IHE Research in Progress Series 2019-002
Submitted to series: April 11, 2019

Undermatching and Affective Development during the First Year of College: A Longitudinal Study of College Students in the Netherlands

Gregory C. Wolniak, *Institute of Higher Education, University of Georgia,* *gwolniak@uga.edu*
&
Marjolein Muskens, School of Business and Economics, Maastricht University
m.muskens@maastrchtuniversity.nl

Wolniak, G. C., & Muskens, M., (2019). Undermatching and Affective Development during the First Year of College: A Longitudinal Study of College Students in the Netherlands. *IHE Research Projects Series 2019-002*. Retrieved from: https://ihe.uga.edu/rps/2019_002

Undermatching and Affective Development during the First Year of College: A Longitudinal Study of College Students in the Netherlands

Gregory C. Wolniak
Institute of Higher Education
University of Georgia
106 Herty Drive
Athens, GA 30602
gwolniak@uga.edu

&

Marjolein Muskens
School of Business and Economics
Maastricht University
Tongersestraat 53
6211 LM Maastricht, The Netherlands
m.muskens@maastrichtuniversity.nl

2019 AERA Conference
April, 2019
Toronto, Ontario, CA

Abstract

This study focuses on the phenomenon of "undermatching" in relation to affective development during the first year of college. Particular attention is paid to examining the role of first-generation college student status in moderating these relationships. The analyses utilize longitudinal data from the Netherlands (N=14,540), testing whether undermatching is associated with affective development, based on measures of academic motivation, college satisfaction, and self-confidence. Results indicate that among first-generation students, undermatching predicts positive development of satisfaction and academic self-confidence. Alternatively, among continuing-generation students, undermatching does not affect satisfaction and is associated with less development of academic self-confidence. We conclude that undermatching may promote affective development for socially-mobile students (i.e., students from families with less educational attainment), and might therefore have positive long-term consequences for educational attainment.

Key words: Undermatch; Affective Development; College students; Netherlands

1. Introduction

Throughout Europe and the United States, higher education systems have wrestled with achieving equality of educational opportunity through programs and policies aimed at promoting fair and equitable access to college in general, and to elite colleges in particular (Goodchild and Wechsler 1997; Rudolph 1990; Hippe, Araújo, and Dinis da Costa 2016). The desire to secure equal and fair access to higher education for all students, regardless of social backgrounds, centers on the clear social and economic advantages tied to attaining advanced education. For example, a four-year college degree accompanies substantial positive returns for students in both monetary and non-monetary terms, including labor market earnings, likelihood of employment, as well as health, well-being, and civic engagement (Grossman 2006; Kamhofer, Schmitz and Westphal 2018; McMahon, 2009).

Within the larger context of equality of educational opportunity is specific attention to the accessibility of elite or selective colleges. Research has shown that attending a more selective institution increases one's likelihood of graduating and improves subsequent success in the labor market (Bowen, Chingos and McPherson 2009; Long 2008, 2010; Titus 2004), and attending a more selective institution among students from lower socioeconomic backgrounds plays a distinctly valuable role in social mobility (Alon and Tienda 2005). Yet, despite efforts to make the most selective tracks in higher education accessible for all students, those with lower socioeconomic status (SES) remain less likely to enter, or attain degrees from, the most selective tracks, even after taking into account prior academic achievement (Smith, Pender and Howell 2013).

The phenomenon of undermatching – when a student attends an institution that is less selective than their academic achievement would enable – has become a notable concern among researchers and is where we focus our attention in the present study. Nearly all of the research on academic undermatch has examined college enrollment as the primary outcome, seeking to uncover factors that influence one's likelihood of undermatching (Bastedo and Flaster 2014; Ovid, Kalgrides, Nanney and Delaney 2017). From this work, evidence points to students from lower socioeconomic backgrounds as being more likely to undermatch (Bowen et al. 2009; Roderick, Coca and Nagaoka 2011; Roksa and Deutschlander 2018; Smith et al. 2013), raising concerns about undermatching in relation to equality of educational opportunity and, more broadly, social mobility.

Recent findings by Ovid et al. (2017) suggest that undermatching may have significant negative influence on long-term, post-college outcomes (most notably on the likelihood of employment), and that students' non-academic factors, such as preferences for certain types of college, influences their likelihood of undermatching, particularly among students from lower income backgrounds (Belasco and Trivette 2015; Ovink et al. 2017; Roksa and Deutschlander 2018). Ovid et al.'s (2017) research is significant for having provided the only published evidence that we are aware on the relationship between undermatch and higher education outcomes, beyond those based on enrollment. To our knowledge, no previous study has examined students' developmental trajectories in relation to academic undermatch, marking an important gap in the literature. Furthermore, the pervasive assumption through the existing literature is that undermatching is a negative outcome in and of itself, and that students who undermatch will ultimately fail to maximize their potential; for example, note the title of Belasco

and Trivette's (2015) article that begins with the phrase "Aiming low." With the present study, we interrogate this assumption within a developmental framework.

1.1.Study aims

The study aims to contribute new evidence on academic undermatch in relation to college student development, specifically examining development within the domain of students' affective characteristics, including academic motivation, satisfaction, and confidence. These characteristics are related to what some have conceptualized as "soft" or "non-cognitive" skills (Heckman and Kautz 2012), or as elements of "grit" or "resilience" (Duckworth and Yeager 2015; Luthar, Cicchetti and Becker 2000). Whereas previous research has concentrated on understanding the factors that influence undermatching, or its longer-term effects, here we examine undermatching in relation to a distinctive definition of student success that is based on the extent to which students change over the course of their first year in college. We have designed this study to gain understanding of the influence of institutional undermatch on affective development, and whether or not this influence differs for students who are the first in their family to attend higher education (i.e., first-generation) versus students whose parents have attained some higher education (i.e., continuing-generation).

Specifically, we examine the influence undermatching has on students' affective development over the first year of college. In addition, we examine if the influence of undermatching on affective development is moderated by (i.e., conditional on) first-generation status. Drawing on data that follows a large, national sample of students into and through their first year of college, we examine the possibility that undermatching influences student development by investigating outcomes previously unexamined in relation to undermatch. Whereas the majority of research on social inequality in education has focused on objective

measures of enrollment and degree or credential attainment, students' subjective experiences have not been well examined (Aronson 2008), nor has undermatch been examined in relation to affective development.

2. Conceptual Framework

The conceptual underpinnings of this study draws from multiple perspectives. First, in terms of the outcomes examined, we were guided by models of college impact, notably Weidman's (1989) model of undergraduate socialization. Primarily focused on the U.S. postsecondary context, Weidman's and other college impact models (Pascarella 1985a) point to socioeconomic factors, normative pressures from parents and peers, as well as the academic and social contexts within the collegiate environment as developmental influences on the formation of values, aspirations, and career and lifestyle choices. Developmental models highlight the combined influences of students' precollege characteristics, which predispose students to enter certain educational contexts, and in turn, stimulate the formation of values, aspirations and preferences (Astin 1984; Mayhew, Rockenbach, Bowman, Seifert and Wolniak 2016).

