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Female Under-Representation Among Philosophy Majors: A Map of the Hypotheses and a Survey of the Evidence

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Female Under-Representation Among Philosophy Majors: A Map of the Hypotheses and a Survey of the Evidence¹

Tom Dougherty, Samuel Baron and Kristie Miller

Abstract

Why is there female under-representation among philosophy majors? We survey the hypotheses that have been proposed so far, grouping similar hypotheses together. We then propose a chronological taxonomy that distinguishes hypotheses according to the stage in undergraduates' careers at which the hypotheses predict an increase in female under-representation. We then survey the empirical evidence for and against various hypotheses. We end by suggesting future avenues for research.

Keywords: under-representation, undergraduates, majors, female, women, philosophy

1. Introduction: Female Under-Representation In Philosophy

It is well understood that female under-representation is a problem in the Anglophone philosophy profession, and that this phenomenon increases during students' tertiary education. Indeed, the largest and most recent empirical study of the phenomenon in the United States suggests that the gap may be mostly

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explained by the drop-off at the undergraduate level. Data from 32 doctoral-granting institutions and 24 liberal arts institutions yield

evidence of a significant decline in the proportion of women, as one looks from the population of introductory philosophy courses to the population of philosophy majors. The proportion of women found at the major, graduate, and faculty levels...indicate no such further drop. (Paxton et al. 2012, 953)

The emergence of under-representation at the undergraduate level is not limited to the United States. In Australia, there is statistical evidence that “whilst female students are enrolling in philosophy in larger numbers than their male counterparts at Bachelor level, they are more likely to pursue one or two units in philosophy, rather than a philosophy major” (Goddard 2008, 4). Meanwhile, in the United Kingdom, female under-representation is only slight by the end of undergraduate education, but becomes pronounced by graduate studies (Beebee and Saul 2011). Female under-representation in philosophy education is importantly related to the broader problem of female under-representation in the profession. Once the ratio of men to women studying philosophy at undergraduate or graduate level is significantly skewed towards female under-representation, it is inevitable that in the absence of significant affirmative action policies there will be an under-representation of women employed in academic jobs within the discipline of philosophy.

What is less well understood is *why* philosophy has this problem. Several explanatory hypotheses have been proposed, which could point to either a single cause, or several causes that combine to form a “perfect storm” (Antony 2012). Since there has not yet been a mapping of these hypotheses in the literature, in Section 2, we will look at each in turn, grouping similar hypotheses together. Then in Section 3, we propose a chronological taxonomy for these hypotheses, grouping them according to the stage of students’ education when the relevant causal factors have an *effect* on students’ intentions to major in philosophy. Finally, in Section 4, we will survey the evidence for and against these hypotheses.

2. The Hypotheses

In this section, we aim to create a rough map of the hypotheses discussed so far, placing similar hypotheses together under five loose groups. The grouping is not perfect, since inevitably there are some similarities between hypotheses in different groups. Moreover, in distinguishing some of the hypotheses we risk introducing more precise distinctions than have explicitly been drawn so far.²

² Thanks to an anonymous reviewer for raising this concern.

Still, we think that this additional precision and these loose groups are on balance helpful for navigating what might otherwise prove unwieldy terrain.

The first group that we will consider is the group of *course content hypotheses*. These hold that the content of philosophy courses fails to be sufficiently inclusive of women. Along these lines, Margaret Walker claims that how welcoming the philosophy profession is to women would be ameliorated by

the presence of concerns, texts, and images that acknowledge women within undergraduate classrooms, graduate training, and professional media allow women students to feel that a discipline, literally, comprehends them, that it is a space that they are free to enter and expected to enter (Walker 2005, 156; see also, Superson 2011).

Part of this lack of inclusion could be the quite literal absence of women themselves in philosophy courses. Along these lines, the *Role Model Hypothesis* is that female students do not choose to major in philosophy because they feel that they do not belong in philosophy as the result of lacking female philosopher role models. This could be because of an absence of female philosophy instructors to serve as role models (Hall 1993; Rask and Bailey 2002; Paxton et al. 2012). Alternatively, it could be the result of an absence of female philosophers in the way that philosophy is presented to students in educational materials. For example, the images of philosophers on philosophy websites and course materials are often images of male philosophers. Similarly, course syllabi are typically dominated by male authors, and this could send female students the message that they are unlike those who participate in philosophy (Schouten 2015). Alternatively, philosophy courses' content could increase female under-representation because of the subject matter of the course. Let us call this the *Subject Matter Hypothesis*. It holds that, statistically, male and female students have different interests, and philosophy courses focus on topics that are of disproportionate interest to male students. An example might be an ethics course focused on ethical issues pertaining to killing and harm, which neglected ethical issues pertaining to interpersonal relationships, or reproductive ethics. What the *Role Model Hypothesis* and *Subject Matter Hypothesis* have in common, as *Course Content Hypotheses*, is that they hold that the substance and presentation of philosophy courses either fail to interest female students or leave them feeling alienated from the discipline or both.

The second group of hypotheses focuses not on the content of philosophy courses, but the manner in which they are taught. Together, these are the *Teaching Methods Hypotheses*. The *Gendered Intuitions Hypothesis* is that there are gender differences concerning whose views are validated in the classroom. Wesley Buckwalter and Stephen Stich claim that there are statistically significant differences between the philosophical intuitions of male and female students and suggest that "male" intuitions get valorized in the classroom as the correct

ones to have (Buckwalter and Stich 2014). By contrast, the *Adversarial Argumentation Hypothesis* is that discussion in philosophy courses is typically aggressively argumentative and that this style disproportionately puts women off (Dotson 2011; Friedman 2013; Moulton 1989; Rooney 2010; Wylie 2011). The problems of this style would be exacerbated if it is implemented in the “philosophical ‘sport’ of arguing to win” (Hall 1993, 30). In what is arguably its most plausible form, this hypothesis allows that substantive disagreement about content is not problematic in itself, but only becomes so when this disagreement is expressed in a particularly adversarial manner (Beebee 2013). Meanwhile, the *Learning Styles Hypothesis* is that philosophy is taught in a way that does not suit learning styles that are statistically more favored by female students than male students. For example, it may be that female students are especially put off by the fact that philosophy is often taught in a particularly abstract way that fails to make adequate use of familiar examples (Dodds and Goddard 2013). In particular, it may be that the methodology of appealing to thought experiments to elicit intuitions is particularly off-putting to female students (Turri and Buckwalter ms). Finally, the *Implicit Bias Hypothesis* is that teachers and other students hold negative implicit biases about women’s ability in philosophy, and this affects how female students are treated in the classroom, and the feedback and grades that they receive (Haslanger 2008; Saul 2013).³ The hypothesis holds that these experiences, feedback, and grades influence students’ decisions about which subjects to major in. What all the *Teaching Methods Hypotheses* have in common is that they focus on how courses are taught and hypothesize that some methods make male students more likely to major in philosophy than female students.

