Three Studies on Student Outcomes in Higher Education

By

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A dissertation submitted in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

(Educational Policy Studies)

at the

UNIVERSITY OF WISCONSIN-MADISON

2016

Date of Final Oral Examination: August 30, 2016

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Abstract

This dissertation contains chapters that explore higher education policy issues related to student outcomes. In the first chapter, I examine the results of a controlled randomized trial of a brief, inexpensive phone call outreach to a sample of Pell eligible students at the University of Missouri intended to increase FAFSA filing, on-time FAFSA filing, aid awarded, and subsequent persistence. Controlling for baseline variations between the intervention and control, students receiving the phone call reminders have significantly higher rates of overall filing and filing by both institutional and state deadlines compared to peers in the control; increases were particularly large for students from the lowest income families, independent students, and students at the sophomore level or higher. There were no significant differences in retention between the treatment and control.

In the second chapter I use a randomized trial at a public university and draw on both administrative and survey data to evaluate a third party service intended to increase student persistence by delivering daily text-message "nudges" encouraging positive academic behavior and providing opportunities for values affirmation. Controlling for baseline variations between the intervention and control, students receiving the text messages did not differ overall from students in the control in their subsequent on-time FAFSA filing, use of campus tutoring centers, quarterly GPA, or retention to the subsequent semester. Although analysis of interaction effects suggests the possibility of differential impact on subgroups of students, these may due to chance and merit further exploration.

In the third chapter, I address calls for additional insight on program-level student outcomes at For-profit Colleges and Universities (FPCUs). Using longitudinal data from the Wisconsin Educational Approval Board, I perform both descriptive and exploratory regression

analysis to examine levels of variation in the student outcomes of retention, graduation, and employment as well as the relationship between those outcomes and observable program-level characteristics. Program-level outcomes are found to vary at rates similar to or greater than institutional outcomes, suggesting greater diversity of outcomes at FPCUs than is typically depicted. Program level data elements are shown to have considerable explanatory power for this variation.

Acknowledgements

I would like to thank my dissertation chair, Sara Goldrick-Rab, for her support and guidance throughout my doctoral training. Her passion for higher education is contagious, and her emphasis on the importance of translational research has shaped both my academic and professional work. I also greatly appreciate the support and guidance from the rest of my committee, including Eric Grodsky, Nick Hillman, Nancy Kendall, and Xueli Wang.

During my time in Madison I was very fortunate to have the opportunity to work on projects as part of the Wisconsin HOPE Lab. In that work and in my own research I would like to express my thanks to Alison Bowman, who now serves as Assistant Director of the Lab, for her impressive management of tedious tasks and encouragement when navigating challenging projects.

I would like to thank the faculty and staff of the University of Chicago MAPPS program, who challenged me use multiple lenses in my research and to prepare to ask and be asked challenging questions. I am also grateful to the faculty and students of Princeton University, who first helped me understand the disparities between schools and the social, economic, and personal impact of education. I am grateful to the teachers and administrators of the public schools of Laurel, Mississippi, many of whom worked tirelessly and with few resources to serve our community.

Justin Chase Brown, whose office conducted the randomized trial described in the first chapter, deeply informed my understanding of the work of financial aid offices and the roles they can play in student success.

I am grateful to the University of Missouri Office of Financial Aid and the leadership of the University of Washington Bothell for their willingness to ask questions about access and student success and for allowing me to be a part of the process of answering them.

Every step of my studies, from my coursework to my dissertation, has been deepened by the opportunity (and occasional challenge) of engaging in the practical work of higher education through the field of institutional research. I would like to thank Cynthia Gray, Scott Bierman, Ann Davies for giving me the opportunity to enter and advance in the field, and for allowing me the flexibility to pursue my Ph.D. coursework while employed at Beloit College. I am similarly grateful to the leadership of the University of Washington Bothell and the handful of colleagues who have known I have been completing my dissertation for their encouragement.

I would also like to acknowledge individuals who provided me with feedback on one or more of my chapters. These include Katharine Broton, Justin Chase Brown, Dorothy Cheng, Rachel Feldman, Kyong Kang, and Jessica Sabin.

Finally, I am grateful to my parents, Charles and Susan Cannon, my parents-in-law George and Dorothy Smith, and my wife, Shannon Cannon, whose support and patience have been constant.

Table of Contents

Why Didn't You Say So?
Experimental Impacts of Financial Aid Outreach

Russell Cannon

The price of higher education is at an all-time high; between 2000 and 2015, the cost of attendance at public four-year colleges rose nearly fifty-three percent in inflation-adjusted dollars (Baum and Ma, 2014). As it has become increasingly difficult for students from low-income families to pay these expenses out-of-pocket, need-based financial aid is a crucial mechanism for providing access to higher education. Grant aid in particular has become a major focus of policy and research amid rising concerns about the impacts of student loan debt (Conner & Rabovsky, 2011; Baum et al., 2012; Goldrick-Rab, 2016). But obtaining grants is not easy. One obstacle is that with few exceptions, the federal government, states, and most public institutions require the annual completion and timely submission of the Free Application for Federal Student Aid, or FAFSA.

Completion of the FAFSA is a complex process, and research establishes that it creates barriers to both college access (King, 2006; Dynarski & Scott-Clayton, 2006; Bettinger et al., 2009) and college persistence (Bird & Castleman, 2014; Novak & McKinney, 2011). Students struggle with the difficulty of specific steps of the process as well as with the cognitive challenges of planning and motivation. In addition to the policies associated with federal aid, students must also understand policies specific to aid from their state and institution, creating opportunities for confusion and information asymmetry. Efforts to support students in the FAFSA filing process have become more widespread in recent years, yet typically target first-time filers during their initial application process as high school students and focus on eventual filing rather than the timing of filing.

College students must re-submit an application annually to continue receiving aid, and even for students who successfully file, failure to submit by early, high-consequence priority dates set by states and institutions can reduce aid packages by half (Feeney & Heroff, 2013; Lamanque, 2009; McKinney & Novak, 2015). Re-filing students must do so outside of the more structured and better supported college application process, often in the midst of an academic year filled with other stressors and distractions (Lamanque, 2009; McKinney & Novak, 2015). Roughly 10% of Pell-eligible returning students fail to file and nearly half file after state deadlines (Bird & Castleman, 2014; McKinney & Novak, 2015; Cannon & Goldrick-Rab, 2016). Most troublingly, research suggests that these challenges may disproportionately affect students who already disadvantaged, including students from backgrounds underrepresented in higher education, first-generation students, and those from the families with the lowest incomes. Given recent evidence linking increases of as little as $1,000 in need-based aid to improved retention and graduation rates for economically-disadvantaged students (Goldrick-Rab, Kelchen, Harris & Benson, 2016), both non-filing and late-filing have implications for retention and equity.

Research focused on first-time filers has established that targeted, high-touch interventions that provide direct one-on-one help to students in completing the FAFSA can increase not only FAFSA filing and the amount of aid awarded but college application and attendance as well (Bettinger et al., 2012; Castleman & Page, 2013). Yet although states and institutions have a vested interest in equitably distributing aid and increasing attendance, the relatively high cost of these types of interventions has limited their scalability.

More recently, researchers influenced by findings from the field of behavioral economics have begun to investigate whether small, timed, targeted, and personalized reminders can increase the rate of positive, beneficial behaviors. These interventions are typically brief and take

into account both the phrasing and mode of communications in order to clarify information, assist planning, increase motivation (Thaler & Sunstein, 2009; Milkman et al., 2011; Sunstein 2014). In higher education, a growing group of researchers have begun to examine the impact of these types of low-touch, low-cost interventions on college application and FAFSA filing (Castleman, 2013; Carrell & Sacerdote, 2013; Castleman & Page, 2016)

Early findings from experiments applying behavioral nudges in higher education spaces have been positive. A series of widely publicized studies by one research team demonstrated that targeted text messages increased proportion of graduating high school students enrolling in college the subsequent fall by roughly 4 percentage points (Castleman & Page, 2013). In a follow-up study with a subset of the same cohort, the authors found that text messages focused on FAFSA re-filing were associated with a 12 percentage point increase in fall retention among students attending two year institutions but no significant increase for the larger subgroup attending four year institutions (2014). A key limitation of the published research, however, is that it has only been conducted in partnership with external agencies and has only included students who have already opted-in to receiving other types of supports. As a result, the researchers have not had access to institutional data on outcomes of FAFSA filing and financial aid awards central to their theory of change, generalizability has been limited, and scalability has been questionable.

This paper attempts to address these gaps in our understanding by examining whether low-cost, low-touch outreach to students can impact FAFSA filing, aid awards, and subsequent retention. Given concerns recently raised about the disproportionate impact of early state and institutional “priority” dates on already at-risk student groups, data on the timing of filing is leveraged to examine impacts of the intervention on the timing of filing and priority-date

contingent aid awards. This is of particular importance to states and institutions that use deadlines as a mechanism to control the distribution of limited aid. Finally, heterogeneous impacts for different subgroups of students are estimated.

The study's guiding hypothesis is that students are not filing a FAFSA, or are not filing on-time, because they either are struggling with the difficulty of the process, misunderstand (or are not aware of) deadlines and their impacts, or face non-cognitive challenges to motivation or planning. An experiment is conducted to test this hypothesis—specifically, a phone call outreach designed to provide a timely reminder, simplified information, social "nudges," and an offer of help to students eligible to re-file the FAFSA. The calls were delivered over the course of a week in the early spring to potential re-filers who were Pell-eligible in the previous year (and thus likely eligible for state and institutional need-based aid) but had not yet filed the FAFSA for the subsequent year. Students in both the treatment and the control received the standard reminders provided by the institution via email, social media, and on-campus fliers, but only students in the treatment group received the calls and a single follow-up email.

The next section reviews existing literature on the extent and causes of FAFSA non-filing and under-filing as well as applications of behavioral economics to student outreach in higher education. Subsequent sections lay out the research design, implementation, and analysis of the intervention. The final section notes results and concludes with a discussion of the findings and their implications for policy and subsequent research.

LITERATURE REVIEW

Evidence and Impacts of Non-Filing and Under-filing

The FAFSA's role in helping students from low- and middle-income families access higher education is both self-apparent and confirmed by research. Whether from the federal government, states, or individual institutions, the FAFSA-filing process is the central pipeline through which need-based aid in higher education flows (Novak & McKinney, 2011; King, 2004; Cochrane, 2007) and the connection between levels of grant aid received and subsequent retention have now been well-documented (Bettinger, 2004; Singell, 2004; Castleman & Long, 2013; McKinney & Novak, 2013; Goldrick-Rab, Kelchen, Harris, & Benson, 2016). While many eligible students successfully use the FAFSA to take full advantage of need-based aid, a significant minority of students do not.

Research suggests that many eligible applicants fail to file a FAFSA at all (King, 2004; Kantrowitz, 2011; Novak & McKinney, 2011), even if they are continuing students who have successfully filed in a previous year (Bird & Castleman, 2015; Kofoed, 2016). Descriptive evidence from the Beginning Postsecondary Students Longitudinal study (BPS 04/09) shows that each year roughly 4% of Pell-eligible incoming first year students and 10% of returning first year students who were Pell-eligible in the previous year fail to file a FAFSA (Novak & McKinney, 2011; Bird & Castleman, 2015)[1]. Pairing this national data with regression models and matching methods, researchers have estimated that these students are much less likely to persist than peers of similar backgrounds who file the FAFSA (Novak & McKinney, 2011; McKinney & Novak, 2013; Bird & Castleman, 2015). This is not surprising, given that students who fail to file for aid

[1] It is important to note that Novak and McKinney focused their analysis only on students attending full-time, whereas Bird and Castleman included all returning first year students in their sample.

do not have access to the vast majority of federal, state, and institutional aid; this access includes both subsidized loans and work study funding (King, 2004; Kofoed, 2016).

To receive the full amount of need-based aid for which they are eligible, most low-income students must not only file a FAFSA but must file "on-time." Although a less studied phenomenon than non-filing, research suggests that a far greater number of students miss intermediate deadlines and priority dates tied to state and institutional need-based aid (Cochrane, 2007; Lamanque, 2009). Because the term "late-filing" is sometimes used in the financial aid profession to describe students who attempt to file after the final federal deadline, we adopt the term "under-filing" to describe students who successfully file a FAFSA but do so at a date after priority deadlines, potentially resulting in a large decrease their grant aid package. Until recently, under-filing had only been documented at the national level through the use of the National Postsecondary Student Aid Survey (King, 2004; McKinney & Novak, 2015), although state studies and institutional analyses provided early suggestions of its extent and often significant financial consequences (Feeney & Heroff, 2013; LaManque, 2009). More recently, a brief published by the Wisconsin HOPE Lab examined the filing dates of students who submitted a FAFSA and received Pell grants for the 2014-15 academic year (and were therefore likely eligible for state-distributed need-based aid). It found that nearly half of these students (45.6%) filed after binding state priority dates, with under-filing rates varying across states from 12% to nearly 74% (Cannon & Goldrick-Rab, 2016). This analysis still understates the full-extent of under-filing because many individual institutions have priority dates for institutional aid that fall even earlier than their state's deadline.

