

## **Nudges to the Finish Line – Preliminary Research Brief (September 2019)**

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### **Project Overview**

Nearly half of students who enter college do not graduate, and many students drop out after earning substantial credits. To date, most efforts to increase college completion have focused on supporting students before or soon after they enter college. Initiatives targeting students at risk of leaving late into college, by contrast, have received comparatively little attention, despite the fact that they may offer a cost-effective strategy for increasing degree attainment and reducing completion disparities by race and income. We developed Nudges to the Finish Line (N2FL), an interactive mobile messaging campaign to increase completion among students who have earned substantial credits but remain at risk of dropout. Messages prompted students to connect with campus-based academic and financial resources, reminded students of upcoming and important deadlines, and invited students to connect remotely via text message with advisors at their college or university. We have partnered with both higher education systems and individual institutions, totaling 21 colleges and universities in New York City, Ohio, Texas, Virginia, and Washington State to implement the project. We also collaborated with two text messaging platforms (Signal Vine and Persistence Plus) to deliver messages to students. We began N2FL in the Fall 2016 and have messaged cohorts of students into the Fall 2019 semester.

### **Data and Sample**

We have partnered with a diverse array of non-selective, public two- and four-year institutions through N2FL. All of our partner institutions accept 75 percent or more of the applicants that apply. Students at participating institutions were eligible to participate in the study if they were pursuing an associate or bachelor's degree and had completed at least 50 percent of the credits typically required for degree completion. We recruited 22,053 students to participate in the project. We use student-level administrative records maintained and provided by our institutional partners to evaluate the impact of the intervention on students' academic progress and performance. We also leverage National Student Clearinghouse records to track students who are no longer enrolled at institutions that routinely collect this information. We examine impacts on the probability of re-enrollment, credit attainment, and degree completion.

Prior to the start of the campaign, we worked with historic data from each partner to develop predictive models (using both standard econometric and data science methods for prediction) of the probability that students would withdraw before completing their degree. Our impact analyses focus both on overall impacts and impacts by predicted risk level. Given the growing prevalence of predictive analytics in higher education, one goal of N2FL is to investigate whether nudge strategies to improve college completion are differentially effective based on students' predicted risk of withdrawal. Our hypothesis at the outset of the study was that students on the margin of graduating would experience the greatest benefit from receiving additional outreach and advising support.

## Research Design

To evaluate the effects of N2FL on academic progress and performance, we randomly assigned eligible students within each institution to either a treatment or control group. Students in the treatment group received messages on a weekly or bi-weekly basis for the duration of the academic year. Students assigned to the control condition maintained access to the support structures typically available on their campus but did not receive any text messages offering additional support and guidance.

## Preliminary results

We will conduct our final analyses of N2FL in Summer 2020, after our final cohort of implementation in Fall 2019 and another round of outcome data collection through the Spring 2020 semester. In this research brief we present preliminary impacts of N2FL on re-enrollment in the term following the intervention and impacts on credits completed and graduation within two terms of beginning the intervention, at 19 institutions that launched N2FL prior to Fall 2018. The results are based on 16,993 students, which represents 77 percent of the full study sample. Our final analyses will consider graduation impacts over a longer time horizon and for the full sample. We include tables referenced in this section at the end of this research brief.

As we show in Table 1, we find no overall impact of N2FL on re-enrollment, credit accumulation, or graduation. Students in both the treatment and control group re-enroll in the term following the intervention at high rates (81 percent). Only 21 percent of both experimental groups graduated within two terms of the start of the intervention. In Table 2 we present N2FL impacts by predicted risk of withdrawal at baseline. We find no impacts of the campaign on re-enrollment, credit accumulation, or graduation for students with low- or medium-levels of predicted risk withdrawal. N2FL increased re-enrollment into the term after the intervention by 2.4 percentage points (3 percent relative to the control group) but did not affect credit accumulation or graduation in the overall sample.

In Table 3 we present N2FL impacts by partner higher education system (City University of New York (CUNY), Texas Higher Education Coordinating Board (THECB), and Virginia Community College System (VCCS)) and predicted risk level.<sup>1</sup> We find no impact on re-enrollment, credit completion, or graduation across risk levels in CUNY. In Texas we find suggestive evidence of a 2.7 percentage point increase in graduation within two terms—a 29 percent increase relative to the control—for students at medium predicted risk of withdrawal. In Virginia we find a 2.2 percentage point increase in graduation within two terms—a 27 percent increase relative to the control—for students at high predicted risk of withdrawal.

