

*American Higher Education Since WWII* is of tremendous value to educators who need to point students toward texts on a subject, but it would be challenging for students to navigate the book on their own. For those who are already acquainted with the most prominent histories of US universities and colleges, this work will deepen their knowledge. For those who are less familiar with American higher education, though, this book might be a difficult place to start. There are many historical studies of this period, but none is quite like this work. It is a testament to the tremendous contribution that Geiger has made to the field. While some voices are underrepresented, and thus makes the volume incomplete, *American Higher Education Since World War II* is perhaps the most authoritative work on this topic and will likely be an essential text for years to come.

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TALKING ABOUT LEAVING REVISITED: PERSISTENCE, RELOCATION, AND LOSS IN UNDERGRADUATE STEM EDUCATION

edited by Elaine Seymour and Anne-Barrie Hunter  
*New York: Springer, 2019. 528 pp. \$149.99 (paper).*

In the past two decades, governmental agencies, higher education administrators, and researchers have placed attention on and assigned resources to the alarming loss of undergraduate students in science, technology, engineering, and math (STEM) (Blackburn, 2017). This raises the following question: If substantial resources, both federal and private, have been allocated, and extensive scholarship, both theoretical and applied, has been generated, why revisit the loss of students in undergraduate STEM education? Few readers will be surprised to learn that women and students of color continue to leave STEM disciplines at disproportionate rates compared to their male and white counterparts (Eddy & Brownell, 2016). Earlier attempts to explain why women and students of color were leaving STEM pointed primarily at student academic deficits (Harper, 2010). However, in the foreword to *Talking About Leaving Revisited*, Shirley M. Malcom argues that the evidence does not support the hypothesis that students who have left STEM disciplines do so because they did not have “the right stuff” academically to persist. Rather, the problem lies in the culture and predominant pedagogical practices of STEM programs. Pointedly she writes, “The popular meritocratic narrative of individual effort and intelligence absolves faculty and institutions of any responsibility for student learning and success” (p. viii). To address the idea that students do not persist in STEM because of their academic inability, the contributors in *Talking About Leaving Revisited* sampled students who, by all academic metrics, would likely succeed in STEM disciplines. In both the qualitative and quantitative data presented, the volume includes a large proportion of students who perform well in traditional predictors of academic achievement in STEM (math background, GPA, standardized testing scores).

As the title of the book states, the study replicates the monumental ethnographic research by Seymour and Hewitt (1997). The findings from the 1997 publication have served as a foundational source to STEM education researchers and reformers and have generated a rich body of literature that broadly “suggests increased awareness of alternative ways to teach and some inclination to try them” (p. 35). In the thirteen chapters of the “revisit,” the authors provide diverse evidence that builds toward a nuanced picture of why capable students are still leaving STEM. What emerges from student voices and large surveys goes beyond simplistic explanations hinging on a single cause, such as deficit notions of student ability that undergird attitudes about meritocracy in STEM education. The authors point out that many studies which investigate the link between single factors and students leaving STEM are likely providing investigators with insights about the most proximal factors associated with the actual leaving, suggesting a single solution for STEM attrition. Yet, these studies fail to provide insights into the complicated web of factors—including classroom practices, the culture of STEM, institutional supports, and larger societal concerns—that contribute to student decision-making.

In their research for *Talking About Leaving Revisited*, the contributing authors analyzed nationally representative survey data which revealed that only 40–50 percent of students who enter college intending to major in a STEM discipline actually do so. The leaving rates of women and students of color are more dire than the national percentage of students who leave STEM. This will not be news to scholars and reformers of science education. However, it does raise questions about why these patterns persist even after the attention and resources that STEM attrition has received since the publication of the 1997 study. Why is this still happening? And what has changed?

