

Psychologism in the Logic of John Stuart Mill: Mill on the Subject Matter and Foundations of Ratiocinative Logic

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This paper considers the question of whether Mill's account of the nature and justificatory foundations of deductive logic is psychologistic. Logical psychologism asserts the dependency of logic on psychology. Frequently, this dependency arises as a result of a metaphysical thesis asserting the psychological nature of the subject matter of logic. A study of Mill's *System of Logic* and his *Examination* reveals that Mill held an equivocal view of the subject matter of logic, sometimes treating it as a set of psychological processes and at other times as the objects of those processes. The consequences of each of these views upon the justificatory foundations of logic are explored. The paper concludes that, despite his providing logic with a prescriptive function, and despite his avoidance of conceptualism, Mill's theory fails to provide deductive logic with a justificatory foundation that is independent of psychology.

1. Introduction

As Passmore (1957, p. 13) has remarked, the first publication of Mill's *A System of Logic* in 1843 marks a 'natural boundary' in the history of philosophy. Of particular interest, Mill's theory of logic appeared at a time when debates concerning psychologism in logic, which would peak at about the turn of the century, were just beginning (Brockhaus 1991; Kusch 1995). John Stuart Mill (1806–1873) belonged to the generation of logicians immediately preceding the two most prominent historical advocates of anti-psychologism Frege (1848–1925) and Husserl (1859–1938). Yet even these two thinkers could not agree on whether Mill's theory of logic is, in fact, psychologistic. While Frege grouped his criticisms of Mill's 'gingerbread or pebble arithmetic' (Frege 1884[1980], Intro. p. vii; cf. *Mill 1843/1872*, II.vi.2; 1973, pp. 256–7) together with his broader attacks against psychologism, he does not appear to have directly attributed an explicitly psychologistic view to Mill (Skorupski 1989, p. 164).¹ On the other hand, Husserl (1913[1970], p. 90) accuses Mill of a decidedly psychologistic position, based largely on Mill's famous passage that '[logic] is a part, or branch, of psychology' (*Mill 1865/1867*, ch. xx; 1979, p. 359). Nor does this discord seem to have been resolved in the intervening century.

Though there is remarkably little debate on the topic, there remains considerable disagreement in the literature concerning whether Mill's account of logic is psychologistic. Many of the seminal treatments of Mill's logic simply do not address the question of psychologism focussing instead on other issues. Some,

¹ That said, Frege does argue that Mill's account makes not only the truth but the very sense of arithmetical propositions contingent on psychological facts about our cognitive faculties (Frege 1884, §8; 1980, pp. 11–12). For a more complete treatment of Frege and Mill on the topic of arithmetic see Kessler 1980, and for a review of Frege's arguments against physicalist and abstractionist accounts of number see Cohen 1998.

for instance, address issues such as the epistemological connections between Mill's views on logic and the social-political philosophies of Mill's day (*Anschutz 1949*). Others frame questions concerning Mill's account of the nature and foundation of deductive logic in terms of whether deductively valid arguments are question begging—i.e. merely apparent inferences—and how deductive inference can be informative (*Jackson 1941; Scarre 1984*). Of those works that do venture an opinion on the topic of psychologism in Mill's logic, no consensus is to be found. In his 'Introduction' to Mill's *System of Logic* (1973, p. xxi) R. F. McRae observes that Mill's account has been described as 'an attempt to expound a psychological system of logic within empiricist principles' (*Hartman 1967*, p. 14). Similarly, Macnamara (1986, p. 13), Meiland (1976, p. 328), Posy (1997, p. 260), Richards (1980, pp. 24–8) and Shanker (1998, pp. 82–7) determine that Mill's philosophy of logic is psychologistic. On the other hand, McRae himself (1973, p. xxiv), along with authors such as G. P. Baker (1988, p. 174), Kneale and Kneale (1962, p. 377) and Skorupski (1989, pp. 164–6; 1998, pp. 46 ff.), insist that Mill rejected psychologism. Finally, authors like Passmore have offered an equivocal view, at times attributing (albeit indirectly) a psychologistic position to Mill (1957, pp. 26, 186–7) while at other times suggesting that Mill's views regarding logic are not psychologistic but empirical (1957, p. 148).

While there is no consensus on the matter of whether Mill's theory of logic is psychologistic, there might be said to be an authoritative—though perhaps not predominant—view due to Skorupski (1989, 1998) which maintains that Mill's account of logic is not psychologistic. Skorupski makes this judgement on the basis that psychologism consists in one or both of the two following views:

- (1) that laws of logic are simply psychological laws concerning mental processes;
or
- (2) that 'meanings' are mental entities, and that 'judgements' assert relationships among these entities. (*Skorupski 1998*, pp. 46–7)

Working from this definition, Skorupski argues that Mill held neither of these views. While there can be no objection regarding (2) (see below, §9), Mill's explicit views on (1), and the consequences of them, are perhaps more complicated (see below, §§7, 12–13). Beyond these issues, there is the larger issue of whether these two theses indeed capture the kernel of psychologism.

I contend that the controversial aspects of psychologism arise from a broader view than that encompassed by the two theses above. Psychologism in logic can be generically defined as the thesis that logic is dependent on psychology (*Pandit 1971*, p. 86; *Sober 1978*, pp. 165–6; *Richards 1980*, p. 19; *Cussins 1987*, p. 126; *Notturmo 1989*, preface; *Mohanty 1997*, p. 274). This thesis is generic in the respect that it does not assert the nature or source of the philosophical dependence on psychology, and this dependence can be explained in a variety of ways. One common way of establishing this dependence asserts the metaphysical claim that the subject matter of logic is (at least in some essential part) psychological in nature. Indeed, frequently 'psychologism' is defined as just such a metaphysical thesis (*Toulmin 1958*, p. 86; *Haack 1978*, p. 238; *Sober 1978*, p. 166; *Baker 1988*, pp. 171–2; *Engel 1989[1991]*, p. 292; *Creath 1990*, p. 25; *Brockhaus 1991*, p. 494; *Bell 1992*, pp. 401–2). Such a view could be called metaphysical psychologism about logic.

Both of the definitions considered by Skorupski (above) can be classified as versions of metaphysical psychologism. By different means, each claims that the entities governed by logical laws are psychological in nature. In this respect, Skorupski adopts the right approach when considering the question of psychologism in Mill. The answer, or at least a significant part of it, lies in Mill's account of the nature of the subject matter of logic. Importantly, Skorupski (1989, p. 166) admits that Mill held that logic was somehow dependent on psychology, and the precise character of this dependency is explored in detail below.

The purpose of this paper is to fill a void in the literature by explicitly addressing the question of psychologism in Mill's account of deductive logic.² This question is approached by considering Mill's views on the subject matter of logic as presented in his two major works on logic: *A System of Logic* (1843/1872[1973]) and *An Examination of Sir William Hamilton's Philosophy* (1865/1867[1979]). As is suggested by the current state of the literature, it would seem that a case could be made on either side of this question. This is especially so since Mill's position on the subject matter of logic and its relationship with psychology is, even at the best of times, neither transparent nor unequivocal. Indeed, as will be demonstrated, Mill's position on the subject matter of logic appears to be decidedly fractured. At times, Mill holds that the subject matter of logic is the psychological operations of the understanding, while at other times he holds that the subject matter of logic is the non-psychological objects of these mental operations. The important question to be answered, though, is whether Mill's theory successfully insulates logic from psychology at least to the degree that the laws of logic are not dependent on contingent facts about human psychology.

2. Mill's epistemological framework and the domain of logic

In order to appreciate Mill's account of the subject matter and the corresponding foundations of logic, we must first be familiar with Mill's general epistemological framework. In general, Mill's epistemology is empiricist and foundationalist. For Mill, there are two basic ways by which we come to know truths: intuition and inference. He writes (1843/1872, Intro. §4; 1973, p. 6): '[t]ruths are known to us in two ways: some are known directly, and of themselves; some through the medium of other truths. The former are the subjects of Intuition, or Consciousness; the latter, of Inference'. This view displays two characteristic features of foundationalism: (1) those truths known by intuition cannot be justified with reference to other known truths (i.e. they cannot be known on the basis of a knowledge of other truths) and (2) truths known by intuition become the foundation, on the basis on which all other truths are known. Truths known by intuition are 'known antecedently to all reasoning' (1843/1872, Intro. §4; 1973, p. 7), and form 'the original data, or ultimate premises of our knowledge' (1843/1872, Intro. §4; 1973, p. 7). Because of this, truths known purely by intuition are a necessary component of any body of knowledge. As Mill argues (1843/1872, Intro. §4; 1973, p. 7), since in the case of inferred knowledge '[o]ur assent to the conclusion . . . [is] grounded on the truth of the premises, we could

² As such, I set aside questions of whether Mill's account of such adjacent disciplines as arithmetic, geometry and even inductive logic are psychologistic. Instead, I am concerned only with Mill's account of the status and foundation of deductive logic, and with basic logical principles such as the law of non-contradiction.

never arrive at any knowledge by reasoning, unless something could be known antecedently to all reasoning'. Mill's empiricism is to be found in his doctrines that all of the substantive truths that can be known directly by intuition are particular and are known on the basis of experience.

Mill's foundationalism significantly shapes his account of logic. Specifically, while we can be certain of those truths known by intuition, they are beyond the scope of logic. Mill writes (*1843/1872*, Intro. §4; *1973*, p. 7): 'Whatever is known to us by consciousness [i.e. intuition], is known beyond possibility of question [i.e. it is certain and indubitable]. . . . No science is required for the purpose of establishing such truths; no rules of art can render our knowledge of them more certain than it is in itself. There is no logic for this portion of our knowledge'. As such, logic concerns only those truths known through inference, on the basis of other truths. Mill writes:

The province of logic must be restricted to that portion of our knowledge which consists of inferences from truths previously known; whether those antecedent data be general propositions, or particular observations and perceptions. Logic is not the science of Belief, but the science of Proof, or Evidence. In so far as belief professes to be founded on proof, the office of logic is to supply a test for ascertaining whether or not the belief is well grounded. With the claims which any proposition has to belief on the evidence of consciousness [i.e. intuition], that is, without evidence in the proper sense of the word, logic has nothing to do. (*1843/1872*, Intro. §4; *1973*, p. 9; see also *1843/1872*, II.i.1; *1973*, p. 158, where Mill offers a similar description of 'the peculiar problem of the Science of Logic').