While the previous hypotheses focused on the content and teaching methods of philosophy courses, the *Hostile Atmosphere Hypotheses* focus on the social atmosphere in philosophy education.⁴ According to the *Coping Methods*

³ This implicit bias could be related to a stereotype or gender schema, in which case there are important connections between the *Implicit Bias Hypothesis* and the *Internalized Stereotype/Gender Schema Hypotheses*, below. We distinguish them because the former concerns the biases of other students and teachers, and the latter concerns female students internalizing stereotypes or gender schemas themselves. Moreover, given implicit bias is a form of gender discrimination, this hypothesis has an important connection to the *Sexist Mistreatment Hypothesis* below. The latter focuses on how this sexist mistreatment creates a social atmosphere that is hostile to female students, and this could be separate from a mechanism whereby female students receive lower grades.

⁴ We acknowledge that there is not always a sharp line between this group of hypotheses and some of the others. For example, if female students find

Hypothesis, the unfriendliness of this climate consists in a lack of social support networks that help students to cope. For example, Valerie Morganson, Meghan Jones and Debra Major have suggested that female students are less likely than male students to major in science, technology, engineering and mathematics (STEM) subjects because these have an impersonal atmosphere, and female students' preferred coping method is social coping (Morganson et al. 2010). A similar hypothesis could be made for philosophy. More worrisome is the *Sexist Mistreatment Hypothesis*, which posits that within philosophy, female students are the victims of disrespectful, discriminatory, sexist or sexually harassing behavior by teachers or other students (Beebee and Saul 2011; Haslanger 2008; Steele et al. 2002). This mistreatment could either be targeted at a specific individual, such as when a teacher gratuitously refers to an individual student's gender, or be targeted at women as a group, such as when a teacher implies that women are not generally good at philosophy.

To illustrate the next group of hypotheses, we need to first introduce the notion of a gender schema. Virginia Valian defines a gender schema as "a set of implicit, or nonconscious, hypotheses about sex differences" which "are usually unarticulated" and indeed "may even be disavowed" (Valian 1998, 2). These hypotheses concern the "behaviors, traits, and preferences of men and women" (Valian 1998, 11). Valian proposes this as a refinement and extension of the popular concept of a stereotype. Building on Valian's work, Sally Haslanger has argued that there is a conflict between the schema for "woman" and the schema for "philosopher" (Haslanger 2008). A schema for a philosopher could be directly masculine if it portrays the stereotype of a philosopher as male or portrays philosophy as a stereotypically masculine activity (Calhoun 2009; Haslanger 2008; Lloyd 1984). Alternatively, a schema for a philosopher could be indirectly masculine insofar as philosophy is associated with something else that is independently coded as masculine. For example, philosophy could be associated with autonomous, assertive, task-oriented activities that are coded as male and not with the expressions of emotions and nurturing of others that are coded as female (Valian 1998, 13).⁵ An important recent hypothesis in this vein comes from Sarah-Jane Leslie and Andre Cimpian. Leslie and Cimpian hypothesize that given that there is a societal stereotype of women as lacking innate brilliance,

classes problematic because these classes involve aggressive argument, then there is a sense in which they are objecting to the social atmosphere of philosophy. This is one of the respects in which our map of the hypotheses is imperfect.

⁵ Further, studies in computer science have found that female students find it hard to identify with subjects that have a "geek image"—an image that philosophy has in certain cultures (Margolis and Fisher 2002).

women are underrepresented in disciplines thought to require this brilliance. They call this the “field-specific ability beliefs hypothesis”:

Laboratory, observational, and historical evidence reveals pervasive cultural associations linking men but not women with raw intellectual talent. Given these ambient stereotypes, women may be underrepresented in academic disciplines that are thought to require such inherent aptitude. (Leslie et al. 2015, 262)

Leslie et al. apply this general hypothesis to philosophy, in light of evidence that philosophy is one of the subjects that people perceive to require raw brilliance. While Leslie et al.’s hypothesis concerns general, field-wide beliefs about what success in the field requires, a related hypothesis of Carol Dweck focuses on individual students’ beliefs about how success is achieved. Dweck distinguishes a “fixed mindset” that sees ability as a gift from a “growth mindset” that sees ability as dependent on effort (Dweck 2006; Dweck 2008; Good et al. 2003). A fixed mindset could interact in problematic ways with a male stereotype of students with the gift.

It is important to note that stereotypes and gender schemas could be invoked to explain female under-representation in two different ways. First, stereotypes and gender schemas could be held by teachers or other students, who then treat female and male students differently in a way that leads female students disproportionately not to wish to study philosophy. This would be a version of the *Sexist Mistreatment Hypothesis* or the *Implicit Bias Hypothesis*. Second, female students’ own internalization of stereotypes and gender schemas can lead them not to major in philosophy. This is the central idea of what we will call the *Internalized Stereotypes / Gender Schema Hypotheses*. For each type of stereotype or gender schema, one might hypothesize that it is internalized before students arrive at university (Calhoun 2009), or alternatively one might hypothesize that philosophy courses themselves reinforce these schemas and stereotypes or create them where they did not exist before. In this respect, there is a potential affinity between the *Course Content Hypotheses* and the *Internalized Stereotype/Gender Schema Hypotheses*.