Both non-filing and under-filing appear to occur at higher rates among already-disadvantaged students, including those who identify as underrepresented racial or ethnic

minorities[2], have no parent with a four year degree ("first generation"), or are members of families with the lowest incomes[3] (Feeney & Heroff, 2013; LaManque, 2009; Cannon, 2016). These same students are more likely to drop out of higher education and to take longer to graduate (Pascarella, Pierson, Wolniak, & Terenzini, 2004; Sirin, 2005). Results also suggest that non-filing rates and under-filing are highest among students at community colleges, which often have fewer supports (Bird & Castleman, 2014; Feeney & Heroff, 2013; LaManque, 2009; Romano & Millard, 2006; Cannon & Goldrick-Rab, 2016), although even at public college nearly one-third of Pell-recipients file past state deadlines (Cannon & Goldrick-Rab, 2016). Because institutional deadlines often fall on or before state deadlines, it is likely that there is a similar heterogeneity in filing behavior in relation to these institutional deadlines as well.

The limited literature on the timing of filing suggests that first-time filers are more likely to miss intermediate deadlines than re-filers (McKinney & Novak, 2015; Cannon & Goldrick-Rab, 2016). Among re-filers, however, although the published research has focused on first-time re-filers (first-year students re-filing in preparation for their second year of attendance) (Castleman & Page, 2014), there has been no published study on whether first-time re-filers are more likely to file on-time or at all compared to peers in their sophomore, junior, or senior years.

Finally, it is important to note that just as subgroups of students may face different forms and degrees of challenges that lead them to file at different rates, they may also be impacted differently by interventions intended to address those challenges; an intervention that is particularly impactful for one group may be ineffective for another (Schochet, 2014).

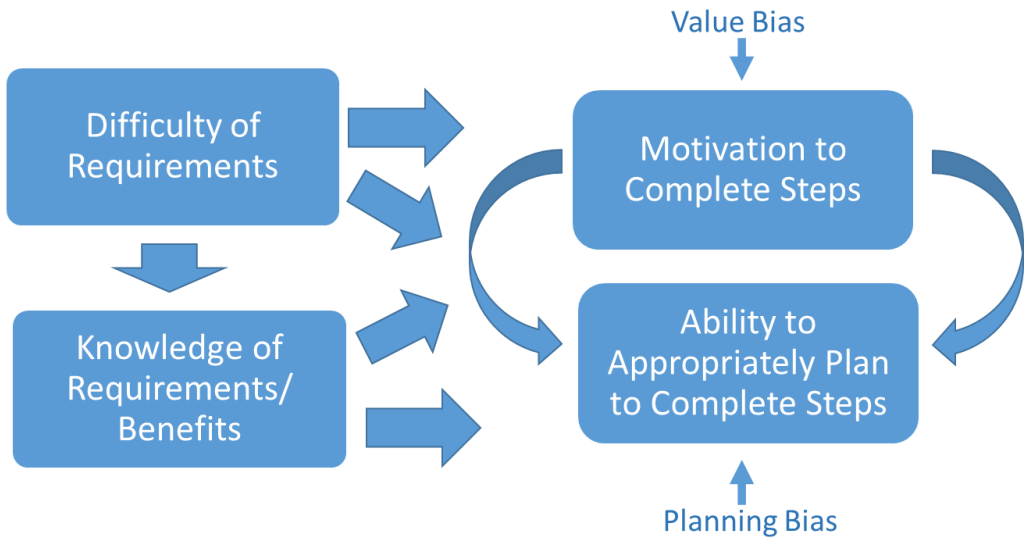
[2] Underrepresented minority is typically defined as students who identify as either Hispanic, Black, or Native American (alone or in combination with other races/ethnicities)

[3] An Estimate Family Contribution (EFC) of "0" is often used, and is used in this paper, as a proxy for this "lowest-income" subgroup within the already "low-income" group approximated by Pell Eligibility.

Potential Causes of Non-Filing and Under-filing

Several potentially complimentary factors are hypothesized to impact the timing of FAFSA filing. These include the difficulty of the specific steps required to complete the FAFSA, misunderstanding or lack of information about the requirements of the process, and challenges to planning and motivation to complete the required steps (which may be aggravated by cognitive biases). The process diagram in Figure 1 depicts one simplified way of framing these elements and their interactions.

Figure 1. Hypothesized Potential Causes of Non-Filing and Under-filing



First, the difficulty of the FAFSA process itself has immediate impacts on a student's ability to complete the form. Though piecemeal improvements have been made to the FAFSA in recent years, its remaining complexities are well-documented and include the length of the form, the number of separate information sources needed, the difficulty of obtaining these sources, and the amount of mathematical calculation required (Dynarski & Wiederspan, 2013; Bettinger et al., 2009; HOPE Lab, 2015; Dynarski & Scott-Clayton 2006). Small reminders might be expected to

have minimal direct impact on procedural difficulties, such as obtaining required fiscal information from parents. However, reminders can be used to provide offers of help (from the financial aid office or outside agencies), to identify alternative pathways (such as the policy that allows students to provide estimates of tax information until the exact information is available), or to mitigate downstream challenges associated with motivation and planning.

A second set of obstacles may arise from inadequate knowledge of norms, requirements, and benefits of filing. The degree to which this is a cause of non-filing or under-filing is the subject of debate. A 2009 study by Bettinger et al. found no increases to overall FAFSA filing for a treatment group provided only with information but no additional support, and this study has been widely cited as evidence that information-only interventions have little impact (Bettinger et al., 2012) on overall filing. Castleman and Page have similarly emphasized the correction of cognitive biases and influence on motivation, rather than simple information asymmetry, as the primary challenges addressed by the outreach. Information challenges might be assumed to be particularly small for re-filers, who by definition have already successfully filed the FAFSA. However, there are reasons to believe that some information challenges may continue to exist for this group.

There is some evidence from qualitative studies that a significant number of students mistakenly believe that they or their parents must have already filed their taxes in order to submit a FAFSA (Lamanque, 2009), although students are only required to provide an estimate of their tax information as long as they later update it with their actual tax data. In addition, if re-filers need assistance, resources are likely to differ from those they relied upon in high school. Finally, the dates of state and institutional deadlines, which typically occur over a year prior to federal deadlines, likely lead to confusion (Lamanque, 2009; McKinney & Novak, 2015; Cannon &

Goldrick-Rab, 2016). While re-filers may have the experience of having filed previously, students who lack the structure of the broader application process (which typically takes place in the spring prior to the year of attendance, in alignment with most state and institutional deadlines), may be more likely to miss these priority dates. While most institutions make an effort to provide students with information on the timing of deadlines, there is also growing evidence that their primary method for doing so may be losing effectiveness.

Email has served as the default communication mechanism at most institutions for over a decade (University of North Dakota, 2015; Boise State, 2013; Salem State, 2013). Research, however, indicates that there has been a significant shift in student communication habits; whereas email was initially a primary mode of social communication used actively and regularly by students, recent research suggests that only 6% of teenagers use email daily (Anderson & De Palma, 2012; Lenhart, 2012; Madden et al., 2013), while survey data on broader age-ranges indicates that daily email usage by African Americans and Hispanics is 10 to 15 percentage points lower than their White peers (Purcell, 2011). Together, this suggests that other modes of outreach may be necessary.

Another set of challenges relate to the motivation necessary to complete requirements and the ability to appropriately plan for them, both of which may be impacted by the difficulty of the requirements and a student's understanding of them. High short-term cognitive or time costs resulting from complexity may lead individuals to make poor decisions related to their long-term financial interests (Thaler & Sunstein, 2009). Such "procrastination" is often the result of "time-inconsistent preferences," the documented tendency of individuals to be more willing to commit to future costs than those that occur in the short term, with tasks appearing to grow more daunting as they become more proximate (DellaVigna, 2009; Bird & Castleman, 2015). At

minimum, time-inconsistent preferences may cause students to "put-off" a complex task like FAFSA filing; at the extreme, it may result in avoiding the task entirely. Even for students who begin the filing process, under-estimation of the time and preparation necessary to complete the task, a well-documented bias known as the "planning fallacy," may lead them to submit the FAFSA much later than they intend (Kahneman & Tversky, 1979; Thaler & Sunstein, 2009). While both cognitive challenges have been shown to affect individuals across the age spectrum, they are likely magnified in adolescents whose cognitive self-regulation systems are still developing (Casey, Jones & Somerville, 2011; Casey, Tottenham, Liston, and Durston, 2015). Information that clarifies relevant social norms, emphasizes the potential for loss, and provides offers of support have been shown to counteract these biases (Thaler &Sunstein, 2009; Castleman, 2013).

Interventions to Increase FAFSA Filing

The 2009 Bettinger et al. study was among the first to explicitly test whether an intervention of support for FAFSA filing had a direct impact on filing, receipt of aid, enrollment, and persistence. In their randomized experiment, eligible families of low or moderate income already receiving tax filing assistance from H&R Block were offered 10 minutes of additional support in completing and filing the FAFSA along with an estimate of the aid the potential student would receive and information on local colleges. A separate group was randomized to a treatment that included only the aid and college information and a third group randomized to the control received a general brochure with information on the costs of college. The group receiving the additional 10 minutes of support with completing and filing the FAFSA was 15.7 percentage points more likely to file a FAFSA and 7.7 percentage points more likely to be enrolled in

postsecondary education the subsequent year, whereas the students receiving information alone had no changes in their filing or enrollment behavior (although the authors noted that the sample size in the information-only group was particularly small). These findings suggest an emphasis on the difficulty of the process itself, but the intervention may also have prevented downstream challenges of planning and motivation. Importantly for this study, the authors also noted that students who received direct help filed an average of 29 days earlier than those in the treatment; a similar analysis was not conducted for the smaller information-only group. Importantly, the authors only examined average date of filing rather than considering whether or not students filed by institutional or state priority dates (Bettinger et al., 2012). Because the intervention took place in Ohio, among the states with the latest filing deadlines and highest on-time filing rates at 89% (Cannon & Goldrick-Rab, 2016), their intervention may not have had a meaningful impact on on-time filing. Despite positive findings, the nature of the experiment, which provided high-touch support to students whose parents were already actively seeking tax-support from a third-party firm, may have limited its scalability as a form of student support.

Recent research from the fields of behavioral economics and psychology suggests that small personalized, targeted reminders delivered through salient modes of communication can increase the likelihood that individuals will pursue beneficial behaviors. Altering the "choice architecture" can increase the efficacy of these reminders and heuristics with which individuals make decisions, to address problems of complexity and incomplete information (Thaler & Sunstein, 2009; Kahneman, 2011; Castleman, 2013). Such interventions often integrate a variety of characteristics intended to have this effect.

Reminders can be used to simplify complex choices. One often-cited study showed that reducing the number of retirement options available to employees and providing suggestions for

contributions increased both enrollment and the optimization of enrollment (Beshears et al., 2006). Similarly, FAFSA-related reminders that focus on a particular filing date may help students focus their decision about when to file. Research has also shown that individuals are loss-averse when making decisions, and that in choices that are quantitatively identical, people are more likely to select a particular option when it is framed as allowing them to prevent a loss of existing resources (Kahneman, 2011). Reminder nudges, then, can assist students in their decision-making both by concretizing the advantages of on-time filing and by framing the missing of deadlines as a potential "loss" of aid for which they would otherwise be eligible.

Reminders can also increase the salience of information, the readiness by which it can be called to mind. Each reminder serves as an additional reference point to be drawn upon, taking advantage of the availability heuristic, which relies on the examples that come immediately to mind in evaluating a decision (Kahneman & Tversky, 1979). Timing reminders so that they are received chronologically near the actual decision point also takes advantage of the "recency effect," the documented tendency of individuals to remember best the information viewed last in a series (Murdock, 1962).

Reminders can take advantage of peer influence. If relevant, this can happen by suggesting or correcting social norms. When faced with complex decisions, individuals are likely to be influenced by the actions of their peers (Cialdini, 2009). If students are aware that most of their peers file by the priority date (particularly if the framing of "peers" is narrowed to focus on students with similar aid eligibility), it may increase the likelihood that the reminded student will follow that lead. When possible, having peers actually deliver the reminders to students may have a similar peer effect (Cialdini & Goldstein, 2004) while also potentially increasing receptivity to the message.

Finally, reminder nudges can serve to connect individuals with resources that can help them navigate complex decisions. This can include highlighting existing resources, like financial aid workshops and contact information for the office of financial aid, for students who might otherwise be unaware of them. However, a variety of factors including motivation, perceptions of self-competence, and views of help-seeking may influence the willingness of individuals to take advantage of resources even when they know about them (Boldero & Fallon, 1995). Reminders may be particularly effective if they remove barriers to help-seeking either by inviting it explicitly at a later date or, for "live" reminders, by providing an immediate offer of support as part of the reminder itself.

Of course, even an expertly designed reminder can only be impactful if it reaches the attention of its intended audience. While emails once served as an effective mode of delivery for reminders, survey research suggests that this is no longer the case; the frequency of email usage has declined even as the number of emails received has increased significantly (Anderson & De Palma, 2012; Rubin, 2013). By comparison, however, cell phone ownership has reached 97% for adults between 18 and 44 (Smith, 2013; Ranie, 2013). Because email addresses can be assigned to all students and nearly all colleges have built both infrastructure and processes around email systems, email is likely to remain the "official" source of campus communications (Kolowich, 2011). However, given the growth of cell phone ownership and that most phone plans now include text messaging and voicemail in addition to voice calls, these modes of communication may now offer an accessibility and salience for reminders no longer provided by email.

