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A Pilot Study of Holistic Assessment and Course Placement in Community College: Findings and Recommendations

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Abstract

The Educational Testing Service *SuccessNavigator*® assessment measures student psychosocial skills relevant to success in postsecondary education. In addition to gauging the likelihood of student retention and academic success, SuccessNavigator provides course acceleration recommendations relevant to placement in both mathematics and English. To the extent that many community college students fail remedial mathematics courses, prior research has revealed such sequences to be among the most challenging encountered by that population.

This report focuses on the academic success index and the mathematics course placement index. We analyzed the grades and passing rates of students conditional on their assigned level of each index. Further, we compared mathematics course passing rates between students placed using a holistic approach (incorporating the SuccessNavigator mathematics course placement index) and those placed according to standard institutional practice. No statistically significant differences in course success rates were observed between these 2 groups across 3 levels of mathematics courses.

Overall, students for whom SuccessNavigator recommended acceleration passed their mathematics courses at higher rates than those receiving a cautionary recommendation. This finding was true in particular in college level and credit-bearing courses. Substantial differences in passing rates were also observed across campuses between the two acceleration recommendation groups. Our results are supportive of using SuccessNavigator acceleration recommendations to inform mathematics course placement in community college samples. We also found the SuccessNavigator academic success index to be predictive of overall college grade point average (GPA). Institutional recommendations and study limitations are discussed.

Key words: developmental education, course acceleration, holistic placement, community college, remedial education

Community colleges often deliver developmental education to new students consisting of preparatory precollege level (aka remedial) courses as well as student support services. The intent of developmental coursework is to bolster the academic skills of new students to the extent that they are able to manage courses at the college level (Bailey, Jeong, & Cho, 2010). Community colleges also tend to adopt open admission policies and require new students to take academic placement tests prior to enrollment.

Prior research has demonstrated that remedial mathematics courses present among the most significant academic challenges to college students. Using data from the National Education Longitudinal Study, Attewell, Lavin, Domina, and Levey (2006) found that while over two thirds of the student population passed remedial reading and writing courses, less than one third passed remedial mathematics. Bailey et al. (2010) noted also that across the nationwide Achieving the Dream network of community college students (http://achievingthedream.org/), 27% of all students recommended for developmental mathematics coursework had still not enrolled in such courses within 3 years and only one third of remedial mathematics students actually completed an entire course sequence.

On most any campus, a subset of underprepared students is likely to enroll for whom some form of academic remediation would be necessary to equip them with the knowledge and skills necessary to successfully negotiate coursework at the college level (Zeidenberg, Cho, & Jenkins, 2010). However, remediation in the form of preparatory coursework (which consumes both time and money but generally does not earn college level credit) may itself become an obstacle to student success as students negotiate concurrent structural challenges (e.g., employment, family commitments) that may limit their available time (Calcagno & Long, 2008; Deil-Amen & Rosenbaum, 2002). The issue of time management is particularly salient for community college and nontraditional students (i.e., those not enrolling in college directly after completing high school) who tend to be older on average and persist to complete a degree at significantly lower rates versus traditional 4-year college students (Horn, Nevill, & Griffith, 2006). The combination of temporal, financial, and academic stresses may leave students overwhelmed and contribute to a decreased probability of completing their intended degree(s).

While some prior research has reported positive relationships between developmental mathematics education and institutional policies, higher transfer rates to 4-year institutions, and credits earned (e.g., Bettinger & Long, 2005; Calcagno & Long, 2008; Moss, Yeaton, & Lloyd,

2013), a definitive conclusion about the overall impact of remedial courses has not yet been reached. The study by Calcagno and Long (2008) represents an example of the difficulty of making conclusive inferences regarding the effects of academic remediation. They found that while remedial coursework may benefit student retention early on, its impact on degree completion was not statistically significant. Martorell and McFarlin (2011) also found no positive impact of remediation and discussed the difficulty inherent to evaluating its impact. Complicating the matter even further, the effectiveness of remediation may vary across demographic groups, the number of courses needed, student economic circumstances, and type of school (Bailey et al., 2010). Not surprisingly, estimates of remediation's impact also vary by how effectiveness itself is conceptualized and measured by each institution or state (Martorell & McFarlin, 2011).