In conceptualizing outcomes central to student development, we build on Pascarella's (1985b) study of affective development and draw from Astin's (1991) taxonomy for defining higher education outcomes. Astin's taxonomy is useful for organizing outcomes along multiple dimension, based on whether an outcome is cognitive versus affective, and whether an outcome is psychological versus behavioral. These dimension intersect to form a 2 x 2 matrix whereby nearly all higher education outcomes may be conceptually situated. For example, the cognitive-psychological category includes critical thinking and academic achievement-related outcomes, while the cognitive-behavioral category points to such things as education attainment. Affective-psychological outcomes include such things as self-concept and satisfaction with college, while

affective-behavioral outcomes represent key educational choices (such as major field of study) and educational aspirations. As previously mentioned, some researchers have referred to affective (or non-cognitive) measures within economic models of human capital development (Heckman and Kautz 2012) or within social-psychological models (Duckworth and Yeager 2015; Luthar et al. 2000), conceptualized as important skills associated with motivation, attitudes, and temperament of well-rounded students. Our focus for the present study represents the affective-psychological domain, often examined as mediating the relationships between students' backgrounds or curricular interventions and academic or cognitive outcomes (Mayhew et al. 2016).

In examining academic undermatch, and whether or not differences exist in its effects between first-generation and non-first-generation college students, we drew from models of social inequality and status attainment (Sullivan 2001) that point to the qualitative differences in students' education—selectivity of institution attended and major field of study—as being more influential towards post-college status outcomes than even the amount of education attained (Lucas 2001). Drawing from the related framework of conflict theory (Collins 1971), undermatching is a possible mechanism through which the education system distributes advantages according to preexisting social positions.

Furthermore, examining undermatch is conceptually tied to prior research on peer effects, in which scholars examine how educational contexts, as defined by peers, influence student outcomes (Manski, 1993). A large share of peer effects research has focused on studying the effects of institutional selectivity on student outcomes (Wolniak and Ballerini, 2019). This body of research is premised on notions of human capital formation and education production functions (Carrell, Fullerton and West 2009; Sacerdote 2001), in which an institution's

selectivity is assumed to be an indicator of academic "quality", such that the average behaviors of a group of students influences the behavior of the individual students that comprise a group. Peer-effects have been shown to have long-term consequences for educational attainment, income and occupational prestige, mediated by students' educational expectations (Göllner, Damian, Nagengast, Roberts and Trautwein 2018).

3. Causes and consequences of undermatch

A number of recent studies have examined the assumptions and challenges in estimating undermatch (Bastedo and Flaster 2014; Belasco and Trivette 2015; Rodriguez 2015), with research offering different perspectives as to the pervasiveness of the undermatch phenomena (Rodriguez 2015; Smith et al. 2013). Prevalence of undermatch aside, past research has found lower-SES students are more likely to undermatch than their higher-SES peers (Bastedo and Jaquette 2011; Hoxby and Avery 2013; Ovink et al. 2017; Smith et al. 2013), as are Black and Hispanic students compared to their White and Asian peers (Black, Cortes and Lincove 2015; Ovink et al. 2017). Evidence further indicates that a student's likelihood of undermatching is affected by non-academic factors, including college search activities, attitudes related to campus social life and living at home, and dimensions of social and cultural capital (Belasco and Trivette 2015; Ovink et al. 2017; Roksa and Deutschlander 2018).

In terms of the outcomes associated with undermatch, the only study we have identified is Ovink et al.'s (2017) examination of nationally representative longitudinal data on U.S. college students within the first few years of completing college. The study uncovered evidence that undermatch may negatively influence degree completion (for both four-year bachelor's degrees and graduate degrees), and that the selectivity of institutions to which students were initially admissible serve to moderated these relationships; the negative relationship was most

apparent among students who had access to somewhat selective schools. In addition, a negative relationship was found between undermatch and employment outcomes. Across the entire set of outcomes, the results varied based on analytic design (specifically, weather the model included high school fixed effects or an instrumental variable based on proximity of college to one's high school).

Moreover, in an unpublished conference paper by Fostnacht (2015), students' self-reported experiences during their first year of college were examined through the National Survey of Student Engagement that was conducted across a wide range of U.S. colleges and universities. Results suggest that undermatched students may engage with faculty more often, perceive greater gains across personal and social dimensions of college, and report lower levels of institutional satisfaction than their matched counterparts. The findings also suggest that the influence may differ by students' race/ethnicity and gender. However, given the self-reported, cross-sectional nature of the underlying data, Fostnacht's findings should be interpreted with caution until replicated.

It stands to reason that being sorted into institutional contexts that are misaligned with one's academic achievement may have lasting consequences, given the sizeable career effects associated with graduating from more selective institutions (Mayhew et al. 2016; Ovink et al. 2017). However, if students who undermatch have greater opportunity to engage in curricular and co-curricular activities, they may arrive at a greater sense of satisfaction towards their institution (Fostnacht 2015). Ultimately, the existing evidence on the effects of undermatch is not entirely conclusive.

The pervasive assumption throughout much of the literature is that undermatching is a negative outcome and that students who undermatch will fail to maximize their potential. The

evidence to date does not fully support this assumption, or deficit-oriented approaches to examining undermatch. In fact, some evidence suggests that undermatched students may experience some positive outcomes relative to their matched peers, such as credit accumulation (Kurlaender and Grodksy 2013), and Tiboris (2014) has argued that maintaining individual autonomy in choosing what college to attend should be a greater imperative than assuming that undermatching leads to unfavorable outcomes.

4. Plausible mechanisms

Informed by the above theoretical and conceptual tenets, along with existing evidence on undermatch, there are three plausible mechanisms through which undermatching may influence students' affective development. Each mechanisms represents a distinct hypothesis we evaluate through our analysis.

4.1. Misalignment hypothesis

First, development may be influenced by undermatching through misalignment with students' capacities. Exposure to a less rigorous curriculum and larger misalignment with their academic profile may serve to de-motivate undermatched students and diminish their satisfaction (Hoxby and Turner 2013). Therefore, a negative association between undermatching and affective development supports the misalignment hypothesis.

4.2. Peer-effects hypothesis

Second, development may be affected by undermatching because of peer-effects (Manski 1993; Wolniak and Ballerini, 2019). Students' behaviors and mindsets may be determined by the average behavior of their peers. For example, if students in less selective institutional environments display less academic motivation on average than students in more selective institutions, the development of any given students' motivation may be negatively affected when

they enroll in less selective institutions (whether it be a matched or undermatched institution), and positively affected when they enroll in more selective institutions. Therefore, the peers-effect hypothesis is that undermatching is negatively associated with affective development relative to matching in selective institutions, due to lower average academic profiles of students' peers.

4.3.Big-fish-little-pond hypothesis

Third, and to the contrary of the peer-effects hypothesis, affective development may be positively influenced by undermatching through the 'big-fish-little-pond' effect (Fang, Huang, Zhang, Huang, Li and Yuan 2018; March 1987; March and Hau 2003). Students may form higher self-concepts when surrounded by relatively less academically capable students than if they were surrounded by more academically capable students, such that undermatching may be related to greater levels of affective development in terms of motivation, satisfaction, and self-confidence, compared to matching (in less selective or more selective institutions). In other words, undermatching is more positively associated with affective development than are matching in more- or less-selective institutions.