Use of Phone-based Reminders to Increase FAFSA Filing

Two recent studies have attempted to incorporate phone-based targeted reminders on FAFSA filing into randomized interventions intended to increase college attendance by college-

intending seniors (Castleman & Page, 2013) and to increase first year retention among college freshmen (Castleman & Page, 2014). In the first study, the authors find that text message nudges increase college attendance by roughly 4 percentage points compared to the control. In the second, in which they follow-up with a cohort of students who participated in the first study, they find that 19 text message nudges led to a 12 percentage point increase in retention at community colleges but did not lead to an increase at four-year institutions. In both studies, the authors hypothesize that the positive effects are likely due in part to increased completion rates of key tasks such as FAFSA-filing (Castleman & Page, 2013; Castleman & Page, 2014).

Although both studies have received significant coverage in the education press and professional literature, critics have noted that other researchers have had difficulty replicating the findings in the field (Greene, 2016). While the second study explicitly deals with FAFSA re-filing among current college students, several key elements of its construction and findings suggest the necessity of further research.

First, the sample of students for the study consisted only of students who had opted-in to receiving either text message or peer-mentor outreach from a specific non-profit organization while in high school; students in both the treatment and control were also eligible for additional support services not available to all students at their institutions. Second, the study sample includes only first year students. Both may limit the generalizability of the research to broader college populations and scalability to interventions conducted by institutions with limited resources rather than those conducted by external agencies focused on this type of work (Castleman & Page, 2014, 7). The most important limitation acknowledged by the authors is the study's lack of data on the intermediate actions of actual FAFSA re-filing behavior and aid receipt that they hypothesize "drove the improvements in sophomore year retention" (2014, 14).

In the absence of this data, the authors are unable to explore whether overall FAFSA filing, the timing of FAFSA filing, or aid awards were actually impacted by the nudges.

In addition, Castleman and Page's finding of impacts at two-year institutions but not four-year institutions begs the question of whether there is heterogeneity of impacts of this type of outreach among student subgroups that may be more highly concentrated in two-year institutions. If this is the case, this heterogeneity may also be visible in a large sample at a four-year institution when interaction effects are observed between treatment and these subgroups.

The study described in this paper investigates whether a simple, inexpensive phone call reminder delivered by a financial aid office can increase on-time filing, subsequent state or institutional grant aid received, and retention, all while addressing several of the limitations of the existing literature. Because it examines an intervention performed by an office financial aid, all enrolled Pell-eligible students are included and the services received by the full group do not extend beyond those regularly provided by the institution. The sample includes eligible first years, sophomores, juniors, and seniors and is able to examine the effects across those groups. Moreover, the study takes advantage of detailed institutional data on FAFSA filing, aid awards and enrollment. The differences between the present study and that by Castleman and Page are summarized in Table 6.

Phone calls and voicemails have the benefit of reaching students in a more direct manner than mail, email, or text message while being more likely than texts or email to maintain salience through the recency effect because of the lower relative number of calls typically received by students (Anderson & De Palma, 2012). It may be for this reason that most institutions provide both in-bound and out-bound call support from their admissions offices and outbound call centers for alumni fundraising have become ubiquitous in higher education, both of which have

also demonstrated proof-of-concept in the effectiveness of student staffing. While most financial aid offices provide inbound support, proactive outbound support is nearly unheard of, even though aid distribution, like admissions and alumni outreach, has connections to both access and revenue generation at public institutions (NEC, 2012).

The two known cases of calling center intervention have been perceived by their sponsoring aid offices as successful, but were conducted in non-experimental conditions and with minimal analysis (Brown, 2014; DMACC, 2007). In 2007 the Des Moines Area Community College made a $50,000 per-year, two-year investment in an outbound calling center targeted at recruitment and retention; in the absence of a control group, the system compared the results of students were called and reached for a live call to those who were called and not reached, meaning that positive results might stem primarily from a shared confounding characteristic of students who they were unable to reach for a call. In addition to perceived positive effects, their part-time staffed model was significantly less expensive than high-touch interventions in the literature at a cost of roughly $3.33 per call. (Harris & Goldrick-Rab, 2010).

Study Characteristics and Methods

Theory of Change and Research Questions

This study explores the impact of a providing Pell-eligible college students with phone call reminders with a narrative focus on the importance of the institutional FAFSA filing deadline. The outreach was conducted entirely by peer mentors (student workers) located within the University of Missouri's financial office, which conducted the intervention using only existing staffing and resources.

As illustrated in Figure 1 below, the intervention (Phone Call "Nudge") was intended to directly increase on-time (March 1st or earlier) filing. The University of Missouri Financial Aid Office will consider applications filed with errors by March 1st as eligible for priority aid consideration as long as errors are corrected before priority funds are depleted, typically in late May or early June. Thus, gains in on-time filing are expected to result in increased grant aid eligibility. Subsequently, increased eligibility for grant aid is expected to have a direct effect on actual grant dollars received. Finally, increases in grant aid may increase likelihood of retention.

Figure 2.

The remainder of the paper is structured around the following central research questions:

1. Can a simple, inexpensive reminder delivered via phone call by student workers increase rates of FAFSA re-filing a) overall b) by the institutional priority date c) by the state priority date?
2. Does this intervention impact the amount and type of grant aid that students receive (both overall and conditional upon filing)?
3. Does this intervention impact retention rates over the subsequent semester?
4. Does the impact of the intervention on filing rates, grant aid, and retention vary by EFC, first-generation status, class year, or GPA?

Study Characteristics

During the spring of the 2013-14 academic year the University of Missouri-Columbia (MU) financial aid office conducted a randomized trial of a process to deliver phone call reminders to Pell-eligible students focused on FAFSA renewal by the institution's March 1 priority date. MU is a public research institution that serves as the flagship campus of the

University of Missouri System and enrolls 26,590 degree-seeking undergraduates, 94% of whom are full-time. Of MU degree-seeking undergraduates, 53% apply for aid and are determined to have at least some financial need, and 23% receive Pell grants. Among students who graduated in 2010-11, 56% took out loans at some point during their time at MU. Of these students, the average cumulative principal borrowed was $24,661. The University has a 6-year graduation rate of 71% and first-year retention rate of 84%, both above national averages for four-year institutions (NCES, 2014).

Students applying for need-based financial aid at the University of Missouri face two aid deadlines in addition to the federal deadline. The state of Missouri has an April 1 deadline, which is used to determine eligibility for the need-based Access Missouri (AMO) grant. Most Pell-eligible students who apply by the deadline are automatically eligible for the AMO grant, which for the past several years has been funded at the mandatory minimum of $1500 per eligible student. In addition, the University of Missouri has a March 1 Priority date, used to determine eligibility for the need-based University of Missouri (MU) grants and the federally funded Supplemental Equal Opportunity Grants (SEOG), as well as Perkins loans and Federal Work Study. MU grants and SEOGs are administered by the UM Office of Financial Aid; MU Grants are used to assist students with the largest gaps between grant aid and need, although some preference is given to students from underrepresented backgrounds. UM grants have a higher maximum EFC cutoff than Pell grants, and because they are distributed with a focus on reducing aid gaps they may be "crowded out" or "displaced" by other aid. The UM Office focused on the March 1 filing deadline both because they wished to ensure that more of the students with the lowest family incomes were eligible for this aid and because that they hoped that increasing March 1 filing would as a consequence increase April 1 and overall filing, increasing student and

institutional access to state and federal aid dollars. The average need-based grant award tied to the March 1 deadline is roughly $2,800. As illustrated in Figure 3, for students eligible to receive the maximum Pell Grant, filing by March 1 and filing after April 1 can mean the difference between covering 98% of tuition with need-based aid versus only 56%. In most cases this $4,300 gap must be filled either out-of-pocket or with loans.

Figure 3.

Tuition and Cost of Attendance (COA) Covered by Average Aid Awards to Pell-Eligible Students at the University of Missouri

	Dollar Value	% of Tuition ($10,286)	% of COA ($24,704)
Aid tied to March 1 Priority Date: Avg UM Grant + SEOG	$2,800	27%	11%
Aid tied to April 1 Priority Date: Avg AMO Grant	$1,500	15%	6%
Maximum Pell Grant	$5,730	56%	23%
All aid tied to priority dates + Max Pell Grant	$10,030	98%	41%

The outcomes of the control group provide an informative baseline of student behaviors under regular practice. The overall baseline rate of re-filing among students Pell-eligible in previous years is quite high at roughly 88%. However, about one third of Pell eligible re-filers miss the institutional deadline and about half that amount miss the state deadline. Although these students remain eligible for Pell grants and federal loan aid, Table 1 suggests they are leaving a great deal of need-based grant aid dollars on the table.

Intervention and Comparison Conditions

The study analyzes the results of a randomized experiment examining the impact of phone call outreach by the University of Missouri Financial Aid Office on FAFSA re-filing behaviors, grant aid receipt, and retention of students at MU who had received Pell grants the previous year and were eligible to re-file. Students received the outreach if they were selected to

the treatment and had not filed by the time that the outreach call was scheduled. In addition to up to two phone calls, the office of financial aid also sent a summary email (referenced in the call) to ensure that students had a written record of the contents of the call. The outreach operation was conducted during variable hours between 9 A.M. and 5 P.M Monday through Friday for two weeks between February 3 and February 14, 2014. These dates were selected because they represented a relatively quiet period in the Office of Financial Aid's workflow that was near enough to the March 1 priority date for it to seem relevant and fast-approaching while still allowing students adequate time to seek out additional help from the aid office if necessary. Finally, the office hypothesized that increasing on-time filing by the March 1 priority date might have positive downstream effects on the secondary outcomes of filing by the April 1 state deadline and overall filing.

Twelve peer advisors, students already employed by the office who received an additional day of training for the outreach, used the phone calls and a follow-up email summarizing the call to provide up to three small reminders encouraging on-time aid filing and offering support. The students selected to receive the outreach would not have received any phone calls from the financial aid office previously unless they were part of a small number of students who had submitted their applications with errors in a prior year. Students who did not receive the outreach (the control group) did not receive the calls or follow-up email, but received the same reminders and outreach provided to all students in previous years including campus emails, outreach through Twitter and Facebook, publicly-posted flyers, and campus workshops hosted by the office of financial aid. Both groups had access to the same level of high-touch support from the financial aid office, should they request it. The intervention differed from existing outreach methods at the institution in the medium employed (telephone), the individuals

conducting the outreach (trained peer-leader employees of the financial aid office), and the content of the message (incorporating structural elements suggested by behavioral economics literature).

The script was drafted based on a literature review of interventions targeted at increasing motivation and reducing bias in decision making, and was then edited in concert with the staff of the University of Missouri Financial Aid Office to ensure that it accurately conveyed key informational elements (see Appendix A). The language of the message was intentionally written to be personalized (using the student's name), stress social influences (noting the "peer" identity of the student making the call and the percentage of a student's classmates who had filed by the priority date in the previous year), clarify the potential to lose eligibility for need-based awards, provide a timely and simple reminder of the institutional deadline, highlight available resources (an upcoming workshop and the availability of the aid office for answering questions and providing assistance), and prompt questions or concerns if students were reached in a live call. Student peer-leaders received one day of training on the script and coding procedures, overseen by the associate director of financial aid.

To conduct outreach for an individual student, the peer-leader staffing the call center pulled up the student's record, which noted the student's name, a marker for whether they had filed the FAFSA, a cell phone number, and a permanent phone number. If the student had not yet filed the FAFSA, the peer-leader followed the following process:

Step 1: Call student's cell phone number. If the student is reached, read the live call script (appendix A), provide support if requested and proceed to Step 3. If the student is not reached, leave the message script if possible via voicemail or another person and proceed to Step 2.

Step 2: Call student's permanent number (often a landline or parent number). If the student is reached, read the live call script (appendix A), and provide support if requested. If the student is not reached, leave the message script if possible via voicemail or another person and proceed to Step 3.

Step 3: Send the student a personalized email summarizing the call.

A coding system was developed in concert with the Office of Financial Aid that allowed students making the calls to quickly record whether the call was made, whether the peer mentor were able to relay the message and to whom, and, if they spoke to a person, whether the person asked questions (Appendix B).

Because the intervention was brief, staffed by student workers, and relied only on available resources, the average cost was roughly $1 per student in the treatment group; this accounts for student time, professional staff time, and the cost of materials and calls. By comparison, the cost of delivering text message nudges in Castleman's study is described as "approximately $5." Similar low-touch interventions that have been explored in the literature have had costs higher than $10 per student; higher-touch interventions are typically much more expensive (Castleman & Page, 2014).

Contact Rates

Calls were only made to students in the treatment group who had not yet filed by the time that the call was scheduled. For the 1569 students in the treatment group who had not already filed a FAFSA by February 3, 29% were reached in a live call, messages were successfully left for an additional 57% across the cell and permanent number contacts, and emails were sent to all students. One subset of the 14% of students not contacted in a phone call is a result of calls intentionally not being made because the student filed the FAFSA at some point between the

beginning of the intervention and when they were scheduled to receive a call. Roughly one fourth of those students reached directly (7% of all treatment students) asked questions during the call. In-person contact rates did not differ significantly by first-generation status, race, "0 EFC" status, or class year.