Course Acceleration

Concomitant with (or perhaps in response to) the literature expressing varying findings on the effectiveness of remediation on academic performance, the potential utility of accelerating students through such developmental coursework has also garnered increased scrutiny.

In the context of developmental education, *acceleration* is defined as a "strategy used by community colleges to reduce the amount of time students spend in remediation and allow them to enroll more quickly—or immediately—in courses leading to certificates or degrees" (Venezia & Hughes, 2013, p. 39). While the primary purpose of developmental education is to improve student academic skills, as an additional requirement, it also (by definition) increases the amount of time a student must spend pursuing his or her degree. As a result, and due to other associated costs (see Bailey et al., 2010, for a discussion of these), developmental education programs may in fact represent a barrier to success for many students (Hern, 2010). By reducing the amount of time it takes to complete remedial coursework, course acceleration may thus serve to lessen opportunities for students to exit the sequence prior to enrolling in college level courses. This factor is important given that both students (in particular those with limited financial resources) and institutions face concerns about the costs of increasing time-to-degree rates at public universities (Bowen, Chingos, & McPherson, 2009).

Edgecombe (2011) and Nodine, Dadgar, Venezia, and Bracco (2012) described three common approaches to acceleration: (a) restructuring (reorganization of course length and/or curriculum), (b) mainstreaming (placing a student who would otherwise have been placed into

remedial courses into a higher or college level course, typically with additional academic support), and (c) modularization (dividing courses into distinct learning components focused around particular competencies). For the purposes of this report, *acceleration* was defined as mainstreaming students into higher level courses.

Noncognitive Skills

In order to accelerate the appropriate students into higher level mathematics courses, institutions must decide which students are likely to succeed in higher level courses. Variables assessing previous academic performance (e.g., *SAT*®, ACT) and current academic ability (e.g., standardized placement exams such as Compass and *ACCUPLACER*®) are often taken into account when making acceleration decisions. While such scores are also likely to capture components of student personality (Borghans, Golsteyn, Heckman, & Humphries, 2011), more explicitly behavioral or dispositional noncognitive characteristics could also be considered in determining a student's eligibility for course acceleration. Noncognitive skills include a wide range of factors such as personality, attitude, motivation, and interpersonal skills (Lipnevich, MacCann, & Roberts, 2013). Numerous single studies and meta-analytic research have shown significant relationships between noncognitive variables and academic achievement and success in higher education settings (Habley, Bloom, & Robbins, 2012; Poropat, 2009; Richardson, Abraham, & Bond, 2012; Robbins et al., 2004; Robbins, Oh, Le, & Button, 2009).

Prior research has consistently found significant positive associations between personality traits and other noncognitive skills and collegiate course grades (Chamorro-Premuzic & Furnham, 2003; Conard, 2006; Phillips, Abraham, & Bond, 2003). Although interest in this field has been growing over the past decade, noncognitive indicators are rarely taken into consideration when making course placement decisions at community colleges (Gerlaugh, Thompson, Boylan, & Davis, 2007). Recently however, there have been calls in the literature for a more holistic assessment of students in service of informing such decisions (Boylan, 2009; Hughes & Scott-Clayton, 2010; Saxon, Levine-Brown, & Boylan, 2008). Notable exceptions to the trend to eschew noncognitive indicators include the Texas Higher Education Coordinating Board (THECB), which recommended the consideration of noncognitive factors into developmental student advising practices (THECB, 2012), and the efforts of states such as Colorado and Florida to use noncognitive assessments to help inform placement decisions (Bracco et al., 2014).

Purpose of the Study

Educational Testing Service developed the *SuccessNavigator*® assessment (Markle, Olivera-Aguilar, Jackson, Noeth, & Robbins, 2013) to assess a series of noncognitive skills related to academic outcomes. In the Spring 2014 semester, SuccessNavigator was used in conjunction with Compass test scores to inform mathematics course placement decisions at four different campuses within a large urban community college system. The purpose of the current study was primarily to examine relationships between SuccessNavigator predictive indices and academic outcomes. We also investigated whether performance in college level coursework was observed to differ between students recommended (vs. not recommended) for math course acceleration when SuccessNavigator was used to inform placement decisions. Specifically, four research questions were addressed:

1. How well does SuccessNavigator predict overall academic success as measured by final semester grade point average (GPA)?
2. Do students with different SuccessNavigator mathematics course placement recommendations also differ in the rate at which they pass mathematics courses?
3. How well does SuccessNavigator predict mathematics course success at different course levels?
4. Do students placed in mathematics courses based solely on their placement scores pass at different rates in comparison to students accelerated into the same course level based (in part) on the SuccessNavigator mathematics course placement index?