Stereotypes and gender schemas have received significant attention in discussions of minority under-representation in various disciplines in the academy (Hill et al. 2010). We can draw on this broader discussion to isolate more specific hypotheses according to the posited mechanisms by which a directly or indirectly “male” schema for philosophy may put women off philosophy. The *Schema Affects Self-Conception Hypothesis* holds that schemas hinder women from becoming personally attached to philosophy by making it “harder for women [to] imagine themselves as philosophy majors, or at least suspect that being a philosopher and being female is a less pleasant, or less promising, option than other academic options” (Calhoun 2009, 218). The

Schema Affects Confidence Hypothesis claims that schemas bias people into thinking that men are better at philosophy than women (Haslanger 2008, 213-4; see also Correll 2001), and this differentially affects men's and women's self-confidence concerning philosophy. This would plausibly affect major choices since there are links between self-confidence and motivation (Bandura 1977), and between self-confidence and interest (Valiant 1998, 152). The *Schema Affects Interest Hypothesis* holds that schemas may affect students' interests in philosophy since enacted gender roles predict the kinds of things an individual is likely to be interested in (Barak et al. 1991; Lupart et al. 2004; Steele and Barling 1996). Moreover, research on the psychology of interest suggests a strong correlation between interest and the extent to which students enjoy learning, their cognitive processing, and their vocational choices (Hidi 1990; Krapp 1999; Schiefele 1991; Tobias 1994). This research suggests that interest may be a central factor guiding the attitudes of a student toward a particular area of education. The *Schema Affects Standards Hypothesis* is that a male schema for a subject can lead female students to hold themselves to higher standards than male students, to devalue their abilities relative to male students, and to choose academic career paths on the basis of their assessment of these abilities. For instance, Shelley Correll found that where participants are exposed to the belief that males are better at a task, and those participants are then asked to perform that task, "men use a more lenient standard to infer ability and assess their task competence higher than women" (Correll 2004, 108). Similarly, under these conditions male participants assess their abilities higher than female participants even when they receive the same score, and male participants have higher aspirations than female participants for careers requiring this task. The *Schema Affects Popularity Hypothesis* is that schemas may result in women who are successful at "male" activities being considered less likeable (Hill et al. 2010, xvi). In turn, concerns with likability may have some effect on major choice. The *Stereotype Threat Hypothesis* is that schemas can give rise to "stereotype threat" which is the threat "of being viewed through the lens of a negative stereotype or the fear of doing something that would confirm that stereotype" (Hill et al. 2010, 38-39, citing Steele and Aronson 1995). Stereotype threat could affect under-representation in that it can hinder students' performances in class and on tests (Saul 2013). It could also create anxiety in students, which leads them to avoid the subject (McKinnon 2014; Schouten 2015). Lastly, the *Schemas Make Sexism Representative Hypothesis* is that a schema could interact with the *Sexist Mistreatment Hypothesis*. For example, a schema that codes the philosophy discipline male could lead female students who experience sexism to see this as representative of the discipline, and representative sexism may be significantly more discouraging than an isolated incident of sexism (Calhoun 2009).

The last remaining hypothesis is what we will call the *Impractical Subject Hypothesis*. According to this hypothesis, female students are disproportionately put off majoring in philosophy because they choose majors in order to pursue

certain goals, and they judge philosophy is unhelpful for pursuing these goals. These goals could include either getting a job or gaining the training that would allow them to make a difference to the world.⁶ There are two possible mechanisms behind this hypothesis. First, female students might tend to believe that philosophy is less useful for getting a job or achieving another type of goal than male students do. Second, female and male students may have the same beliefs about how useful philosophy is for achieving various goals, but may have different goals that they are pursuing in their undergraduate education. For example, female students might have a stronger preference than male students have for pursuing an education that helps them make a difference to other people's lives after university.⁷ Alternatively, they may have career goals that are influenced by a gender-structured workforce (Calhoun 2015). This gendered preference could be the result of gender schemas, or it could have been produced by male and female students' having had different experiences prior to university.

3. A Chronological Taxonomy of the Hypotheses

In the last section, we created five loose groupings of the hypotheses according to salient similarities between them. We did so in the hope that this makes the overall picture of the literature more accessible. That said, we want to highlight the fact that there are other ways of carving up the hypothesis space. Ultimately, we think that there is no taxonomy that is best *simpliciter*. Rather some typologies are more or less useful for different theoretical purposes. Here we wish to flag a reasonably coarse-grained chronological taxonomy that we think is helpful for some investigatory strategies that are relatively easy to carry out and that may help direct the focus of future research.

The chronological taxonomy that we propose categorizes hypotheses according to their stance on (a) the stage of students' careers at which the causes of female under-representation occur; and consequently their predictions about (b) the stage of students' careers at which representation of women

⁶ This hypothesis might be combined with the hypothesis that women are less inclined than men to take unfamiliar subjects, such as philosophy. In particular, it may be that women are less inclined to major in subjects when they are unfamiliar with the criteria for success in these subjects. The *Unfamiliar Subject Hypothesis* has not been proposed in the literature, and so we do not include it in our survey of the literature. But it has been suggested to us informally in conversation. By itself, it appears unpromising giving patterns of gender representation across all the disciplines in the academy. But Sara Mrsny has suggested to us that it might be more promising when combined with the *Impractical Subject Hypothesis*.

⁷ Thanks to Cheshire Calhoun for emphasizing this point.

among intending or actual philosophy majors decreases. Obviously, female under-representation among philosophy majors is the result of students' decisions about which subjects to major in. So we can ask when, according to each hypothesis, the students would have experienced the various effects that might have influenced these decisions. In particular, we can ask whether these effects would have occurred before students arrived at university or during their time at university. Moreover, hypotheses postulate various *causes* of these effects. We can similarly ask when these causes might have occurred, and whether they would have occurred before or after students' arrival at university. Accordingly, we can group hypotheses according to the timing of the causes and effects that they postulate.

If we adopt this approach, then we should distinguish three types of hypothesis according to each hypothesis' causal structure. First, there are hypotheses that postulate (proximate⁸) causes that occur before students arrive at university and that lead to under-representation of women among prospective students who intend to major in philosophy before they even arrive at university. An example of such a hypothesis would be the claim that prior to university, female students internalize a gender schema that codes philosophy as male, which makes them less likely to major in philosophy before they have arrived at university. Given that these hypotheses postulate causes before students arrive at university, let us call these *Pre-University Cause(s) Hypotheses*. Such views also hold that the relevant effect of these causes—women being less likely to major in philosophy—already occurs before entry to university. So for this reason let us categorize these as *Pre-University Effect Hypotheses*.