5. Methods

5.1. Study context

While undermatching is an international phenomenon, research on prevalence and consequences of undermatching has been conducted mainly within the U.S. context. For the present study we focus on undermatching in Europe; specifically, the Netherlands. Higher education in the Europe is highly comparable to higher education in the U.S. with regard to educational programs, degrees that can be attained, and job-market perspectives after graduation, as illustrated by the blooming exchange of students and scientific staff. Furthermore, Europe and the U.S. demonstrate comparable patterns in the relatively high tendencies of first-generation

(versus continuing-generation) students to undermatch, and the corresponding concerns among researchers and policy-makers regarding talent that may not be fully developed.

There are some notable differences which make it particularly interesting to study undermatching in Europe, and particularly in the Netherlands. First, as in many European countries, in the Netherlands there are two types of higher education institutions: selective or less selective institutions. This differs from the U.S. system, where institutional selectivity is often seen as a continuum (Roderick et al. 2006). The well-defined distinction between selective and non-selective institutions in the Netherlands offers a relatively clear framework to determine academic undermatch.

Second, there are differences with regard to admission procedures. In the U.S., students' academic and extracurricular performance during high school, in combination with scores achieved on standardized tests widely used by colleges (i.e., the SAT and ACT), determine whether they are deemed admissible by various institutions. Institutions exercise a large degree of autonomy in determining their own admissions standards, and thus, a given students' admissibility. Alternatively, in the Netherlands and many other European countries, a student's eligibility for the most selective institutions is determined by the level of the track completed during secondary education. In the Netherlands, the eligibility for the most selective institutions is determined by the level of the track completed during secondary education: the highest level (VWO[1]) gives access to the most selective higher education institutions, and a lower level (HAVO[2]) only gives access to less selective higher education institutions. Therefore, it is clear for all students whether they are eligible for the most selective institutions or not, which markedly differs from the U.S., where a students' admissibility must be empirically estimated by

[1] VWO (Voorbereidend Wetenschappelijk Onderwijs) = preparatory academic education
[2] HAVO (Hoger Algemeen Vormend Onderwijs) = higher general secondary education

researchers interested in studying undermatch, except in the rare situation where an institution provides researchers with precise and complete information on the basis of their admissions decisions In addition, overmatching (i.e., when students attend more selective institutions than their credentials would permit) is not possible in the Netherlands, in contrast with the U.S. Applying data from students in the Netherlands offers an opportunity to study undermatching within a system of clearly defined and comprehensive admissions guidelines.

5.2. Data

Data for the study were drawn from the Startmonitor, a large-scale longitudinal survey of first year student experiences in the Netherlands. Each year, from 2009 to 2015, researchers randomly selected participants from all higher education institutions in the Netherlands. The resulting data contain six waves (2009 to 2015) of students who participated in the beginning and the end of their first year in higher education, resulting in a sample of 14,540 participants whose age ranged from 16 to 30 years of age (M=18.18, SD = 0.93). Table 1 presents descriptive statistics for all variables, described in detail below.

5.3. Variables

5.3.1. Outcomes

We focused on three dependent variables regarding student affective development, measured at T1 and T2: *Satisfaction with college* (3-item scale: Cronbach's Alpha $(\alpha)_{T1}$=.72; α_{T2}=.75); *Academic Motivation* (8-item scale: α_{T1}=.90, α_{T2}=.88); and *Academic Self-esteem* (single item, range 1-11). The *Academic Motivation* and *Self-esteem* measures were collected in all six waves, while *Satisfaction with college* was only collected at T1 and T2 in 2009. Year-specific fixed effects were included in the models to appropriately control for these data characteristics.

5.3.2. Academic match

We created three categorical dummy variables representing students who: 1) Matched in the most selective institutions (participant who followed the highest level of secondary education and enrolled in a most selective institution); 2) Matched in the less selective institutions (participant from a less selective track in secondary education and enrolled in a less selective institution; and 3) Undermatched (participant who completed the most selective track in secondary education and enrolled in a less selective institution). Matched-selective students served as our comparison group.

5.3.3. Covariates

We included the following characteristics as covariates (all self-reported by participants): gender, age (varying from 16 to 29), immigrant status, first-generation status (1=one or both parents have attained a degree in higher education, 0=both parents hold no degree in higher education education), disability or functional limitation, grade retention during secondary education (having repeated a grade), and college major (i.e., Education, Agriculture, Nature, Science, Health, Law, Behavior, Language, and Economics).

[Insert Table 1 about here]

5.4. Analysis

We conducted a series of multivariate regression analyses to estimate factors that influence affective development at the end of the first year (T2), controlling for a parallel measure of these experiences at the beginning of the first year (T1). Our primary independent variable is *Academic match*. To account for differences in students' demographics and circumstances known to influence affective experiences and higher education choices, we added control variables in our models for background variables and academic major. The resulting

estimates represent general effects, or, the average effects across the full sample, statistically controlling for all other variables contained within the model. The regression equation is presented as Equation 1.

$$\boldsymbol{Y}_{T2} = b_0 + b_1\boldsymbol{X} + b_2\boldsymbol{Y}_{T1} + b_3\boldsymbol{MATCH} + b_4\boldsymbol{S} + b_5\hat{\boldsymbol{e}} + \varepsilon \quad (1)$$

In Equation 1, $\boldsymbol{Y}_{T2}$ represents the measures of affective development at the end of students' first year of college, while $\boldsymbol{Y}_{T1}$ includes the parallel "pretest" measure collected at the beginning of the first year. In addition, ***MATCH*** represents three categorical variables, including attending a matched-selective institution, a matched less-selective institution, or an undermatched institution; the matched-selective served as our omitted reference group for comparison. Furthermore, ***X*** includes students' background characteristics and cohort fixed effects, and ***S*** signifies the student's college major. The term $\hat{\boldsymbol{e}}$ represents the estimated propensity for attending a matched versus undermatched institution. This term was included to further strengthen our analytic design based on the possibility that the some of the same characteristics that influence affective development also influence students' enrollment in a matched (versus undermatched) institution. To obtain $\hat{e}$, we estimated a multinomial logistic model predicting the three match categories based on precollege variables, as shown in Equation 2, where *m* = 1 captures those who attended a matched-selective institution (reference category); *m* = 2 corresponds to attending a matched less-selective institution; and *m* = 3 represents students who attended an undermatched institution. Predicted values were then included as a covariate in all models, providing a doubly robust design (Reynolds and DesJardins 2009; Kang and Schafer 2007).

$$\ln\frac{P(\boldsymbol{MATCH} = m)}{P(\boldsymbol{MATCH} = 1)} = a_0 + a_1\boldsymbol{X} + u = e \quad (2)$$

In general, researchers caution against solely relying on propensity scores, particularly in non-experimental, pretest-posttest designs, noting that the kind of covariate adjustment we performed may indeed reduce selection bias just as well as various matching strategies (Shadish, Clark and Steiner 2008; Schafer and Kang 2008). Our pretest-posttest design with adjustments for selection enabled our results to more plausibly reflect causal relationships between academic match and students' affective development during the first year of college. Results from the models predicting the match categories are provided in the Appendix, Table A.