To answer these questions, the researchers featured in *Talking About Leaving Revisited* undertook a multicomponent, mixed-methods study over five years and in six different universities, in a sense, replicating much of the research first reported by Seymour and Hewitt (1997). The reporting of this study is organized roughly into two sections. The first section is made up of chapters 1–3, which provide extensive descriptive statistics based on analyses of nationally representative student data. Establishing that patterns of STEM attrition persist motivated this research and set the context. Further, these chapter authors describe the changes that have happened in the patterns of student switching and relocation over the past twenty years. The second section of the book addresses why STEM attrition is still happening. It is illustrated by the ethnographic component of the research, with in-depth interviews and through the student’s own voices. Chapters 4 and 5 explore the expectations undergraduates have when first starting a STEM major and their reason for choosing STEM. Chapters 6–10 focus on the educational experiences of STEM majors, while chapter 11 addresses outside factors in the decision to leave STEM (e.g., being employed). Chapter 12 synthesizes these themes,

and, finally, chapter 13 includes a set of potential implications and solutions to keep interested and capable students in STEM.

It is impossible to summarize all the findings here. But one of the most compelling is about women in STEM. Even after accounting for ability, women continue to leave these disciplines at higher rates than men. The research suggests that this is happening due to their loss of confidence in their ability to succeed in STEM fields. Student accounts from introductory chemistry and calculus courses corroborate the finding that even after accounting for academic performance, women show lower STEM self-efficacy than men, which undermined their belief that they belonged in STEM. Not belonging was cited as one reason for switching out of STEM by 81 percent of those students who left. Yet, students reported lower self-efficacy and the sense of not belonging in STEM even when they performed as well or better than their peers. Interestingly, 42 percent of persisters, those who stay in STEM, also continued to struggle with a sense of belonging. Students of color also frequently expressed that they did not feel like they belonged in STEM, as did students from low-income families and first-generation families.

The authors argue that rather than innate ability or STEM talent, the culture of STEM has detrimental effects on who persists, namely by exacerbating societal inequities. Specifically, the “weed-out” culture and the competitive classroom climates discourage those who are most vulnerable from being successful. Efforts to keep undeserving students out of STEM in early gate-keeper courses also have the unintended consequence of pushing talented and capable students out of STEM. Pedagogical practices in introductory courses, according to students, also played a role in their decision to leave STEM. Over 80 percent of the students interviewed talked about lecture being the primary mode of instruction used in their introductory courses. As is well documented, lecture-based courses fail to engage the majority of students (Freeman et al., 2014; Theobald et al., 2020). Again, the undergraduate students in this study corroborated findings reported in the literature.

But in spite of the extensive use of lecture in introductory courses, the authors explain how pedagogy and assessment are instructional practices that are also used in gateway courses to promote inclusion. Persisters in STEM describe how active pedagogies and student-faculty interactions during moments when they considered switching prompted them to stay in STEM. One of the surprising strategies used by persisters was detaching their sense of self-worth from their grades. According to the authors, “persisters differed from switchers in finding ways to adapt their expectations and academic identities” (p. 465). This suggests that a culture which normalizes the idea that learning in STEM is challenging may help counter some of the detrimental effects of the competitive and weed-out culture.

After reading hundreds of pages and an overwhelming amount of data about why capable undergraduates leave STEM, readers may be left feeling that

change is happening at a glacial pace. Yet, the overarching message of the volume is its argument against a simplistic notion that individual student academic ability is the key factor explaining STEM attrition. Readers may find this both hopeful and energizing. If student intellect and deficit-based notions of student achievement are not the reason for attrition in STEM, as the authors demonstrate, then attrition patterns are more likely to be due to structural disadvantages. Persisters provide insights into how structural disadvantages can be countered, and *Talking About Leaving Revisited* provides researchers and science education reformers with productive paths forward.

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## MOVING UP WITHOUT LOSING YOUR WAY: THE ETHICAL COSTS OF UPWARD MOBILITY

by Jennifer M. Morton

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Jennifer M. Morton's *Moving Up Without Losing Your Way: The Ethical Costs of Upward Mobility* argues for a new narrative for low-income and first-generation students pursuing higher education—one that accounts for the trade-off between economic and ethical values that students experience in their journey toward upward mobility. Morton asserts that the traditional narrative available to low-income and first-generation college students, or “strivers,” is not only falsely meritocratic but fails to take into account the “ethical goods” that strivers are typically asked to leave behind as they enter the middle and upper classes. These ethical goods, namely the people and places they love, are cru-