

# “The Feminine Logical Mystique: Rethinking Feminist Critiques of Formal Logic”

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## 1. Introduction

Standard feminist critiques of formal logic cast it as a white European male paradigm of abstract, non-contextual rationality that is foisted on women and other minority groups.<sup>1</sup> Some feminists recommend a fundamental reconceptualization of reason and rationality in order to free it from the domineering influence of formal logic<sup>2</sup>; others recommend the rejection of the normativity of reason and rationality entirely.<sup>3</sup> Common to both responses, however, is the idea that formal logic is to blame; its influence is inherently—paradigmatically—nefarious.

In this paper I respond to these feminist critiques in two ways: first, I argue that they misrepresent formal logic; second, I examine current empirical research that suggests that formal logic *per se* is not one of the forces marginalizing women in philosophy (and related fields, such as mathematics). Both points undermine the standard feminist critique and force us to rethink the relationship between women and formal logic.

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<sup>1</sup> E.g., see Nye (1990) and the essays collected in Falmagne and Hass (2002). I will focus on logic and gender, but similar themes arise in other areas: logic and race, logic and colonialism, etc. For example: “the arena of logic was made by men for men; it was expressly founded on the exclusion of what is not male, as well as what is not Greek, nor Christian, nor Western, [nor] Aryan” (Nye 1990: 177); and “men armed with the authority of logic themselves completed the devastation, perfecting master languages insulated from criticism, ruthlessly pursuing Sophists, heretics, witches, scarlet women, unbelievers, Jews, extending the rule of law and truth over diversity” (Nye 1990: 182).

<sup>2</sup> See Plumwood (1991, 1993) and Walkerdine (1988).

<sup>3</sup> See Nye (1990) and Irigaray (1985a, 1985b, 1987) for versions of this perspective; for a discussion of the nuance in Irigaray see Hass (2002: 71-88).

A subsidiary critique of formal logic (or formal logicians, more precisely) offered by some feminists is that its practitioners treat feminist contributions to their field “with skepticism if not dismissal” (Hass and Falmagne 2002: 1). By engaging with feminist critiques of formal logic my further aim here is to respond constructively to this charge by offering a concrete example of how formal logic can benefit from gender theory and how gender theory can benefit from formal logic.

## **2. Form-mal**

Formal logic seems, at first glance, to be the perfect subject for feminist critique. Logic is commonly described as the discipline that studies the decontextualized, topic-neutral norms of reasoning as such, and it does so with abstract, symbolic, meaningless languages.<sup>4</sup> Logic therefore has all the hallmarks of a problematic dualism: it champions reason over emotion, abstraction over contextualization, all the while purporting to be universally binding (hence: oppressive, colonial, and repressive of the “other”). Given that it was developed by white European males with marginalizing theories of the female gender (such as Aristotle), it is little surprise that logic has featured prominently, and unequivocally problematically, in feminist critiques.

I will focus on two of the most important aspects of these standard critiques. One is the equation of logic and rationality, and the other is the use of symbolic languages in formal logic. First consider the connection between logic and rationality. Logic is often portrayed as the study of the rules by which we ought to think and reason; it is normative for thought as such (in contrast with norms for thought specific to different subject

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<sup>4</sup> Nye calls this “the feminist indictment of logic”, and recounts its various forms in 1990: 4-5.

matters, such as ethics or physics or psychology). Feminists have argued, however, that since logic is a masculine creation of non-emotional, objective rules, in its deployment as normative for thought it has in actuality been an instrument of oppression; in particular, the oppression of females and feminine forms of thought.<sup>5</sup> Oliver, for example, uses and criticizes this conception of logic (as constitutive of rationality and as normative for thought as such), a conception of logic that she attributes to Mill and Kant. In particular, Oliver bases her understanding of logic on this passage in Kant: “Logic is a science of the necessary laws of thought, without which no employment of the understanding and the reason takes place” (Oliver 2002: 210).<sup>6</sup> She then proceeds to subject it to extended critique (Oliver 2002: 211-225).