In addition, we conducted these analyses separately for first-generation students and for students whose parents had completed some higher education (i.e., continuing-generation students) for those outcomes variables in which a statistically significant ($p<.05$) general effect (based on the pooled sample) was found. To formally examine the moderating influence of first-generation status, we utilized *z*-tests to detect differences between coefficients from the two sub-samples (Clogg, Petkova and Haritou 1995).

Utilizing a pretest-posttest design to examine the effects of academic match on students' affective measures affords optimal statistical control over student differences prior to exposure to college. By using posttest measures as our outcome variable while controlling for the parallel pretest, allows the effects of the models' independent variables (e.g., academic match) to account for variation in pretest-posttest gains, above and beyond the influence of the pretest. In other words, by including the pretest as a statistical control, the estimated effects of the independent variables on posttest scores indicate those variables' influence on pretest-to-posttest gains, or growth (i.e., development) in college during the timeframe studied (Pascarella, Wolniak and Pierson 2003).

6. Results

6.1. General effects

We begin our discussion of results by focusing on the relationship between academic match and students' affective development during the first year of college. As shown in Table 2, based on the pooled sample, several findings emerged. First, controlling for all other variables in the model, the effects of higher education match on affective development varied substantially across the models in both significance and direction of influence. In terms of academic motivation, we found no effects based on academic match. However, in terms of students developing a sense of satisfaction with their college, match appeared to exert an interesting influence. Specifically, relative to students who attended a matched-selective school, students attending an undermatched institution developed significantly more in terms of feeling satisfied with their college experience (*Beta*=.07, $p<.001$). Similar results occurred among students who matched at less selective tracks (*Beta*=.12, $p<.001$). This finding suggests that college satisfaction may be cultivated more within less selective institutional environments, regardless of match.

A very different finding emerged in terms of the development of academic self-confidence. Here, net of all other variables, we found students who matched within a less selective track, developed significantly less academic self-confidence during the first year of college relative to those who matched in the most selective tracks (*Beta*=-.11, $p<.001$). Interestingly, students who undermatched made comparable gains in academic self-confidence as those students who matched in the most selective track.

Across the other variables in model, for all three outcomes, the parallel pretest (measured at the beginning of students' first year of college) proved to be large, positive, and statistically significant predictors of the posttest (measured at the end of the students' first year of college).

This finding is consistent with what one should expect. In terms of student background characteristics, immigrant status had a negative effect on all three affective measures, most notably in terms of satisfaction with college (*Beta*=-.06, $p<.001$). Having a disability or functional limitation further reduced affective development during the first year of college, in terms of academic motivation (*Beta*=-.02, $p<.05$) and academic self-confidence (*Beta*=-.02, $p<.05$). All other areas where students' background characteristics had an influence were tied to academic self-confidence, where first-generation status (*Beta*=-.02, $p<.01$) and grade retention (*Beta*=-.03, $p<.01$) each accompanied negative effects, while age (*Beta*=.03, $p<.01$) was positively associated with development of academic self-confidence.

Students' major field of study proved highly predictive of students' affective development, particularly their satisfaction with college. Several statistically significant differences were found in how students' satisfaction with college changed during their first year of college, in which studying Economics appeared detrimental. In other words, across the eight major fields—each compared to Economics—six were positively related to an increase in satisfaction. Only Law and Behavior fields did not significantly differ from Economics. Alternatively, relative to Economics, we found Education, Health, and Law majors to negatively influence academic self-confidence during the first year of college.

[Insert Table 2 about here]

6.2. Conditional effects

To uncover the extent to which first-generation status exerts a moderating influence, we turn attention to the conditional effects models. For these analyses, we examined if the effects of higher education match differed based on first-generation status among the affective

characteristics previously found to be influenced by students' academic match; specifically, satisfaction with college and academic self-confidence.

Building on the general effects estimates from the pooled sample, in terms of the development of college satisfaction, first-generation status significantly moderated the effects of undermatch (see Table 3). Specifically, relative to students attending a matched-selective institution, first-generation students who undermatched (*Beta*=.15, $p<.001$) developed significantly more in terms of feeling satisfied with their college than did continuing-generation students who undermatched. In fact, for continuing-generation students, undermatching (versus matching at a selective institution) did not have a statistically significant effect on satisfaction with college. When examining the effects of attending a matched-less selective institution (versus attending a matched-selective institution), both first-generation and continuing-generation students mirrored those uncovered in the general model: both were statistically significant and positive (*Beta*=.15, $p<.001$ and *Beta*=.10, $p<.01$, respectively).

[Insert Table 3 about here]

In terms of academic self-confidence, the general effects model masked important differences by first-generation status. Whereas attending an undermatched institution did not yield a statistically significant effect on developing academic self-confidence relative to attending a matched-selective institution within the pooled sample, we uncovered very different results when examining these same relationships within sub-samples. Among first-generations students, undermatch had a positive and significant effect on academic self-confidence (*Beta*=.03, $p<.05$), while among continuing-generation students, undermatch exerted a negative and significant effect (*Beta*=-.02, $p<.05$). Similar to the results for satisfaction with college, we again found that the effect of attending a matched-less selective institution (versus attending a

matched-selective institution) for both first-generation and continuing-generation students mirrored those uncovered from the pooled sample: both had a statistically significant and negative influence on academic self-confidence.

One additional statistically significant difference was found between first-generation and continuing-generation students in terms of immigrant status. Whereas being an immigrant negatively affected the development of academic self-confidence among continuing-generation students, immigrant status did not significantly influence academic self-confidence among first-generation students.

[Insert Table 4 about here]

Altogether, the results from our conditional models point to an important moderating influence of first-generation status on the relationship between academic undermatch and the development of college satisfaction and academic self-confidence. Presented graphically, Figures 1 and 2 further highlight the varied influence of attending a matched-less selective or undermatched institution among first-generation and continuing-generation students, compared to attending a matched-selective institution.

Presented graphically (see Figure 1), in terms of students' development of college satisfaction, there is a positive effect of attending an undermatched institution among first-generation students, but not among continuing-generation students. Attending a matched-less selective institutions (versus attending a matched-selective institution) predicts development of satisfaction for both first-generation and for continuing generation, and the effect is more pronounced among first-generation students.

[Insert Figure 1 about here]

In terms of students' development of academic self-confidence (see Figure 2), attending a matched-less selective institution exerted a negative influence among both continuing-generation students and among first-generation students. Alternatively, attending an undermatched institution had the opposite effect among first-generation students (which was statistically significant and positive) than among continuing-generation students (which was statistically significant and negative).

