

# Hidden obstacles in education for students from low socioeconomic backgrounds

## Citation for published version (APA):

Muskens, M. M. E. (2019). *Hidden obstacles in education for students from low socioeconomic backgrounds*. Maastricht University. <https://doi.org/10.26481/dis.20191115mm>

## Document status and date:

Published: 15/11/2019

## DOI:

[10.26481/dis.20191115mm](https://doi.org/10.26481/dis.20191115mm)

## Document Version:

Publisher's PDF, also known as Version of record

## Please check the document version of this publication:

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## 6.1 Summary of the main findings

The aim of this thesis is to investigate the existence and consequences of hidden barriers that students from low socioeconomic status (SES) encounter in educational settings. It is well documented that students' SES-background is a key predictor for academic performance and educational attainment (Sirin, 2005). Low socioeconomic circumstances have detrimental effects on cognitive development, parental resources, and educational opportunities. These effects are known to contribute to the relation between SES and educational attainment (Mani, Mullainathan, Shafir, & Zhao, 2013; Vohs, 2013). However, less is known about the possibility that the relation between SES-background and educational attainment is also reinforced by a mismatch between low-SES students' skills and strengths, and features of educational environments (e.g., Ellis, Bianchi, Griskevicius, & Frankenhuis, 2017; Rogoff et al., 2017; Valencia, 2010). Demands in school environments may be unintendedly tailored towards students from high-SES backgrounds, disadvantaging low-SES students (e.g., Rogoff et al., 2017; Sternberg, 2005; Valencia, 2010). This thesis adds to the current literature by investigating empirically the existence and consequences of mismatches related to students' socioeconomic background across three qualitatively different domains. Specifically, possible mismatches are examined with regard to the content of test materials offered to students, to personality traits, and to the study environment more broadly. First, I focus on features of math tests that may unintendedly bias low-SES students' performance. Second, I investigate whether the well-known positive relationship between certain personality traits (e.g., Openness) and educational outcomes differs by students' SES-background. Finally, I study the consequences from undermatching (i.e., when students attend less selective colleges than their credentials would permit) on students' subjective experiences, and focus on the possibility that these consequences differ by students' SES.

**Chapter 2** shows that regardless of their level of intelligence, certain context (i.e., money, social interaction) applied in math-test items to explain mathematical problems, may impede low-SES students' performance. Neutral context, mathematical notation, and context related to food, were not related to impaired performance among low-SES students. These results suggest new insights in features of standardized tests that disadvantage low-SES students, and might have significant implications for fair testing.

**Chapter 3** shows that the personality trait Openness in late childhood predicts educational attainment in middle adolescence, and that this relation is stronger for low-SES students than for high-SES students. These results suggest that the personality trait Openness may compensate for background disadvantage. Because we find this pattern with regard to performance related to teachers' subjective evaluations, but not with regard to students' objective performance, these findings may point to the possibility that this compensating role might work through teachers' evaluations. For low-SES students, who are more likely to meet low teacher expectations, displaying Openness may be a way to influence teachers' expectations.

**Chapter 4** shows that in their first year in higher education, students from low-SES environments who enroll in the most selective institutions in higher education experience a match with the academic environment, but at the same time experience a mismatch with the social environment. Undermatched low-SES students (i.e., students who are enrolled in less selective institutions than they are eligible for) are not experiencing this mismatch with the social environment during their first year. We conclude that undermatching may contribute to students' integration into college during their first year, but only among low-SES students.

**Chapter 5** shows that students in higher education that are undermatched are in general less satisfied with their social and academic environment. The negative relation between undermatching and satisfaction increases toward the last year in college, especially for low-SES students. This lowered satisfaction in the final stage in higher education implies that the negative consequences of undermatching become more pronounced after students have become more integrated into their colleges. In sum, whereas undermatching may positively contribute to the social integration of low-SES students in higher education during their first year in college (chapter 4), undermatching seems to lead to less satisfaction with social and academic aspects in college toward the final stage in higher education (chapter 5).

The research reported in this dissertation made use of preregistration of research questions, data source, definitions, and statistical plans, in line with recent recommendations (Wagenmakers, Wetzels, Borsboom, van der Maas, & Kievit, 2012). The current view in psychology on preregistration is that it reduces the risk of false positives, and that preregistered research is more likely to produce findings that replicate, compared to traditional research (Nelson, Simmons, & Simonsohn, 2017). In Chapter 2, 4, and 5, preregistrations were published on Open Science Framework (<https://osf.io>). Chapter 3 is a follow-up on a commissioned research by order of the Dutch Ministry of Education, and research questions and the data source were discussed and established in a research proposal before conducting the analyses. In all studies, the initial plan changed during the research process, for example because of new insights based on relevant literature or reviewers' comments, unforeseen flaws in the data, or new research questions that were evoked by the results. Therefore, in all studies, we added additional information about these deviations to the preregistration and/or to the manuscript, or decided to conduct additional exploratory analyses. Because of the preregistration, such changes are now systematically recorded during each research project. Furthermore, through preregistration, the distinction between confirmatory and exploratory analyses is clear for each chapter. Being able to make this distinction is important because it improves the accuracy of inferences, and therefore the likelihood that findings will replicate (Wagenmakers et al, 2012).

In sum, this dissertation shows new evidence for the existence and consequences of hidden barriers for low-SES students in educational contexts. It reveals several features of educational environments that may have differential consequences for students from

low-and high-SES backgrounds including test materials used, interaction with personality traits, and the encountered social and academic environment. Together, the findings imply that focusing on mismatches that may occur when low-SES students attend schools or institutions for higher education, may lead to more insight in the negative relation between low socioeconomic background and academic performance. These insights may have implications for policy aimed at reducing the academic performance gap between low-and high-SES students. Moreover, with regard to research practices, the experiences with preregistration lead to policy recommendations as well. The main policy implications are discussed in the next section.