Method

The SuccessNavigator assessment was administered to students beginning their enrollment in the Spring 2014 semester at four campuses within a large urban community college system. Of the 3,647 students completing the assessment, 1,549 both enrolled in a mathematics course and exhibited interpretable mathematics course outcome data in the college's administrative database at the semester's end. This sample was 53% male, with African-American (40%), Hispanic/Latino (28%), and Caucasian (15%) students representing the three most prevalent racial/ethnic groups. Approximately 25% of the respondents were enrolled in credit-bearing college level courses, with 65% enrolled in remedial credit-bearing precollege courses and another 15% in noncredit precollege courses.[1]

Based on their responses to SuccessNavigator, all students were assigned to a level in the four predictive indices provided: the academic success index, the retention index, the mathematics course placement index, and the English course placement index. The present study focuses on the academic success index and on the mathematics course placement index. The SuccessNavigator academic success index was designed to predict overall first semester college GPA and utilizes all 10 SuccessNavigator subskills in addition to student self-reported (or institutionally uploaded) high school GPA and standardized test scores (e.g., SAT, ACT). Students were assigned to one of three levels (low, moderate, or high). The SuccessNavigator mathematics course placement index was designed to predict performance in college level mathematics courses and also accounts for all 10 subskills as well as high school GPA. Based on their score level on the mathematics course placement index, students received either a recommendation to accelerate or a caution recommendation. Markle et al. (2013) provided a detailed overview of the predictive indices built into SuccessNavigator.

The Compass mathematics placement test was also administered. As a matter of standard practice in the community college system, predefined Compass cutoff scores dictated indications for student placement at different levels of developmental or college level mathematics courses. Differing from standard practice, however, an *acceleration band* was defined consisting of students earning Compass scores within 1 standard deviation below the cutoff score at each course level. Students scoring within the acceleration band were accelerated (i.e., enrolled in a higher level mathematics courses) only when the SuccessNavigator mathematics course placement index recommended acceleration. Students within the acceleration band who received a cautionary recommendation were not accelerated (i.e., they were enrolled in the course indicated by their Compass score). In effect, student noncognitive skill levels served as additional data to inform mathematics course placement in cases where Compass scores were near (within 1 standard deviation) but did not meet standard cutoff scores. Advising and testing coordination staff across all four participating campuses were trained by senior staff from the participating institutions on procedures regarding the deployment of SuccessNavigator as well as how to interpret the information presented in each SuccessNavigator score report (with particular focus on the mathematics course placement index).

In creating a comparison group for accelerated students, it was important to avoid comparing them to peers scoring far above the relevant placement cutoff. Students with such

high Compass scores might be expected to perform better than accelerated students simply as a result of possessing a higher level of prior preparation in mathematics. To achieve a more fair comparison group, we created a score band above the Compass cutoff for each course level of the same width as each level's acceleration band. Using simple values as an example, if the cutoff score for a given level was 50 and the acceleration band was defined as scores ranging from 45 to 49, the selection band above the cutoff was defined as scores ranging from 50 to 54.

Successful course completion was defined as a student earning a final grade of A, B, C, or S (the latter being a satisfactory grade assigned in a developmental course). Unsuccessful course completion was defined by having earned final grade of D or F or the course record being coded either ADW (administrative withdrawal) or, in most cases, WTH (student-initiated withdrawal). Because students were able to withdraw throughout the term, course records with a WTH designation were classified into two groups: early withdrawals and late withdrawals. Early withdrawals indicated the student was enrolled in the course for 10 days or less. These students were excluded from our analyses, whereas later withdrawals were coded as unsuccessful in the course.

Results

Research Questions

Research Question 1: How well does SuccessNavigator predict overall academic success as measured by final semester grade point average (GPA)? The academic success index classifies students into three levels: low (projected first semester GPA < 2.23), moderate (projected first semester GPA of 2.23–2.97), and high (projected first semester GPA > 2.97). Figure 1 depicts Spring 2014 final semester GPA by academic success index level, showing the proportion of students within each level who achieved a range of possible GPA values. As reflected in Figure 1, the academic success index appears to be an effective gauge of risk for academic failure. For example, focusing on the yellow highlighted portion of this plot, we see that 69% of students receiving a high score earned an overall GPA of at least 2.0 versus only 39% of students receiving a low score.