[Insert Figure 2 about here]

7. Discussion and conclusion

This study aimed to contribute new information on the phenomenon of higher education undermatch in relation to college students' affective development. We were particularly motivated to examine whether or not the influence of undermatching was general across all students, or conditional on social class backgrounds, which we examined based on first-generation status. A sizeable literature documents the economic benefits associated with attending a more selective higher education institution (Mayhew et al. 2016), prompting many scholars to assume that academic undermatching is a negative outcome (Belasco and Trivette 2015; Hoxby and Avery 2013), particularly for students from lower-SES backgrounds who appear more prone towards undermatching (Smith et al. 2013). However, some evidence offers a counter-narrative, suggesting undermatched students may accumulate more credits and possibly have greater opportunity to engage in curricular and co-curricular activities (Fostnacht 2015; Kurlaender and Grodsky 2013), and prominent scholars of college student development have noted that institutional contexts influence the formation of values and attitudes among students (Astin 1991; Pascarella 1985b; Weidman 1989).

Drawing on data based on a large national sample of students in the Netherlands, we sought new evidence on the relationship between academic match and students' affective development during the first year of college, which we operationalized according pre- and post-test measures of academic motivation, satisfaction with college, and academic self-confidence. Our analyses, first, centered on uncovering the relationships between academic match and affective development over the first year of college. Second, we examined whether or not these relationships were general for all students, or conditional on first-generation status. We framed our interpretation of results according to three hypotheses: the *misalignment hypothesis*; the *peers-effect hypothesis*; and the *big-fish-little-pond hypothesis*. Altogether, the results highlight three main findings.

First, in terms of affective developmental across the full sample, attending an undermatched institution appeared either to have a positive influence, or no influence, but never a negative influence. Specifically, in terms of students' feelings of satisfaction towards their college, attending an undermatched institution had a positive influence when compared to attending matched-selective institutions, providing some of the clearest evidence to date that undermatch is not a uniformly negative phenomenon; this differs from what prior research has suggested (Bastedo and Flaster 2014; Belasco and Trivette 2015; Hoxby and Turner 2013) and offers some empirical support for Fostnacht's (2015) findings.

Second, our results suggest that the effects of attending an undermatched institution are conditional on (or moderated by) students' first-generation status. Building on the previous finding regarding satisfaction towards college, it appears that attending an undermatched institution has a particularly strong, positive effect for first-generation students. However, for continuing-generation students, undermatching had a very different influence: for these students,

undermatching appeared unrelated to satisfaction with college and negatively related to academic self-confidence. It may be that continuing-generation students perceive attending an undermatched institution as a disappointment, or possibly not aligned with their (or their family's) expectations, which may, over the first year of college, act to erode confidence. Prior studies have reported similar results as we found among continuing-generation students: small-sample longitudinal studies showed declines in self-esteem across the first year of college based on samples from the U.S. (Shim, Ryan and Cassady 2012) and the United Kingdom (Bewick, Koutsopoulou, Miles, Slaa and Barkham 2010).

Third, in terms of the plausible mechanisms that account for these findings, our results did not support the peer-effects hypothesis, with one exception being the development of academic self-confidence among continuing-generation students. The peer-effects hypothesis is premised on the notion that attending more selective institutions benefits the individual student by way of average academic achievements and behaviors of the students' peers (Manski 1993). Our findings at least partially suggest that peer-effects models may not be valid in terms of affective outcomes, or among students from lower socioeconomic backgrounds, such as first-generation students. Alternatively, our findings aligned with the big-fish-little-pond hypothesis in general (in terms of satisfaction with college) and particularly among first-generation students (in terms of satisfaction with college and academic self-confidence). The meaning one can assign to this evidence rests on the idea that high achieving students who attend institutions that, on average, cater to those who are less-academically accomplished prior to college, may acquire more positive attitudes and feelings towards their education. In other words, being an academic "big fish in a little pond" does good things to one's self concept (Fang et al. 2018; Marsh 1987).

Finally, we found no evidence in support of the misalignment hypothesis; in no instance did we find similar patterns differentiating undermatched students relative to their matched-selective and matched-less selective peers. It appears the alignment between a student's academic profile and her/his institution's academic profile is less influential on affective development than the underlying selectivity of the institution attended.

Despite policy efforts to make the most selective institutions accessible for students regardless of backgrounds, students from more disadvantaged backgrounds remain less likely to enroll in, or graduate from, selective institutions. One can argue that such students–lower SES, high academic achievers–represent the most socially mobile students and warrant the attention of researchers to understand factors and mechanisms that affect their success in higher education. We show that undermatching promotes affective development during their first year in college in some instances, which in turn may have longer-term positive influence on educational persistence and degree completion – albeit in less selective institutions. Prior research on the development of, and economic value associated with, "soft skills" (such as motivation and self-confidence, see Heckman and Kautz 2012) suggests that students who experience greater affective development during college may experience longer-term benefits. And within college impact studies, affective measures are often viewed as mediating the relationships between a student's background or curricular experiences and subsequent academic outcomes (Mayhew et al. 2016). Therefore, an important question for further research is whether the effects of undermatching on affective development ultimately increases students' odds of completing a college degree and achieving subsequent career success.

From a social equality perspective, our results could be interpreted as new evidence of the barriers first-generation students face in accessing highly selective institutions. Our study

suggests that regardless of cognitive abilities or eligibility, students from lower social backgrounds reported less well-being in the most selective institutions. Today, there are many policy-initiatives aimed at supporting first-generation students after their entrance to higher education, often with the goal of preventing drop-out. Our study suggests that in evaluating such policy interventions, students' affective development should also be examined.

Importantly, our results also call into question the often negative assumptions tied to institutional undermatch. In some instances, this assumption is rooted in the evidence that attending more selective institutions increases one's chances of attainment and career success. In other instances, this assumption may be rooted in an over-emphasis on the selectivity or competitive rankings of institutions. In fact, findings from the present study remind us of what decades of research has demonstrated: differences in the experiences students have *within* a college environment has greater influence than the differences *between* colleges (Mayhew et al. 2016; Pascarella and Terenzini 2005). Ultimately, if attending an undermatched institution provides students, particularly first-generation students, with a more comfortable, nurturing, and supportive environment, then they will exhibit greater affective development and potentially, greater academic attainment in the long-run.

References

Alon, S., & Tienda, M. (2005). Assessing the mismatch hypothesis: Differences in college graduation rates by institutional selectivity. *Sociology of Education, 78*(4), 294–315.

Aronson, P. (2008). Breaking barriers or locked out? Class-based perceptions and experiences of post-secondary education. *New Directions for Child and Adolescent Development, 119,* 41–54.

Astin, A. W. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Development, 25*(4), 297–308.

Astin, A. W. (1991). *Assessment for Excellence: The philosophy and practice of assessment and evaluation in higher education.* New York: Macmillan.

Bastedo, M. N., & Flaster, A. (2014). Conceptual and methodological problems in research on college undermatch. *Educational Researcher, 43*(2), 93-99.

Bastedo, M. N., & Jaquette, O. (2011). Running in place: Low-income students and the dynamics of higher education stratification. *Educational Evaluation and Policy Analysis, 33*(3), 318–339.

Belasco, A. S., & Trivette, M. J. (2015). Aiming low: Estimating the scope and predictors of undermatch. *Journal of Higher Education, 86*(2), 233-263.

Bewick, B., Koutsopoulou, G., Miles, J., Slaa, E., & Barkham, M. (2010). Changes in undergraduate students' psychological well-being as they progress through university. *Studies in Higher Education, 35*(6), 633–645.