S*tudy Design and Analysis*

The sample of interest includes low-income FAFSA re-filers eligible to attend the university the following fall. This sample was chosen because of the high likelihood that these students would be eligible for both institutional and state aid, should they apply. The analytic sample was constructed by selecting all students who: (1) Filed a FAFSA and were Pell-eligible in 2013-14 based on their estimated family contribution, (2) Did not have an expected graduation dates of Summer 2014 or earlier, (3) Had less than 100 total credit hours [typically necessitating at least one additional semester of coursework for graduation], (4) Were enrolled as of the fall 2013 census date.[4] This resulted in a sample of 3,998 students, of which 1999 (50%) were randomized to the treatment group. The treatment and control groups are summarized in Table 2. An evaluation of baseline equivalence was performed using Hedges' g for continuous variables and Cox index for dichotomous variables; 37% of the sample had an EFC of zero, 55% were female, 38% were first generation, 29% were first year students, and the average cumulative GPA for the group was 2.79. There were no differences larger than a 0.25 effect size between the treatment and control groups for any of the baseline variables examined (What Works Clearinghouse, 2014). Thus the randomization appears successful, meaning that individuals in the sample had an equal chance of being in either the treatment or the control, and subsequent differences in outcomes between the groups are attributable to the intervention.

[4] Data on previous filing behavior, student credits, expected graduation dates, and fall enrollment were all taken from central UM data.

Data on student demographics including gender and race/ethnicity as well as information on high school GPA, Fall 2013 GPA, cumulative college GPA, enrollment status, units completed, and class year comes from official administrative records and were available for all students in the sample. Because the sample included only students who had filed the FAFSA in the previous year, data on prior year filing date, EFC, dependency status, and parental education were available for all students in the sample from Institutional Student Information Records (ISIR) data provided by the federal government to the UM Office of Financial Aid. Finally, based on this source data, binary variables were derived for "first-generation" status (no parent with college experience), zero vs non-zero EFC, and filing by or after the start of the intervention on February 2, 2014.

Outcome Measures

Outcomes are examined in three key areas: FAFSA filing behavior, aid awards, and retention. In the 2014-15 academic year the University of Missouri had an institutional aid deadline of March 1 tied to University of Missouri need-based grants and federal supplemental educational opportunity grants, which are administered by the institution. Students also faced a state priority deadline of April 1 tied to the state's need-based grants. Regardless of their level of financial need, students filing after these dates were no longer eligible for the associated aid awards without filing an appeal, which is typically not granted. We examine the outcomes of filing by 3/1, filing by 4/1, and filing by the close of the subsequent fall semester. Each outcome is a binary variable, with students filing by the date coded as a 1 and those failing to file by that date coded as a 0. Data on FAFSA filing were pulled from the institutional financial aid information system, which derives its data from Institutional Student Information Reports (ISIR) provided by the federal Office of Student Aid.

The amount of grant aid awarded includes total grant aid (from all sources) and grant aid specifically associated with the March 1 institutional filing deadline (the first-order effect of interest). Students are eligible to receive aid contingent on the March 1 deadline as long as their FAFSA is submitted by the deadline and any errors in the form are corrected by a later date, typically mid-summer. Total grant/waiver/scholarship aid includes institutional, state, and federal grant aid and may or may not be based on need. Both variables are continuous measure of dollars awarded. Data on aid awarded was also pulled from the institutional financial aid information system, the source of record for this data.

Retention is defined as having an active student registration on the tenth day of the semester in question. Retention is coded as a binary variable, with students registered on the tenth day coded as 1 and those not registered coded as 0. Data for the retention analysis was pulled from the student information system, which serves as the source of record for the data.

Research Design

An intent-to treat (ITT) model is used to assess the impact of the intervention, including all students assigned to the treatment in the analytic sample even if the university was unable to contact them or did not attempt to contact them because they had already filed. Taking advantage of the randomized controlled trial design, impacts are first estimated by comparing means for continuous outcomes using t-tests,

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}}$$

where

X= mean
s=standard deviation
N= sample

and comparing ratios for categorical outcomes using chi-square ratios

$$X^2 = \sum \frac{(O - E)^2}{E}$$

where

O=Observed Frequency

E=Expected Frequency

Additionally, in accordance with WWC standards, regression methods were used to increase precision by accounting for variables that differed at baseline between the treatment and the control groups with an effect size between .05 and .25 including Spring 2014 enrollment, filing by the beginning of the intervention on February 3, 2014, and dependent filing status (What Works Clearinghouse, 2014).

The equation is

$$y_i = \alpha + \beta(T_i) + \gamma X_i + \varepsilon_i$$

where y_i is a student outcome, T_i is an indicator of being selected to receive the phone call outreach; X_i is a vector of individual-level baseline controls; and ε_i is an error term. Ordinary least squares regression is used to estimate impacts on continuous variables including aid awarded and logistic regression is used to estimate the effect on dichotomous outcomes

including FAFSA filing and retention. Treatment impacts are reported as changes in dollars for aid awards and as percentage point differences for dichotomous outcomes. Additionally, magnitudes of treatment impacts are reported as effect sizes (Lipsey, et al., 2013). To report effect size of the standardized mean difference, Hedges' *g* is used for continuous outcomes and the Cox index is used for dichotomous outcomes (What Works Clearinghouse, 2014). These outcomes are reported in Table 4.

Limitations

There are several limitations to this study. First, the sample is not nationally representative, including only students at a single four-year public institution. Previous studies have suggested students at community colleges may be more likely to benefit from nudging interventions (Castleman & Page, 2016). The analysis is limited to intent-to-treat in order to take advantage of the randomization process. Because the intervention was conducted as a single-site study, it is possible that there may have been a contamination effect, with students in the treatment sharing information with peers in the control. Finally, the study only examines retention to the subsequent fall quarter and may not capture differences in retention to later semesters or subsequent graduation.

RESULTS

Overall Impacts of Treatment

Controlling for baseline variations between the intervention and comparison group, the phone call reminders are estimated to generate a small, statistically significant impact on rates of FAFSA renewal by the fall 2014 census date, increasing the rate by 1.5 percentage points, from 93.99% to 95.51%, among students in the treatment group ($p<.05$) (See Table 3).

The intervention had the most sizable impacts on the timing of filing. Students in the treatment group filed by the March 1 institutional priority date, the deadline nearest to the intervention and mentioned specifically in the call script, at a rate nearly 9.5 percentage points (or 14%) higher than peers in the comparison group's rate of 67.70% ($p<.01$). Students receiving the outreach also filed by the April 1 state priority date at a rate more than 4.5 percentage points higher than the 81.17% rate of peers in the control group ($p<.01$).

Next, we examine second-order impacts on grant aid received.[5] As a form of sensitivity analysis, we generate estimated impacts on aid both conditional and unconditional upon aid award[6]. There is a positive but non-significant impact in total grant, scholarship, or waiver aid (award types which do not require repayment) of $218 above the $7,331 received by the control group unconditional upon award and a $276 impact above the $9,355 received by the control group conditional upon award. For such a second-order effect (average total grant aid received) to be significant, first-order effects (overall and on-time filing) that necessarily precede them must be particularly large. Therefore, it is not surprising that the observed differences in total grand aid received between the treatment and control groups were not significant.

However, for the subgroup of students who filed before the priority dates as opposed to after, the difference in received aid was large. A separate sensitivity analysis (Table 4) examined students filing in specific time periods before and after priority dates to isolate the effect of the institutional deadline on aid received. In this analysis, students filing between February 2 and March 1 (making both the March 1 institutional priority date and the April 1 state priority date)

[5] In addition to grant aid, we also performed separate tests of total aid received. Because retention rates were similar, we would also expect aid awarded, including student access to federal aid including loans, between the two groups to be similar and likely unaffected by the intervention. In addition, because federal loans often serve to fill "gaps" between total need and grant aid, it is not surprising that overall average aid including loans is very similar across the two groups, and this might likely be the case even if one group received more grant aid.

[6] If a student withdraws their registration or aid application prior to the award, an award is often not made even the student has successfully filed a FAFSA.

are compared to students who filed between March 2 and April 1 (missing the March 1 institutional priority date but filing before the April 1 priority date). By limiting the date range so that students in the first group received no additional benefit from the small subset of departmental scholarships tied to a February 1 priority date and so that students in the second group benefited from state aid tied to the April 1 deadline, the impact of the institutional aid deadline on the receipt of specific types of aid is isolated. As expected from institutional policy, the average institutional aid received by students in the first group was nearly $0, while the average aid received by the first group was $1,643. Considering all grant, scholarship, and waiver aid, the aid received by the first group was greater by almost $3,500.

Students in the intervention group received roughly $157 above the $1,472 in grant awards based on the March 1 institutional deadline received by the control group, and $195 more than the $1,883 received by the control group when the when analysis was conditional on filing aid being awarded. Both differences in aid tied to the March 1 priority date were statistically significant ($p<.05$).

Notably, there are also no statistically significant differences between the outreach and control group in fall retention, with both groups enrolling at nearly the exact same rates (85.56% and 85.46%, respectively). As with aid received, retention is a second-order effect that we would most expect to be impacted if the intervention had large effects on both filing behavior and aid awarded.

Variation in Impacts

Additional analyses focused on a subset of outcomes and examined whether the treatment had a disproportionate impact for subgroups of students in the sample suggested by the literature

to be at risk for non-filing and under-filing, including students with EFC=0, without a parent who has attended college, with a GPA<3.0, in their first year in college, and with a dependent status. Interaction effects were examined between dichotomous forms of each of these variables and the treatment condition to explore whether the treatment had a disproportionate impact for some subgroups.

The impacts of the intervention on FAFSA filing appear to vary based on EFC and dependency status. Students with a $0 EFC who received the intervention had a predicted probability of filing a FAFSA for 2014-15 of 94.2%, compared to 89.4% of $0 EFC students randomly assigned to the control group. Students with greater than 0 EFCs filed at higher rates for the control and similar rates for the treatment (93.3% and 91.5%). Similarly, independent students appear to have benefitted greatly from nudging (increasing their predicted probability of FAFSA filing from 82.7% to 94.2%) although dependent students did not (predicted probability of filing 93.2% for the treatment group vs. 93.7% for the control group).

There is also limited evidence that nudging was most effective for students who were not in their first year of college. While nudging boosted the predicted probability of filing by the March 1 deadline for first-year students (67.5% in the treatment group vs 63.2% in the control group), the difference was much larger for continuing students, boosting their predicted probability from below first-year students in the control condition to above them in the treatment condition (70.5% in the treatment group vs. 56.7% in the control group). This effect was only seen for the intermediate March 1 FAFSA deadline.

Finally, there is suggestive evidence that while on average the intervention had no impacts on retention, there were differential impacts based on parental education. Among first-generation students (whose parents did not attend college), predicted probability of persistence to

Fall 2014 was 85.2% compared to 81.4% in the control group. There is no clear explanation for such a downstream negative treatment impact, and it possible that this estimated impact is due to chance alone.

DISCUSSION

There is national concern about FAFSA under-filing by Pell-eligible students and its consequences for whether and how students pay for college (The White House, 2015). Prior studies suggest that phone call reminders could reduce under-filing rates, positively impact student filing behavior, and increase aid awards and retention. This study explored this hypothesis with a low-cost, scalable intervention was implemented using only the existing resources of an institutional office of financial aid.

The results of a randomized experiment indicate that phone call reminders successfully induced some Pell-eligible students to change their FAFSA filing behaviors. Student receiving the intervention were more likely to successfully file before the institution's March 1 priority deadline, the state's April 1 priority deadline, and to file at all. Furthermore, as a result of the intervention, awards of grant aid tied to the March 1 priority date increased for students.

Additionally, impacts on filing behavior appear to be largest for some of the most disadvantaged students as well as for students in groups frequently overlooked in outreach efforts. Pell-eligible students with a $0 EFC typically under-file more often, but with nudging their filing rates were comparable to their more advantaged peers. Similarly, independent students, who are significantly less likely to file a FAFSA than their dependent peers (even if they have successfully filed and received a Pell Grant the previous year) saw their predicted probability of overall filing increase by more than 11 percentage points. Finally, students in their

sophomore, junior, or senior years were far less likely to meet deadlines than first-year re-filers at the University of Missouri. Yet, although both groups see a positive effect from the intervention, students in higher grades overtake their first-year peers in on-time filing, increasing their predicted probability of on-time filing by nearly 14 percentage points, or roughly 24%. Notably, these impacts were achieved by a very limited intervention accomplished using only existing institutional resources at a cost well-below even interventions described as "low-cost" in the literature. In practical settings with limited resources, these subgroup findings suggest potential ways to focus outreach towards students that may benefit from them the most.

It is important to note, however, that impacts on overall filing were small and retention rates were not improved with nudging. This partially aligns with Castleman and Page's finding that brief phone-based interventions had retention effects for students in community college settings but not at a four year setting (Castleman & Page, 2013), as well as with interventions currently in the field that have not been able to able to replicate second-order retention impacts as a result of first-order impacts on FAFSA filing (Greene, 2016; Cannon, forthcoming[7]). Our research provides some suggestions for why this may be, but also raises new questions.

One possibility for the lack of retention effect suggested by previous research is that, particularly at selective institutions like the University of Missouri, a ceiling effect limits the potential of interventions to impact retention. Fortunately an examination of specific filing patterns and aid awards helps test this hypothesis. As with retention, the baseline rate for overall FAFSA filing was quite high at roughly 94%. This may suggest either that overall FAFSA filing patterns are significantly different between two-year and four-year institutions (as tentatively

[7] In a Spring 2015 trial of a text message nudging platform at public four-year institution in the Pacific Northwest a series of four text-message nudges targeted at on-time FAFSA filing did not have a significant impact on the on-time filing rates of first year students for either the overall treatment group or the subgroup of Pell-eligible students.

suggested by Castleman & Bird, 2015) or that impacts on retention that have been observed in community colleges have been achieved through a mediating mechanism *other* than changes in FAFSA filing behavior, such as influencing a student's desire to return or sense of self-efficacy in navigating higher education.