Not only is the domain of logic thus limited to a certain fragment of human knowledge, but its function regarding this fragment is restricted also. The function of logic is to supply a set of rules of art for the estimation of evidential relations supporting this body of inferred knowledge.

The purpose of logic, according to Mill, is inherently practical; it has an epistemological value. Since Mill takes inference to be the principal subject of logic (*1843/1872*, I.i.1; *1973*, p. 19), an understanding of Mill's conception of logic must appreciate Mill's view of the nature of inference. According to Mill, 'inference in the proper acceptation of the term, [consists in] those [cases] in which we set out from known truths, to arrive at others really distinct from them' (*1843/1872*, II.i.3; *1973*, p. 162). Thus, Mill holds that logic is involved in the advancement of knowledge. Because it is involved in the advancement of knowledge, the purpose of logic is not merely to *preserve* (or, to use Mill's word, 'conduct') truth; rather the function of logic is to *establish* truth (i.e. the truth of individual, contingent propositions). It is in this context that Mill distinguishes between a 'Logic of Consistency' (or Formal Logic) and a 'Logic of Truth' (*1843/1872*, II.iii.9; *1973*, p. 208). For Mill, logic is properly conceived of as a Logic of Truth, and as such logical rules include any rule of evidence or justification—at least insofar as these rules have a role in inferring one proposition from other propositions.

According to Mill, then, 'Logic . . . is the entire theory of the ascertainment of reasoned or inferred truth' (*1843/1872*, II.iii.9; *1973*, p. 206). Mill takes reasoning to be synonymous with inference (*1843/1872*, II.i.3; *1973*, p. 162), which divides into two kinds: Induction and Ratiocination or Syllogism (*1843/1872*, II.i.3; *1973*, p.

162).^{3,4} ‘Induction is inferring a proposition from propositions *less general* than itself, and Ratiocination is inferring a proposition from propositions *equally* or *more general*’ (1843/1872, II.i.3; 1973, p. 162). Typically we would call Ratiocination by the more familiar name of deduction, and at times Mill does so himself (e.g. 1843/1872, II.iv.1; 1973, p. 209; 1843/1872, II.iv.4; 1973, p. 214). According to Mill, then, the Science of Logic includes not only the study of deductive inference, but also the study of inductive inference. Mill’s view of the domain of logic is considerably broader than logic more narrowly understood as the study of necessary consequence. Since this paper concerns only the nature and justificatory foundations of logic narrowly construed, I limit my discussion of Mill’s account of the foundations of logic to considerations which pertain directly to the foundations of the ratiocinative portion of logic.

3. Mill on logic as the art and science of reasoning

Mill begins his *System of Logic* by accepting Archbishop Whately’s (1787–1863) view that ‘Logic . . . comprises the science of reasoning, as well as an art, founded on that science’ (1843/1872, Intro. §2; 1973, p. 4). The discipline of logic as a whole, Mill calls the Science of Logic (see, e.g. 1843/1872, II.i.1; 1973, p. 158), and it divides completely into the art and the science of reasoning. Mill agrees with Whately that each of these two components is required to achieve the purpose of logic, which Mill describes as follows: ‘[t]he sole object [i.e. objective] of Logic is the guidance of one’s own thoughts’ (1843/1872, Intro. §3; 1973, p. 6).

According to Mill, the art of reasoning and the science of reasoning make separate but individually necessary contributions to the overall purpose of logic. One of the places where Mill describes the object of logic in terms of the individual contributions of these two components is in the following passage.

Our object, then, will be to attempt a correct analysis of the intellectual process called Reasoning or Inference, and of such other mental operations as are intended to facilitate this: as well as on the foundation of this analysis, and *pari passu* with it, to bring together or frame a set of rules or canons for testing the sufficiency of any given evidence to prove any given proposition. (1843/1872, Intro. §7; 1973, p. 12; see also 1843/1872, Intro. §2; 1973, p. 4)

The general division of labour within the discipline of logic seems to be this. The art of reasoning provides rules of evidence that serve to guide our thoughts; it is in

³ Here, Mill seems to treat Ratiocination as coextensive with Syllogism. At other places, Mill makes (1843/1872, II.i.1; 1973, p. 158) the weaker claim that ‘syllogism is the general type [of ratiocination]’.

⁴ According to Mill (1843/1872, II.i.3; 1973, p. 162), in addition to Induction and Ratiocination ‘there is a third species of reasoning, which falls under neither of these descriptions, and which, nevertheless, is not only valid, but is the foundation of both of the others’. While Induction is ‘reasoning from particulars to generals’ (1843/1872, II.i.3; 1973, p. 162), and Ratiocination is ‘reasoning from general to particulars’ (1843/1872, II.i.3; 1973, p. 162) this third species of reasoning appears to be reasoning from particulars to particulars—which encompasses all inference (1843/1872, II.iii.4; 1973, p. 193) and seems to have the form of reasoning by analogy (see 1843/1872, II.iii.3, 1973, pp. 186–92; 1843/1872, II.iii.7, 1973, p. 202). Mill describes this ‘universal type of the reasoning process’ as follows: ‘Certain individuals have a given attribute; an individual or individuals resemble the former in certain other attributes; therefore they resemble them also in the given attribute’ (1843/1872, II.iii.7; 1973, p. 202).

accordance with these rules that we ought to reason. The science of reasoning, on the other hand, provides an analysis of mental processes, and as such is a psychological discipline. Crucially, since the art of reasoning is somehow founded on the science of reasoning, the art of reasoning—which fulfils the prescriptive function of logic—is somehow dependent on psychology.

4. Psychologism and the prescriptive function of logic

So for Mill, the laws of logic are rules or precepts which are normative or prescriptive in character, and whose purpose is to guide our thoughts. One might be tempted to think that the attribution of a prescriptive function to logic is sufficient to answer any charge of psychologism made against Mill. Jacquette, for instance has written:

If logic ... studies patterns of inference from thoughts to thoughts, then it has appeared to some theorists that logic is a branch of psychology that can best be understood in terms of the most advanced psychological science. Against this psychologistic view of logic, antipsychologistic opponents have argued that logic is not a descriptive theory of how we actually think, but a prescriptive account of how ideally we ought to think. (*Jacquette 1997a*, p. v; cf. *Jacquette 2003*, p. ix)⁵

Importantly, though, the claim that logic is prescriptive is not on its own sufficient to overcome the charge of psychologism. Haack, for example, (1978, p. 238) distinguishes between strong and weak psychologism, claiming that while strong psychologism assigns to logic a merely descriptive function, weak psychologism allows that logic is prescriptive of how we should think.⁶ So it would seem that both psychologistic and anti-psychologistic positions can provide logic with a prescriptive function, and as such the prescriptivity of logic is not what is fundamentally at issue in debates about psychologism. As Philipse (1989, p. 62) writes: ‘The issue is not whether logic is a normative discipline, but what kind of science provides normative logic with its theoretical basis. And the mistake of psychologism is not that it tries to deduce *ought* from *is*, ... [its] mistake is that it conceives [of] this *is* as a factual *is*, and thus makes the norms of logic dependent on facts’—specifically contingent facts about human psychology.

So, instead of dismissing the charge of psychologism, the claim that logic is prescriptive merely gives rise to the question of whether the prescriptive rules of logic are genuinely independent from psychological considerations. This question is, in turn, settled by two further questions. First, what is the subject matter of logical rules? What do logical rules govern? Second, what are the ultimate foundations, or justifications, for the prescriptive norms of logic? For Mill, the answer to the second question is influenced by the degree to which the science of reasoning contributes to the rules of its corresponding art. This, in turn, is influenced by Mill’s account of the subject matter of logic.

⁵ It should be noted that Jacquette himself does not hold this view (1997b, pp. 323–4).

⁶ See also Carnap’s definition of ‘qualified psychologism’ (1950, §11; 1962, p. 39; as cited in *Toulmin 1958*, p. 86).

5. Logic as the science of the operations of the understanding

Mill's view that logic is comprised of the art and science of reasoning, and that '[t]he sole object [i.e. objective] of logic is the guidance of one's thoughts' (1843/1872, Intro §3 1973, p. 6) commits him to two decidedly psychologistic theses. The first is the dependence thesis of generic psychologism about logic: that psychology is necessary for logic. The second is metaphysical psychologism about logic: that the subject matter of logic is psychological in nature. In order to appreciate the various problems arising from Mill's adherence to the dependence thesis, one must appreciate the consequences of the metaphysical thesis, and the influence this has on the prescriptive rules of logic.

In Mill's view, 'Reasoning, or Inference [is] the principal subject of logic' (1843/1872, I.i.1; 1973, p. 19). In the *Examination* Mill places reasoning alongside conception (concept formation) and judgement, claiming that 'the[se] three psychological processes ... constitute the operations of the Intellect' (1865/1867, ch. xx; 1979, p. 348).⁷ Repeatedly in the Introduction of *A System of Logic* Mill (1843/1872, Intro. §7; 1973, pp. 12–16) can be found claiming that logic necessarily involves the analysis of mental processes. Indeed, Mill (1843/1872, Intro. §3; 1973, p. 6) goes so far as to *define* logic as 'the science which treats of the operations of the human understanding in the pursuit of truth'. Yet, those same mental processes are the subject matter of psychology.