Second, there are hypotheses that postulate some causes that occur before students arrive at university, and other causes that occur after students arrive at university. These hypotheses maintain that the interaction of these causes discourages women from majoring in philosophy. An example would be the hypothesis that posits the following two causes: (a) before university women and men are socialized in such a way that women tend to have a stronger dislike of aggressive argumentation than men; and (b) at university, students discover that philosophy classes involve aggressive argumentation. As a result of the interaction of these causes, women end up less inclined to major in philosophy than men—an effect that occurs during their university experience. Since these

⁸ By focusing on proximate causes, we leave open the question of where more distal causes are located. For example, it may be that academic philosophers' actions within universities causally contribute to a gender schema in society, which students adopt before university. If so, then the distal cause would be academics' actions within the university, but the proximate cause would be the student's internalization of the schema before they arrive at university.

hypotheses point to a mixture of pre-university causes and causes in the classroom, let us call these *Mixed Causes Hypotheses*. Because these hypotheses postulate causes that occur after students have arrived at university, these hypotheses predict an increase in female under-representation that would also occur after students have arrived at university. To capture this, let us call them *Classroom Effect Hypotheses*.

The third type of hypothesis postulates only causes that occur during students' university experiences. An example would be the hypothesis that women and men similarly dislike being victims of sexual harassment (we may suppose) but that victims of sexual harassment in philosophy at university are disproportionately female. Since these hypotheses posit causes that occur only after students arrive at university, let us call these the *Classroom Cause(s) Hypotheses*. Like hypotheses of the second type, hypotheses of the third type postulate that women's representation in philosophy decreases during their time at university. Consequently, they are also *Classroom Effect Hypotheses*.

We can represent this tri-partite taxonomy in Table 1:

Table 1: Tripartite taxonomy of hypotheses according to their causal structure

	Category 1	Category 2	Category 3
Name of category by cause	Pre-University Cause(s)	Mixed Causes	Classroom Cause(s)
Name of category by effect	Pre-University Effect	Classroom Effect	
Stage at which proximate causes occur	Before university	Some before university; some during university	During university
Stage at which female under-representation increases among intending or actual majors	Before university	During university	During university

The point of this taxonomy is of course to fit specific hypotheses into it. A complication is presented by the fact that for some of the aforementioned hypotheses, it is possible to formulate more specific versions that fit into one

category and other more specific versions that fit into another category. For example, as we noted, the *Internalized Stereotype/Gender Schema Hypotheses* could either claim that the schema is internalized before university or during classroom experience. Consequently, variants of these hypotheses can fit into more than one column. Incorporating this complexity, the resulting chronological taxonomy is as follows:

Table 2: Locations of female under-representation hypotheses within the tripartite causal taxonomy

Hypothesis	By Cause	By Effect
<p>Course Content Hypotheses The substance and presentation of philosophy courses increases female under-representation (<i>Role Model Hypothesis; Subject Matter Hypothesis</i>)</p>	Classroom Cause or Mixed Causes	Classroom Effect
<p>Teaching Methods Hypotheses The way philosophy courses are taught increases female under-representation (<i>Gendered Intuitions Hypothesis; Learning Styles Hypothesis; Implicit Bias Hypothesis</i>)</p>	Mixed Causes	Classroom Effect
<p>Hostile Atmosphere Hypotheses The social atmosphere of philosophy education increases female under-representation (<i>Coping Methods Hypothesis; Sexist Mistreatment Hypothesis</i>)</p>	Classroom Cause or Mixed Causes	Classroom Effect

<p><i>Stereotype/Gender Schema Hypotheses</i> Female students' internalization of gender schemas increases female under-representation</p> <p>(<i>Schema Affects Self-Conception Hypothesis; Schema Affects Confidence Hypothesis; Schema Affects Interest Hypothesis; Schema Affects Standards Hypothesis; Schema Affects Popularity Hypothesis; Stereotype Threat Hypothesis; Schema Make Sexism Representative Hypothesis</i>)</p>	Pre-University Cause, Mixed Causes, or Classroom Cause	Pre-University Effect or Classroom Effect
<p><i>Impractical Subject Hypothesis</i> Female students' judgments that philosophy is unhelpful for achieving their life goals increases female under-representation</p>	Pre-University Cause, or Mixed Causes	Pre-University Effect, or Classroom Effect

A key reason why the chronological taxonomy is helpful is that it facilitates the following investigatory strategy. First, it is possible to investigate students' intentions to major at the beginning of university. Only the *Pre-University Effect Hypotheses* predict that there will be female under-representation at this stage. So if there is under-representation at this stage, then that would mean that one of these hypotheses posits a cause that is part of the overall explanation of under-representation. Consequently, one way to test the *Pre-University Effect Hypotheses* is simply to investigate students' intentions to major at the start of university. Meanwhile the *Classroom Effect Hypotheses* predict that female under-representation will significantly grow during undergraduates' careers. So if there is an increase in female under-representation among students intending to major after the start of university, then that would mean that one of the *Classroom Effects Hypotheses* posits a cause that is part of the overall explanation of female under-representation. To test these hypotheses, one could investigate students' intentions to major and their decisions to major at different points in their undergraduate careers. In the grander scheme of things, these investigations are relatively easy and cheap to conduct. These investigations would not isolate a single specific hypothesis, but the results from them would help us direct the focus of future research investigations onto a subset of all the

hypotheses in the literature.

4. Evidence for and Against the Hypotheses

What evidence is there for and against these hypotheses? Some of the previous hypotheses have been suggested on the basis of philosophers' personal experience as students and teachers. While this testimony is valuable for shaping inquiry into the issue, there are limits to how much light it can shine.⁹ Sometimes, different philosophers' testimonies conflict (e.g., about whether an aggressive argumentative style in philosophical discussion is a cause of female under-representation in philosophy). Moreover, it is hard to know the degree to which any single piece of testimony is representative of women's experience in general. Relatedly, testimony does not provide much insight into how the explanatory power of different hypotheses *compare*. So while we consider testimony a valuable part of the inquiry into female under-representation, we suggest that where possible it should be supplemented by empirical inquiry. In what follows, we survey the evidence of which we are aware, both from other disciplines and from philosophy.