Black, S. E., Cortes, K. E., & Lincove, J. A. (2015). *Apply yourself: Racial and ethnic differences in college application* (Working Paper No. 21368). National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w21368.

Bowen, W. G., Chingos, M. M., & McPherson, M. S. (2009). *Crossing the finish line: Completing college at America's public universities.* Princeton, NJ: Princeton University Press.

Carrell, S. E., Fullerton, R. L. & West, J. E. (2009) Does Your Cohort Matter? Measuring Peer Effects in College Achievement. *Journal of Labor Economics, 27*(3), 439-464.

Clogg, C. C., Petkova, E., & Haritou, A. (1995). Statistical methods for comparing regression coefficients between models. *American Journal of Sociology, 100(5),* 1261-1293.

Collins, R. (1971). Functional and conflict theories of educational stratification. *American Sociological Review, 36,* 1002–1019.

Duckworth, A. L., & Yeager, D. S. (2015). Measurement matters: Assessing personal qualities other than cognitive ability for educational purposes. *Educational Researcher, 44,* 237-251.

Fang, J., Huang, Z, Zhang, M., Huang, F., Li, Z., & Yuan, Q. (2018). The Big-Fish-Little-Pond Effect on Academic Self-Concept: A Meta-Analysis. *Frontiers in Psychology, 9(1569),*1-11.

Fostnacht, K. (2015). *Undermatching and the first-year experience: Examining effect heterogeneity.* Paper presented at the annual meeting of the Association for the Study of Higher Education, Denver, CO.

Göllner, R., Damian, R. I., Nagengast, B., Roberts, B. W., & Trautwein, U. (2018). It's Not Only Who You Are but Who You Are With: High School Composition and Individuals' Attainment Over the Life Course. *Psychological science, 29*(9), 1-12.

Goodchild, L.F., & Wechsler, H.S. (Eds.). (1997). *The History of Higher Education* (2nd ed.). ASHE Reader Series. Boston, MA: Pearson Publishing.

Grossman, M. (2006). Education and non-market outcomes. In E. Hanushek & F. Welcoh (Eds.), *Handbook of the Economics of Education* (Vol. 1, pp. 578–633). Amsterdam: Elsevier-North Holland.

Heckman, J. J., & Kautz, T. (2012). Hard evidence on soft skills. *Labour Economics, 19,* 451–464. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3612993/.

Hippe, R., Araújo, L. & Dinis da Costa, P. (2016). *Equity in Education in Europe*; Luxembourg (Luxembourg): Publications Office of the European Union; EUR 28285 EN; doi:10.2791/255948.

Hoxby, C. M., & Avery, C. (2013). *The Missing ''One-Offs'': The Hidden Supply of High-Achieving, Low Income Students.* Brookings Papers on Economic Activity.

Hoxby, C. M., & Turner, S. (2013). *Expanding college opportunities for high achieving, low income students (SIEPR 12-014).* Stanford, CA: Stanford Institute for Economic Policy Research.

Kamhöfer, D. A., Schmitz, H., & Westphal, M. (2018). Heterogeneity in Marginal Non-Monetary Returns to Higher Education. *Journal of the European Economic Association, 00*(0):1–40. https://doi.org/10.1093/jeea/jvx058.

Kang, J.D.Y. & Schafer, J.L. (2007). Demystifying double robustness: A comparison of alternative strategies for estimating a population mean from incomplete data. *Statistical Science, 22,* 523-539.

Kurleander, M., & Grodsky, E. (2013). Mismatch and the paternalistic justification for selective college admissions. *Sociology of Education, 86*(4), 294–310.

Long, M. C. (2008). College quality and early adult outcomes. *Economics of Education Review, 27,* 588-602.

Long, M. C. (2010). Changes in the returns to education and college quality. *Economics of Education Review, 29(3),* 338-347.

Lucas, S. R. (2001). Effectively maintained inequality: Education transitions, track mobility, and social background effects. *American Journal of Sociology, 106,* 1642–1690.

Luthar, S.S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development, 71,* 543-562.

Manski, C. F. (1993). Identification of endogenous social effects: The reflection problem. *Review of Economic Studies, 60,* 531–542.

Marsh, H. W. (1987). The big-fish-little-pond effect on academic self-concept. *Journal of educational psychology, 79(3),* 280.

Marsh, H. W., & Hau, K. T. (2003). Big-Fish-Little-Pond effect on academic self-concept: A cross-cultural (26-country) test of the negative effects of academically selective schools. *American psychologist, 58(5),* 364.

Mayhew, M. J., Rockenbach, A. N., Bowman, N. A., Seifert, T. A., & Wolniak, G. C. with Pascarella, E. T., & Terenzini, P. T. (2016). *How college affects students: 21st century evidence that higher education works (Vol. 3).* San Francisco, CA: Wiley.

McMahon, W. W. (2009*). Higher learning, greater good: The private and social benefits of higher education.* Baltimore, MD: Johns Hopkins University Press.

Ovink, S., Kalogrides, D., Nanney, M., & Delaney, P. (2017). College match and undermatch: Assessing student preferences, college proximity, and inequality in post-college outcomes. *Research in Higher Education, 58 (7),* 1-38.

Pascarella, E. (1985a). College environmental influences on learning and cognitive development: A critical review and synthesis. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 1). New York: Agathon.

Pascarella, E. T. (1985b). Students' affective development within the college environment. *Journal of Higher Education, 56,* 640-663.

Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: A third decade of research (Vol. 2).* San Francisco, CA: Jossey-Bass.

Pascarella, E. T., Wolniak, G. C. & Pierson, C. T. (2003). Explaining student growth in college when you don't think you are. *Journal of College Student Development, 44,* 122-126.

Reynolds, C. L., & DesJardins, S. L. (2009). The use of matching methods in higher education: Answering whether attendance at a 2-year institution results in differences in educational attainment. *Higher Education: Handbook of Theory and Practice, 24,* 47-97.

Roderick, M., Coca, V., & Nagaoka, J. (2011). Potholes on the road to college: High schooleffects in shaping urban students' participation in college application, four-year college enrollment, and college match. *Sociology of Education, 84*(3), 178–211.

Roderick, M., Nagaoka, J., Allensworth, E., Coca, V., Correa, M., & Stoker, G. (2006). *From high school to the future: A first look at Chicago public school graduates' college enrollment, college preparation, and graduation from four-year colleges.* Chicago: Consortium on Chicago School Research.

Rodriguez, A. (2015). Tradeoffs and limitations: Understanding the estimation of college undermatch. *Research in Higher Education, 56*(6), 566–594.

Roksa, J., & Deutschlander, D. (2018). Applying to College: The Role of Family Resources in Academic Undermatch. *Teachers College Record, 120*(6), 1-30.

Sacerdote, B. (2001). Peer effects with random assignment: Results for Dartmouth roommates. *Quarterly Journal of Economics, 116*(2), 681–704.

Schafer, J. L., & Kang, J. (2008). Average causal effects from nonrandomized studies: A practical guide and simulated example. *Psychological Methods, 13*(4), 279-313.