In addition to studying mental processes, psychology also studies those laws which determine the succession of mental states. According to Mill (1843/1872, VI.iv.3; 1974, p. 852), '[t]he subject ... of Psychology is the uniformities of succession, the laws ... according to which one mental state succeeds another, [i.e.] is caused by, or at least, is caused to follow, another'. In general, there are two such laws. The first is Hume's law that sensory impressions excite 'faint copies' of themselves in the mind called 'ideas'. The second is that the excitement of an idea by some other mental state is governed by the laws of association (1843/1872, VI.iv.3; 1974, p. 852). (As such, the second law is really not an individual law, so much as the entire class of the laws of association, whatever these turn out to be.) Taken together, Mill calls Hume's law and the laws of association the 'Laws of the Mind', and they are unquestionably psychological in character. Importantly, in being causal laws (if only at a psychological level), Hume's law and the laws of association determine the succession of *any* series of mental states, regardless of any epistemological connections which might obtain between those states. That is, the succession of one state by another is completely determined by, and explained in terms of, these psychological laws. Indeed, Mill claims that there is no third, special kind of law pertaining exclusively to the operations of the mind involved in inference. Rather, 'the general laws of association prevail among these more intricate states of mind' (1843/1872, VI.iv.3; 1974, p. 856).⁸

Finally, Mill contends that psychological laws can only be discovered experimentally. He writes (1843/1872, VI.iv.3; 1974, p. 853): 'These simple or

⁷ For an insightful account of Mill's views on the nature of belief see Mandit 1984. There, Mandit argues (1984, p. 86) that Mill held a fractured view on the nature of belief. In his writings on logic, Mill adopted a traditionally empiricist, psychological explanation of belief, while in his political writings Mill advanced an epistemic theory of belief 'which in turn involves a philosophy of mind according to which mind is a social product forged in the intellectual and practical life of a community'.

⁸ Among these 'more intricate states of mind' Mill includes not only cognitive states and processes (e.g. inference) but also emotive states and processes (e.g. desire).

elementary Laws of Mind have been ascertained by the ordinary methods of experimental inquiry; nor could they have been ascertained in any other manner'. Thus not only is the subject matter of the science of reasoning psychological in nature, but if the science of reasoning involves ascertaining the Laws of the Mind, it is dependent on psychology not only for its subject matter but also for its methodology. Further, to whatever extent the art of reasoning is dependent on the science of reasoning, it too will be dependent on psychology with respect to its subject matter and methodology.⁹

On Mill's account the science of reasoning is a branch of psychology whose subject matter and methodology are provided exclusively by psychology. As such, the kinds of things discussed above are the kinds of things that the science of reasoning is capable of contributing to logic. Yet, Mill also claims that the art of reasoning is somehow founded on the science of reasoning—that logical principles are somehow dependent on psychology. Further, Mill is not entirely clear on the contribution which the science of reasoning makes to its corresponding art, or the manner in which the precepts of logic are 'founded' on psychology. Yet, the nature and status of logical principles will be significantly determined by their relationship to the psychological facts and Laws of the Mind provided by the science of reasoning.

6. Mill on the contribution of the science of reasoning to the art of reasoning

There are times when Mill wants to restrict the contribution which the psychological science of reasoning makes to its corresponding art. For instance, Mill (*1843/1872*, Intro. §7; *1973*, p. 13) writes that '[while] it is necessary that the logician should analyse the mental processes with which logic is concerned[,] . . . Logic has no interest in carrying the analysis beyond the point at which it becomes apparent whether the operations have in any individual case been rightly or wrongly performed'. Here, it would seem that the only contribution psychology makes to logic is to provide 'the analysis of the mental process which takes place whenever we reason' (*1843/1872*, Intro §2; *1973*, p. 4), while the art of reasoning alone provides 'the rules . . . for conducting the [reasoning] process correctly' (*1843/1872*, Intro. §7; *1973*, p. 4). On this picture, not only is the extent of this analysis of mental processes limited to whatever is required for the purposes of the art of reasoning (*1843/1872*, Intro. §7; *1973*, p. 13), but the science of reasoning does not contribute to the formulation of the rules of evidence which guide reasoning. As such, the prescriptive elements of logic appear to be completely independent of its psychological aspects.

Yet, this is not the only picture Mill offers of the contribution of psychology to logic. In other places, Mill asserts that the dependency of logic on psychology is far greater. For instance, Mill writes that:

[a] right understanding of the mental process itself, of the conditions it depends on, and the steps of which it consists, is the only basis on which a system of rules, fitted for the direction of the process, can possibly be founded. (*1843/1872*, Intro. §2; *1973*, p. 4)

⁹ Since Mill considered inductive reasoning to be part of logic, Mill could be read as holding that the methodology of experimental psychology is part of logic. Yet, if one is concerned solely with the logic of necessary consequence, Mill's position obviously makes the psychologistic assertion that logic is dependent on psychology with respect to its methodology.

Here, Mill can be read as claiming that psychology actually contributes to the normative project of logic by shaping the rules that direct the proper conduct of these mental processes. On this account, something about the psychological nature of mental processes affects or shapes the rules that guide them. The reasoning informing such a view might look something like this: since the rules of logic direct reasoning processes, the nature of these processes actually shapes the precepts that direct them. On this interpretation of Mill's position, while the epistemic principles which justify logical rules might be independent of psychology, the rules of logic themselves are not independent and would be stated differently were they directing *other* processes. So, the contribution of psychology to logic is not limited to an analysis of mental processes; rather, the rules for the direction of reasoning must somehow be founded on psychological facts about processes involved in reasoning.

In still other places, Mill goes beyond the claim that the science of reasoning shapes the way in which logical rules must be stated if they are to direct reasoning processes. At times, Mill goes so far as to say that 'Its [the Science of Logic's] theoretic grounds are wholly borrowed from Psychology, and include as much of that science as is required to justify the rules of the art' (1865/1867, ch. xx, 1979, p. 359). Here, Mill does not merely assert that psychological facts about the nature of mental processes somehow inform the statement of logical rules. Rather, Mill claims that psychology is involved in the *justification* of the rules of logic, and provides their *theoretic grounds*. On this picture, the rules of logic are in no way independent from psychology, which shapes not only how they are stated, but provides the theoretic grounds from which their justification is derived.

While it may not be possible to provide a definitive interpretation of Mill as holding one of these views over the others, it is important to recognize the strains of psychologism that they share, and the epistemological and interpretive problems associated with each interpretation.

7. Logical precepts: rules of evidence or rules for the estimation of evidence?

According to Mill (1843/1872, Intro §2; 1973, p. 4) the principles of logic are 'rules...for conducting the [reasoning] process correctly'. Further, Mill takes reasoning to be a (human) mental process, and he holds that the science which analyzes our mental processes is psychology. In accepting this picture, Mill (1843/1872, Intro §2; 1973, p. 4) holds that 'Logic . . . comprises the science of reasoning, as well as an art, founded on that science' and, since the science of reasoning is a branch of psychology, logic is somehow dependent on psychology. No matter how strongly this dependence thesis is interpreted, it creates problems for the remainder of Mill's position. Consider the various options associated with the interpretative positions discussed above.

In the following sub-sections, I consider three accounts of the nature and foundation of logical precepts that mark increasing levels of independence from psychology. On the first account, psychological facts are involved in the justification of the principles that distinguish good inferences from bad ones. On the second scenario, the standards which distinguish good inferences from bad ones are justified independently from psychology, but the application of these standards in the task of guiding our thought must reflect the factual details of how our thoughts actually proceed. That is, facts about the nature and operation of psychological processes are

required in order to formulate the rules of logic in such a way as to allow the mind to be guided by them. On the last account, the rules of logic are formulated completely independently of any psychological considerations. Not only are the rules of logic justified completely independently of any psychological considerations, but the articulation of these rules need not reflect any facts concerning the nature or operation of thought and inference.

Precepts of logic are justified by psychology

Suppose we interpret the dependence thesis as the strong claim that psychology provides the theoretic grounds involved in the justification of rules of logic. Since the function of logic is to prescribe certain progressions of thoughts over others, and since *every* succession of mental states is determined by, and explained in terms of, the psychological Laws of the Mind, the precepts of logic can only be a subset of these psychological laws. Further, on this strong picture, the very principles involved in the selection of one sub-set of psychological laws over another (i.e. the justification of logical principles) is itself justified by psychological considerations. Such a view would clearly suffice to relegate logicians to the departmental offices of psychology.

As Skorupski (1989, p. 165) has observed, the problem with attributing this view to Mill is that it takes its textual basis almost entirely from the oft-quoted but controversial passage in the *Examination (Mill 1865/1867, ch. xx; 1979, p. 359)*. Skorupski (1989, p. 166) claims that when this passage is read in its full dialectical context, Mill 'means no more than that the logician must formulate rules of inquiry in a manner which will be as helpful as possible to inquirers, and must draw on the psychology of thought to do so'. According to Skorupski, it is not the justification of logical precepts, so much as their application as rules for correct thinking which is informed by psychological considerations. Yet while it is certainly contestable that Mill held the strong view that psychological considerations justify logical precepts, I claim that the weaker interpretations of Mill's position are no better.

Logical precepts are rules for the estimation of evidence

Suppose, instead, a weaker view on which the precepts of logic are justified independently of psychological considerations. Perhaps, when in the pursuit of truth, the operations of the understanding can be described and classified according to a set of principles and properties which are not ultimately psychological, and it is these properties which ultimately justify the proper separation of reasoning processes into correct and incorrect instances. One might interpret Mill as moving in this direction when he (1843/1872, Intro. §7; 1973, p. 12) claims that 'Logic ... is the science of the operations of the understanding which are subservient to the estimation of evidence: both the process itself of advancing from known truths to unknown, and all other intellectual operations in so far as [they are] auxiliary to this'. Here, the principles of logic might be thought of as rules for the estimation of evidence.