There are two important problems, however, with this form of feminist criticism of logic. The first is that, even for philosophers like Kant, logic is more complex than the feminist critique acknowledges. In the *Critique of Pure Reason* Kant considers “pure general logic”, not logic as such, to be constitutive of thought (and sundry operations of the understanding and reason) (see A52/B76). Logic, as the science of the rules of the understanding, is divided into general, special, and transcendental logics, and general logic is further divided into applied and pure logic; it is the latter field, pure general logic, which Kant considers the study of the necessary laws of thought. It is interesting, then, that even Kant, an archetypal object of feminist criticism, did not hold the univocal conception of logic that feminists indict. In particular, special logics for Kant involve principles specific to

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<sup>5</sup> E.g., see Oliver (2002: 210-216) and Nye (1990).

<sup>6</sup> Oliver borrows the quote from Henle (1962: 366). It is originally from the *Jäsche Logic*, which is not a work published by Kant himself; it is a compilation of notes and marginalia. Nonetheless it is generally treated as accurately reflecting Kant’s view. Henle is quoting a translation of the *Jäsche Logic* by T. K. Abbott called *Kant’s Introduction to Logic* (1885: 3).

various sciences, and applied logic uses principles of psychology: we therefore cannot attribute to Kant a conception of logic as such as a decontextualized, object-neutral theoretical field.<sup>7</sup> Logic for him is a much more complicated field which, in one manifestation, provides necessary laws for thought.

I don't wish to push this criticism too far. Perhaps writers like Oliver will respond that as long as any part of logic is supposed to be universally binding then it will still be an instrument of oppression. Even if we acknowledge that response, though, it is important to recognize that logic *per se* is not then being indicted; it is one very particular manifestation of logic.

The second problem is that the depiction of logic as providing the constitutive norms of thought ignores the great diversity of conceptions of normativity within the field of logic. Even focusing on what today is considered formal logic (what Kant would have called “pure general logic”) the idea that logic is normative for thought as such is just one substantive theory defended by some philosophers and rejected by others. Let me illustrate with a timeworn example. It is a fact about classical logic that a contradiction entails everything. So the proposition <snow is white and snow is not white> entails <the moon is made of green cheese>. Does that mean, however, that if you believe that or some other contradiction, then you ought to reason to the conclusion that the moon is made of green cheese? That would be a troubling thought, given that the frailty of human intelligence probably is such that each of us holds some contradictory beliefs—yet we don't think that we all ought to believe that the moon is made of green cheese. Logicians have endorsed a great variety of responses to this issue. Some have advocated relevance logics,

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<sup>7</sup> The picture is more complicated still if we consider all the evidence from the *Jäsche Logic*. See the excellent discussion in MacFarlane (2000), to which I am indebted.

claiming that the problem in this example is that that premise is not properly relevant to that conclusion. Others have followed Harman (1986) in thinking that logical validity itself does not tell us what we ought to believe; rather, we need certain (non-logical) bridge principles that connect logic to belief. It is of course difficult to speak of consensus within any discipline, but if anything the consensus among logicians is that logic is not normative for thought in the way that feminists have so attributed.<sup>8</sup>

Feminists’ use of Kant illustrates this problem of normativity particularly well. For Kant the normativity of logic is motivated within his transcendental philosophy, so in the absence of a commitment to that philosophy (i.e., for all of *us*), the normativity of logic is an entirely unsettled matter. There is no theory of the normativity of logic that is compulsory, somehow dictated by logic itself. Logic as a subject is therefore much more diverse and dynamic, in several ways, than standard critiques suppose. While it is true that some logicians have theorized that logic studies the constitutive norms of thought, it is simply a mistake to identify an entire field with one theory within the field.<sup>9</sup>

The second aspect of formal logic that I will examine is its use of symbolic, “meaningless”, syntactically specified languages. This too is a critical aspect of the feminist critique, because it is the basis of the charge that logic champions decontextualization and abstraction. It is certainly true that formal logic involves formal (or symbolic) languages (and the proof rules that go with them). They are the syntactic aspect of logic, and they allow one to give inductive definitions of logical notions of a term, a well-formed formula, a

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<sup>8</sup> For further discussion of normativity and other debates about foundational issues see, e.g., Etchemendy (1990), Hale (1999), and MacFarlane (2000, unpublished).