4.1 Indirect Evidence from Other Disciplines

We can get indirect evidence about female under-representation in philosophy from the impressive amount of research into under-representation in other disciplines. Efforts have been focused particularly on STEM disciplines. This research has recently been surveyed in the American Association of Women's investigation into female under-representation (Hill et al. 2010). This report describes evidence that supports hypotheses that focus on stereotype threat (Steele and Aronson 1995), implicit bias (Nosek et al. 2009), self-assessment (Correll 2001; 2004), and "fixed" vs. "growth" mindsets (Dweck 2006; 2008; Good et al. 2003). Beyond this report, Morganson et al. find that social coping—seeking support from others—was a more significant predictor of majoring in STEM subjects for women than for men (Morganson et al. 2010). With respect to the *Role Model Hypothesis*, the evidence is mixed but suggests that under certain circumstances, the role model effect can be significant (Bettinger and Long 2005; Dee 2007; Neumark and Gardecki 1996; Rask and Bailey 2002). Lastly, support for the *Internalized Stereotype/Gender Schema Hypotheses* can potentially be found in research that indicates that mothers' attitudes about gender-role ideology influence female undergraduates' vocational choices (Steele and Barling 1996).

⁹ For a collection of anecdotes see beingawomaninphilosophy.wordpress.com
<https://beingawomaninphilosophy.wordpress.com/>.

4.2 Experimental Philosophy

With respect to evidence that is specific to philosophy as a discipline, one source of evidence is experimental philosophy.

The first piece of experimental philosophy evidence is arguably the most controversial. Buckwalter and Stich provide support for the *Gendered Intuitions Hypothesis* by providing evidence from an investigation of theirs for their claim that female and male students have different philosophical intuitions (Buckwalter and Stich 2014).¹⁰ However, Toni Adleberg, Morgan Thompson and Eddy Nahmias argue that Buckwalter's and Stich's statistical methodology is flawed, and state that they were unable to replicate Buckwalter's and Stich's results in their own study (Adleberg et al. 2014).¹¹ Similarly, Hamid Seyedsayamdost failed to replicate Buckwalter's and Stich's findings (Seyedsayamdost Forthcoming), as did Yuliya Chernykhovskaya in her interdisciplinary honors thesis at Rutgers University (Chernykhovskaya 2011).¹²

The second piece of experimental philosophy evidence concerns philosophical methodology. John Turri and Wesley Buckwalter have investigated lay-persons' preferences concerning the methodology of using thought experiments to elicit intuitions and the methodology of using empirical observation when attempting to answer certain questions that have been of interest to philosophers and psychologists (Turri and Buckwalter ms). Turri and Buckwalter found that female respondents had a significantly stronger preference than male respondents for the observational methodology over the thought experiment methodology. In addition, Turri and Buckwalter found that female respondents tended to view a question pursued by a team as more important than male respondents viewed such a question, while female and male respondents tended to view a question pursued by an individual no differently. Turri and Buckwalter note that these gender differences were statistically significant but not large, and remain neutral on how much

¹⁰ To explain the chronology of this publication and the attempts to replicate its findings: an advanced draft of Buckwalter's and Stich's manuscript had been available since at least 2010.

¹¹ For further criticism of Buckwalter's and Stich's hypothesis, see (Antony 2012).

¹² While attempting to replicate the study of (Weinberg et al. 2001) that found evidence of variation among ethnic groups with respect to their intuitions concerning Gettier counterexamples to accounts of knowledge as justified true belief, Jennifer Nagel, Valerie San Juan and Raymond Mar found no evidence of variation in intuition by gender (Nagel et al. 2013). With respect to ethnicity, Nagel et al.'s study is one of three recent studies that fail to replicate the results of Weinberg et al. (see also Kim and Yuan 2015; Seyedsayamdost 2015).

importance to place on this real but small difference.¹³ Moreover, Turri and Buckwalter do not advance or test any formal hypotheses about under-representation among philosophy majors. All the same, with these caveats in place, we conclude that, given the prevalence of the thought experiment methodology in undergraduate philosophy education, this evidence provides at least some support for the *Learning Styles Hypothesis*, although we admit it is hard to judge the strength of this support.

4.3 Large Survey of Multiple Philosophy Departments in the US

The next piece of evidence comes from data that Molly Paxton, Carrie Figdor and Valerie Tiberius gathered from 32 doctoral-granting institutions and 24 liberal arts institutions in the U.S. in 2011 (Paxton et al. 2012). Paxton et al. found that there was a positive correlation between the number of women majoring in philosophy at a university and the number of female teachers at that university. This provides some support for the *Role Model Hypothesis*, which would predict that exposure to female teachers would increase female philosophy enrolments. In addition, this evidence provides some support for the *Internalized Stereotype/Gender Schema Hypotheses*. This is because the women teaching philosophy could have served as counter-stereotypical exemplars, which helped address certain problems facing women (e.g., concerning implicit bias and stereotype threat).¹⁴

4.4 Georgia State University Surveys of 2012 and 2013

The next piece of evidence concerns female under-representation at only one university, but yields data that is rich with detail. Morgan Thompson, Toni Adleberg, Sam Sims and Eddy Nahmias investigated the attitudes of philosophy undergraduate students at the end of an introductory philosophy class at Georgia State University in both 2012 and 2013 (Thompson et al. ms). Thompson et al. found that female students were less likely than male students to intend to major. But interestingly, their results suggested that certain classroom effects were absent. They found that students typically disagreed with the claim “I felt that the classroom discussion was too combative,” with no significant gender differences in their responses to this statement—a result that provides evidence against the *Adversarial Argumentation Hypothesis*. Students tended to agree that students of each gender were treated with respect and that instructors attempted to involve all students in the discussion. This provides some evidence against the *Sexist Mistreatment Hypothesis*.