This scenario differs from the first in the following respect. On this scenario logical principles are justified independently of psychological considerations. That is, there is a set of non-psychological principles which separates good reasoning from bad. On this option logic exclusively studies those operations of the understanding involved in the estimation of evidence, and the precepts of logic are prescriptions for these acts of estimation. That is, the precepts of logic are not rules of evidence, but are rules for the

estimation—or recognition—of evidence (i.e. the rules by which the mind correctly apprehends evidential relations). The difference between a rule of evidence and a rule for the estimation of evidence is analogous to Frege's distinction between a law of truth and a law-of-taking-to-be-true (*Frege 1893*, pp. xv–xvi; *1964*, p. 13; cf. *Frege 1918[1977]*, pp. 1–2). A rule of evidence prescribes when one proposition (or set of propositions) is (sufficient) evidence for another; rules of evidence may be seen as describing evidential relations. By contrast, a rule for the estimation of evidence is something that the mind follows when it correctly apprehends an evidential relation; it does not describe evidential relations, but relations between those mental states where evidential relations are correctly apprehended.

Importantly, such an interpretation might not be altogether foreign to Mill's overall position. In order for logic to fulfil its function of guiding our thoughts in the pursuit of the truth, the precepts of logic must somehow apply to our estimation of evidence. As such, those precepts must reflect at least some of the psychological features of thoughts—namely, those by which the recognition of evidence correctly occur. Yet, on such a view, it is not at all clear that the precepts for the estimation of evidence can be formulated independently of psychological considerations.

The first problem facing Mill on this scenario echoes the problem presented by the first scenario: it reduces the precepts of logic to a sub-set of psychological laws. Even if it is supposed that logical principles have a prescriptive character, so long as the purpose of logic is to guide our thoughts, the merit of the normative character of logic is mitigated by our ability to think in accordance with logical precepts. That we *ought* to think in a certain way implies that we *can* think in that way. Yet, the ways in which we *can* think are exhaustively described by the psychological Laws of the Mind. As such, in so far as Mill is committed to the 'ought implies can' premise, the *only* prescriptive function of logic can be to select some subset of patterns of thinking.

So, even on the supposition that there is some set of principles, justified independently of psychology, which distinguish good inferences from bad ones, so long as our thinking (conceived of as a psychological process) is to be guided by these principles, they must serve to indicate some law that the mind can follow. Yet, the only laws that the mind can follow are given by the psychological Laws of the Mind. As such, the principles of logic must function as selection principles, which distinguish certain progressions of thought—those which are involved in the correct apprehension of evidence—from those progressions of thought do not result in the correct apprehension of evidence. The prescriptivity of logic on such a picture would be something like this: to think correctly, follow these successions of thought rather than those. Further, the 'rules', which the mind actually follows in *thinking according to the precepts of logic*, are the Laws of the Mind (or some subset thereof). Whatever the mind does when it thinks correctly is described according to psychological laws. So, if logic is to direct the mind in thought, it must do so by means of those laws in accordance with which the mind *actually* thinks. It is for this reason that psychological facts pertaining to the nature and operation of thought must inform the articulation of the precepts of logic.

While the difference between correct and incorrect thinking might not be marked by categorical differences among the Laws of the Mind, the precepts of logic must, nevertheless, be articulated in terms of these psychological laws. On this picture, patterns of correct thinking are a subset of the patterns of thinking, and these are exhaustively described by psychology. As such, while the selection principles would be independent of psychology, the precepts of logic would not be. Rather, because

they are involved in guiding our thoughts, and the direction of our thoughts is solely determined by psychological laws, the precepts of logic could only be a subset of those psychological laws.

The second problem with this scenario is interpretive. Mill does not claim that logic has a proprietary interest in the rules for the estimation of evidence. Instead, Mill proceeds to assign the same task to the psychologist, claiming (*1843/1872*, VI.iv.3; *1974*, p. 856): ‘Psychologists will always have to inquire, what beliefs we have by direct consciousness, and according to what laws one belief produces another; what are the laws, in virtue of which one thing is recognized by the mind either rightly or erroneously, as evidence of another thing’.¹⁰ The second problem with this option, then, is that Mill asserts that it is the task of psychology to determine the laws which the mind follows in the apprehension of evidential relations. If the rules of logic have the character of rules by which the mind thinks correctly, then these rules cannot but be a subset of the laws by which the mind thinks, and it is the task of psychology to determine all of these laws.

So, even if we grant Mill the claim that there is some set of non-psychological principles by which we separate those successions of thoughts by which we correctly apprehend evidential relations from those successions of thoughts by which we fail to do so, Mill is still committed to the view that logical rules are a sub-set of psychological laws. It would seem, then, that, on the assumption that logic is to provide rules for the estimation of evidence, Mill is committed to a view whereby the rules of inference are a subset of the laws of association and that the precepts of logic are indeed a species of psychological laws.

Logical precepts are rules of evidence

On the first two scenarios, the contribution of the science of reasoning to the art of reasoning results in the position that the rules for correct thinking are a subset of psychological laws. Yet, there may be some reason to suspect that Mill wanted to limit the contribution of the science of reasoning even further. For instance, Mill writes that the notion of evidence is not explained in terms of something that produces a belief. Instead, Mill claims:

By evidence it is not meant anything and everything which produces belief. There are many things which generate belief besides evidence. A mere strong association of ideas often causes a belief so intense as to be unshakable by experience or argument. Evidence is not that which the mind does or must yield to, but that which it ought to yield to, namely, that, by yielding to which, its belief is kept conformable to fact. (*1843/1872*, III.xxi.1; *1973*, p. 564)

Perhaps Mill is here suggesting that the precepts of logic are not rules for the estimation of evidence—they are not a subset of laws in accordance with which beliefs are produced by prior mental phenomena—but are instead rules of evidence.

Suppose, then, that there is some set of properties of thoughts which are non-psychological in nature, and that it is these non-psychological properties of thoughts which provide the theoretic grounds on which the rules of logic are justified. Such a position could result from the view that logic pertains to the contents of these states

¹⁰ Here, Mill seems to relegate not only logic, but all of epistemology in general to psychology.

and processes, and not to the states or processes themselves, where the content of a belief or thought is conceived of as a non-psychological feature or property of that thought. The rules of logic are based upon, and justified in terms of, the properties and relations that obtain between the contents of thoughts. (Perhaps these might be thought of as the semantic, logical, epistemic or evidentiary properties of thoughts.) Suppose further that logic has an exclusive and proprietary interest in these logical or epistemic properties of thoughts, and that the precepts of logic are articulated completely independently of any consideration of how thoughts *actually* proceed.

On this scenario, when in the pursuit of truth the operations of the understanding can be described according to a set of laws (be they prescriptive or descriptive) which are fundamentally different in kind from the psychological laws just given. Perhaps the disciplines of logic and psychology can be distinguished by saying that psychology studies only the causal relations that obtain between psychological states, while logic studies the evidentiary relations that obtain between those same states.¹¹ Perhaps the rules of evidence guiding our estimation of evidence are categorically different from merely associative laws, and perhaps it is the proprietary task of the logician to study just those rules. On this scenario, what is given up is the 'ought implies can' premise, which states that the precepts of logic must be formulated in such a way that they can guide our thoughts. Instead, the precepts of correct thinking are formulated independently of any considerations of how thought actually proceeds. While this scenario grants the highest degree of independence of the art of reasoning from the science of reasoning, it raises two significant problems for Mill: the first is theoretical, and the second is interpretive.

The theoretical problem arising from this scenario becomes apparent when we consider the following questions: How are psychological entities the bearers of non-psychological properties? How is it that psychological states and processes are the bearers of logical and epistemic properties, in such a way that one of them *necessarily* follows from another, or in such a way that one of them is *validly inferred* from another? If beliefs are indeed psychological states then they are exclusively governed by psychological laws. If we want to claim that logical or epistemic relations *also* hold between these psychological states, and that these special relations cannot be explained in terms of the psychological properties of these psychological states, then Mill must explain how this special class of properties attaches to psychological states. Insofar as Mill is committed to the view that the subject matter of logic is reasoning or inference, and that these are psychological processes involving psychological states, Mill faces this theoretical problem.

The move to the claim that the logical and epistemic properties of thoughts can be specified independently of psychological considerations also gives rise to a second, interpretive, problem. In making this move, Mill must admit that the nature of belief and inference cannot be completely explained psychologically. Yet, in his writings on logic Mill *never* makes this claim.¹² Moreover, by hypothesis, the very properties of psychological states in which the art of reasoning takes a unique interest are those about which the science of reasoning can tell us nothing. Indeed, if it is only these special logical and epistemic properties and relations in which logic has any interest, and these properties are explained completely independently of psychology, then why

¹¹ That is, on the naturalistic and psychologistic supposition that relations of evidence can and do hold between natural, psychological states.

¹² But see *Mandit 1984* (cf. note 7 above).

does Mill think that the art of reasoning must be based on the science of reasoning at all? If this were Mill's view, then it would seem that the psychological science of reasoning could tell us *nothing* about the logical and epistemic properties of beliefs. Yet, Mill is unequivocal in his claim that the art of reasoning *is* based on the science of reasoning, and is somehow dependent on it. Just what the nature of that dependency is, Mill is rather sketchy on. But, the fact that he claims there to be any dependency whatsoever indicates that Mill does not unequivocally feel that the foundations of the rules of the art of reasoning, and hence the Science of Logic, can be explained or justified independently of psychology.

It would seem, then, that no matter how strongly we interpret the dependence claim—that the art of reasoning is founded upon the science of reasoning—Mill's position runs into trouble. Importantly, this dependence claim is a consequence of Mill's views regarding the subject matter and purpose of logic. According to Mill, the subject matter of logic is reasoning and inference, and the purpose of logic is to guide our thoughts. So long as these two views are held, Mill seems committed to the claim that the precepts of logic are somehow dependent on psychology.