<sup>9</sup> Claiming that logic is inherently problematic because Aristotle’s theory of logic is problematic, e.g., is a bit like claiming that gynecology is inherently problematic because Aristotle’s theory of gynecology is problematic (which of course it was).

sentence, and a proof—definitions that rely on no understanding of what any of the symbols might mean. The point of such languages is that they can be specified syntactically, by the shapes of the symbols. But that doesn’t mean that anyone (even logicians) thinks of or uses sentences of such languages as meaningless strings of symbols.<sup>10</sup> Ask a logician what “ $P \vee \neg P$ ” says, and she will tell you it says “P or not P.” She won’t tell you, “It doesn’t say anything; it is a meaningless string of symbols.” So while logicians are interested in such languages because they can be specified purely formally, (i.e., syntactically), logicians use such languages with their intended meaning or interpretation.

Talk of meaning or interpretation here is not some non- or anti-logical notion. Syntax is only one half of formal logic, but an equally important part of logic is the semantics of such languages: precise interpretations of the languages that assign meanings to the various bits of formal language. Many of the most famous results in logic, such as the metalogical theorems of soundness and completeness of first-order logic, concern the connection between syntax and semantics. Logicians create formal languages, e.g., in order to study the notion of logical consequence; logical consequence itself, though, is a semantic notion (involving concepts of meaning and interpretation and truth), not a syntactic one. It is therefore simply a misunderstanding of logic to think that logic is solely, or even primarily, concerned with formal, meaningless languages. Logic is a field of study that uses syntactic languages to study both semantically precise notions of logical truth and logical consequence as well as natural language notions of logical truth and logical consequence.

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<sup>10</sup> Perhaps the only thing to actually “use” a string of symbols purely syntactically or formally is a computer, such as when it is executing an algorithm.

What is critical to much contemporary logic, then, is this distinction between syntax and semantics. Feminist critiques have therefore failed to ask, let alone answer, the critical question that gets to the core of the discipline: is there an inherent problem with studying reasoning with a syntax/semantics dichotomy? *Prima facie* we might think that the answer is yes: the syntax/semantics distinction itself represents a problematizing dualism of abstract formalism over the particularity of interpretation; since that distinction is fundamental to logic (to which nearly every logician would him- or herself agree), formal logic itself is problematized.

Not any distinction or dichotomy, however, amounts to a dualism (as I understand them, dualisms<sup>11</sup> (in contrast with mere distinctions or dichotomies) involve the subordination of one the relata to the other: master/slave; reason/emotion; masculine/feminine). Furthermore, and to the point, the syntax/semantics distinction is not a dualism in this sense, since it does not champion syntax over semantics. Indeed, as mentioned, some of the most celebrated theorems in metalogic concern the deep connections between what you can do with semantics and what you can do with syntax. Standard feminist critiques consequently operate at a level of generality that simply misconstrues the subject of their critique.<sup>12</sup>

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<sup>11</sup> This issue is well discussed in Plumwood (2002).

<sup>12</sup> I should note, however, that some feminist critiques raise more detailed criticisms of classical logic, such as the discussion of negation and identity in Plumwood (2002) and extensional semantics in Nye (2002). I have seen no convincing criticism of this detailed type either, but I will have to leave the particulars of that response to another occasion.

### 3. An empirical approach

Standard feminist critiques of formal logic do not just misrepresent logic, however. My second argument is that empirical research suggests that they misrepresent the feminine as well. It is well known that women face the same underrepresentation problem in philosophy as they do in physics and mathematics.<sup>13</sup> We might think, then, that formal logic is one of the contributors towards skewing philosophy towards males. Consider, for example, this anecdotal evidence, which provides a sort of autobiographical bookend to Nye’s famous critique of logic:

Now she is to be a philosopher. And logic is required. But logic, she is learning, is not a feminine subject. There is only one other woman in the logic class. Even in her other philosophy classes there are few women, and no one she knows. ... I think I must not have been the only woman who struggled in this way in her first logic class. ... Is it because I, as a woman, had a different kind of mind, incapable of abstraction and therefore of theorizing, is it because I was too “emotional”? (1990: 2)

... logic remains a permanent and central part of the curriculum that represents current knowledge. It is taught in every philosophy program and is proposed as Critical Thinking for all courses of study. Women still struggle, if not with Quine with other texts. (1990: 181)<sup>14</sup>

Empirical data<sup>15</sup>, however, suggest that this anecdotal evidence is inaccurate. Data reveal, firstly, that contrary to Nye’s claim women who enroll in logic courses consistently outperform men who enroll in logic courses. That result alone should make us rethink Nye’s claims, as well as the common argument in psychology and sociology that men are inherently (biologically) better at mathematics and spatial/abstract relationships, while

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<sup>13</sup> E.g., see the new statistics by Beebee and Saul (2011).

