

Do Internalized Feminine Norms Depress Girls' STEM Attitudes & Participation?



Let
Every
Child
Shine.



1 Femininity and STEM

The causes of girls' lower participation and interest in STEM have been much debated. Three general types of barriers have been studied: institutional obstacles (family, classroom settings, etc.), interpersonal (pressure from peers, parental attitudes), and personal (attitudes and values) (Wyer, 2003).

Of these, institutional and interpersonal obstacles have attracted the most attention. If personal barriers have been less studied, perhaps this is because of the conviction that, as Eileen Byrne (1993) notes, when a plant fails to grow one looks first at the soil, water and sun; one doesn't start by blaming the plant (p. 49).

Thus, researchers have generated a wealth of useful hypotheses about institutional and interpersonal barriers to girls' participation in STEM, including the absence of feminine role models (Marx, 2002), negative parental attitudes (Yee & Eccles, 1988; Lindberg, et al., 2008), stereotype threat (Spencer, et al., 1999), "chilly" classroom climate (Morris, 2003; Salter, 2003), and a "masculine pedagogy" in STEM teaching that privileges logic, objectivity and detachment (Keller, 1989; Ng, 2002).

Many of these hypotheses engage, in some way, with the effects of feminine norms, if only through the actions others take or the attitudes they hold. But the mechanism through which these external norms impacts girls' attitudes and behaviors remains unclear.

Research outside the STEM area suggests that the internalization of feminine norms and conventions is a central rite of passage for young girls (Eder & Parker, 1995, Wiseman, 2002; Lerner & Steinberg, 2009) However, understanding how girls themselves internalize feminine norms related to STEM, and what effect this has on their academic interests is both crucial and missing from STEM research and policy.

Shifts in attitudes during adolescence are a promising area for investigation, because from roughly grades five through nine, STEM interest levels undergo a measurable decline (Catsambis, 1995; Fennema, 1996; Jones, et al., 2004).

By eighth grade, only half as many girls as boys are interested in STEM careers (NSF, 2003), and this decline seems to inversely correlate with age, overlapping with the "gender intensification" period of late adolescence/ early teens when Hill and Lynch (1983) hypothesized that awareness and desire to conform to traditional gender norms accelerates, and belief in gender ideals rigidifies.

Acknowledgements: Brenda Wilson of Sally Ride Science, Jill Denner of ETR Associates, Karen Peterson of EdLab Group/National Girls Collaborative Project, and Mimi Lufkin of National Alliance for Partnerships in Equity provided feedback, guidance and ideas in the development of this report. Data collection and research for this report funded in part by an Innovation Generation Grant from the Motorola Solutions Foundation.



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The decline in STEM interest which begins in adolescence increasingly manifests itself in STEM participation in the last years of high school, when girls can express their own wants. Teenage girls score lower than boys on math SAT tests, take fewer AP tests in calculus, physics, and computer science, and are less likely to select college STEM majors (AAUW, 2010). We propose that these trends are connected to girls' perception of STEM as masculine and their internalization of feminine norms.

Girls are caught in a "double conformity" bind, in which they must opt out of femininity or opt out of STEM. The title of Nosek and colleagues' study of undergraduate women (2002) and math stereotypes, neatly encapsulates this problem in the syllogism:

Math = Male, Me = Female; Therefore Math ≠ Me

Their study focused on the two prepositions on the left side of this equation by investigating the effect of undergraduate women's identification as female (e.g., gender identity) on math attitudes and their personal association with math (e.g., math identity).

Like Nosek, researchers and programmatic interventions have often focused on the left or external side of the equation (Math=Male) and the need to make STEM classes less male-identified.

We propose instead that research, policy and philanthropy needs to also focus on the right side of the equation (Math≠Me). To do so, means first looking more closely at what is meant by femininity and feminine norms.



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Pretty or Smart

In conducting focus groups with young girls of color, we found some support for a conflict between femininity and STEM. For instance, while participants at first claimed they could be both smart and feminine, they then went on to describe a pretty classmate with long hair who "no one sees as a pretty girl in that class because she is so smart. She's like a nerd."