It is also possible that Castleman and Page's retention findings are not generalizable. Their retention findings were based on a small sample (n= 225) of students in community colleges who had opted-in to receive support from an external organization that, for some, included similar text message outreach when they were in high school. It may be that students who are willing to opt-in to support from external providers, including text message outreach, are also more likely to benefit from that outreach, or that students who have become accustomed to nudging interventions in one setting are more responsive to them in a new setting. Students attending community colleges may have also remained closer geographically to the sponsoring organization than their peers in four-year institutions, making it easier to maintain connections and take advantage of supports. Future research should include a broader study encompassing multiple institution types—fortunately, the Wisconsin HOPE Lab is undertaking this study with Castleman and Page and a nationally representative sample of students and institutions.

Some of this study's other findings generate new questions not addressed by the existing literature. Data from the control group suggest that even at a flagship state institution with a nearly 100% eventual re-filing rate, roughly one-third of eventual filers who were Pell-eligible in the previous year miss the March 1 institutional priority date and one-sixth miss the April 1 state priority date, potentially losing thousands of dollars of grant aid for which they are otherwise eligible. Multiple deadlines add additional layers of confusion to an already challenging process.

While previous research suggested that nudges did not have observable effects at four-year institutions, this analysis shows that the timing of filing can be influenced. By definition, reminder nudges as suggested by the behavioral economics literature are targeted and timely, and our nudges were targeted in language and timed to most closely coincide with the March 1 filing deadline. The hypothesis that the effects of increased March 1 filing would carry over to April 1 filing and overall filing was confirmed, although the effects decreased for each. This may be, in part, because while messaging on state and federal filing deadlines comes from both institutions and external bodies, messaging on institutional deadlines typically comes only from institutions, making the institutional priority date the least likely to be known and the most susceptible to influence via reminders. It may also be that institutions are both better equipped and more incentivized to emphasize the later state and federal deadlines which yield new income to the institution rather than drawing on already limited resources. The hypothesis that these changes in filing behavior would have observable second-order effects on awards and retention was not confirmed, other than for grant aid contingent upon the March 1 priority date.

However, it may well still be possible to increase filing by the state deadlines, overall filing, and retention by simply by targeting and timing phone call nudges specifically towards the outcomes more distant from the intervention in this study. Given the low cost of the intervention and the fact that the sample of interest for each stage is smaller than the previous (i.e. the number of students who have not filed by March 3 is significantly less than the number that have not filed by February 3), additional targeted nudges could have been conducted while still costing less per student than previously published studies. In addition to reduced intervention cost, the use of peer-advisors to administer any nudge, whether via text or phone call, may increase its impact by adding an additional social component. Mode of contact may also be important to

understanding the results; because of their combined accessibility and increasing rarity, phone calls may have a particularly high short-term salience for modern young adults in ways that differ from text messages. All of these variables could be examined in a larger study utilizing multiple modes of outreach across multiple time points.

Finally, both differences in on-time filing and differential impacts of the intervention on subgroups deserve further analysis in a wider variety of educational settings. Deadlines are an effective means of rationing limited aid dollars, but function as axes rather than scalpels. It is important for institutions to understand how these deadlines impact students already most at risk, such as those from families with the lowest incomes. This study also yielded unexpected findings in the impact of the intervention for continuing students in more advanced grades. While these students are typically seen as less at-risk than first year students given the higher relative attrition rates typically observed among new entrants, the results suggest that at baseline these students filed by institutional and state deadlines at rates very similar to their first year peers and experienced much greater positive impacts on their filing behavior from the phone call outreach. This result, too, deserves study in a wider variety of contexts to explore its generalizability.

In conclusion, this research adds to the growing literature on the potential of low-cost, low-touch interventions to inform student behavior at key decision points. Although colleges will likely continue to rely on email as the "communication mode of record," this study suggests that email alone may be an increasingly insufficient means for informing students of FAFSA deadlines. Phone-based nudges are becoming increasingly embraced by third-party retention and early-alert tools as a way to provide timely reminders to students, although this technique is still in its infancy. As the cost burden of higher education increasingly shifts to students and their families, it is incumbent upon colleges and states to understand how limited aid is distributed and

to “meet students where they are” with the information and support necessary for them to make informed decisions. In today’s evolving communications environment, the integration of additional, low-cost outreach mechanisms into existing operational structures may provide one pathway for better supporting the next generation of students.

Tables

Table 1. Baseline Comparisons

	Comparison Group	**Intervention Group**		**Effect Size**
Baseline Measure	Mean	Mean	Mean Difference	Cox Index or Hedges G
N	1998	1998		
Demographics				
Ethnicity (% White)	65.2%	63.3%	-2.0%	-0.05
Gender (% Female)	55.8%	53.9%	-1.9%	-0.05
First Generation	36.5%	38.5%	2.1%	0.05
Resident	74.3%	72.8%	-1.5%	-0.05
Academics				
Fall 2013 GPA	2.76	2.70	-0.06	-0.07
Cumulative GPA	2.80	2.78	-0.02	-0.03
Class Year (% First Year)	29.4%	29.9%	0.5%	0.03
Class Year (% Sophomore)	32.6%	32.6%	-0.1%	0.00
Class Year (% Junior)	30.9%	30.7%	-0.2%	-0.01
Class Year (% Senior)	6.9%	6.7%	-0.2%	-0.04
SAP 14 (N or P)	4.2%	4.3%	0.1%	-0.02
Enrollment				
Enrolled Units Spring 2014	13.12	12.93	-0.19	-0.04
Enrolled Spring 2014	92.2%	90.7%	-1.5%	-0.12
Total Units Completed	49.68	49.24	-0.44	-0.02
Financial Aid				
Pell Eligibility 2013-14	100.0%	100.0%	0.0%	
Met 2014 FAFSA Priority Deadline (Filing)	75.8%	76.0%	0.3%	0.01
Considered for 2014 Priority Aid	71.8%	72.2%	0.4%	0.01
Selected for Verification 2014	39.7%	39.4%	-0.4%	-0.01
2014 EFC	$1,343	$1,355	$12	0.01
2014 EFC=0	36.5%	36.8%	0.3%	-0.01
2014 Dependency (% Independent)	11.4%	8.6%	-2.8%	-0.19
Filed FAFSA after 2.2 (Intervention began 2.3)	80.4%	78.5%	-1.9%	-0.07
* Binary variable SEs are estimated as Bernoulli trials using the formula sqrt(p(1-p)/n) **Because all students from the baseline sample were included in the analytic sample, only a single table is presented Sample *n*=3998. Treatment *n*=1999 students, Comparison *n*=1999 students				

Table 2. Overall Outcomes (Unadjusted)

Outcomes by Domain	Comparison	Intervention	Mean Difference	p-value	N
Overall Filing	90.35%	91.05%	0.70%	0.446	3998
Filing by 3.1	67.83%	75.54%	7.70%	0.000	3998
Filing by 4.1	79.79%	82.99%	3.20%	0.009	3998
Overall Grant Aid	$7,338	$7,534	$196	0.338	3998
Overall Grant Aid (Conditional Upon Award Decision)	$9,296	$9,692	$396	0.056	3132
All 3.1 Contingent Aid	$1,470	$1,632	$162	0.016	3998
All 3.1 Contingent Aid (Conditional Upon Award Decision)	$1,862	$2,099	$238	0.003	3132
Fall Enrollment	83.04%	82.19%	-0.85%	0.048	3998

Table 3. Overall Outcomes (Adjusted)

Outcomes by Domain	Comparison	Intervention	Mean Difference	p-value	N	Effect Size
Overall Filing	93.99%	95.51%	1.52%	0.029	3998	0.186
Filing by 3.1	67.70%	77.18%	9.48%	0.000	3998	0.290
Filing by 4.1	81.17%	85.72%	4.55%	0.000	3998	0.201
Overall Grant Aid	$7,331	$7,549	$218	0.249	3998	0.000
Overall Grant Aid (Conditional Upon Award Decision)	$9,355	$9,631	$276	0.172	3132	0.001
All 3.1 Contingent Aid	$1,473	$1,630	$157	0.016	3998	0.001
All 3.1 Contingent Aid (Conditional Upon Award Decision)	$1,883	$2,078	$195	0.013	3132	0.002
Fall Enrollment	85.56%	85.45%	-0.11%	0.928	479	-0.005

Notes: The Following covariates are included in the model: Enrolled Spring 2014, Filed Pre 2.3.14, 2014 Dependency Status. Effect sizes (Hedges' G for continuous outcomes and Cox index for dichotomous outcomes) are calculated in accordance with What Works Clearinghouse 3.0

Table 4. Impact of March 1 Institutional Priority Deadline on Filers

Group	N	MU/ SEOG	All Grant/ Scholarship/ Waiver
Filing 2/2-3/1	2070	$1,643	$8,601
Filing 3/2-4/1	388	$6	$5,131
Difference		*$1,637*	*$3,470*

Table 5. Subgroup Variation in Phone Call Treatment Impacts

	Overall		3.1 Filing		4.1 Filing		Total Grant Aid		Total 3.1 Aid		Fall 2014 Retention		Spring 2015 Retention	
Interaction Model	Filing	p-value		p-value		p-value		p-value		p-value		p-value		p-value
Call	0.0301	0.869	0.4201	0	0.241	0.036	54.57	0.816	141.02	0.083	-0.1145	0.399	-0.043	0.713
	(.183)		(.098)		(.115)		(233.89)		(81.31)		(.135)		(.118)	
Call*0EFC	0.6351	0.033	0.2156	0.21	-0.0098	0.301	549.27	0.155	81.86	0.542	0.3432	0.102	0.128	0.482
	(.298)		(.172)		(.134)		(386.20)		(134.26)		-0.2098		-0.182	
Call	0.275	0.126	0.4372	0	0.2685	0.022	265.27	0.266	104.6	0.202	0.2597	0.056	0.1444	0.218
	(.208)		(.122)		(.117)		(238.24)		(81.94)		(.1360)		(-.103)	
Call*1stGen	-0.0302	0.92	0.1479	0.379	0.1159	0.558	-100.4	0.797	154.78	0.248	-0.5355	0.011	-0.309	0.091
	(.300)		(.168)		(.197)		(389.25)		(133.88)		(.211)		(.183)	
Call	0.1026	0.541	0.4821	0	0.2514	0.021	162.72	0.459	119.92	0.126	0.0047	0.97	0.0805	0.464
	(.168)		(.093)		(.146)		(219.61)		(72.32)		(.127)		(.110)	
Call*URM	0.614	0.061	0.0218	0.907	0.2239	0.302	125.41	0.749	159.77	0.254	0.089	0.653	-0.1976	0.301
	(.327)		(.186)		(.217)		(392.42)		(139.95)		(.218)		(.191)	
Call	0.3604	0.175	0.4416	0.001	0.3833	0.016	225.58	0.422	57.1	0.562	0.0313	0.886	0.1906	0.311
	(.266)		(.127)		(.160)		(280.83)		(-69.32)		(.219)		(.188)	
Call*GPA<3.0	-0.1239	0.695	0.1135	0.49	-0.091	0.646	111.1	0.766	195.51	0.136	0.0355	0.887	-0.1969	0.362
	(.124)		(.165)		(.198)		(337.31)		(131.00)		(.250)		(.216)	
Call	0.3912	0.033	0.6005	0	0.3924	0	422.21	0.06	235.73	0.002	0.073	0.576	0.0292	0.798
	(.183)		(.094)		(.112)		(224.40)		(427.43)		(.131)		(.114)	
Call*1Yr	-0.3197	0.283	-0.4118	0.022	-0.2958	0.158	413.71	0.133	-234.48	0.099	-0.1027	0.632	-0.0365	0.845
	(.298)		(.180)		(.210)		(413.71)		(142.15)		(.214)		(.187)	
Call	0.0947	0.547	0.4699	0	0.30104	0.002	145.69	0.463	162.56	0.018	-0.023	0.835	-0.066	0.497
	(.157)		(-.085)		(.0971)		(198.70)		(68.40)		(.111)		(.097)	
Call*Dependent	1.126	0.008	0.0614	0.818	0.2623	0.362	732.86	0.247	-53.7	0.806	0.246	0.423	0.399	0.145
	(.422)		(.267)		(.288)		(633.63)		(218.10)		(.307)		(.273)	
Sample Size	3998		3998		3998		3998		3998		3998		3998	

Table 6. Comparison of Castleman and Page (2016) and Cannon (2016)

	Castleman and Page (2016)	Cannon (2016)
Sample	First year students who opted into additional services in high school and were enrolled in college in Fall 2012. 83% Pell eligible	Students who were Pell eligible in the previous years who were enrolled in Fall 2013 at a single four-year university.
Partner	Non-profit (UAspire); nudges administered using Signal Vine tool	Financial Aid Office; nudges administered by peer mentors using office phones
Intervention	19 Text Messages	1-2 phone calls
Outcomes	4- vs 2- year institution retention, same-institution retention	On-time Filing, Aid Received, Same-institution retention
Measure of Engagement	Student response, appointments	Student answer, student questions
Cost	~$5 per student in treatment	~$1 per student in treatment
Findings	No overall effects on retention; subgroup analysis indicated retention increases for CC students but not four-years	Significant positive effects on on-time filing, overall filing, and receipt of deadline-contingent aid. No overall effects on retention. Significant positive effects on on-time filing and receipt of deadline-contingent aid. Subgroup analysis indicates greater impact on students with 0 EFC, with status of independent, and in their second, third, or fourth year of college.