Mill felt compelled to ground the logical rules of art in the science of psychology because he felt that prescriptive rules of logic, in serving to guide thoughts, must somehow reflect the factual details of how those thoughts actually proceed. So, the moral at this point in the story is this: if one is to start with the commonplace that logic has a prescriptive function of supplying rules for the direction of the mind, and one wishes to avoid the perils of psychologism, one must provide some account of the relationship between logical precepts and patterns of thinking which properly insulates the former from dependency upon the latter. Such an account must begin by providing an explanation of the subject matter of logic, and a justification of logical principles, which is independent from psychological considerations.

Logic as the science of evidence and proof

What then does Mill have to say about the justification of logical precepts and the principles involved in the legitimation of inferences? In order to answer this question, we must first find some examples of those rules or precepts that Mill actually offers as principles of logic.

Problematically, Mill never explicitly states any examples of the precepts of ratiocinative logic.¹³ He does, though, claim (*1843/1872*, II.ii.1; *1973*, p. 166) that all valid instances of deductive inference can be represented in a syllogistic form, and further (*1843/1872*, II.ii.1; *1973*, p. 168) that '[e]very valid ratiocination . . . may be stated in the first figure [of the syllogism]'.¹⁴ As such, it would seem that the rules of

¹³ Mill does offer five Canons of Induction which pertain to his four Methods of Experimental Inquiry (*1843/1972*, III.viii.1–7; *1973*, pp. 388–406). Since I am concerned in this inquiry only with Mill's account of the foundations of the ratiocinative portion of logic, the foundations of induction are not a matter of immediate interest.

That said, Mill holds that induction is involved in every real inference, including ratiocinative inference. Problematically, Mill draws no obvious or direct connection between these canons and the justification of ratiocinative inference. Instead, Mill provides a different set of principles, which he claims to provide the justificatory foundation of all ratiocinative inference, and it is these which I proceed to discuss below.

¹⁴ McCloskey rightly points out (*1971*, p. 22) that 'traditional attempts to reduce all deductive forms of argument to the one syllogistic form would be widely questioned today', and proceeds to give (*1971*, pp. 22–3) a number of deductively valid argument forms which are not reducible to a syllogistic form.

Similarly, Skorupski (*1989*, p. 103) observes that the conversion rules for premises which allow syllogisms to be represented in the first figure are not all merely verbal. Instead, the conversion of some premises requires the law of non-contradiction which, as we will see, Mill considers a real proposition.

ratiocinative inference, for Mill, are given by specifying the valid forms of the syllogism.

Relation between logic and truth

If we accept that the rules for testing the sufficiency of evidence in ratiocinative reasoning are given by certain forms of the syllogism, we must next determine how Mill distinguishes good forms of the syllogism from bad. How is the legitimacy of a form of the syllogism explained? Mill explains (*1843/1872*, II.ii.1; *1973*, p. 166) the legitimacy of syllogistic inference by saying that ‘if the premises are true, the conclusion must inevitably be so’. On this account, a good syllogism is one which has a form that necessarily preserves truth—or, in Mill’s terms, it ‘conducts’ truth from its premises to its conclusion.

According to Mill, then, good inferences have something in common with good conceptions and good judgements: they are all connected to the truth. Mill writes:

A concept, to be rightly framed, must be a concept of something real, and must agree with the real fact which it endeavours to represent, . . . A judgement, to be rightly framed, must be a true judgement, that is, the objects judged of must really possess the attributes predicated of them. A reasoning, to be rightly framed, must conduct to a true conclusion. (*1865/1867*, ch. xx; *1979*, p. 365)

So for Mill logic is inherently concerned with, and connected to the truth. As far as logic is concerned, Mill continues:

The most important . . . and at bottom the only important quality of a thought being its truth, the laws or precepts provided for the guidance of thought must surely have for their principal purpose that the products of thinking shall be true. (*1865/1867*, ch. xx; *1979*, p. 365)

Now, what properties of thought are related to the truth? What is the difference between true and false inferences?¹⁵ According to Mill (*1843/1872*, Intro. §5; *1973*, pp. 10–11), ‘[m]aking false inferences . . . [consists] of drawing conclusions which are not grounded in the reality of things’. This is an absolutely crucial realization for Mill. The properties of thought which are of logical interest are those properties by which a thought is made true. Specifically, it is the property (or properties) by which truth is ‘conducted’ between thoughts in inference.

Importantly, this is not a property that is internal to thoughts themselves. Rather, it is a relational property between a thought and the reality of things. The truth of a thought cannot be determined merely by looking at it as a psychological or mental state. Instead, that aspect of the thought which represents (i.e. which corresponds or fails to correspond with) reality must be compared with reality itself. In the end, the precepts of logic must ultimately be justified in accordance with their connection to the truth.

¹⁵ I here follow Mill’s rather idiosyncratic categorization of inferences as false (or true), as opposed to the more common categorization of inferences as (deductively) valid or invalid according to whether they are necessarily truth-preserving, where the invalid ones are usually classified as (inductively) strong or weak according to whether they are generally truth-preserving. It might be speculated that Mill intended to indicate those inferences that are capable of leading one justifiably to the truth with his otherwise incorrect categorization here.

8. Objects of judgements as the subject matter of logic

Because of this, Mill distinguishes between the act and the object of a judgement. It is neither the act of the judgement, nor the mental state instantiating the judgement, nor any other psychological or phenomenological feature of the judgement that connects it representationally to the external world. Instead, it is the content of the judgement which accounts for its representational features, and which connects it to the external world. Yet, just as the truth of a judgement is not a function of its act, neither is it exclusively a function of its content. Rather, the truth of a judgement is explained in terms of its object—in terms of whether or not the state-of-affairs represented by the content of a judgement actually obtains in the world. This state of affairs represented by the content of a judgement can be called the object of that judgement. Hence, it is the objects of judgements that are of interest to logic. Thus, Mill claims (*1843/1872*, I.v.1; *1973*, p. 87), ‘Logic . . . has no concern with the nature of the act of judging or believing; the consideration of that act, as a phenomenon of the mind, belongs to another science’. It is in this way that logic is distinguished from that other science—psychology. Logic has a limited, but proprietary interest in the contents and objects of judgements.

Mill’s rejection of conceptualism

Perhaps the most important facet of Mill’s account of the nature of the object of a judgement is his denial of conceptualism. According to conceptualism, the object of a judgement is mental, and ‘a proposition is the expression of a relation between two ideas’ (*1843/1872*, I.vi.1, *1973*, p. 109). Indeed, conceptualism—the view that “meanings” are mental entities, and that “judgements” assert relationships among these entities’ (*Skorupski 1998*, p. 47)—is one of the theses that Skorupski identifies as definitive of ‘psychologism’. Crucially, Mill rejects this view, claiming first that it is unable to provide an adequate account of truth and second that it misrepresents the nature of communication.

Mill’s first argument against conceptualism claims that it cannot supply us with an accurate account of truth, or explanation of belief. According to the conceptualist view, judgements (or propositions) ‘consist in affirming or denying one *idea* of another’ (*1843/1872*, I.v.1; *1973*, p. 87), and ‘truth consists in contemplating and handling our ideas, or conceptions of things, instead of the things themselves’ (*1843/1872*, I.v.1; *1973*, p. 89). This view, and the accompanying view that these relations amongst our ideas are of primary interest to the logician, Mill calls ‘one of the most fatal errors ever introduced into the philosophy of logic’ (*1843/1872*, I.v.1; *1973*, p. 89). Against this view, Mill argues that judgements do not consist in making assertions about our ideas of things, rather our judgements reach beyond our ideas to the things themselves, and involve making assertions about things in the external world. Thus, Mill writes (*1843/1872*, I.v.1; *1973*, p. 88), ‘propositions . . . are not assertions respecting our ideas of things, but assertions respecting the things themselves’. Similarly, the truth of a judgement is not established by our ideas themselves; rather the truth of a judgement is established when a corresponding fact or state-of-affairs obtains in the world.

Not only does conceptualism misrepresent the nature and foundation of truth (and so misconstrue the nature of belief). According to Mill, since conceptualist accounts provide erroneous accounts of the object of judgement, they provide a mistaken explanation of the nature of communication. If, as maintained by

conceptualism, the objects of linguistic expressions are given by ideas, then the purpose of communication must be the exchange of those ideas. But, Mill objects, this is mistaken:

For names are not intended only to make the hearer conceive of what we conceive, but also to inform him of what we believe. Now, when I use a name for the purpose of expressing a belief, it is a belief concerning the thing itself, not concerning my idea of it. (*1843/1872*, I.ii.1; *1973*, p. 25; cf. *1843/1872*, I.v.1; *1973*, p. 88)

Communication does not merely involve the exchange of our ideas. Rather, the purpose of communication includes making an interlocutor aware of certain states-of-affairs (or facts) in the world, as well as our attitudes and intentions with regard to those states-of-affairs. As such, communication and understanding involve not merely an exchange of ideas, but an exchange of ideas *about* the world. Indeed, communication is frequently part of an activity (or set of activities) which includes direct action on the world among its other facets. So, as with truth, communication requires that the objects of our expressions be features¹⁶ of the world, and not our ideas.

While Mill distinguishes between the object of a belief and the psychological belief state, he does not assert that they occur independently. Rather Mill admits that belief and inference are psychological states and processes. He writes (*1843/1872*, I.v.1; *1973*, p. 88): ‘in order to believe . . . [any] fact in external nature, another fact must take place in . . . [the] mind, a process must be performed upon . . . ideas’, and (*1843/1872*, I.v.1; *1973*, p. 87) ‘in any . . . judgement . . . a process takes place in our minds’. Yet, Mill claims (*1843/1872*, I.v.1; *1973*, 88) that: ‘believing is an act which has for its subject [i.e. its object] the facts themselves, though a previous mental conception of the facts is an indispensable condition’.