When asked specifically if they could be feminine, smart and popular with boys, their response was "Yes, but not in junior high!", because as they became more interested in boys, they had to "dumb it down then."

When presented with research that around 3rd grade girls stop doing as well in math and science, participants agreed that one likely reason was because that's when girls start noticing boys, implying an inherent conflict. Comments included the following:

- "[This is when] girls start giving up [on math]."
- "It's when they start noticing the boys." (All participants agree.)
- "[This is when they] start thinking 'I can't be pretty.'"
- "Girls focus more on 'oh, he wants me to be pretty.'"

Some participants complained that as they got older, they had to spend so much time on appearance ("I would wake up at 4 am to get ready for junior high") that little time and energy was left for schoolwork. Many participants believed that late elementary and junior high is when girls start "slacking on academics and start worrying about their appearance."

This competition for time and attention appeared to have an unexpected connection to lower math participation. For instance, participants noted that they all loved math in elementary school. However, they complained that as they focused more on being pretty by late elementary, they began to fall behind, and once behind catching up became impossible. Subsequently they lost all interest in math.



For social constructionists, a person acted the way they did not simply because they had feminine traits, or had learned a female social role, but because they had internalized specific beliefs and attitudes about femininity.

2 Thinking Femininity

Efforts to understand the role of internalized feminine norms on STEM must be guided by theory, in particular exactly what is meant by femininity, a concept used in a variety of contexts.

Traditional femininity is understood as an amalgam of attitudes that promote connectedness, conflict avoidance, beauty, motherhood, and nurturing. Thus femininity has been mostly thought of in the literature as either a personality trait or a social role (Bem, 1981; Eagly, 1987).

Trait theory explores the degree to which one exhibits learned characteristics considered feminine or masculine. A common drawback of trait approaches is the emphasis on traits as “hard-wired,” and their circular quality, in which one is feminine to the degree that one is not masculine, and vice versa (Pleck, et al, 1993a, 1993b).

Social role theory explores the ways members of each sex are subject to different expectations, resulting in gendered behaviors and attitudes. For example, females conform to cultural expectations by being more communal as girls, and working in the home as women (Eagly, 1987). A common shortcoming of social role approaches is their focus on external cues, which offers little room or explanation for the differences we see among individuals (Sczesney & Kuhnen, 2004).

Social constructionism offers an alternative way for us to think about femininity (Kimmel & Messner, 1989). It understands gender norms as constructed through beliefs, practices, and social scripts which hold that all women are naturally feminine, and all men naturally masculine. This binary arrangement then organizes individuals’ interests, beliefs, and behaviors (Gergen, 1985). Social constructionism is thus consistent with feminists theory which understands patriarchy as instilling a set of normative expectations that lead women to regulate their own behavior (Foucault, 1978; Bartky, 1990; Butler, 1995).

Thus social constructionists stress the importance of individuals’ own internalization of gender norms, and how these organized their thoughts, feelings, and behaviors (Pleck, et al., 1993b; D. Tolman, personal communication, March 13, 2010).

For social constructionists, a person acted the way they did not simply because they had feminine traits, or had learned a female social role, but because they had internalized specific beliefs and attitudes about femininity (Pleck, et al., 1993a, 1993b). This is central to our understanding of why girls drop out of STEM.

From a social constructionist standpoint, we might now rewrite Nosek’s syllogism to highlight traditional gender norms and the double conformity bind that can result for girls as:

Math = Masculine, Me = Feminine; Therefore Either Math ≠ Me Or Me ≠ Feminine

This refocuses attention back on the right (internal) side of the equation— Either Math≠Me Or Me≠Feminine. Insufficient attention has been paid to how girls, as active agents, might be able to alter or rewrite the equation themselves.