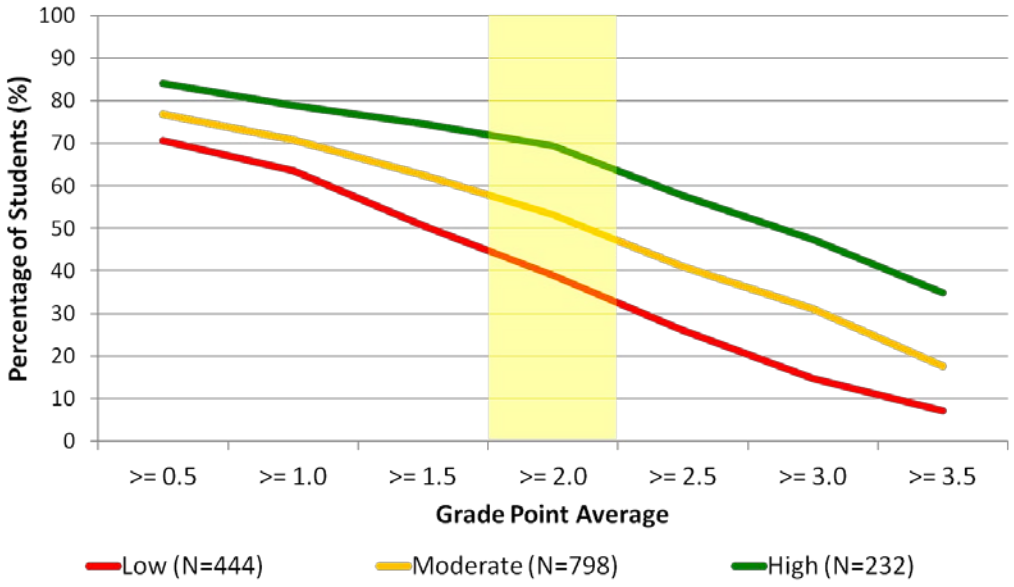

***Figure 1*. Spring 2014 term grade point average (GPA) by SuccessNavigator academic success index (*N* = 1,474). Yellow highlighted section indicates students who earned a GPA ≥ 2.0.**

Research Question 2: Do students with different SuccessNavigator mathematics course placement recommendations also differ in the rate at which they pass mathematics courses? As mentioned above, the SuccessNavigator mathematics course placement index was designed to predict student performance in college level mathematics. Considering the overall sample of students for whom both final Spring 2014 mathematics grades and a SuccessNavigator mathematics course placement index score were available (and regardless of actual course enrollment), we found a statistically significant difference in mathematics course passing rates between those students for whom SuccessNavigator recommended acceleration versus caution: $\chi^2(1) = 9.18$, $p < .01$. As depicted in Figure 2 showing mathematics course passing rates split by SuccessNavigator placement recommendation, 56% of students receiving a recommendation to accelerate passed their mathematics course, while less than half (47%) of those cautioned evidenced mathematics course success.