In Table 4 we present N2FL impacts by level (two- or four-year college or university). We again find suggestive evidence that N2FL increased re-enrollment among high-risk students by 2.4 percentage points (3 percent relative to control) at community colleges, but we find no evidence of impacts on graduation. The estimated impact on re-enrollment at four-year institutions is similar in magnitude (2.9 percentage points, or 3.7 percent relative to control). We also find suggestive evidence that N2FL increased graduation after one year by 3.2 percentage points (41 percent relative to the control) for high-risk students attending four-year institutions.

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<sup>1</sup> We find no overall within-system impacts.

Finally, in Table 5 we explore whether N2FL impacts vary based on the advising model employed by our partner campuses. Some institutions had one dedicated professional advisor responding to student messages, while other campuses used a team of advisors to manage student responses. Some campuses used a non-advisor staff member to serve in a connector role, facilitating connections between students and advising staff. Finally, two of our partner institutions (Ohio University and University of Washington-Tacoma) used Persistence Plus' automated, interactive messaging platform that did not rely on two-way texting capability between students and campus staff. We find that the dedicated professional advisor model increased graduation for high-risk students by 3.2 percentage points (44 percent relative to the control group at these institutions).<sup>2</sup> The team advising model did not impact the probability of graduation but increased re-enrollment by 5.3 percentage points (8 percent relative to the control). We find no evidence of effects on re-enrollment or graduation at campuses that employed alternative advising models to connect with students.

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<sup>2</sup> We do not have precision at this stage to rule out that the impacts on graduation for high-risk students are the same across advising models

**Table 1.** Overall impacts of N2FL on academic performance and graduation, two terms following the start of the intervention

	(1)	(2)
	Control Group Mean	Treatment Effect Estimate
Re-enrolled to term 2	0.811	0.003 (0.006)
Credits earned (terms 1 & 2)	21.05	0.126 (0.145)
Graduated (terms 1 & 2)	0.208	0.004 (0.006)
Observations	16,993	

Notes: Effect estimates are from linear probability models that include randomization block fixed effects and pre-treatment covariates. Robust standard errors are reported in parentheses.

**Table 2.** Impacts of N2FL on academic performance and graduation by predicted risk of withdrawal, two terms following the start of the intervention

	(1)	(2)	(3)	(4)	(3)	(4)
	Low Risk		Medium Risk		High Risk	
	Control Group Mean	Treatment Effect Estimate	Control Group Mean	Treatment Effect Estimate	Control Group Mean	Treatment Effect Estimate
Re-enrolled to term 2	0.847	-0.007 (0.009)	0.852	-0.009 (0.010)	0.730	<b>0.024**</b> (0.012)
Credits earned (terms 1 & 2)	25.02	0.084 (0.230)	22.22	0.181 (0.264)	15.36	0.097 (0.261)
Graduated (terms 1 & 2)	0.304	0.005 (0.011)	0.203	0.006 (0.011)	0.101	0.005 (0.008)
Observations	6,206		5,180		5,607	

Notes: Effect estimates are from linear probability models that include randomization block fixed effects and pre-treatment covariates. Robust standard errors are reported in parentheses.

**Table 3.** Impacts of N2FL on academic performance and graduation by predicted risk of withdrawal and system, two terms following the start of the intervention

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Re-enrolled to term 2		Credits attempted in term 2		Credits earned (terms 1 & 2)		Graduated (terms 1 & 2)	
	Control Group Mean	Treatment Effect Estimate	Control Group Mean	Treatment Effect Estimate	Control Group Mean	Treatment Effect Estimate	Control Group Mean	Treatment Effect Estimate
<i>A. City University of New York (N = 6,195)</i>								
Low Risk	0.780	-0.015 (0.016)	10.10	-0.213 (0.252)	21.32	-0.043 (0.341)	0.354	-0.009 (0.018)
Medium Risk	0.766	-0.001 (0.021)	8.247	-0.084 (0.293)	17.27	-0.279 (0.433)	0.271	-0.001 (0.022)
High Risk	0.683	0.015 (0.024)	6.795	0.040 (0.309)	13.87	-0.298 (0.477)	0.183	-0.021 (0.019)
<i>B. Texas Institutions (N = 4,623)</i>								
Low Risk	0.879	0.009 (0.014)	10.19	0.158 (0.266)	20.98	0.279 (0.362)	0.257	0.011 (0.019)
Medium Risk	0.893	-0.012 (0.017)	7.848	0.293 (0.314)	15.29	<b>0.747*</b> (0.432)	0.092	<b>0.027*</b> (0.015)
High Risk	0.796	0.013 (0.025)	6.810	0.291 (0.328)	11.98	0.001 (0.497)	0.0376	0.005 (0.012)
<i>B. Virginia Community Colleges (N = 3,744)</i>								
Low Risk	0.881	-0.037 (0.035)	8.441	-0.477 (0.683)	19.42	-0.288 (0.833)	0.483	0.018 (0.054)
Medium Risk	0.844	-0.030 (0.024)	8.168	0.027 (0.377)	16.97	0.409 (0.548)	0.290	-0.028 (0.028)
High Risk	0.703	0.030 (0.019)	6.742	0.271 (0.252)	13.23	0.427 (0.376)	0.082	<b>0.022**</b> (0.011)