Figures

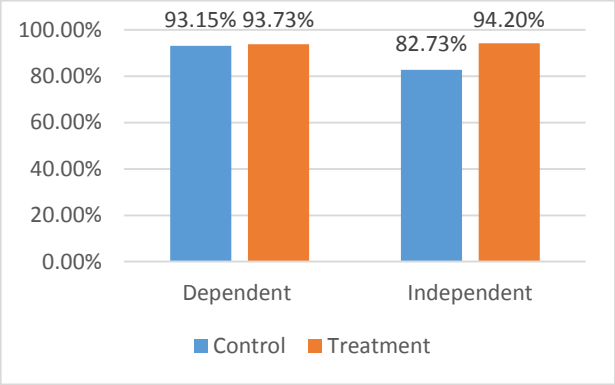


Figure 4. Predicted probability of overall FAFSA filing 2015 by dependency (p=.008)

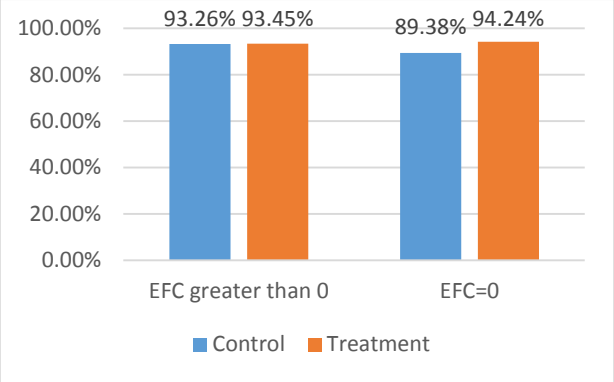


Figure 5. Predicted probability of overall FAFSA filing 2015 by Estimated Financial Contribution (p=.033)

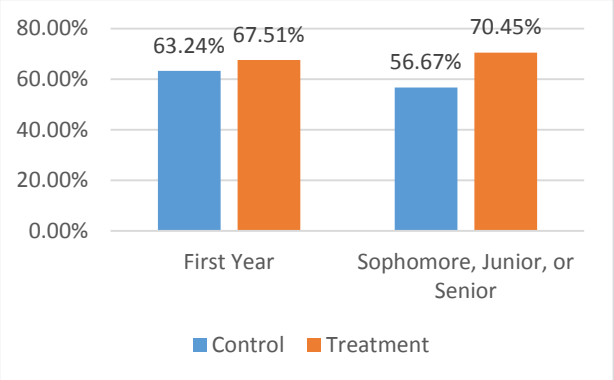


Figure 6. Predicted probability of filing by institutional deadline (3.1) by class year (p=.022)

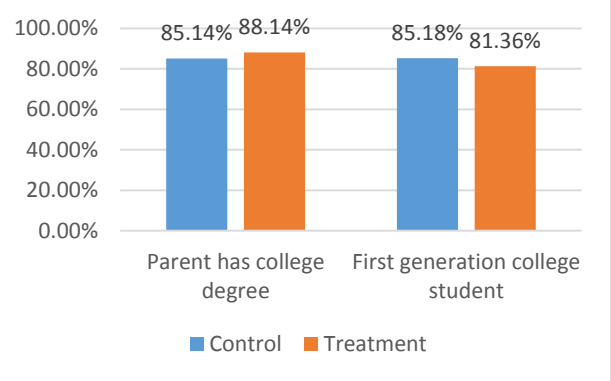


Figure 7. Predicted probability of fall retention by parental education (p=.011)

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Appendix A: Call Script and Follow-up Email

Call Script for Live Call with Student/Live Message/Voicemail

[-----CALLING SCRIPT----- {look up student first to see if they have a 14-15 FAFSA on file}

a. Hi, my name is _____, a current student and Peer Financial Aid Advisor at Mizzou. May I please speak with _____?

{Pause for response; if student, continue to b; if someone else, continue to e}

b. I'm calling to let you know about Mizzou's March 1st FAFSA priority date for the 2014-15 school year. 72% of your classmates filed their FAFSA by the priority date last year and we noticed you haven't filed yours yet for next year. We don't want you to miss this important date that could impact your financial aid and eligibility for certain awards. You can file the FAFSA at www.fafsa.gov. If you need help filing your FAFSA, we encourage you to attend a free FAFSA filing event on February 15th from 12-5pm in Strickland Hall, Room 124A.

c. Do you have any questions about applying for financial aid?

{Pause for response and answer questions, if applicable}

d. Thank you and don't forget to file before the first! Please contact us if you have financial aid questions or concerns.

e. May I leave a message with you about _____ applying for financial aid?

{Pause for response; if yes, continue to f; if no, "Thank you." and end call}

f. I'm calling to let you know about Mizzou's March 1st FAFSA priority date for the 2014-15 school year. 72% of your student's classmates filed their FAFSA by the priority date last year. We don't want your student to miss this important date that could impact financial aid and eligibility for certain awards. The FAFSA can be filed at www.fafsa.gov. If _____ needs help filing the FAFSA, we encourage attendance at a free FAFSA filing event on February 15th from 12-5pm in Strickland Hall, Room 124A.

g. Do you have any questions about applying for financial aid?

{Pause for response and answer questions, if applicable}

h. Thank you and don't forget to file before the first! Please contact us if you have financial aid questions or concerns.

i.

-----VOICEMAIL SCRIPT

----- {look up student first to see if they have a 14-15 FAFSA on file}

5. This is _____, a current student and Peer Financial Aid Advisor at Mizzou calling for _____.

a. I'm calling to let you know about Mizzou's March 1st FAFSA priority filing date for the 2014-15 school year. 72% of your classmates file their FAFSA by the priority date and we don't want you to miss this important date that could impact your financial aid and eligibility for certain awards. You can file the FAFSA at www.fafsa.gov. If you need help filing your FAFSA, we encourage you to attend a free FAFSA filing event on February 15th from 12-5pm in Strickland Hall, Room 124A.

b. Thank you and don't forget to file before the first! Please contact us with any financial aid questions or concerns at 573-882-7506 or MizzouSFA@missouri.edu.]

Follow-up Email

[You are receiving this note as a follow-up to the phone call we made to you earlier today reminding you that not filing the FAFSA by the March 1st priority filing date could negatively impact your financial aid and eligibility for certain awards.

The Mizzou Student Financial Aid Peer Advising Team would like to make sure you are ready for the 2014/2015 school year by sending you this friendly reminder to file your FAFSA by March 1st 2014, to meet the Mizzou Priority Filing Date!

72% of your classmates filed by the priority date for the current academic year!

- You can file the FAFSA at **www.fafsa.gov**.
- **You can file the FAFSA even if 2013 taxes have not been filed. You can estimate with 2012 information and update later. Submit your FAFSA today and you will make the Mizzou Priority Filing Date!**
- **If you need help filing your FAFSA, we encourage you to attend a free FAFSA filing event on February 15th from 12-5pm in Strickland Hall, Room 124A.**
- You can also contact your **Assigned Financial Aid Advisor** directly by email (see **http://financialaid.missouri.edu/contact/find-your-adviser.php**) for help with filing the FAFSA or other financial aid questions.

We hope are having a great spring semester at **Mizzou**! If you have any questions or concerns about financial aid, please feel free to contact our office at **573-882-7506** or via email at **MizzouSFA@missouri.edu**.

Best Wishes,
The Mizzou SFA Peer Advising Team

Mizzou Student Financial Aid Peer Advising
University of Missouri
11 Jesse Hall
Columbia, MO 65211-1600
Office: 573-882-7506 Fax: 573-884-5335
Toll Free In MO, KS, & IL 1-(800)-225-6075

mizzousfapeeradvising@missouri.edu
Check out http://financialaid.missouri.edu/ for helpful tips on **MIZZOU** Financial Aid!

Information about the Mizzou SFA Peer Advising Program: The Financial Aid Peer Advising Team is composed of undergraduate students who assist the full-time advising staff, and help serve as our front-line of communication for students and parents. Peer Advisors go through an intensive month-long training time, in addition to weekly professional development opportunities, and are able to answer a broad-spectrum of questions you may have about the financial aid process; they can also provide you information on how to complete required online forms and financial aid paperwork. At Mizzou real-world experience is part of our mission and the student workers who help us in the Student Financial Aid Office are given an important role that will provide them a unique opportunity to develop expert-level communication skills, and complement their overall educational experience at Mizzou.

Appendix B: Coding Instructions

Instructions

1. Look up student's 14-15 ISIR. If already on file, do not call & post FAcall comment:
    a. 1a,2a,3a,4a
2. If they haven't file the FAFSA yet, attempt the cell phone first.
    a. Use the coding below to code.

Record a response for each of 1-4

1. Cell Phone
    a. Did not call
    b. Left voicemail
    c. No Answer, no option to leave voicemail
    d. Spoke with student
    e. Left message with another person
    f. Other person declined message
    g. Hang up
2. Question (Cell)
    a. Not applicable
    b. No questions asked
    c. Questions were asked
3. Permanent Phone
    a. Did not call
    b. Left voicemail
    c. No Answer, no option to leave voicemail
    d. Spoke with student
    e. Left message with another person
    f. Other person declined message
    g. Hang up
4. Question (Permanent)
    a. Not applicable
    b. No questions asked
    c. Questions were asked

A Text Message a Day
Experimental Impacts of a Retention Intervention

Russell Cannon

Each year in the United States roughly 3 million students enter college for the first time. Yet among those who begin at a public 4 year college, less than 40% graduate in four years and less than 60% graduate in six (NCES, 2014). Policy-makers have challenged schools to increase graduation rates and decrease time-to-degree (The White House, 2015), which requires not only raising existing outcomes but also doing so with an increasingly diverse pool of students.

Students leave college for many reasons. While some causes may be largely outside of an individual institution's sphere of influence, research suggests that elements of institutional resources and students' use of them can influence student success (Chen, 2012; MDRC, 2010; Gansemer-Topf & Schuh, 2006; Webber and Ehrenberg, 2009). At present, most institutions provide resources such as tutoring and advising, faculty office hours, and need-based financial aid, but evidence suggests that only a fraction of students avail themselves of student support services and nearly half of students who would otherwise qualify for need-based-aid lose out on eligibility by missing filing deadlines (Castleman & Bird, 2014; Gates, 2004; Cannon & Goldrick-Rab, 2015). For some students this may result from a lack of information about these resources, with remedies limited by an institution's ability to effectively communicate with its students (Feeney & Heroff, 2013; Lamanque, 2009; McKinney & Novak, 2015). For students already aware of support resources, failure to take advantage of them may result represent a more complex combination of planning behavior, motivation, and engagement (Farrington et al., 2012; Bourdieu and Wacquant, 1992; Castleman, Schwartz, & Baum, 2015.)

High-touch, high-cost resources such as mentoring and one-on-one FAFSA filing support appear to increase engagement and retention (Bettinger et al., 2012; Castleman & Page, 2013), yet institutions facing strained budgets may have limited ability to dedicate the necessary dollars to these types of reforms. A growing body of research in the behavioral sciences suggests that small, timed, targeted, and personalized reminders can increase the rate of positive, beneficial behaviors (Thaler & Sunstein, 2009; Kahneman, 2011; Milkman et al., 2011; Castleman, 2013; Fishbane & Fletcher, 2016), and may even be more effective in some cases than costly high-touch strategies (Castleman & Page, 2013). Such interventions work in part by attempting to address not only information deficiencies but also the cognitive biases and motivational challenges that may hinder students (Castleman & Page, 2016; Sunstein, 2014). This study examines an intervention delivering a program of text message reminders to first-year students at a public four-year university and explores the intervention's impact on those students' support-seeking behaviors and subsequent persistence.

The next section reviews existing literature on retention and applications of behavioral economics to student outreach in higher education. Subsequent sections detail study characteristics, design, and analysis. The final section presents results and concludes with a discussion of the findings and their implications for policy and subsequent research.

Literature Review

Student Persistence, Resources, and Support Services in Higher Education

Student retention is a major challenge for postsecondary institutions in the United States and a significant barrier to fulfilling broader national goals for higher degree attainment (Tinto, 2004; Shapiro et al., 2008). Students who leave a school, even for a brief period, are less likely to

graduate. One study estimates that 12% of students stopping-out for at least one term go on to graduate, compared to 35% of all matriculants. Those stop-out students who do graduate took longer to do so, adding an average 2.6 terms to their total enrollments (Desjardins, Ahlburg, & McCall, 2006). Within this group, there are significant and persistent achievement gaps. Students who identify as underrepresented racial or ethnic minorities, have no parent with a four year degree ("first generation"), or come from low-income families earn lower grades, are more likely to leave post-secondary education, and take longer to graduate (Pascarella, Pierson, Wolniak, & Terenzini, 2004; Sirin, 2005). In addition to the obvious challenges faced by students who fail to complete their degree, student attrition is also costly for institutions, as they both lose the tuition revenue and must spend additional funds on recruiting (Johnson, 2012).