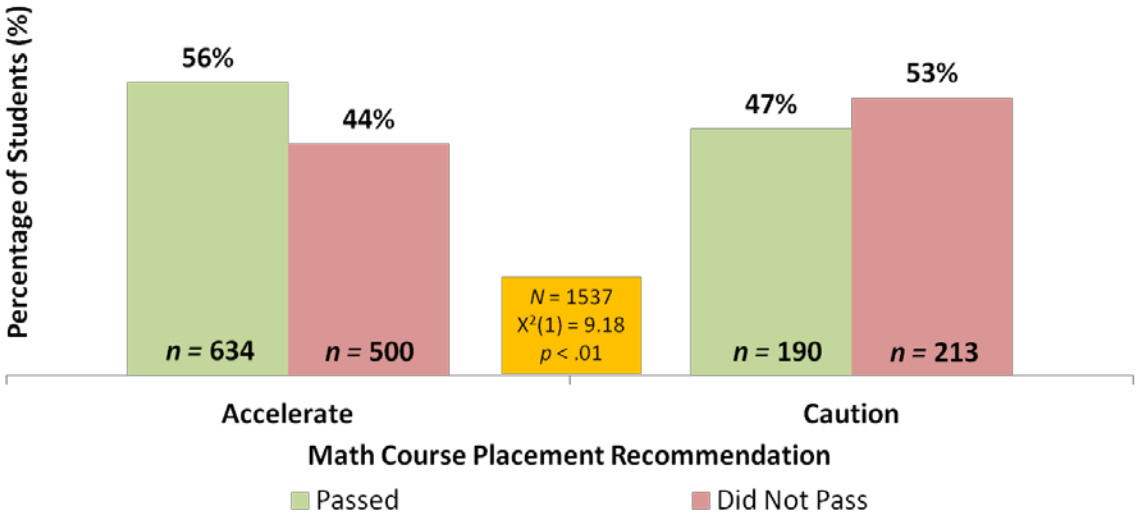

Figure 2. **Overall mathematics passing rates by mathematics course acceleration recommendation (*N* = 1,537).**

Disaggregating the data on mathematics course placement recommendations by campus, a distinctive pattern of results was observed. While no statistically significant differences in mathematics passing rates by SuccessNavigator acceleration recommendation were observed at either Campus A or Campus B, we did observe such differences among students primarily enrolled at both Campuses C and D. At these latter two campuses, more than 60% of students receiving an accelerate recommendation passed mathematics, while only 46–50% of students receiving a caution recommendation earned the same outcome. Although the comparison between the two groups of schools (A and B vs. C and D) is not experimental and thus does not permit any causal interpretation, it is important to note only Campuses C and D were equipped with senior staff dedicated to ensuring that the institutional policy of using SuccessNavigator recommendations to help inform course acceleration decisions was implemented with high fidelity.