Shadish, W. R., Clark, M. H., & Steiner, P. M. (2008). Can nonrandomized experiments yield accurate answers? A randomized experiment comparing random and nonrandom assignment. *Journal of the American Statistical Association, 103,* 1334-1343.

Shim, S. S., Ryan, A. M., & Cassady, J. (2012). Changes in self-esteem across the first year in college: The role of achievement goals. *Educational Psychology: An International Journal of Experimental Educational Psychology, 32*(2), 149–167.

Smith, J., Pender, M., & Howell, J. (2013). The full extent of student-college academic undermatch. *Economics of Education Review, 32,* 247-261.

Sullivan, A. (2001). Cultural capital and educational attainment. *Sociology, 35(4),* 893-912.

Tiboris, M. (2014). What's wrong with undermatching? *Journal of Philosophy of Education, 48*(4), 46–664.

Titus, M. A. (2004). An examination of the influence of institutional context on student persistence at 4-year colleges and universities: A multilevel approach. *Research in Higher Education, 45,* 673–699.

Weidman, J. (1989). Undergraduate socialization: A conceptual approach. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 5, pp. 289–322). New York: Agathon.

Wolniak, G., & Ballerini, V. (2019). Peer Effects, Higher Education. In P. Teixeira & J. Shin (Eds.), *Encyclopedia of International Higher Education Systems and Institutions*. Springer, Dordrecht. https://doi.org/10.1007/978-94-017-9553-1_84-1.

Table 1. Descriptive Statistics

	Total sample		First generation		Continuing generation	
	Mean	SD	Mean	SD	Mean	SD
Ascribed Characteristics						
Female	0.68	0.47	0.70	0.46	0.67	0.47
Age	18.18	0.93	18.17	1.00	18.18	0.89
Immigrant	0.02	0.12	0.02	0.15	0.01	0.11
Disability or functional limitation	0.18	0.39	0.18	0.38	0.19	0.39
First-generation	0.35	0.48	.	.	.	.
Grade retention secondary education	0.16	0.37	0.20	0.40	0.14	0.35
Higher Education Match						
Matched: selective track	0.58	0.49	0.47	0.50	0.64	0.48
Matched: less selective track	0.34	0.47	0.44	0.50	0.28	0.45
Undermatched	0.08	0.27	0.09	0.29	0.08	0.26
College Major						
Education	0.08	0.27	0.10	0.30	0.06	0.25
Agriculture	0.05	0.22	0.04	0.20	0.06	0.23
Nature	0.08	0.27	0.06	0.24	0.09	0.29
Science	0.16	0.37	0.15	0.36	0.17	0.37
Health	0.17	0.38	0.17	0.38	0.17	0.38
Law	0.03	0.18	0.04	0.19	0.03	0.18
Behavior	0.17	0.37	0.17	0.38	0.16	0.37
Language	0.07	0.26	0.06	0.23	0.08	0.28
Economics	0.17	0.37	0.20	0.40	0.15	0.36
Affective Measures						
Academic Motivation (T_1)	4.19	0.58	4.21	0.58	4.18	0.58
Academic Motivation (T_2)	4.19	0.58	4.21	0.57	4.17	0.58
Satisfaction with college (T_1)	8.26	0.99	8.28	0.97	8.25	1.00
Satisfaction with college (T_2)	7.52	1.25	7.55	1.26	7.50	1.25
Academic Self-confidence: (T_1)	9.20	1.25	9.10	1.29	9.26	1.23
Academic Self-confidence: (T_2)	9.63	1.24	9.50	1.26	9.69	1.22

Note. SOURCE: STARTMONITOR, 2009-2015, all measures are unstandardized. T_1 = at college entry, T_2 = end of first year. N = 14,540.

Table 2. Estimated Standardized (*Beta*) coefficients predicting Affective Development

	Academic Motivation (T_2)	Satisfaction with College (T_2)	Academic Self-confidence (T_2)
Affective measure at beginning of college			
Academic Motivation (T_1)	0.52***		
Satisfaction with College (T_1)		0.39***	
Academic Self-confidence (T_1)			0.44***
Higher education match (Matched: most selective track = 0)			
Matched: Less selective track	0.00	0.12***	-0.11***
Undermatched	0.00	0.07***	0.00
Student characteristics			
First-generation	0.01	-0.01	-0.02**
Age	-0.01	0.00	0.03**
Female	0.01	0.00	0.02
Immigrant	-0.03***	-0.06***	-0.02*
Disability or functional limitation	-0.02*	-0.03	-0.02*
Grade retention secondary education	-0.01	-0.03	-0.03**
College major (Economics = 0)			
Education	0.03***	0.14***	-0.02*
Agriculture	-0.01	0.15***	0.00
Nature	0.00	0.15***	0.00
Science	0.01	0.11***	-0.02
Health	0.04***	0.08**	-0.04***
Law	0.02*	-0.01	-0.02*
Behavior	-0.02*	0.04	-0.01
Language	-0.01	0.11***	-0.01
Year Fixed Effects	Yes	No	Yes
Propensity Score	Yes	Yes	Yes
Constant	3.09***	2.15***	4.94***
Adjusted-R^2	0.28	0.24	0.22
N	14540	2710	13724

SOURCE: STARTMONITOR, 2009-2015.

*p<.05; **p<.01; ***p<.001.

Table 3. Estimated Standardized (*Beta*) predicting Satisfaction with College at the end of the first year of college (T_2), by first-generation status

	First-Generation	Continuing-Generation
Affective measure at beginning of college		
Satisfaction with College (T_1)	0.40***	0.38***
Higher education match (Matched: most selective track = 0)		
Matched: less selective track	0.15***	0.10**
Undermatched	0.15*** ††	0.02
Student characteristics		
Age	-0.01	0.01
Female	-0.02	0.01
Immigrant	-0.10**	-0.02
Disability or functional limitation	-0.03	-0.02
Grade retention secondary education	-0.02	-0.02
College major (Economics = 0)		
Education	0.14***	0.14***
Agriculture	0.09**	0.18***
Nature	0.09*	0.19***
Science	0.10*	0.12***
Health	0.04	0.10**
Law	0.00	-0.01
Behavior	0.05	0.04
Language	0.12**	0.12***
Year Fixed Effects	No	No
Propensity Score	Yes	Yes
Constant	3.44**	3.35***
Adjusted-R^2	0.28	0.23
N	920	1790

SOURCE: STARTMONITOR, 2009-2015.

*p<.05; **p<.01; ***p<.001. †† Estimated effect is significantly (p<.01) different from students whose parents had attained at least some higher education.