To summarize his position to this point, Mill accepts the picture that judgement and inference are mental acts or operations, and logic is prescriptive with respect to these mental processes. Yet the foundation and subject matter of logic is not to be found in these acts (although Mill is decidedly equivocal on this point); rather the subject matter of logic is inherently connected to the truth. The connection of a judgement with the truth is explained in terms of the representational nature of the content of a judgement and whether or not the object represented by that content obtains in the world. In this way, Mill distinguishes the act from the object of a thought, and he does so in an attempt to secure the connection between judgement and inference on the one hand and reality and truth on the other. Finally, it is this connection which is seen to secure the foundation of logic and truth. It is the object of a judgement that ultimately explains its truth, and it is logic’s connection with the truth that affords its prescriptive relationship to the acts in judgement and inference. As such, the foundation of logical precepts is considered as a function not of the acts of inference so much as of the objects of these psychological acts.

¹⁶ These features can be actual or possible (or sometimes even impossible), accurate or mistaken, past, present, or future. The point is that they must reach beyond the mental world of ideas to the world itself.

9. Mill's anti-psychologism

It is Mill's acceptance of the picture just described which brought authors such as Skorupski (1998, pp. 46–50) and G. P. Baker (1988, p. 174) to attribute to Mill an anti-psychologistic view regarding the subject matter of logic. The subject matter of logic is not mental but material. In treating the objects of judgements, logic has the same subject matter as the (other) empirical sciences. Indeed for Mill, logic cannot be distinguished from the natural sciences (taken together) in terms of its subject matter. Nor, as we will see, can logic be distinguished from the natural sciences in terms of how its truths are justified. Rather, logic might be distinguished from the sciences in regards to the generality with which it treats of that subject matter.¹⁷ Taken by themselves, the objects of judgements are the subject matter of individual sciences. But, taken together, they are the subject matter of logic. The justification of basic logical truths relies upon their correspondence with regularities governing *all* objects of science. Further, logic is only concerned with the objects of judgement insofar as they are involved in inference—that is, insofar as they establish, or are established by, the truth of other judgements.

Importantly, Mill's claim that the subject matter of logic is not the acts, but rather the objects of judgements flatly contradicts his earlier claims regarding the proper subject matter of logic. Mill has already claimed that logic studies mental processes—i.e. that the subject matter of logic is acts of judgements. Indeed, as has already been noted, Mill *defines* logic as 'the science of the operations of the human understanding in the pursuit of truth' (1843/1872, Intro § 3; 1973, p. 6). Further, insofar as the truth of a judgement—explained in terms of the relationship between the content and object of that judgement—is independent of psychological considerations, Mill's claim that the Science of Logic must take into consideration psychological facts about thinking seems misplaced. Not only is the subject matter of logic not psychological in nature, but the essential business of logic is entirely independent of psychology. Mill's view of the subject matter of logic, then, is decidedly fractured. On the one hand, Mill claims that the subject matter of logic is a set of psychological states and processes. On the other hand, Mill claims that the subject matter of logic is a set of non-psychological properties and relations which accounts for the truth of judgements and the logical and evidentiary relations which they bear to one another.

¹⁷ An interesting question for Mill's theory of language is how we arrive at 'general concepts' such as numbers. Supposing that our number concepts are based on physical objects or observed matters of fact, only two options appear to be available to explain the meaning of arithmetical expressions:

- (1) number concepts result from a re-arrangement of the actual physical objects themselves;
- (2) number concepts result from an abstraction from the particulars of the physical objects.

These could be called the 'physicalist account' and the 'abstractionist account' respectively. It is not entirely clear whether Mill unequivocally held one or other of these views; instead he seems to waver between them. For instance, in some places (e.g. 1843/1872, II.v.1; 1973, pp. 224–7) Mill seems to advocate the abstractionist account, while in others (e.g. 1843/1872, II.vi.2; 1973, pp. 256–7) he seems to advance the physicalist (or aggregationalist) account.

At any rate, Frege's arguments against each of these accounts are well known. Frege argues 1884[1980] against a physicalist account of number (which he attributes to Mill), while in his 1894[1972] Frege argues against an abstractionist account attributed to Husserl. Because my argument here does not explicitly concern the foundations of arithmetic or our number concepts, I leave a discussion of these matters for another occasion.

Having already considered the intellectual terrain on the one side of this fracture, it remains to consider the theoretical landscape on the other side. On this account, Mill rejects the view that the subject matter of logic is the operations of our understanding, and that the precepts of logic are laws that are dependent of the nature of mental processes. Rather, Mill claims:

It [Logic] does not, as we now see, relate to the Laws of Thought as Thought, but to those of the Products of Thought. Instead of the Laws of Conception, Judgement, and Reasoning, we must speak of the Laws of Concepts, Judgements and Reasonings. (1865/1867, ch. xx; 1979, p. 361)

Here, Mill is unequivocal in his claim that the precepts of logic do not pertain to acts of judgement, but to the products—what I have called the contents—of these acts. As such, the nature and character of logical precepts would seem to be independent of the mental processes that they serve to govern. Rather, the things that determine the nature and character of logic are the epistemic and semantic properties of these products of judgement. These, in turn, are a function of the objects of judgement.

Let us see how this view affects Mill's account of the foundation and justification of logical precepts. Having determined that Mill formulates the precepts of ratiocinative reasoning as the valid forms of the syllogism, it remains to be seen whether there is some common principle at work in all of these valid forms. That is, is there some principle that explains the legitimacy of all valid forms of the syllogism?

10. Mill on the ultimate justificatory foundations of valid ratiocination

The dictum do omni et nullo: Mill's rejection of platonism and conventionalism

Mill begins his search for the principle that underwrites the legitimacy of syllogistic inference by considering the *dictum de omni et nullo* as the 'maxim, on which all ratiocination is said to be founded' (1843/1872, II.ii.2; 1973, p. 174).

The maxim is, That whatever can be affirmed (or denied) of a class, may be affirmed (or denied) of everything included in the class. This axiom, [is] supposed to be the basis of syllogistic theory . . . (1843/1872, II.ii.2; 1973, p. 174)¹⁸

Mill rejects both Platonist and conventionalist accounts of the *dictum*. The Platonist account is rejected because it involves the postulation of universals as special kinds of abstract objects which we can know, but which we never directly experience. Clearly such a metaphysical account is at odds with Mill's empiricism. The conventionalist account views the *dictum* 'not as an axiom, but as a definition . . . intended to explain . . . the meaning of the word *class*' (Mill 1843/1872, II.ii.2; 1973, p. 175). Mill rejects this account because it would effectively reduce logical principles to a set of merely verbal truths. As a result, inferences relying on these principles would be apparent inferences,¹⁹ and logic would thus be prevented from fulfilling its

¹⁸ The *dictum de omni et nullo* was thought to derive from Aristotle's *Prior Analytics* i.I(24^b 26), and through the middle ages it was commonly accepted as the foundational justificatory principle of syllogistic inference (Kneale and Kneale 1962, pp. 79, 272).

epistemic function of advancing knowledge. Logic, for Mill, is not merely a ‘Logic of Consistency’, but is instead a ‘Logic of Truth’, and the Logic of Truth must involve rules governing real inferences capable of establishing informative conclusions.

Transitivity of co-existence: the empirical foundations of logic

Having rejected conventionalism and Platonism as the ultimate legitimating grounds for ratiocinative inference, Mill proceeds to formulate his own principle, which provides the ultimate justificatory foundations of all syllogistic reasoning. In arriving at this principle, Mill considers several instances of syllogistic reasoning. Having done so, he claims the following:

If we generalize this process [of analysing examples of the syllogism], and look out for the principle or law involved in every such inference, and presupposed in every syllogism, the propositions of which are anything more than merely verbal; we find, not the unmeaning *dictum de omni et nullo*, but a fundamental principle, or rather two principles, strikingly resembling the axioms of mathematics. The first, which is the principle of affirmative syllogism, is, that things which co-exist with the same thing, co-exist with one another: or (still more precisely) a thing which co-exists with another thing, which other co-exists with a third thing, also co-exists with that third thing. The second is the principle of negative syllogisms, and is to this effect: that a thing which co-exists with another thing, with which other a third thing does not co-exist, is not co-existent with that third thing. These axioms manifestly relate to facts, and not to conventions; and one or other of them is the ground of the legitimacy of every [deductively valid] argument in which facts and not conventions are the matter treated of. (1843/1872, II.ii.3; 1973, p. 178)

Roughly then, Mill finds that there are two fundamental principles which provide the grounds for the legitimacy of every ratiocinative inference. These principles appear to be an affirmative and a negative formulation of the principle of the transitivity of co-existence.²⁰

¹⁹ When Mill describes apparent inferences, he uses examples of ‘immediate inferences’ where the conclusion follows directly from just one claim and is obtained by a mere repetition of all or part of the claim from which it is derived (1843/1872, II.i.2; 1973, p. 158). Yet, the characteristic feature of an apparent inference is that:

In all the cases [mentioned above] there is not really any real inference; there is in the conclusion no new truth, nothing but what was already asserted in the premises, and obvious to whoever apprehends them. The fact asserted in the conclusion is either the very same fact, or part of the same fact, asserted in the original proposition. (1843/1872, II.i.2; 1973, p. 160)

Clearly, another class of inferences would also have the property just described: inferences where any derived claim follows necessarily from some claim taken from an initial list of premises (which may be real propositions) and a set of merely verbal truths about the meanings of the terms used in the initial list. Such inferences might be called ‘complex apparent inferences’.

²⁰ Indeed, Mill claims (1843/1872, I.vi.5; 1973, pp. 116–17) that real general propositions like these axioms may be interpreted in two ways. He writes that all real general propositions may be looked at either ‘as portions of speculative truth, or as memoranda for practical use’ (1843/1872, I.vi.5; 1973, pp. 116–17).