Challenges to the Provision of Student Support Resources

The efficacy of institutional strategies for providing support resources to students faces challenges on multiple fronts. Although most institutions rely upon email as their default mode of communications with students (University of North Dakota, 2015; Boise State, 2013; Salem State, 2013), recent years have seen significant changes in the ways students communicate. Survey research suggests email no longer serves as a primary mode of social interaction even as it remains a necessary tool for professional communication, with only 6% of teenagers reporting daily email use even as three quarters send text messages each day (Lenhart, 2012; Lenhart, 2015; Anderson & De Palma, 2012). At the same time, cell phone ownership has grown increasingly common, reaching 97% for all age ranges between 18 and 44 (Smith, 2013). Because most cell phone plans now include both text messaging and voicemail in addition to voice calls as part of standard packaging, messages delivered through these modes of communication may now have greater salience while also being similarly accessible to students

(Castleman et al., 2015). The importance of being able to reach students remotely is magnified at commuter campuses where students may rarely encounter handouts, flyers, or other on-campus advertisements. Inside Track, a company that contracts with institutions to deliver proactive one-on-one outreach to at-risk students from success coaches based in call centers, has been shown in a randomized trial to increase retention in the treatment group by 12 points over the control (Bettinger & Baker, 2011). While taking advantage of new communication mechanisms, however, such high-touch one-on-one telecommunications outreach remains expensive.

Investments in student support services have become particularly challenging as institutions have faced restrained spending following significant decreases in state investments in higher education. The American Institute for Research's Delta Cost Project identified that state and local subsidies dropped from covering 61.6% of expenditures at public colleges in 2000 to 43.8% in 2010, with the balance made up by tuition revenues often reflected in higher student costs. The Cost Project also found that per-student funding for student services was flat or declined during the early years of the recession (Desrochers & Kirshstein, 2012). Other reports suggest institutions have adopted hiring freezes in non-instructional areas including students support services as a strategy to conserve limited funds (Oliff et al., 2013). Such cuts significantly decrease the feasibility of high-touch outreach.

In this environment, administrators have been particularly receptive to research suggesting that relatively low-touch, low-cost interventions may be able to meaningfully supplement limited staff resources (Koproske, 2015). A growing group of researchers has suggested that relatively minimal prompts delivered through more salient modes of communication can have major effects by targeting misunderstandings and behaviors that may impact larger outcomes downstream (Thaler & Sunstein, 2009; Kahneman, 2011; Milkman et al.,

2011; Castleman, 2013). Research supporting these claims draws from the emerging field of behavioral economics to address both challenges of inadequate information as well as broader issues of planning, motivation, and engagement that impact a student's ability to take advantage of resources even when they are fully aware of them.

Applications of the Behavioral Sciences

Planning and the cognitive biases that complicate it are among the most studied areas of behavioral economics. Many student tasks associated with retention require students to plan and follow-through on actions, some of which require multiple time-sensitive steps. FAFSA filing, for example, requires students to gather necessary tax information, complete a difficult form, and submit it by an institution-specific deadline (Dynarski & Scott-Clayton, 2006; Bettinger, Long, Oreopoulos, & Sanbonmatsu, 2012). While access to even incremental increases in need-based aid has been shown to have a clear impact on retention (Goldrick Rab et al., 2016), nearly half of eligible returning students fail to take full advantage of need-based aid by filing after deadlines and roughly 10% fail to file at all (King, 2004; Cannon and Goldrick-Rab, 2016; Bird and Castleman, 2014). Some students may simply be unaware of deadlines or their importance, while others may know what is at risk yet delay or do not perform the necessary steps.

The behavioral sciences suggest several explanations for this latter set of behaviors in which the necessary outcome is understood but delayed or not acted upon. The first class of challenges are cognitive biases. One widely studied bias is the "planning fallacy," the well-documented tendency of individuals to underestimate the amount of time necessary to complete a task, even among those with extensive experience and expertise at the task (Kahneman & Tversky, 1979; Thaler & Sunstein, 2009). A second cognitive bias that complicates follow-through on planning is "time inconsistent preferences," the phenomenon in which individuals are

willing to commit actions in the distant future but are much less willing to complete them as they become more proximate; this may result from a college schedule busier than initially anticipated (Zauberman & Lynch, 2005), competing options that are more entertaining (Read, Loewenstein & Kalyanaraman, 1999), or the discovery that the task is more challenging than initially anticipated (Pallais, 2015). In weighing the benefits of a short-term action, research suggests that individuals overemphasize immediate costs while underestimating more distant benefits (Chabris, Laibson, & Schuldt, 2008). While both phenomenon are well documented among adults, they may be further aggravated in adolescents still undergoing key stages of cognitive development (Casey, Jones, & Somerville, 2011). Timely reminders that make explicit connections between small, proximate tasks and more distant desirable outcomes may increase the likelihood of follow-through (Castleman & Page, forthcoming).

Thinking through the steps and timing of tasks may also be a challenge to planning that delays action and decision-making. Even a task as simple as attending office hours or visiting a tutoring center may require students to find time in their schedule and to be present on campus; this alone can be a challenge for commuter students. One method that has been shown to address this challenge is the delivery of reminders at specific times. Simple text message reminder prompts delivered close to the intended moment of action have been shown to increase flu vaccination rates by 4 percentage points and investments in savings accounts by 6 percentage points (Karlan et al., 2010; Stockwell et al., 2012). Another established way to support planning in advance is to use timing or location itself as a prompt for the behavior of interest. Research from randomized trials suggests that prompts asking recipients to commit to a specific time and place to complete a task increases the likelihood of completion, findings that that have been replicated for vaccination appointments (Leventhal, Singer, & Jones, 1965) and voting

(Nickerson & Rogers, 2010). It is hypothesized that this increased likelihood of task completion results from creating an environmental "cue" for an action rather than requiring the individual to go through the cognitive process of decision-making in the moment (Gollwitzer, 1999). Finally, simply providing an earlier deadline than the student already had in mind may help to serve as "anchor," a term that reflects the tendency of individuals to rely on a number or example that they encounter early when making future decisions (Ariely, 2010).

Motivation can also serve as a challenge to completing tasks that are beneficial in the long run. A bridge between motivation and planning is goal setting. Studies have documented for over one hundred different work-related tasks that the simple act of assigning goals (or asking individuals to set them) increases both productivity and attendance (Latham & Kinne 1974; Locke & Latham, 2006).

Research also suggests that individuals often rely on social norms as a simplifying strategy to motivate decisions (Cialdini et al., 2006; Cialdini & Goldstein, 2004). Researchers have shown that targeted references to such norms can set a new anchor for decision-makers. Randomized experiments have shown that electricity bills that provide comparisons to particularly energy-efficient neighbors cause those in the treatment group to reduce household energy consumption by an average of 2 percentage points (Ayres, Raseman, & Shih, 2009). A key limitation of using social norms as a strategy to influence behavior is that the social norm must be in the direction of the behavior of interest; simply providing individuals with the average energy consumption in their neighborhood may actually lead to an undesired *increase* in consumption by those who were consuming less than the average. An example of the use of advertised social norms to influence behavior already actively in use in postsecondary institutions is the use of advertisements that note the high percentage of students who do not

drink or drink little as a way combat binge drinking (Borsari & Carey, 2003; Weitzman, Nelson, & Wechsler, 2003).

Social belonging has been shown in a meta-analysis of retention studies to be a key predictor of retention in higher education (Robbins et al., 2004). Developing a sense of belonging can be particularly challenging for students in groups historically underrepresented in higher education, including racial and ethnic minorities, first generation students, and students from low-income families. In addition to challenges these groups already face, the simple fact that they are underrepresented may put them at risk of stereotype threat, a cognitive occupation with attempting not to conform to negative stereotypes that may itself lead to decreased engagement and performance (Steele & Aronson, 1995; Steele, 2011). A similar experience has been documented for women within STEM courses (Spencer, Steele, & Quinn, 1999).

Relatively brief interventions have been shown to increase students' sense of belonging and decrease stereotype threat. One randomized intervention showed that a brief mid-term self-affirmation activity in which students spend a few minutes identifying values important to their personal narrative increased the average grades of African American students by roughly .3 grade points while also increasing course completion (Cohen et al., 2006). In another randomized study, the treatment group heard survey quotes from other students who had struggled with "fitting in" initially but saw things improve; the students themselves then constructed their brief essays about their own transition to college (Walton & Cohen, 2007). In a similar study, a randomized group of new students heard presentations from older students about how their background impacted their pathway through college. In both studies, students in the treatment exhibited a significant increase in GPA over their peers in the control (Stephens, Hamedani, & Destin, 2014).

Finally, a student's willingness to engage with campus supports may be related to the student's perception of her ability to impact her learning. Students may face an internal challenge if they believe that they are "beyond help." An emphasis on the nature of intelligence as malleable rather than fixed has been shown to increase both student willingness to seek help and subsequent GPA (Aronson, Fried, & Good, 2002).

Prior Studies on Cell Phone Outreach to Students

A small number of randomized trials demonstrate the ability of targeted prompts that draw upon research from behavioral economics and are delivered through phone-based communication modes to impact behavior in postsecondary spaces. For example, one study used a series of text messages to break down the college application process into specific steps and timed the messages to align with when students would need to complete the steps. The authors found that these text message nudges increased college attendance by 4 percentage points above the control (Castleman & Page, 2013).

A second follow-up study by the same researchers used the cohort of students who had participated in the first study and later matriculated in college as their sample. In this study, they delivered a series of 19 text messages related to the financial aid application process. In addition to language on the deadlines and steps of the financial aid re-application process, references to SAP (Satisfactory Academic Progress), a requirement to receive financial aid, also emphasized GPA and pointed students to available campus supports. In this study the authors found significant effects on retention at community colleges, increasing retention rates by 12 percentage points over the control, but did not find significant effects at four-year institutions (Castleman & Page, 2016). One key limitation of both studies is that while the authors hypothesized that the text messages had increased retention by encouraging students to take

intermediate steps like filing the FAFSA and seeking academic support, they were unable to access data on these intermediate actions (Castleman & Page 2013; Castleman & Page, 2016).

A third study conducted at the University of Missouri delivered brief phone reminders regarding the FAFSA priority filing date to students who received Pell grants the previous year and were eligible to re-file. The intervention increased the rate of on-time filing by 9.5 percentage points and the average amount of institution-based awards received by $195. The calls also increased overall filing rates for students from families with the lowest incomes (EFC=0) by 4.9 percentage points. The study did not find an increase in retention to the subsequent fall (Cannon, 2016).

Most recently, a randomized controlled trial in the San Jose Unified School District examined a series of behavioral interventions. Students in the treatment either completed a 10-15 minute class on values affirmation, received an app that delivered reminders about important deadlines and upcoming tasks, or both. Students in the control received an app delivering study skills reminders. Students receiving the app delivering reminders completed financial aid applications at a rate of 82% compared to 75% of the control and received financial aid awards at a rate of 65% compared to 36% of the control (Fishbane & Fletcher, 2016).

Each study suggests the potential of low-touch, low-cost alternatives that take advantage of new cultural trends in communication habits. In addition to the usage of salient methods of delivery, which may decrease the likelihood that students are simply unaware of processes or resources, all are informed by research from the behavioral sciences on mitigating broader challenges of planning behavior, motivation, and engagement. Each of these studies delivered a relatively low number of total messages, ranging from 2 to 19. It has been suggested, however, that because these interventions are low cost and relatively brief, delivering prompts to students

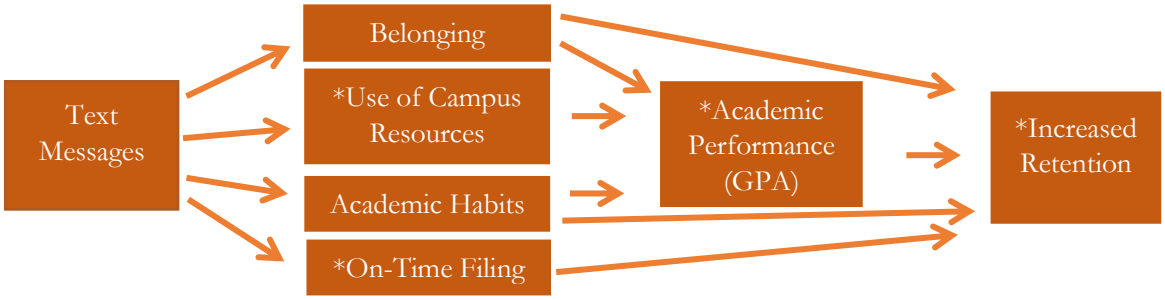
more regularly and covering a broader range of topics including value affirmation and reflection on belongingness and engagement may have wider-ranging positive effects for retention (Frankfort, O'Hara, & Salim, 2015). Additionally, because the published literature typically contains multiple elements informed by different research strains in behavioral economics, there is an opportunity to explore which aspects of a prompt are most impactful–clarification that is especially important when space is limited, such as within a text message.

Study Characteristics and Methods

Theory of Change and Research Questions

The present study examines the impacts of delivering daily text message prompts to first-year students with a narrative focus on use of campus supports and key deadlines along with opportunities to for students to set goals, "check-in," and complete brief self-affirmation activities intended to increase motivation and engagement. The frequency of the text messages, which was significantly higher than in other published studies where weekly or one-time messages are the norm, was intended to accommodate this broader range of messages and intended impacts. The messages were intended to increase utilization of campus resources, academic habits, on-time FAFSA filing, sense of belongingness, and engagement with the campus. These, in turn, were intended to have downstream effects on both academic performance (as measured through GPA) and, ultimately, rates of student persistence. This process is illustrated in Figure 1 below.