Thompson et al. did, however, find many other interesting differences.

¹³ Thanks to Wesley Buckwalter for emphasizing this point in personal communication.

¹⁴ Thanks to an anonymous reviewer for this point.

Thompson et al. found that although men and women received the same grades in introductory courses, women's grades were lower relative to their overall GPA. This might suggest that female students under-performed(e.g., as the result of stereotype threat) or that they performed to their usual ability, but were under-marked (e.g., because of implicit bias of instructors). To that extent, this evidence tends to support the *Stereotype Threat Hypothesis* and the *Implicit Bias Hypothesis*. Thompson et al. found that female students were less likely than male students to agree that they would have a lot in common with typical philosophy majors or their instructors. Further, female students were less comfortable than male students when expressing their opinions, as well as when asking and answering questions. Similarly, compared to male students, female students were less confident in their abilities to talk about philosophy and do well on assessments. These results support versions of the *Internalized Stereotype/Gender Schema Hypotheses* that predict that female students will have these experiences. Moreover, Thompson et al. found that women had a stronger dislike of thought experiments than men, and this partly mediated their willingness to continue studying philosophy. This supports the *Learning Styles Hypothesis*. In addition, Thompson et al. found that women perceived philosophy to be less useful than men but the differences were not significant when corrected for multiple comparisons. Further, Thompson et al. found that for women, more than men, having a field-specific ability belief negatively correlates with identification with philosophy. Finally, Thompson et al. found that women had less strong views than men and believed their views were more similar to other students' views. Significantly, they found that both of these effects partially mediated women's "willingness to continue" studying philosophy.¹⁵ This is an interesting and important result, but we do not see it providing support for or against any of the extant hypotheses in the literature. This suggests that we need either to add to the current array of hypotheses or modify one so that it predicts this difference.

Regarding the *Role Model Hypothesis*, Thompson et al.'s results were mixed. They found that women were more likely to view the gender and ethnic composition of syllabi to be unfair, and that this partially mediates the effect of gender on students' willingness to continue. However, Thompson et al. also found that increasing the percentage of female authors on the syllabus from roughly 10 percent in 2012 to roughly 20-30 percent in 2013 did not significantly increase female students' willingness to continue. Moreover, Thompson et al. found no correlation between the gender of the instructors and gender

¹⁵ In Thompson et al.'s work, "willingness to continue" is a composite measure based on the average of students' responses to the statements "I plan to take another philosophy course after this one" and "I would consider majoring in philosophy."

differences in answers to the survey.¹⁶

In summary, we conclude that Thompson et al.'s results provide evidence against the *Adversarial Argumentation Hypothesis* and the *Sexist Mistreatment Hypothesis*, evidence for versions of the *Learning Styles Hypotheses*, *Implicit Bias Hypothesis* and *Internalized Stereotype/Gender Schema Hypotheses*, and mixed evidence concerning the *Role Model Hypothesis*.

4.5 Evidence of a Pre-University Effect

Several pieces of evidence bear on the *Pre-University Effect Hypotheses* (i.e., versions of the *Internalized Stereotype/Gender Schema Hypotheses* and the *Impractical Subject Hypothesis*). There is a large amount of evidence that a pre-university effect widely occurs in the United States and some evidence that it occurs in Australia. However, evidence from the UK suggests a pre-university effect is more limited there. We look at each piece of evidence in turn.

The first piece of evidence supporting the *Pre-University Effect Hypotheses* was identified by Cheshire Calhoun. Calhoun notes that this evidence is a "sample of one," albeit a sample that she finds "astonishing and also instructive" (Calhoun 2009, 217). Colby College keeps survey data on entering first-year students. Over the period of 1971-2002, there were 11,394 respondents, of whom 52.1 percent were female and 47.9 percent were male. 105 students indicated that they intended to major in philosophy, and among these only 29 percent were female. This gender ratio closely tracks the gender ratio of students who do major, as 28.6 percent majors were female between 1999 and 2003. In other words, there is female under-representation at the level of students who intend to major in philosophy at the very beginning of university at Colby College, and female under-representation does not grow beyond this level by the stage at which students major.

The results of the aforementioned large US survey fit with Calhoun's hypothesis (Paxton et al. 2012). This data indicates that women are under-represented in introductory courses, composing roughly 43 percent of students on average. This initial under-representation is what a pre-university effect hypothesis would predict. Here it is significant that Calhoun hypothesizes that female students arrive at university interested in taking the odd philosophy course, but unwilling to major (Calhoun 2009). Calhoun's hypothesis would predict that women are less represented among students who arrive at university intending to major in philosophy than they are represented among students who take introductory courses. If so, the percentage of incoming students intending to major in philosophy who are female might be smaller than the 43 percent of students taking introductory courses who are female.

¹⁶ When interpreting this finding, we think it is worth noting that only a small number of instructors were involved with the course.

The strongest evidence of a broad pre-university effect across the United States comes from data from the Higher Education Research Institute (HERI). This is currently being analyzed by Chris Dobbs (Dobbs ms).¹⁷ HERI surveys incoming freshmen, and this survey includes a question concerning students' intentions to major. Dobbs found that these data indicate that women are already under-represented among students who enter college intending to major in philosophy. Dobbs notes that the surveys were answered by only a fraction of all incoming freshmen, and his research about how to interpret the data is still in progress.¹⁸ However, we are struck by the interesting fact that the percentage of women among the intending majors he reports—33.7 percent—is remarkably close to the percentage of women among actual philosophy majors found by Paxton et al. in their survey of over 50 universities, which was 35 percent (Paxton et al. 2012). This is the sort of pattern that one would expect if one of the *Pre-University Effect Hypotheses* were a significant part of the explanation of female under-representation.