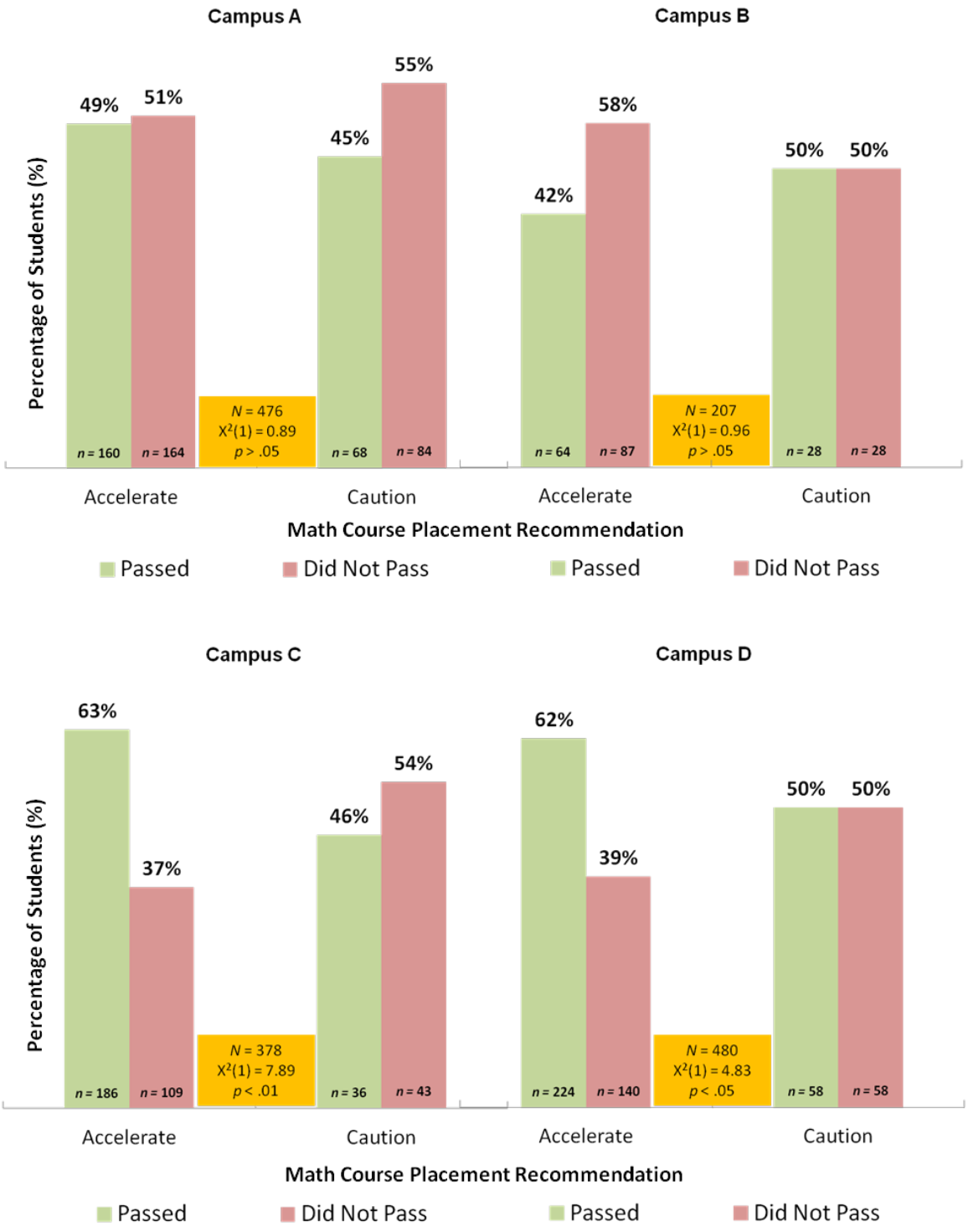

Figure 3. **Mathematics passing rates by acceleration recommendation and by campus (*N* = 1,541).**

Research Question 3: How well does SuccessNavigator predict mathematics course success at different course levels? This analysis disaggregated student mathematics course data by course level. That is, passing rates by SuccessNavigator mathematics course placement recommendation were analyzed separately for each course level (Table 1) and by whether courses were credit bearing (Table 2). The Total line in each table mimics Figure 2, where students who received a mathematics course placement acceleration recommendation exhibited significantly higher passing rates overall than those students receiving a caution recommendation. More specifically, this relationship was found to hold among students enrolled in college level courses but not among those at the precollege or remedial course levels. Considering college level mathematics, students receiving an accelerate recommendation demonstrated a 29% greater likelihood of passing their course than students receiving a caution recommendation: $\chi^2(1) = 16.4$, $p < .01$.

Table 1

Mathematics Passing Rates by Course Level and Acceleration Recommendation

Course level	Caution		χ^2	Accelerate	
	Total *N*	% passing		Total *N*	% passing
Total	403	47.1	$\chi^2(1) = 9.18$*	1134	55.9
College	53	37.7	$\chi^2(1) = 16.4$*	322	66.8
Precollege	151	48.3	$\chi^2(1) = 1.12$	433	53.4
Remedial Math 2	114	47.4	$\chi^2(1) = 0.00$	262	47.3
Remedial Math 1	69	50.7	$\chi^2(1) = 0.11$	90	53.3

*$p < .01$.

In terms of mathematics course passing rates disaggregated by course credit-bearing status and SuccessNavigator mathematics course placement recommendation, statistically significant differences were found among for credit courses (i.e., courses earning either precollege level or college level credit at the institution). Students enrolled in credit-bearing courses who also received an accelerate recommendation passed mathematics at a rate 10% higher than their peers who received a caution recommendation: $\chi^2(1) = 9.95$, $p < .01$.

Table 2

Mathematics Passing Rates by Credit-Bearing Status and Acceleration Recommendation

Status	Caution		χ^2	Accelerate	
	Total *N*	% passing		Total *N*	% passing
Total	403	47.1	$\chi^2(1) = 9.18$*	1134	55.9
Noncredit	87	52.9	$\chi^2(1) = 0.40$	140	57.1
For credit	316	45.6	$\chi^2(1) = 9.95$*	994	55.7

*$p < .01$.

Research Question 4: Do students placed in mathematics courses based solely on their placement scores pass at different rates in comparison to students accelerated into the same course level based (in part) on the SuccessNavigator mathematics course placement index? Moving beyond the issue of whether the SuccessNavigator mathematics course placement index recommendation was an effective predictor of course success, we turned to a brief observational evaluation of the use of SuccessNavigator as a supportive tool informing actual course placement decisions. Because acceleration happened at different course levels, this analysis examined differences at each level separately after confirming that all students were enrolled according to the conditions outlined above (see Method). Mathematics course passing rates were compared between the following groups:

- **Group 1: Students placed in a mathematics course based solely on Compass.** These students scored within the same range above the Compass cut score at a given level of mathematics as students in Group 2 scored below the cut score.
- **Group 2: Students accelerated into a higher level mathematics course based on the combination of Compass and SuccessNavigator acceleration recommendation**. These students scored within the defined Compass acceleration band at a given level (see Method).