When viewed as ‘a portion of our theoretical knowledge’ the proposition makes a statement about whether certain attributes are accompanied by other attributes in things which are signified by a given term (1843/1872, I.vi.5; 1973, p. 117). This interpretation ‘points the attention more directly to what a proposition means’ (1843/1872, I.vi.5; 1973, p. 117). By contrast, ‘[t]he practical use of a proposition is, to appraise us or remind us what we have to expect, in any

These principles Mill calls (1843/1972, II.iii.1; 1973, p. 183) ‘the fundamental axioms on which its [the syllogism’s] probative force or conclusiveness depends’. Importantly, then, these principles actually serve to justify or legitimate ratiocinative inference, and not merely to describe a pattern in accordance with which we reason whenever we reason correctly. Further, Mill’s claim that ‘[t]hese axioms manifestly relate to facts, and not to conventions’ (1843/1972, II.iii.1; 1973, p. 183) reiterates his rejection of the idea that the principles of logic are grounded in linguistic convention.

11. Mill on the empirical foundations of syllogistic inference

Having identified the ultimate justificatory principle involved in ratiocinative inference, the foundation of this principle itself remains to be determined. Surprisingly, though, Mill never explicitly addresses the question of the ultimate justificatory foundations of the transitivity of co-existence. At first gloss, this might seem a remarkable oversight in view of Mill’s claims that this principle provides the grounds for the legitimacy of every ratiocinative inference, and that it is the axiom on which the probative force of the syllogism depends.

Mill does, though, ask this question of the axioms of geometry, and his answer, I believe, applies just as much for the ‘axioms’ of ratiocinative reasoning as it does for those of geometric reasoning. In regards to geometry, Mill writes (1843/1872, II.v.4; 1973, p. 231): ‘It remains to inquire, what is the ground for belief in axioms - what is the evidence on which they rest? I answer, they are experimental truths; generalisations from observation’. For Mill geometric axioms have the status of real general propositions, and Mill’s explanation of the justification of all real general propositions—indeed all real propositions whatsoever—is the same: experience.

So the reason that Mill did not feel obliged to provide a specific account of the foundations of the principle of transitivity of co-existence was because it does not have any special status. Rather, its character is that of a real general proposition, and, as such, it is justified in just the same way as every other real general proposition. In this respect, the principle which provides the ultimate justificatory grounds for all ratiocinative inference has exactly the same status—and is justified in precisely the same way—as any of the general premises (e.g. the major premise) used in those inferences.

individual case which comes within the assertion contained in the proposition. In reference to this purpose, the proposition, All men are mortal, means that the attributes of man are *evidence of*, or are a *mark of*, mortality; an indication by which the presence of that attribute is made manifest’ (1843/1872, I.vi.5; 1973, p. 117). For Mill ‘[t]hese two forms of expression are at bottom equivalent’ (1843/1872, I.vi.5; 1973, p. 117).

In this respect, Mill claims (1843/1872, II.ii.4; 1973, p. 180) that ‘every syllogism comes within the following general formula: Attribute A is a mark of attribute B; The given object has the mark A, therefore The given object has the attribute B’.

Accordingly, Mill claims that the two axioms previously mentioned may be rephrased as follows:

- (1) ‘Whatever has any mark, has that which it is a mark of’
- (2) ‘Whatever is a mark of any mark, is a mark of that which this last is a mark of’ (1843/1872, II.ii.4; 1973, p. 181).

Here syllogisms are not divided according to whether the major premise is affirmative or negative, but rather according to whether the minor premise is universal or not.

When discussing the justification of the major premise in a syllogism, Mill writes the following:

[W]hence do we derive our knowledge of that general truth? Of course, from observation. Now, all which man can observe are individual cases. From these all general truths must be drawn, and into these they may again be resolved; for a general truth is but an aggregate of particular truths; a comprehensive expression, by which an indefinite number of individual facts are affirmed or denied at once. (*1843/1872*, II.iii.3; *1973*, p. 186)

Not only does Mill give us no reason to think that there is some unique but unstated justification for the principle of transitivity of co-existence, but Mill's empiricist epistemology leaves him no other possibilities for its substantiation.

Mill's empiricism commits him to the principle that '[a]ll experience begins with individual cases, and proceeds from them to generals' (*1843/1872*, II.i.3; *1973*, p. 163). Because of this, so long as general principles are to be real (or substantive) and not merely verbal, there is no possible way in which they may be justified except by experience. As such, the status of all real general propositions is the same. In a real general proposition, '[t]he results of many observations and inferences, and instructions for making innumerable inferences in unforeseen cases, are compressed into one short sentence' (*1843/1872*, II.iii.3; *1973*, p. 187). But, the justification of that sentence can only be traced back to the particular cases, known by experience, on the basis of which the general proposition was initially inferred.

In summary, the general picture Mill gives regarding the ultimate justificatory foundations of logic is this:

And so, in all cases, the general propositions, whether called definitions, axioms or laws of nature, which we lay down at the beginning of our reasonings, are merely abridged statements, in a kind of shorthand, of the particular facts, which, as occasion arises, we either think we may proceed on as proved, or intend to assume. (*1843/1872*, II.iii.3; *1973*, p. 192)

When the foundational principle of all ratiocinative inference is seen as a real proposition about the objects of experience, whose truth is justified by observation, Mill's account of the foundations of logic appears to avoid Skorupski's (*1998*, p. 46) psychologistic view whereby the 'laws of logic are simply psychological laws concerning our mental processes'. Yet, as we will see below, even Mill's position on this point is not unequivocal. Before considering Mill's qualification of his empiricist account of the foundations of logic, it is worthwhile to note some of the consequences of this view.

12. Consequences of Mill's position

Empirical foundations and the status of logic

Mill is aware that his account cannot establish the necessity of logical axioms, nor does it entitle us to be certain of them. (As Hume claims, there is no contradiction involved in supposing *any* matter of fact to be otherwise.) Yet, even concerning such a basic logical principle as the principle of non-contradiction, Mill writes that he

‘cannot look upon [it] . . . as a merely verbal proposition’. Rather, Mill claims that it is ‘one of our first and most familiar generalisations from experience’ (1843/1872 II.vii.5; 1973, p. 277). Further, Mill maintains that his empirical account is sufficient to explain the varying degrees of certitude with which we treat different empirical generalizations. Surely, for example, we should be more certain of the principle of non-contradiction than of the generalization that all fish swim. According to Mill, the truths of logic generalise over all of our experiences; so each of our experiences provides additional evidence of their truth. As such truths of logic are confirmed to a higher degree than other truths which generalize over a more limited domain or subject matter, and this is what justifies the increased certainty we find in them (Mill 1843/1872, II.v.4; 1973, pp. 231–2). We can be more certain of logical principles than of other empirical generalizations because every experience contributes to the confirmation of a logical principle while only some experiences contribute to the confirmation of empirical generalizations such as ‘all fish swim’.²¹ While the truths of logic might be more general than the truths of science, our knowledge of them comes from experience as does their ultimate justification.

Mill on the nature of inference

The second important consequence of Mill’s view that the truths of logic are empirical generalizations concerns the nature of inference. We have seen already that logic is involved in the advancement of knowledge for Mill, and that the subject matter of logic is the particular objects of sensory experience. As an empiricist, Mill held that the epistemological origins, and ultimate justification of all of our knowledge is experiential. And, ‘all experience begins with individual cases, and proceeds from them to generals’ (1843/1872, II.i.3; 1973, p. 163). This epistemological position informs Mill’s account of the nature of inference.

According to Mill, since all experience begins with individual cases, ‘All inference is from particulars to particulars’ (1843/1872, II.iii.4; 1973, p. 193). It might *appear* that some inferences—the deductive ones—reason from the general to the particular. But for Mill, what is really at issue in such cases is the support or justification of the general proposition (e.g. the major premise) at work in such inferences. On Mill’s account:

General propositions are merely registers of such inferences already made, . . . the real logical antecedent or premise being the particular facts from which the general proposition was collected by induction. (1843/1872, II.iii.4; 1973, p. 193)

As such all ratiocinative inference is ultimately inductive in character. Moreover, because of this Mill holds that syllogistic forms do not accurately represent the actual evidentiary structure of reasoning. On this point, Mill writes:

In the above observations it has, I think, been shown, that, though there is always a process of reasoning or inference where a syllogism is used, the syllogism is not a correct analysis of that process of reasoning or inference; which is, on the contrary (when not a mere inference from testimony) an inference from particulars to particulars; authorised by a previous inference from particulars

²¹ Mill did not consider Hempel’s ‘paradox of confirmation’ that flying squirrels contribute to the confirmation of the claim that all fish swim (Hempel 1945[1965], pp. 14–20; Quine 1969, pp. 114–16).

to generals, and substantially the same with it; of the nature, therefore, of Induction. (1843/1872, II.iii.5; 1973, p. 196)

Despite the sacrifice of necessity and *a prioricity* that his account demands, Mill is quite content with his picture. Not only is it consistent with his empiricist principles, but it provides that the character of all deductive inference is real as opposed to apparent, and as such promises a genuine advancement of knowledge.

13. Non-contradiction, excluded middle and identity: Mill's return to psychologism

Having noted some of the consequences of his views, it remains to note one final twist in the tale of Mill's empirical account of the foundations of logic. The principle of the transitivity of co-existence is not the only logical principle that Mill claims is justified by observation. Mill claims that the basic logical principle of non-contradiction also has the status of a universal generalization justified by experience. Indeed, in holding that the principle of non-contradiction is an empirical generalization over all our experiences, Mill reverts to a psychologistic position by including psychological experiences within the scope of the universal generalization. Thus, Mill describes the foundation of the principle of non-contradiction as follows.

