an essential connection between the logical and the psychological, then we can say that logical cognitivism is indeed a form of psychologism.

Furthermore, there is an important intellectual benefit to be gained by temporarily loosening our historical scruples about the use of the term ‘psychologism’. We are as a consequence able to recognize that the destruction of psychologism carried out by Frege, Husserl, and (to a lesser extent) Moore was the legitimate rejection of every form of scientific naturalism about logic, including logical psychologism—but not the legitimate rejection of *every* psychological theory of logic. Not every psychological theory of logic is a form of scientific naturalism.⁷⁸ In my opinion, their collective problem was that they did not take human rationality seriously enough. On the contrary, by seriously underestimating the nature, scope, and limits of human rationality they strongly encouraged a misguided tendency to jump straight from the rock of logical psychologism over to the hard place of logical

platonism, thereby metaphysically alienating the human mind from logic. But I believe that human rationality and logic are essentially related: I believe that logic is cognitively constructed by rational animals (the logic faculty thesis), and also that rational human animals are essentially logical animals (the logic-oriented conception of human rationality). So I believe that by taking human rationality seriously we can vindicate Haack's highly prescient suspicion that "at least some form of psychologism [is] more plausible, than it is nowadays fashionable to suppose."