Table 3

Mathematics Passing Rates by Course Level and Placement Mechanism

Course level	Compass only		χ^2	Compass + SuccessNavigator	
	Total *N*	% passing		Total *N*	% passing
College	54	59.3	$\chi^2(1) = 0.00$	66	59.1
Precollege	205	50.7	$\chi^2(1) = 2.11$	138	42.8
Remedial Math 2	77	41.6	$\chi^2(1) = 0.20$	102	38.2

All $p > .05$.

As shown in Table 3, no statistically significant differences were found when making the above comparisons. Rephrased, at all levels of mathematics, the passing rates of students who were accelerated into a given level by way of the SuccessNavigator mathematics course placement index were not statistically distinguishable from those of students placed into the same course level using Compass alone. This finding echoes previous research indicating that the expression of noncognitive skills may provide a compensatory mechanism for those with lower levels of cognitive ability (e.g., DiGuilio, 2009) and supports the notion that students with relatively higher levels of noncognitive skills may be capable of succeeding in college level mathematics courses even though their standardized academic placement exam score indicates a lower level of academic preparation. This result could also be viewed as supportive of the validity of the SuccessNavigator mathematics course placement index as a tool to assist community college advisors in making mathematics course placement decisions for the subgroup of students scoring just below an institutional cut score.

Recommendations

These results provide further support for the validity of SuccessNavigator in predicting both overall collegiate GPA and mathematics course grades as well as helping to inform mathematics course placement decisions. SuccessNavigator was designed in response to the need for holistic student assessment in higher education and to facilitate research on psychosocial skills to benefit both postsecondary students and the institutions they attend. The current study supports three recommendations intended to improve the efficiency of the course remediation processes, generate cost savings, and suggest means for better understanding student behavioral profiles and the importance of fostering an environment supportive of student success.

Recommendation 1: Consider mainstreaming a targeted subgroup of students into higher level courses. Our results suggest no negative association between the advancement of some students into higher level mathematics courses and course success rates in cases where student academic placement test scores fell near but below standard institutional cutoffs. In this study, *some students* were those exhibiting noncognitive skill levels indicative of future mathematics course success (i.e., those receiving a SuccessNavigator accelerate recommendation in mathematics).

One view of mainstreaming is as a preliminary institutional acceleration strategy. Compared to other strategies such as course restructuring and modularization, mainstreaming can be an effective and inexpensive approach to improving access to college level coursework and decreasing the potential for students to become overwhelmed with the additional time commitment and expense associated with remedial coursework. Students who would have otherwise been placed in remedial coursework but exhibit a noncognitive skill profile indicative of the ability to succeed in college level courses may thrive if given the opportunity to both engage with and be challenged by more academically advanced curricula and peers (Edgecombe, 2011).

Along the above line of reasoning, it is crucial to note that we saw no negative association between acceleration and course success where mainstreaming was conducted without explicit procedures in place at the college to provide ancillary support services to the subgroup of accelerated students. Mainstreaming is typically defined in part by the provision of supplemental academic support sessions, such as extra course material review, supplemental instruction, and/or group discussions (Edgecombe, 2011; Hanover Research, 2013). Existing institutional resources (e.g., tutoring, learning centers, academic advising) can also be modified or expanded to provide any necessary additional support. While we cannot say what the observed effect would have been on the rate of mathematics course success among accelerated students had they received some or all of the above services concurrent with being enrolled in higher level coursework, examples from the literature on instruction in writing skills suggest the performance of these students may have improved (Adams, Gerhart, Miller, & Roberts, 2009; Jenkins, Speroni, Belfield, Jaggars, & Edgecombe, 2010).

Recommendation 2: The SuccessNavigator academic success index may be an effective early advising tool to help identify academically at-risk students. The academic success index built into SuccessNavigator was designed to predict overall first semester college GPA. High school GPA, standardized test scores, and noncognitive skill levels are all considered in the calculation of this index (Markle et al., 2013). As demonstrated by Figure 1, the academic success index in the current sample was an effective measure of risk for future academic failure.