I consider it to be, like other axioms, one of the first and most familiar generalizations from experience. The original foundation of it I take to be, that Belief and Disbelief are two different mental states, excluding one another. (1843/1872, II.vii.5; 1973, p. 277)

That is, the mental states of belief and disbelief are included in the universal generalization expressed by the principle of non-contradiction. According to Mill, the universal generalization expressed by the principle of non-contradiction is justified not only by the outward observations of the exclusionary relationship which characterizes any 'positive phenomenon' when contrasted with its negative (1843/1872, II.vii.5; 1973, p. 277), but also by the inward observation of an exclusionary relationship obtaining between the mental states of belief and disbelief. Importantly, not only are mental states included in this generalisation, they are its 'original foundation'. As such, while the subject matter of logic is not entirely psychological in nature, it is partly—indeed essentially—so, and logic is dependent on psychology. In fact, the very foundations of logical truths cannot be explained independently of psychology.

Mill offers a similar account of the foundations of the principle of the excluded middle.²² Here, Mill approvingly quotes a passage from Herbert Spencer's paper 'Mill versus Hamilton: the Test of Truth' which appeared in the *Fortnightly Review* on 15 July, 1865.²³

The law of the Excluded Middle, then, is simply a generalization of the universal experience that some mental states are destructive of other states. It formulates a

²² Importantly, Mill claims that an unqualified statement of the excluded middle is false, writing that '[b]etween the true and the false there is a third possibility, the Unmeaning' (1843/1872, II.vii.5; 1973, p. 278).

²³ It is likely that Mill added this passage either to the 7th edition of *A System of Logic* (which appeared in 1868) or to the 8th and final edition (which appeared in 1872).

certain absolutely constant law, that the appearance of any positive mode of consciousness cannot occur without excluding a correlative negative mode; and that the negative mode cannot occur without excluding the correlative positive mode. . . . Hence it follows that if consciousness is not in one of the two modes [then] it must be in the other. (1843/1872, II.vii.5; 1973, pp. 278–9)

Here again, it seems that the justification of the principle of the excluded middle essentially involves the consideration of certain psychological facts, and this alone is sufficient to make logic dependent on psychology. Mill does not give a metaphysical explanation of the foundation of the axiom of the excluded middle in terms of the objects of judgement and the fact that, for any property and any object, experience always finds either that object has that property or it does not. An account like this would be the kind called for by his empiricist physicalism. Instead though, Spencer's explanation (as endorsed by Mill) appears completely psychological, and rests on the nature of states of consciousness, and the fact that they can only be in one of two 'modes'.

The crucial point here is not that Mill includes our psychological experiences among the sum total of our experiences each of which contribute to the inductive justification of universal principles such as the principle of non-contradiction and the principle of the excluded middle. Rather, the crucial question to ask at this juncture is why Mill seems to emphasize the psychological aspects of our experience in his explanation of these principles. The answer to this question, as Richards has observed (1980, pp. 26–7) lies in the fact that Mill holds that the fundamental principles of logic apply only to the objects of our experience—that is to phenomena—and not, as thinkers such as Hamilton claimed, to things in themselves, or noumena. Because of this, Mill qualifies his previous empiricist and externalist account of the subject matter of logic.

Mill's empiricism does not merely prompt him to provide an inductive foundation logic, whereby logical principles are ultimately justified by our particular experiences. Mill takes the further step of noting the phenomenal nature of the objects of experience. Really, the subject matter of logic is not objects *per se*, but phenomena. Because of this, the nature of the principles of logic might be based just as much on the nature of experience as on the nature of the objects experienced.²⁴ So, while Mill insists that the principles of logic are 'laws of existence', since 'existence, itself, as we conceive it, . . . [is] merely the power of producing phenomena', really the principles of logic have no other subject matter or foundation than that they are 'laws of all Phenomena' (1865/1867, ch. xxi; 1979, pp. 381–2). Since the nature and laws of existence cannot be explained independently of psychological and perceptual facts about human beings, neither can the principles of logic which derive therefrom.

This phenomenalism prompts Mill to make a substantial qualification to his earlier claims about the ultimate status and justificatory foundation of the principles of logic. In discussing the Principles of Non-Contradiction, the Excluded Middle and Identity, Mill writes:

I readily admit that these three general propositions are universally true of all phenomena. I also admit that if there are any inherent necessities of thought,

²⁴ Indeed, if the objects of experience are regarded as phenomena, the objects that we experience might best be thought of as the objects that are the ultimate causes of our experiences.

these are such. . . . Whether the three so-called Fundamental Laws are laws of our thoughts by the native structure of the mind, or merely because we perceive them to be universally true of observed phænomena, I will not positively decide: but they are laws of our thoughts now, and invincibly so. They may or may not be capable of alteration by experience, but the conditions of our existence deny to us the experience which would be required to alter them. Any assertion, therefore, which conflicts with one of these laws . . . is to us unbelievable. The belief in such a proposition is, in the present constitution of nature, impossible as a mental fact. (*Mill 1865/1867*, ch. xxi; *1979*, pp. 380–1; as quoted in *Richards 1980*, pp. 26–7)

The final concession that Mill's empiricism brings him to make is to qualify his claim that the foundation of logical principles is based, ultimately, in generalizations about the objects of our experience. Since these objects are phenomenal in nature, it is impossible to tell whether the laws that describe their behaviour are independent of psychological facts about human beings. Indeed, the nature of the universal laws of phenomena might just as much be the result of the constitution of our minds as of the objects that are the ultimate causes of our experiences. Because of this, while the principles of logic are reliable guides to truth (*Mill 1865/1867*, ch. xxi; *1979*, p. 383), they are only reliable guides to truth about phenomena. Should the conditions of our existence change (perhaps because of changes to our psychological constitution), the principles of logic might well undergo a corresponding alteration. This final point seems to bring Mill's empiricism full circle back to psychologism. Even when asserting that the subject matter of logic is the objects, and not the acts of our thinking, it still seems that the principles of logic are dependent on psychological facts.

14. Conclusion

In the final analysis, then, I claim that Mill's account of the foundations of ratiocinative logic is indeed psychologistic. Even though he provides logic with a prescriptive function, and despite his avoidance of conceptualism, Mill holds that the principles of logic are dependent on psychology. This dependency arises from Mill's views concerning the subject matter of logic. Over the course of this paper, I have argued that Mill's position concerning the subject matter of logic is decidedly fractured. On the one hand, Mill held that the subject matter of logic is psychological processes—the operations of the understanding. On the other hand, Mill held that logic was inherently concerned with the truth and that, as such, the subject matter of logic is the objects of our thoughts, insofar as these determine the semantic and evidentiary properties that obtain between the contents of our thoughts. Problematically, Mill does not provide an account of either the acts or the objects of our thoughts, which insulates logic from a dependency on psychology.

On the first view, logic is about the acts of thinking. Indeed, logic is ultimately prescriptive with respect to these psychological processes; the purpose of logic is the guidance of one's thoughts. Because of this Mill felt that the nature and character of logic is somehow determined by contingent facts about thought processes. Specifically, in order to guide our thought processes, the precepts of logic must reflect the factual details of how those processes actually proceed. Indeed, on some interpretations, Mill seems committed to the view that the precepts of logic amount

to no more than a subset of the laws of association, and such an account is overtly psychologistic.

Yet, on the other hand, when Mill considered in what way logic is meant to be prescriptive over thought, he was moved to recognize that logic is inherently connected with truth. Moreover, the truth of a judgement is a function of its object, not the act itself. As such, the subject matter of logic is the objects of the inferential acts—not the acts themselves. The problem now was, how to explain the nature of these objects of inference. Forsaking conceptualist, conventionalist and Platonist accounts, and prompted by his empiricist upbringing, Mill provided a physicalist account of the subject matter of logic. In this respect, the subject matter of logic is no different than the subject matter of science; the difference between logic and science is explained in terms of the generality with which it treats of that subject matter.

The effects of Mill's empiricism on the nature and foundation of logic are considerable. Logic can no longer be thought of as an *a priori* science, whose truths are universal and necessary. Rather, the basic principles of logic have the status of empirical generalisations which, while highly confirmed by experience, are nevertheless contingent. Further, the deductive character of ratiocinative inference is illusory. Instead, all inference is inductive in character, and begins with our knowledge of the particulars experienced in sensation. Indeed, the deleterious effect of Mill's empiricism on the nature and foundations of logic seems to be no less than that of psychologism. Logic becomes dependent on a set of contingent facts, our knowledge of which only arises *a posteriori*.

While acknowledging the limitations of such an account, Mill was quite content to live within the limited means afforded by empiricism. For Mill, the principles of logic ultimately have the same foundations and status as the propositions of science such as laws of nature and empirical generalizations over natural kinds. Further, Mill maintained that his empirical account is sufficient to explain the varying degrees of certitude with which we treat different empirical generalizations. Mill was content with this account in spite of its obvious limitations because he did not see any other possible justificatory foundation available within the confines of empiricism.

Yet, even when claiming that the subject matter of logic was the objects, and not the acts of judgement, Mill could not escape the psychologistic view that the principles of logic are dependent on psychological facts. Logical principles such as transitivity of co-existence, identity, non-contradiction and the excluded middle are laws of all phenomena. Yet, because psychological phenomena are included in this universal generalization, psychology is necessary for logic. Indeed, were these universal laws of psychological phenomena different, or were they to change, the logical principles based on them would change correspondingly. Nor is this the only source of logic's dependence on psychology on this picture. Because the objects we experience are phenomenal, their nature might be determined just as much by the conditions of our experience (including our psychological constitutions) as by any other set of factors. Since the subject matter of logic is determined, at least in some essential part, by psychological conditions, the logical principles, which describe certain relations among the constituents of that subject matter, are themselves dependent on psychological facts. As a result, no matter which account of the subject matter of logic is finally attributed to Mill, his account of the justificatory foundations of logical principles leaves them dependent on psychology.

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