Moreover, as Damarin (2008) notes, despite its decidedly feminist bent, research on girls and STEM has seen relatively little engagement with contemporary feminist theory as represented by major developments like deconstruction, gender performativity, and social constructionism. Looking at internalized femininity represents an overdue correction, and an important opportunity for the field to begin engaging with such ideas.

3 Empowering Girls (Not Blaming the Victim?)

If research has avoided focusing on girls alone as the site of obstacles or agency, it may be because they are justifiably wary of another round of “blaming the victim,” in which girls are proposed as the source of and solution to their own inequality (Browne and England, 1997).

Yet improving understanding of the effects of internalized norms is not blaming victims for their own inequality. Rather, it is a necessary examination of the means through which inequality is accomplished and sustained—and also how it may be resisted (Friere, 1970; Ward, 1996).

For instance, studies have found that African-American girls resist narrow, traditional ideas of feminine beauty better than their middle-class White peers (Taylor, et al., 1995). For example, they are less likely to internalize idealized presentations in girl-oriented magazines and ads. Similar studies found that working class White girls are better able to resist narrow notions of femininity than their middle-class White peers (Brown, 1998).

Findings like these underscore the importance of considering the role of race/ethnicity and social class in girls’ agency and how their responses to ideologies meant to oppress them. If there is a link between feminine ideals and STEM, such findings hold the promise of developing an effective intervention.

In fact, one advantage of a social constructionist approach is that it understands gender norms as neither hard-wired nor dictated by environment, so that healthier alternatives for girls are always possible. An effective intervention would enable girls to feel less conflicted and experience themselves as having more scholastic and career options.



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4 Some Supporting Studies

Studies have offered some support for the idea that internalized femininity impacts girls' math and science participation.

- For instance, Burke (1989) found links between self-identified gender role and academic performance, data consistent with the idea that students who identified as feminine avoided school behavior which might be considered masculine.
- Smith (1992) found that increased awareness of traditional feminine norms in adolescence depressed achievement in science subjects.
- Santos and colleagues (2006) found that girls aged 12-13 who had less feminine traits performed better at math and Kumari (2009) found that undergraduate women whose gender identity was more male and less female performed better in math.
- Cvencek, et al. (2010) found that belief in math-gender stereotypes and their interaction with girls' self-identity begin as early as first grade. Somewhat similarly to our hypothesis, Faulkner (2007) found that women in engineering experience identity conflicts she termed "gender inauthenticity" and are forced to choose between proving they are "real engineers" and "real women."

It is worth noting that—presumably because of Title IX (1972)—there is substantial research linking internalized feminine norms and adolescent girls' lower interest and participation and in school sports.

Some of these studies do not draw a bright-line distinction between external feminine norms and expectations, and internalized ones: a girl who is worried about the former might ask herself, "If I take math will others see me as less feminine?" Rather than, "Will taking math make me or make me feel unfeminine?"

This distinction is crucial to the work being proposed here. Moreover, it is worth noting that—presumably because of Title IX (1972)—there is substantial research linking internalized feminine norms and adolescent girls' lower interest and participation and in school sports (for instance Cahn, 1994; Feder-Kane, 2000; Shakib, 2003).

5 Femininity: Hypotheses & Unanswered Questions

The journey of adolescence into a more mature body and femininity is a central rite of passage for almost every girl. It is highly unlikely that this is totally unrelated to the growth of negative feelings about math and science which appear to commence about the same time.

We not only need to begin researching this in detail, we need to begin developing the kinds of model interventions which might help inoculate girls against the pressures they encounter.

In that vein, the following questions seem central:

1. What is the nature of the relationship between internalized feminine norms and STEM?



- Does this relationship vary for different areas of math and science?
 - Does this relationship vary by different demographic variables such as age, race, ethnicity, and socioeconomic level?
 - If it varies by age, is there any interaction with the “gender intensification” period?
2. Which different dimensions of feminine norms have value in predicting girls’ attitudes towards STEM?
 3. What kinds of activities are most effective in helping girls think critically about internalized femininity— specifically in challenging traditional notions about femininity and STEM?



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