High quality collegiate academic advising remains an important resource available to students who require extra support to succeed in their courses and navigate the college process in general (Metzner, 1989; Young-Jones, Burt, Dixon, & Hawthorne, 2013). Due to a number of structural and contextual factors at community colleges (e.g., budgeting, job definitions, student population size and composition), community college advisors are often individually responsible for assisting a large number (e.g., hundreds) of students arriving on campus with widely diverse levels of prior academic preparation, behavioral skills, and cognitive abilities. The academic success index may thus be an effective tool for performing an initial quick screening of students to target those whose SuccessNavigator subskill levels indicate the greatest need (e.g., students receiving a low score). Once identified, advisors might make a particular effort to engage with and help guide these students onto a path toward future academic success (however that is defined in each individual case). The key component here is using a standardized holistic assessment to identify such high-need students as early as possible in their college careers.

Recommendation 3: For SuccessNavigator to serve as an effective tool for advising and placement, it should be implemented by institutions using consistent standards aligned with institutional resources and support mechanisms. When comparing mathematics course passing rates across different campuses participating in this study, distinct patterns of performance were observed. While two campuses showed statistically significant positive differences in passing rates between those students recommended for mathematics acceleration versus those who were cautioned, two others showed no statistically consequential differences. Further work must be done to examine more closely why such between-campus differences emerged. Pending the outcome of that work, however, we would hypothesize that at least part of the disparity observed was attributable to differences in the implementation strategies deployed across campuses. As noted above, only Campuses C and D possessed senior staff members who functioned as on-campus leaders facilitating the integration of SuccessNavigator report

information within course placement procedures. Without the benefit of definitive evidence one way or the other, it seems reasonable to posit that this relatively higher degree of implementation fidelity is likely to have had an impact at institutions otherwise accustomed to business as usual (O'Donnell, 2008). Support from centralized college leadership teams and standardized protocols for deploying SuccessNavigator in the above manner are of particular importance when considering multicampus systems where each campus's staff (and thus, its course placement mechanisms) may operate with some degree of independence or isolation from the central administration.

Conclusion

This report has reviewed recent findings from a large urban community college system making use of both SuccessNavigator and administrative student outcomes data. Much as SuccessNavigator represents a holistic assessment at the student level, institutions considering its use for the purposes described above are encouraged to conduct a localized, school-level holistic examination of their current advising and placement policies. As an initial checklist, these might be expected to include:

- Use of standardized course placement tools and practices
- Procedures to evaluate the need for and delivery of student support services
- Current level of staff dedicated to student advising
- Capabilities already in place or required to adequately train staff to deploy any revised assessment or placement procedures with high fidelity

Given the unique nature of each of college and university environment, the protocols best suited to serve their distinct student bodies and institutional objectives will of course vary by school. Strategies for an optimal integration of SuccessNavigator are thus also expected to vary by school, nonetheless maintaining the constant theme of using holistic assessment to help facilitate student academic success and direct students to appropriate support services as needed.

One important limitation of the present study is the relatively small sample size available to our analysis (see Table 3) comparing mathematics course outcomes between students enrolled in college level courses based solely on Compass versus those accelerated into college level mathematics due in part to their SuccessNavigator mathematics course placement index level.

The current findings should be replicated using larger samples from a diverse array of institutions. Another limitation of the results presented in Table 3 is the lack of a true experimental design to examine the causal effect of SuccessNavigator as a tool for informing course acceleration decisions. In those results, all students who scored within the acceleration band and received a SuccessNavigator recommendation to accelerate were registered for the next highest level math course. While our findings may have been due to student differences in noncognitive skills, they also may have been attributable to other unobserved characteristics. An experimental design, for example, holding out a control group of students treated according to standard practice regardless of their SuccessNavigator scores, would have controlled for these unobserved characteristics and permitted a more rigorous examination of the effect of using SuccessNavigator to help place students.[2] Finally, it should be noted that the present study did not examine long-term academic outcomes. It would be valuable to conduct a future study examining the collegiate persistence and graduation rates of students accelerated to higher level courses in comparison to those of students who were not accelerated.

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Notes

[1]The total adds up to greater than 100% because some students enrolled in more than one course. Where this occurred, the highest level mathematics course record for which a final grade was available was included in our analysis.

[2] A study using similar data but employing a quasi-experimental design is forthcoming.