Evidence that a similar pre-university effect is operative in Australia emerges from a study that we undertook at the University of Sydney in 2013 (Baron et al. Forthcoming; Dougherty et al. 2015). We surveyed students before and after their first philosophy course. We failed to find any evidence that this course disproportionately discouraged female students from continuing in philosophy relative to male students. In addition, we failed to find any gendered changes in students' attitudes toward philosophy. This means that we failed to find evidence that supported any of the *Classroom Effect Hypotheses*. More specifically, we failed to find that the course disproportionately increased female students' discomfort in class, contrary to what the *Adversarial Argumentation Hypothesis* and the *Sexist Discrimination Hypothesis* would predict. Similarly, we failed to find any evidence that confirmed the *Sexist Discrimination Hypothesis'* prediction that at the last lecture, female students would disproportionately say that they had been treated in an unfair or disrespectful way. Lastly, while the *Learning Styles Hypothesis* predicts that female students would feel that the course suited their style of learning worse than male students, in their last lecture responses, we found no gendered difference with respect to learning styles. We are cautious about inferring too much from this failure to find evidence in support of *Classroom Effect Hypotheses*. We note that it may be that a single semester is too short a time span for certain classroom effects to occur. This would particularly be the case if these effects resulted from the

¹⁷ The data come from Cooperative Institutional Research Program (2009).

¹⁸ The HERI data concerned the responses of over 2 million students (55.7 percent women) enrolling in U.S. colleges and universities. Of these, 4,838 men and 2,463 women declared philosophy as their intended major. We originally learned of Dobbs's research from (Thompson et al. ms).

accumulation of multiple “micro-inequities” that are negligible in isolation but are jointly significant (Brennan 2013). Moreover, we note that we did not attempt to test all of these hypotheses, and it may be that our survey methodology was insufficient for finding evidence of the hypotheses that we did test. Additionally, we note that the sample for the last lecture survey may not be representative of the course, since it may be that those who attend the last lecture of a course are not a random selection of course participants.

We did find evidence that existing attitudes coming into tertiary education are responsible for female under-representation at the University of Sydney. At the beginning of the course, disproportionately few female students intended to major, which strongly supports the claim that one of the *Pre-University Effect Hypotheses* was at work. We did not find any gendered differences with respect to how useful students considered studying philosophy for achieving their goals. This means that we found no evidence to support the *Impractical Subject Hypothesis*. However, we did find that at the beginning of the course female students were less interested in philosophy, were less self-confident about philosophy, were less able to imagine themselves as philosophers, and predicted they would feel more uncomfortable in philosophy classes than male students. These results supported the versions of the *Internalized Stereotype/Gender Schema Hypotheses* that predict gendered differences in interest, self-confidence and ability to self-conceive as a philosopher. So our data suggests that stereotypes and gender schemas may be responsible for the pre-university effect we found.

The next piece of evidence supports the view that this pre-university effect pattern is not borne out to the same degree in the United Kingdom. Helen Beebee and Jennifer Saul summarize the findings of a 2008–2011 British Philosophical Association questionnaire that was completed by 38 departments (Beebee and Saul 2011). The report found that of 1,397 undergraduates taking philosophy as part of a single honors degree, 44 percent were women, while of 2,368 taking it as a joint honors degree, 47 percent were women. These figures supply evidence of some female undergraduate under-representation, but less than the 29 percent reported by Colby College. Here it is worth bearing in mind that in the UK students choose majors before starting university, and most students stick with this pre-selected major. Therefore, the patterns of representation are largely explained by pre-university preferences (along with some transfers in and out of philosophy majors during university). When comparing the results in the US and the UK, it is worth considering transatlantic differences. In conversation, it has been suggested to us that the relatively healthy representation of women at the undergraduate level in the UK may be linked to the fact that a significant number of philosophy majors have taken a “Religious Studies” A-Level at the end of their secondary education. This would

be significant given that there appears to be female over-representation among students studying Religious Studies in high school.¹⁹ Alternatively, it may also be that cultural differences between the UK and the US mean that, for example, a gender schema coding philosophy as male is more prevalent in the latter.

4.6 Evidence for the Field-Specific Ability Belief Hypothesis

The last piece of evidence is the most recent, and arguably the most impressive in light of its breadth. In the US, Leslie et al. conducted a nationwide survey that investigated the representation of women in 30 different disciplines, including STEM disciplines and non-STEM disciplines (Leslie et al. 2015; see also Bian et al. ms; Meyer et al. ms). The survey was answered by faculty, postdoctoral fellows and graduate students at public and private research universities across the United States. Leslie et al. presented them with claims concerning what is required for success in their field (e.g., “Being a top scholar of [discipline] requires a special aptitude that just can’t be taught”) and asked them to indicate the extent to which they agreed with the claim, and the extent to which they believed people in their field would agree with the claim (Leslie et al. 2015, 262). These answers were averaged to produce a measure of how much the field emphasized raw talent. Leslie et al. found that the more a field valued giftedness, the fewer female PhDs there were in the field. It is worth noting that by investigating female representation at the PhD level, this research did not directly address female representation among philosophy majors, but it is at least indirectly relevant to this issue. What is particularly impressive about this research is that the hypothesis is fully general—ranging across all disciplines—and Leslie et al.’s broad investigation of 30 disciplines found confirmation of its predictions. This strikes us as powerful evidence that the *Field-specific Ability Belief Hypothesis* is at least a significant part of the explanation of under-representation in philosophy. The field-specific ability belief hypothesis is neutral on the mechanism whereby field-specific ability beliefs influence under-representation. Leslie et al. note that one potential mechanism is that these beliefs create biases in practitioners in the fields (e.g., teachers), and another mechanism is that female students internalize stereotypes of women as not being good at these disciplines. Consequently, Leslie et al.’s results lend some support to both the *Implicit Bias Hypothesis* and *Internalized Stereotype/Gender Schema Hypotheses*.

We can summarize this evidence from both the philosophy discipline and other disciplines as follows:

¹⁹ A report by the Department for Education and Skills found that in 2006 GCSEs “Girls are more likely than boys to take Art and Design, Home Economics, English Literature, Drama and Religious Studies” (Department for Education and Skills 2007, 15). In the UK, GCSE exams are typically taken at age 15-16, and A-Levels are typically taken at age 17-18.

Table 3: Evidence for and against female under-representation hypotheses in both philosophy and other disciplines.