Table 4. Estimated Standardized (*Beta*) predicting Academic Self-confidence at the end of the first year of college (T_2), by first-generation status

	First-Generation	Continuing-Generation
Affective measure at beginning of college		
Academic Self-confidence (T_1)	0.45***	0.43***
Higher education match (Matched: most selective track = 0)		
Matched: less selective track	-0.11***	-0.11***
Undermatched	0.03* ††	-0.02*
Student characteristics		
Age	0.06**	0.02
Female	0.01	0.02
Immigrant	0.00 ††	-0.03**
Disability or functional limitation	0.00	-0.02*
Grade retention secondary education	-0.06***	-0.02
College major (Economics = 0)		
Education	-0.02	-0.02
Agriculture	0.00	0.00
Nature	0.01	-0.01
Science	-0.01	-0.02
Health	-0.05**	-0.03*
Law	-0.02	-0.02
Behavior	-0.02	-0.01
Language	-0.01	-0.01
Year Fixed Effects	Yes	Yes
Propensity Score	Yes	Yes
Constant	4.13***	5.29***
Adjusted-R^2	0.23	0.21
N	4844	8880

SOURCE: STARTMONITOR, 2009-2015.

*p<.05; **p<.01; ***p<.001. †† Estimated effect is significantly (p<.01) different from students whose parents had attained at least some higher education.

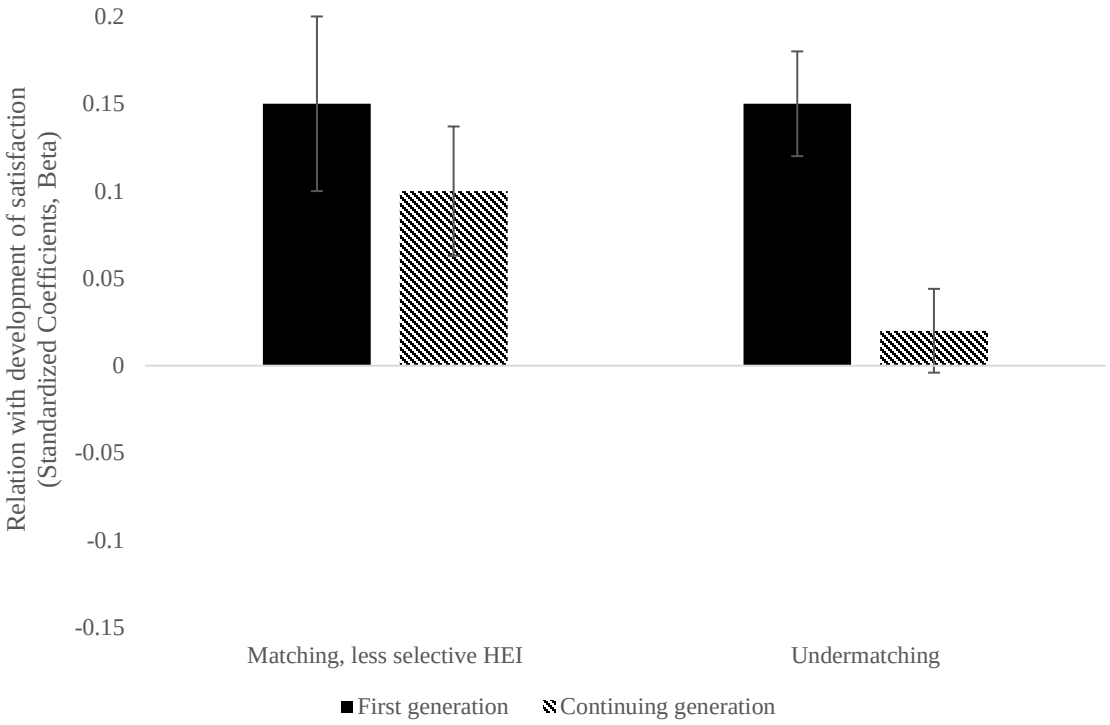

Fig. 1. Relationship between academic match and development of satisfaction with college (standardized coefficients) during the first year in higher education. Reference group is matched students in the most selective HEI. *N* = 2710.

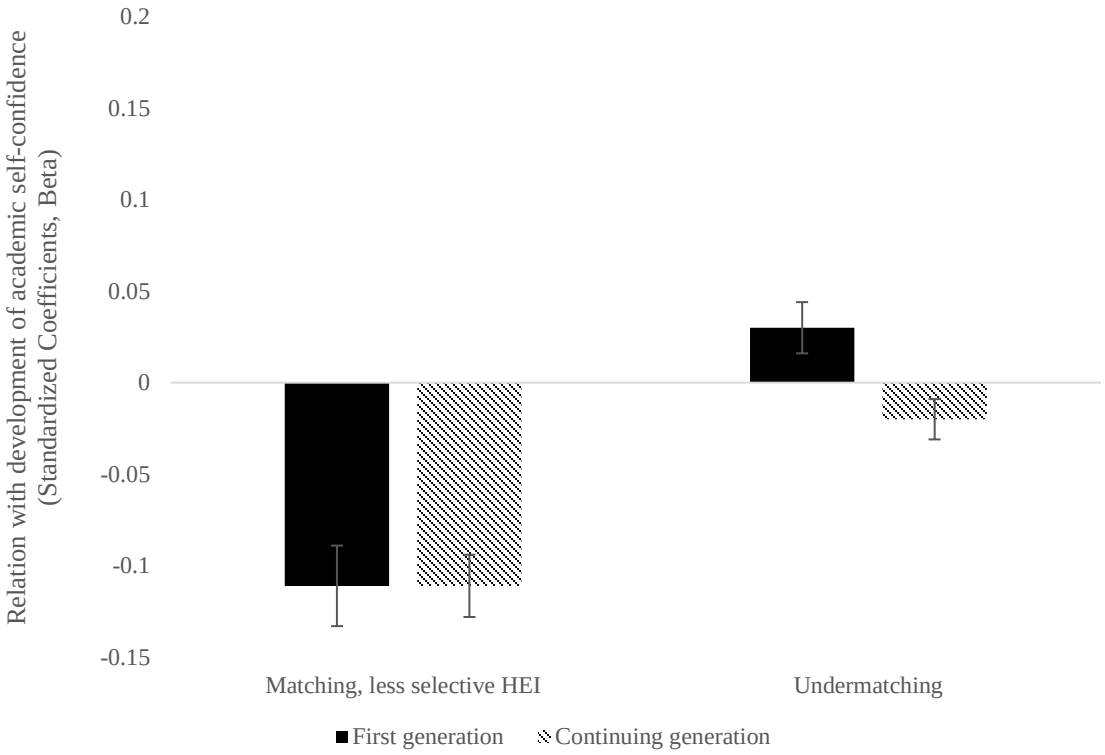

Fig. 2. Relationship between academic match and development of academic self-confidence (standardized coefficients) during the first year in higher education. Reference group is matched students in the most selective HEI. *N*=3724.

APPENDIX

Table A.1. Estimated Coefficients (*Exp(B)*) Predicting Match Categories based on Student Characteristics upon Entering College

	Matched: less selective track[1]	Undermatched[1]
Student characteristics		
First generation	2.14***	1.58***
Age	0.00	0.00
Female	1.04	1.63***
Immigrant	0.84*	0.47***
Disability or functional limitation	1.72***	0.98
Grade retention secondary education	9.70***	1.52***
Constant	0.00	0.00
Nagelkerke-R^2	0.37	0.37
N	14540	14540

SOURCE: STARTMONITOR, 2009-2015.

[1]Matched: most selective track = 0. *p<.05; **p<.01; ***p<.001.