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Embarking on and Persisting in Scientific Fields of Study: Cultural Capital, Gender, and Curriculum Along the Science Pipeline

Embarking on and persisting in scientific fields of study: Cultural capital, gender, and curriculum along the science pipeline

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Abstract: In this paper, we examine the nature and extent of participation in science-based academic fields by Canadian young women and men. Informed by Bourdieu's theory of cultural reproduction, we focus on three key stages – senior secondary school, the transition to post-secondary studies, and the post-secondary completion stage – to determine whether and how the interrelationships of gender, cultural capital, course completion in senior secondary school, timing of decisions, and initial participation in post-secondary education lead to the completion of science-related undergraduate degrees. Through correspondence analyses of 10 years of longitudinal data with 1,055 respondents, we extend the findings of cross-sectional studies that examine only one aspect of this longitudinal story by showing how the intersection between organisational structures (institutional and disciplinary) and cultural capital transmitted by the family shapes the opportunity structures of access to scientific fields of study by young women and men.

Article Summary
From a cultural reproduction perspective advanced by Bourdieu (1986), the transmission of capital, in the form of cultural as well as economic resources, occurs at the level of the family. That is, parents transmit capital in the form of dispositions, habits, and attitudes to their children, resulting in the reproduction of the dominant culture through which background inequalities are converted into differential academic attainment and eventually social status. Rather than positing that cultural capital alone will have the greatest influence on disciplinary choice and eventual earned educational credentials, we take up McCall's (1992) challenge to consider gendered dispositions as a critical form of capital and to examine the "interaction of gender with class distinction through the lens of embodied capital" (p. 839). However, we concur with McCall that Bourdieu's work is a powerful conceptual framework to examine the relationships among capital, gendered dispositions, high school orientation, and post-secondary outcomes.

Through the examination of 10 years of panel data on British Columbian young women and men's educational pathways (Andres, 2002), we examine whether and how cultural capital (i.e., parental education) and academic capital (i.e., curricular choices and subsequent credentials) contribute toward earning formal qualifications in a competitive field like science. This paper builds on previous findings on gender and science-related educational pathways (Adamuti-Trache, 2003).

Some Key Results:

During the senior high school years, girls and boys tended to complete different types of science courses: female students were more oriented toward life sciences and male students toward physical sciences courses. Parental education played a determinant role in senior high school course choices made by respondents, in that there was a noticeable correspondence between students with university-educated parents and the completion of science courses in high school. In addition, students with university-educated parents were more likely to have well-defined, early plans to continue post-secondary education. Early decisions provided an advantage for those who had the ability and interest in pursuing science-related careers that require long and focused trajectories.

High school graduates made post-high school choices that corresponded with senior secondary academic profiles. Students with stronger mathematics and science orientations were more likely to go directly from high school to university or colleges and those with non-science high school profiles were more likely to not attend any post-secondary institution in the first year after school graduation. However, it is important to note that background in mathematics and science at the high school level was beneficial even for students who did not intend to follow scientific educational pathways. For instance, completion of these subjects in high school led to increased likelihood of attending a university and a much broader range of programme options at the post-secondary level.

High school orientation, gender, and parental education played a significant role in the post-secondary completion of respondents 10 years after high school graduation. University graduation corresponded with high school science orientation and having university-educated parents. Holders of non-university credentials (e.g., college), non-completers, and those who did not attend any post-secondary institution were more likely to come from families where neither parent had attended university.

Both gender and high school orientation were related to the fields of study completed by university graduates. Men who completed mathematics and physical science high school courses were more likely than women with comparable backgrounds to complete academic studies in the fields of physical science and engineering.

Further Research:
Further research is needed to illuminate the patterns demonstrated in this study: that is, how educated parents influence their children’s academic choices and, in doing so, the ways in which they push their children toward more science-oriented course work. This type of “push” may be related to parents’ understandings and interpretations of current trends in the workforce in which scientific and technical careers are valued and rewarded by society. As such, parents may recognise the need for their children to have a solid foundation in mathematics and science. Conversely, parents may simply recognise the utility of exposure to courses such as physics and mathematics as academic (versus nonacademic) courses that provide more academic rigour, and more interaction with exacting teachers and academically oriented and motivated classmates.

Policy Implications:
In an analysis of participation in Grade 12 mathematics and science provincial examinations by

British Columbian young women and men between 1991/92 and 1999/2000, Adamuti-Trache (2003) documented that participation rates in these subject areas had not increased for both girls and boys, and gender differences continue to be pronounced and largely unfavourable for girls. Hence, the findings and related implications and recommendations reported in this paper remain current. The issue of under-representation of women in science and engineering cannot begin to be resolved as long as starting conditions are unchanged.

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