<i>Hypothesis</i>	<i>Evidence of effects on students in other disciplines</i>	<i>Absence of evidence of effects on students in other disciplines</i>	<i>Evidence of effects on students in philosophy</i>	<i>Absence of evidence of effects on students in philosophy</i>
<i>Pre-University Effect</i>			Calhoun 2009; Baron et al. ms; Dobbs ms (analyzing HERI data from 2005 – 2009)	Beebee and Saul 2011
<i>Classroom Effect</i>				Baron et al. Forthcoming
<i>Role Model</i>	Bettinger and Long 2005; Dee 2007; Neumark and Gardecki 1996; Rask and Bailey 2002	Bettinger and Long 2005; Neumark and Gardecki 1996	Paxton et al. 2012; Thompson et al. ms (mixed evidence for this hypothesis)	Thompson et al. ms (mixed evidence for this hypothesis)

<i>Gendered Intuitions</i>			Buckwalter and Stich 2014	Adleberg et al. Forthcoming; Chernykhovskaya 2011; Seyedsayamdost Forthcoming
<i>Adversarial Argumentation</i>				Baron et al. Forthcoming; Thompson et al. ms
<i>Learning Styles</i>			Thompson et al. ms; Turri and Buckwalter ms	Baron et al. Forthcoming
<i>Coping Methods</i>	Morganson et al. 2010			
<i>Sexist Mistreatment</i>				Baron et al. Forthcoming; Thompson et al. ms

<i>Gender Schema / Stereotypes</i>	Bian et al. ms; Correll 2001; 2004; Dweck 2006; 2008; Margolis and Fisher 2002; Nosek et al. 2009; Steele and Aronson 1995 Good et al. 2003; Leslie et al. 2015; Meyer et al. ms		Bian et al. ms; Baron et al. ms (concerning pre-university effects of schemas); Leslie et al. 2015; Meyer et al. ms; Thompson et al. ms	
<i>Field-Specific Ability</i>	Bian et al. ms; Leslie et al. 2015; Meyer et al. ms		Bian et al. ms; Leslie et al. 2015; Meyer et al. ms	
<i>Implicit Bias</i>	Bian et al. ms; Leslie et al. 2015; Meyer et al. ms		Bian et al. ms; Leslie et al. 2015; Meyer et al. ms; Thomspen et al. ms	
<i>Impractical Subject</i>				Baron et al. Forthcoming

5. Directions for Future Research

Given the narrow scope of many of these pieces of evidence, there is clearly a need for further research along these lines. For a start, we should be cautious of generalizing too far from studies focused on a few universities, in case these studies uncovered results that are idiosyncratic to these universities. So we need more data from similar studies at different universities. It would also be useful to investigate in greater detail the mechanisms by which certain causes influence major choices. Once particular hypotheses have been identified as plausible, it would be helpful to gather further quantitative and qualitative data that shine light on these causal pathways. An example of such research would be the implicit association tests that Jennifer Saul reports that she is developing with psychologists at the University of Sheffield (Saul 2013). These would appear likely to provide insight into the *Internalized Stereotype/Gender Schema Hypotheses*. Along different lines, Susan Dodds and Eliza Goddard propose qualitative research of students “to analyse what they have to say about what philosophy is, who is a philosopher, how philosophy is done, and what makes for good philosophy” (Dodds and Goddard 2013, 158).

Another important avenue for future research is to investigate whether gender’s intersection with other differences between students is significant both for students’ experiences and female under-representation. The hypotheses and evidence to date have considered women in the aggregate. However, it would be important to investigate whether there are differences in the experiences and under-representation of women of color and white women, between non-disabled and disabled women, between women of different socioeconomic classes, women of different gender identities (e.g., cisgendered or transgendered), and so on. There is much room for empirical work to find out whether factors such as classroom experiences or gender schemas have different implications for different women.²⁰ This gap in the literature seems particularly significant since intersectionality appears significant for under-representation given that, for example, women of color are under-represented in philosophy more than white women.

In addition, there is a need for further research into the effectiveness of classroom interventions that may remediate either pre-university effects or classroom effects. At the moment, we have little empirical evidence that indicates which interventions may increase female students’ propensity to major in philosophy. Similarly, we lack evidence about which interventions are the most effective at ameliorating any of the effects implied by the aforementioned specific hypotheses. One possible study would be a multi-university investigation into, for example, whether there are correlations between the gender ratio of

²⁰ Thanks to an anonymous reviewer for suggesting the possibility of future research focused on the intersection of gender and other differences.

syllabi and teachers, on the one hand, and the changes in the gender ratio of intending majors, before and after the course. Another possible study would be to implement an intervention challenging stereotypes of philosophy (e.g., as a discipline for geniuses or men) in a class, and investigate effects on the gender ratio of intending majors before and after the course. These results could then be compared against those of a control class. The control could be the same course in a year in which the intervention was not implemented, or the control could be a subset of discussion sections of a course in a particular year.

Another avenue for future research involves re-framing the central explanatory questions. When asking why there is female under-representation among philosophy undergraduates, the theoretical focus has understandably been philosophy-centric. People have asked what it is about philosophy that discourages female students from wanting to study philosophy. Clearly, this is an important question to ask. But it is not the only question. This is because if women do not major in philosophy, then they are majoring in other subjects instead. In light of this, it seems that the most precise question is “why do women prefer studying these subjects to philosophy?” (Calhoun 2015; Dougherty et al. 2015). For example, some subjects such as psychology have female over-representation. If this is connected to philosophy’s under-representation, then we should ask what it is about both psychology and philosophy that leads these students to choose psychology over philosophy. Of course, the first step along this road is to identify which subjects female students are leaving philosophy for. The next step would be to inquire into the reasons why they are leaving. For example, it could be enlightening to conduct “exit interviews” for students who take introductory philosophy courses but do not choose to major in philosophy.

6. Conclusion

Discussions of female under-representation among philosophy students have provided a rich set of candidate hypotheses that posit effects either in the classroom or in students’ experiences before they arrive at university. In other subjects, particularly STEM subjects, there has been an impressive amount of empirical research into these effects. However, empirical research into these effects on philosophy students is still in its nascence. There have been a handful of studies that have shone light on the hypotheses. But there remains a pressing need for much more in the way of empirical research, if we are to understand better both the causes of female under-representation in philosophy and also which interventions might redress it.

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