**Table 4.** Impacts of N2FL on academic performance and graduation by predicted risk of withdrawal and level, two terms following the start of the intervention

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Re-enrolled to term 2		Credits attempted in term 2		Credits earned (terms 1 & 2)		Graduated (terms 1 & 2)	
	Control Group Mean	Treatment Effect Estimate	Control Group Mean	Treatment Effect Estimate	Control Group Mean	Treatment Effect Estimate	Control Group Mean	Treatment Effect Estimate
<i>A. Two-Year Colleges (N = 8,825)</i>								
Low Risk	0.850	-0.020 (0.021)	8.360	-0.184 (0.341)	18.76	-0.050 (0.456)	0.406	-0.001 (0.027)
Medium Risk	0.842	-0.012 (0.014)	7.847	0.032 (0.215)	16.30	0.166 (0.308)	0.214	-0.000 (0.014)
High Risk	0.717	<b>0.024*</b> (0.014)	6.744	0.205 (0.180)	13.19	0.100 (0.271)	0.107	0.000 (0.009)
<i>B. Four-Year Institutions (N = 8,168)</i>								
Low Risk	0.846	-0.001 (0.010)	12.21	-0.069 (0.194)	26.49	0.138 (0.264)	0.280	0.002 (0.012)
Medium Risk	0.863	-0.009 (0.015)	13.68	0.124 (0.313)	29.24	0.159 (0.452)	0.190	0.010 (0.015)
High Risk	0.782	0.029 (0.025)	11.21	0.332 (0.461)	23.77	0.212 (0.742)	0.079	<b>0.032*</b> (0.018)

Notes: Effect estimates are from linear probability models that include randomization block fixed effects and pre-treatment covariates. Robust standard errors are reported in parentheses.

**Table 5.** Impacts of N2FL on academic performance and graduation by predicted risk of withdrawal and advising model, two terms following the start of the intervention

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Re-enrolled to term 2		Credits attempted in term 2		Credits earned (terms 1 & 2)		Graduated (terms 1 & 2)	
	Control Mean	Treatment Estimate	Control Mean	Treatment Estimate	Control Mean	Treatment Estimate	Control Mean	Treatment Estimate
<i>A. One Professional Advisor (N = 3,344)</i>								
Low Risk	0.846	0.004 (0.028)	9.642	0.040 (0.436)	19	0.114 (0.691)	0.289	-0.033 (0.032)
Medium Risk	0.837	-0.033 (0.026)	7.822	-0.199 (0.359)	15.97	0.238 (0.542)	0.241	-0.006 (0.027)
High Risk	0.746	0.013 (0.021)	6.674	0.151 (0.271)	13.14	0.311 (0.416)	0.0732	<b>0.032**</b> (0.013)
<i>B. Team of Professional Advisors (N = 4,626)</i>								
Low Risk	0.724	-0.028 (0.024)	9.326	-0.318 (0.357)	21.21	-0.090 (0.454)	0.474	0.000 (0.027)
Medium Risk	0.778	-0.002 (0.024)	7.824	0.257 (0.349)	16.81	0.212 (0.504)	0.314	-0.001 (0.027)
High Risk	0.679	<b>0.053**</b> (0.023)	6.545	0.393 (0.290)	13.12	0.132 (0.442)	0.162	-0.013 (0.018)
<i>C. Other Model (N = 9,023)</i>								
Low Risk	0.890	0.003 (0.010)	12.54	-0.029 (0.215)	27.37	0.172 (0.291)	0.248	0.009 (0.013)
Medium Risk	0.884	-0.007 (0.012)	12.27	0.073 (0.258)	25.98	0.128 (0.369)	0.150	0.010 (0.012)
High Risk	0.761	0.009 (0.019)	9.337	0.146 (0.313)	18.92	-0.052 (0.484)	0.0730	0.002 (0.012)

Notes: Effect estimates are from linear probability models that include randomization block FEs and pre-treatment covariates. Robust SEs in parentheses.