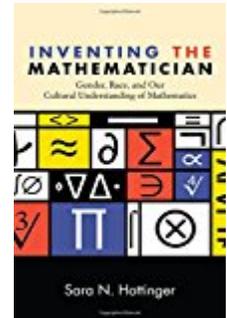


Sara N. Hottinger. *Inventing the Mathematician: Gender, Race, and Our Cultural Understanding of Mathematics.* Albany: SUNY, 2016. 205 pp. \$75.00, cloth, ISBN 978-1-4384-6009-3.



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Math faces troubling disparities. Many visibly white, male students brag about their successes in math, and this boasting keeps out many women and people of color. Such episodes—how "math stories" are told (p. 1)—are one important reason why higher education in math and many math professions still feature a disproportionate number of white men, even as many STEM fields reach a broader population of students and workers. It is important to note that such disparities do not come from biological forces but from social, discursive interchanges. Ethnographic studies have begun to look at how students from different backgrounds talk about math, and we can see similar discursive dynamics operating in math textbooks. In *Inventing the Mathematician: Gender, Race, and Our Cultural Understanding of Mathematics*, Sara N. Hottinger (professor of women's and gender studies and interim dean of arts and humanities at Keene State College) analyzes the stories told in math textbooks. Examining how such stories construct white, male achievement as the norm, Hottinger argues that

these books perpetuate social inequalities and simultaneously build particular ideas of Western success.

Using terminology from Michel Foucault's *Archeology of Knowledge* (1972), Hottinger focuses on how math students' "subjectivities" develop out of mathematical "discourse," and she applies this approach to three genres of math books: middle-school textbooks in the general mathematics sequence, college-level textbooks in the history of math, and research monographs in ethnomathematics (p. 7).[1] Hottinger argues that students encounter particular ideas about who can engage in math and what math means through the stories told in all of these venues. Though only some of these books emphasize white men's performance of mathematics, all of them present particular views of math's role in "the West itself" (p. 8). Investigating such moments, Hottinger argues that math shapes culture, just as culture shapes math.

Each chapter (after the first) focuses on a particular kind of math book. In the second, Hot-

tinger looks at middle-school math textbooks: Danica McKellar's famous "Math Doesn't Suck" series, compared with "Connected Mathematics" and "Mathematics in Context." In most of these books, Hottinger argues, girls are presented as constantly needing help from classmates or as unhealthily attached to the teachers, while boys are portrayed as independent thinkers. In these ways, Hottinger's textual analyses align with the student interviews Valerie Walkerdine conducted in her book *Counting Girls Out* (1998).[2] By contrast, McKellar's "math book[s] for girls" encourage female readers to engage in conversations with a successful, female mathematician: McKellar herself (p. 38). But, according to Hottinger, McKellar relates her experiences in a way that suggests a white, upper-middle-class reader, and media portrayals tend not to take her seriously as either a mathematician or an author, instead focusing on her past as a child actor. On this basis, Hottinger doubts the effectiveness of McKellar's series, while at the same time noting its importance for consistently presenting a female mathematician who wants to engage female readers.

Many college curricula for matheamatics now include a requirement in "history of mathematics," which has led to a developing textbook market, particularly since 2000. Hottinger's third and fourth chapters examine six of these textbooks, most of which are "internalist histories," meaning that they rarely consider forces outside of specific intellectual traditions (p. 60). Even when such histories include biographical stories, they suggest patterns or tropes that may lead present-day students to see themselves as excluded from the longer history of math. For example, most of these textbooks frame Isaac Newton's story in terms of mathematical genius, which Hottinger claims comes across as masculine, cold, deviant, and distant. As Hottinger explores in her fourth chapter, the images in these textbooks reinforce this message, whether Newton appears in a traditional portrait or as a postage stamp. By contrast to these internalist accounts, a few histories of math

try to emphasize connections to the rest of historical practice, showing how historians interpret diverse sources to tell complex stories. Such accounts encourage their readers to engage with the professional practices of both historians and mathematicians.