<sup>14</sup> Also see the autobiographical anecdote by Hart (2002: 89-90).

<sup>15</sup> This data is from an ongoing study of mine. At this point the data come from three different institutions and from introductory and advanced logic courses; but the data are still very limited, and it is hoped that this work will further the empirical study and discussion of women and logic.



women are inherently better at literature and personal/emotionally based relationships.<sup>16</sup> We should not too hastily draw far-reaching conclusions, however, from this one fact alone. Data also show that women who are *required* to enroll in formal logic courses *far* outperform men who are so required (in fact, such women far outperform every other meaningful category of student).

That additional result has several interesting implications. For one, it further suggests, contra Nye, that women are not being driven out of philosophy and related fields because of elementary formal logic. Even more important, however, it suggests that a selection effect might be in play: women who have already selected academic majors that require logic, such as philosophy, mathematics, and computer science (majors that are historically underrepresented by women), are not indicative, in terms of logical talent, of women in general. Women who select such majors outperform women in general, whereas men who select such majors perform on par with men in general. This result seems to have the interesting implication that women face greater barriers to entry to these fields than men (as many have supposed), since compared to men only women of higher ability tend to pursue such degrees. But, furthermore, logical talent and aptitude is not necessarily one of those barriers. Poor performance in logic courses is a greater problem for men than for women, not vice versa.<sup>17</sup>

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<sup>16</sup> E.g., see Baron-Cohen (2003), Geary (1998), Kimura (1999), Benbow and Stanley (1983), Benbow (1988), and Nowell and Hedges (1998). For critical review of these findings see Spelke (2005).

<sup>17</sup> I have no way to measure whether women, to a greater degree than men, wish to avoid logic and thus do not even take logic classes in the first place, but I am aware of no considerations that suggest that this is the case.

If these findings are indicative, then the traditional story that logic is not a “feminine subject” (Nye 1990: 2), that logic is somehow antithetical to “emotion”, and that logic marginalizes women, simply doesn’t stand up to scrutiny.

#### 4. Conclusion

There is much to be learned from feminist critiques of formal logic. Feminists have well documented the fact that many prominent contributors to logic have historically been contributors to theories of rationality and metaphysics that are antithetical to women.<sup>18</sup> Such facts deserve emphasis and deserve investigations into how and why that has been so.<sup>19</sup> I look forward to further dialogue with feminist theorists to answer those, and other, questions. But such facts alone do not problematize logic any more than unjust criminal systems problematize criminology.

In *The Feminine Mystique* Betty Friedan (1963) argued that women’s magazines in the 1950s and early ’60s depicted women either as content, docile housewives or as neurotic and discontented career-seekers. Such stereotypes were silencing women whose experience didn’t conform to them (which, Friedan discovered, was the majority of women). Feminist characterizations of logic are, ironically, doing something similar to many women: by casting logic as antithetical to women they are stereotyping not just logic but women as well. They are, again ironically, agreeing with the chauvinist principle that “women’s logic” is an oxymoron. Empirical research suggests that women have an equal aptitude for formal logic. Social and historical forces have obscured that fact and have

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<sup>18</sup> For an introduction starting from Pythagoras, through Plato and Aristotle, and on the present, see Wertheim (1995), and of course see Nye (1990).

<sup>19</sup> See the discussion of the connection between theology and science in Wertheim (1995) for just one parallel investigation.

misled feminist critics into believing a convenient fiction: logic seems to fit the pattern—indeed, it seems to be the paradigm of the pattern—of a dualism of abstraction and reason over context and emotion. Unfortunately (or fortunately, rather) the world and the feminine experience are more complex than that.

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