In her fifth chapter, Hottinger looks at research monographs in "ethnomathematics," that is, the decades-old anthropological field that examines ways various communities perform math. Focusing on a 1997 edited anthology, Hottinger indicates the roots of this subfield in the claim that math books need to represent how diverse people engage with mathematical ideas in myriad ways. [3] More recently, however, math educators have been skeptical that ethnomathematics makes math more accessible to more students, and these skeptics have produced more edited collections as well as research articles in journals devoted to both math education and anthropology. For Hottinger, ethnomathematics's commitment to both academic math (in the West) as well as cultural anthropology leads to tensions within the field, and she traces such challenges through two different accounts of the voyaging practices in the Marshall Islands. These books represent, according to Hottinger, the ways Western mathematics "has come to rely upon its ethnomathematical Other to serve as a foil from which the West can see and understand itself" (p. 157). In the end, Hottinger joins the chorus of skeptics who doubt ethnomathematics's claims to open Western mathematics to diverse students.

Throughout *Inventing the Mathematician*, Hottinger engages in textual analyses to show how certain students are left out of stories of mathematical success. Not only teachers and students but textbooks, too, emphasize the ways that Western, white men have built math as an intellectual field and as a cultural artifact. Surrounding these analyses, Hottinger talks about her own experiences as a successful math student who decided to pursue an interdisciplinary humanities-

based PhD. instead. She reflects on the ways that she encountered math stories in her own education, and she indicates the potential for new work that could open up mathematical careers to more people like her. I can especially relate to these moments. Though I identify as male, my Jewish-Latino heritage means that I do not always count as white, an though (like Hottinger) I was a successful math major, I decided to pursue an interdisciplinary humanities-based PhD, too. Though our academic development cannot be explained entirely through textbook stories, I agree with Hottinger that such moments invariably had an effect. In general, cultural studies of mathematics (like Hottinger's) have the potential to explain and rework the stories told in math classes, and these claims resonate with Karen Hunger Parshall and David E. Rowe's work about the emergence of American math; Christopher Phillips, Michael J. Barany, and Donald Mackenzie's work on blackboard performances in math education and research; and Peggy Aldrich Kidwell, Amy Ackberg-Hasting, and David Lindsay Roberts's work about textbooks as "tools" in American math teaching.[4] Such work should be of interest not only to historians of math but also to scholar of science, technology, education, and diversity.

Notes

[1]. Michel Foucault, *The Archaeology of Knowledge and Discourse on Language*, translated by A. M. Sheridan Smith (New York: Pantheon Books, 1972), chapters 1-3.

[2]. Valerie Walkerdine, *Counting Girls Out* (London: Routledge, 1998), 99-112.

[3]. Arthur Powell and Marilyn Frankenstein, eds., *Ethnomathematics: Challenging Eurocentrism in Mathematics Education* (Albany: State University of New York Press, 1997).

[4]. Karen Hunger Parshall and David E. Rowe, *The Emergence of the American Mathematical Research Community, 1876-1900: J. J. Sylvester, Felix Klein, and E. H. Moore* (Providence and London: American Mathematical Society and

London Mathematical Society, 1994); Christopher Phillips, "An Officer and a Scholar: West Point and the Invention of the Blackboard," *History of Education Quarterly* 55 (Feb. 2015): 82-108; Michael J. Barany and Donald Mackenzie, "Chalk: Materials and Concepts in Mathematics Research," in *Representation in Scientific Practice Revisited*, ed. Catelijne Coopmans, Michael Lynch, Janet Vertesi, and Steve Woolgar (Cambridge, MA: MIT Press, 2014), 107-129; and Peggy Aldrich Kidwell, Amy Ackberg-Hastings, and David Lindsay Roberts, *Tools of American Mathematics Teaching, 1800-2000* (Baltimore: The Johns Hopkins University Press, 2008).

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