(Figure 1) Hypothesized Pathways (asterisks indicate variables measured in the study)



The remainder of the paper is structured around the following research questions:

1. Can simple, inexpensive prompts delivered via text messages increase habits associated with retention, including a) use of campus support resources and b) on-time FAFSA-filing?
2. Is there a difference in the impact on on-time FAFSA filing between messages explicitly referencing social norms and those without explicit references to social norms?
3. Does the intervention impact student academic performance as measured by GPA?
4. Does the intervention impact retention to the subsequent quarter?
5. Does the impact of the intervention on use of campus resources, on-time FAFSA filing, GPA, or retention vary significantly by Pell eligibility, underrepresented minority status, or gender?

Study Characteristics

The study was conducted during the 2014-15 academic year at a medium-sized public master's university campus located outside of a major city center on the west coast. The institution has a total annual headcount enrollment of roughly 5,000 students including about 650 first-year students. The campus has a six-year graduation rate of 70% and first-year retention rate of 84%, both relatively high for its Carnegie class. However, of those students who eventually leave the institution without graduating, the greatest percentage leaving between the spring quarter of the first year and the subsequent autumn quarter.

In the year of the trial, 19% of all undergraduates identified with races or ethnicities underrepresented in higher education[8], 36% were Pell-eligible, and 33% did not have a parent with a 4-year degree. Each of these percentages represented 10-year highs for the institution, following several years of increasing student diversity.

The institution began admitting first-year students in 2006 after nearly two decades of serving only transfer students. As such, many support services targeted at first-years are relatively new. These include a writing center, quantitative skills center, and advising center. Additionally, faculty members hold regular office hours and other groups of staff provide targeted supports for career guidance, counseling, and other areas.

Intervention and Comparison Condition

The intervention was delivered in the winter and spring quarters of 2014-15 academic years. The intervention was largely developed and entirely delivered by a New England company founded in 2011 that contracts with postsecondary institutions to provide a curriculum of daily targeted text messages to students with the goal of increasing persistence towards graduation.

Students received the intervention if they were selected to the treatment group and did not opt-out through an initial email prompt or subsequent text message. The intervention consisted of brief text messages delivered once per day, Sunday through Friday. The messages varied daily in content, and their wording was intended to remind students of key deadlines, inform them of campus resources, guide them in creating goals to take advantage of those resources, encourage their academic progress, solicit updates on their frame of mind, solicit "advice" for other students (and, in doing so, asking students to affirm their own values and strategies), provide advice from

[8] Within the institution's data and for the purposes of this study, the variable "underrepresented minority" is defined as students who self-identify as Hispanic, Black or African-American, Native American, or Pacific Islander)

other students (often gathered from the solicitation prompts), and provide opportunities for questions and support.

Messages were informed by the company's interviews with campus advisors and the director of the first-year program, a previously developed email and web communication plan developed by campus advisors the previous year, and the company's proprietary template curriculum intended to draw on research from the behavioral sciences to increase student motivation and persistence towards completion of postsecondary education. The text messages were intentionally short, typically numbering 140 characters or less. Excepting a series of text messages focused on FAFSA renewal that were explicitly prepared by the office of institutional research and the office of financial aid, the exact wording of the messages was developed by the third party provider.

The majority of text-messages were intended to be bi-directional, meaning that students had the ability to respond to text messages phrased as questions. Most were phrased to solicit yes/no responses ("Have you completed your FAFSA yet?"), with responses in the positive or negative leading to an automated, pre-written reply. Response rates to individual prompts tended to represent 5-10% of the original sample. If students responded with a question, the company either responded directly or forwarded the message to an advisor on the campus.

The text messaging intervention was supplemental to the college's regular outreach to all students (including those in the control group) regarding deadlines and resources via emails, campus flyers, and social media as well as a limited amount of targeted individual outreach by advisors and orientation leaders. On average, the intervention had a cost of $36.25 per student selected to receive the text messages. This accounts for the total flat-fee the institution paid to

the company (which could have accommodated more participants under their tiered fee structure) covering the development, delivery, and responses to the text message curriculum.

S*tudy Design and Analysis*

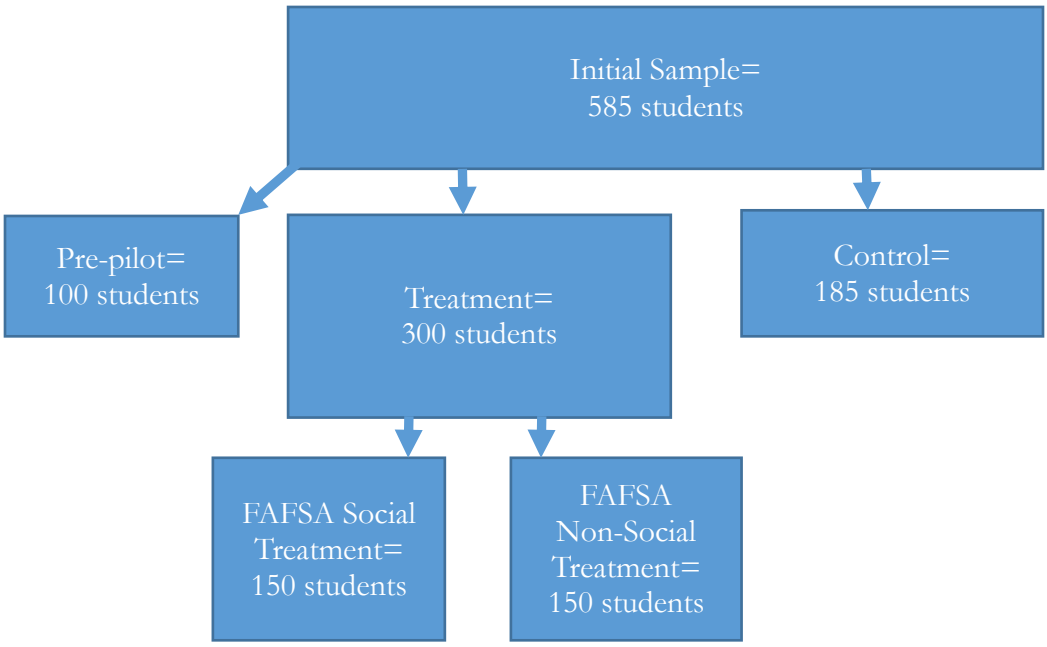
The initial analytic sample of 585 first-year students included all incoming first-year students who had indicated on their applications that they were willing to receive text messages from the institution and were still actively enrolled in the middle of the fall quarter of 2014. Overall, they were generally representative of the first-year cohort of roughly 640 incoming students, which, as a group, was significantly more diverse than the overall campus. Roughly 27% of first-year students (31% of the sample) identified with races or ethnicities underrepresented in higher education, 44% of first-year students (43% of the sample) were Pell-eligible, and 51% of first-year students (51% of the sample) did not have a parent with a 4-year degree[9].

A random number generator was used to assign students to groups of prescribed sizes for purposes of intervention. A group of 100 students were randomized to a "norming" group that served as a pre-pilot for testing the system and gathering student feedback beginning three weeks into the fall quarter. These students were not included in the evaluation analysis, but are described in the baseline sample in order to account for the full eligible cohort. An additional 300 students were randomized to the treatment group, which officially began at the close of the winter quarter (late January), with the remaining 185 students serving as the control. Those in the treatment group were also randomized into two separate treatment groups of 150 each for the

[9] First-generation data is not collected for international students; four students were therefore excluded from the adjusted analysis.

FAFSA reminders, with one group receiving information with explicit references to social norms and the other presenting the reminders alone. The rest of the messages in the intervention were similar for all students in the pilot group. The division of these groups is illustrated in Figure 2.

Figure 2. Division of Sample into Pre-Pilot, Treatment, and Control Groups



The treatment and control groups are summarized in Table 1, including an evaluation of baseline equivalence using Hedges' g for continuous variables and the Cox index for dichotomous variables. There were no differences larger than a 0.25 effect size between the treatment and control groups for any of the baseline variables examined (What Works Clearinghouse, 2014). Thus the randomization appears successful, meaning that individuals in the sample had an approximately equivalent chance of being in either the treatment or the control, and subsequent differences in outcomes between the groups can be attributed to the intervention.

Outcome Measures

The study examines outcomes in four key areas: FAFSA filing behavior, attendance at campus centers that provide student support services, grade point average (GPA), and retention. In the 2015-16 academic year the institution had a February 28th priority date for FAFSA submission; a student filling after 2/28/15 was no longer eligible for most need-based institutional or state aid without filing an appeal, which is rarely successful. The 300 students in the treatment group were randomized to two subgroups that served as individual treatments. While both groups received text reminders, the first group (Non-Social Fin-aid, T1) received reminders that focused on the priority date and its impact while the second group (Social Fin-aid, T2) received messages that also had an explicit social component intended to suggest new social norms that would serve as an "anchor" to the students. The series of text messages received by this group are included in Appendix A. On-time FAFSA filing is a binary variable, with students who submitted a FAFSA by or before 2/28/2015 coded as 1 and those failing to submit by that date coded as 0. Data on FAFSA filing was pulled from the institutional financial aid information system, which derives its data from Institutional Student Information Reports (ISIR) provided to the schools by the federal Office of Student Aid.

Two key locations of student support services offered by the campus are the Quantitative Skills Center (QSC) and the Writing and Communication Center (WACC). Both centers are overseen by professional staff and employ a large number of student workers who serve as tutors. Attendance at each center was selected as an outcome measure both because they are the campus's most heavily staffed student support structures. Additionally, both centers use an online system to track appointments and drop-ins by collecting either student ID (QSC) or student email address (WAC), providing a reliable data source that can be linked to student-level

data for analysis. Full attendance data were provided separately by each of the centers and matched to students in the sample using unique identifiers shared by both the tracking system and the student information system. Students were explicitly informed of the availability of these centers and were encouraged to attend them, particularly during the weeks leading up to final exams. Attendance at each of the centers is treated as a binary variable, with students who visited at least once in the spring quarter coded as 1 and those who did not visit coded as 0.

The text messages are intended to impact both student performance and persistence. Because the treatment group began receiving text messages near the end of the winter quarter, subsequent spring GPA was used as a top-level measure of student academic performance during that time period. Grades are determined at the course-level by faculty and submitted quarterly. GPA is a continuous variable that reflects the average grades, on a 0-4 scale, received by students during a specified period of time. GPA data was retrieved from the campus student information system, the source of record for the data.

A core goal of the project was to increase persistence with the longer-term goals of increasing graduation rates and decreasing time-to-degree. Fall retention is defined as active student registration on the tenth day of classes the subsequent fall quarter. Retention is coded as a binary variable, with students registered on the tenth day coded as 1 and those not registered coded as 0. Data for the retention analysis were pulled from the student information system, which serves as the institutions source of record.

Implementation of the Intervention

Delivery of messages for the pre-pilot norming group began in shortly after the beginning of the 2014 autumn quarter. During the summer and the autumn quarters, interviews of students

and staff were conducted by the company, resources noting key deadlines were provided, and the language for the FAFSA messaging was constructed. Text messaging to the treatment group began on February 20th, roughly one week in advance of the campus FAFSA priority date.

In addition to their initial opt-in through their college application, students in received an introductory email before the start of the intervention informing them of the service and providing them with an opportunity to opt-out before receiving the first text message. Finally, students were given an additional explicit opportunity to opt-out as part of the first text message by replying "STOP", and opting-out remained possible throughout the duration of the program. Across the duration of the program there was a total opt-out rate of 39.5% among students in the pre-pilot and treatment groups. These rates were much higher than rates reported in previous studies (Castleman and Page, 2013; Castleman and Page, 2016).

Campus support services staff were typically unaware of which messages were sent on which days and only a subset of messages chosen by the provider were shared with the campus leadership team in monthly updates. While the office of financial aid, the advising team, and the two resource centers were alerted to the project and provided assistance in gathering data and providing feedback, many of the staff who were in direct contact with students were minimally aware or unaware that the pilot was taking place. Some complications arose from this lack of communication, including confusion by support staff after receiving referrals from the company. Additionally, a series of text messages intended for delivery during the final months of summer in order to address summer attrition was accidentally forgotten by the company and not distributed; as a result, the final messages received by students were delivered in the spring.

A post-intervention survey was conducted to better understand student perceptions of the usefulness of the text messaging program (Appendix B). Students were invited to participate in

the survey via two email invitations and one text message. In addition to the 300 students in the treatment group, the survey sample also included an additional 100 students who were part of a fall pilot cohort. Responses were received from 71 students, or roughly 18% of those intended to receive text messages. Because responses were anonymous and do not include demographic charactistics, they may not be representative of the full treatment sample.

There was a clear variation in the types of messages that students found to be at least "moderately helpful." By far, student deemed deadline reminders to be most helpful (73%), followed by information on campus resources (59%), and encouragement (48%). Check-ins and goal-setting ranked lowest, at 34% and 36%, respectively. While it is certainly possible that messages may indeed be helpful even if students do not subjectively view them as such, any potential value may be moot if the perception of unhelpfulness is strong enough to cause students to opt-out. Students also varied widely in how often they preferred to receive messages, with the majority of students suggesting an optimal frequency lower than that of the intervention and only 29% of students listing a frequency of daily or greater as their ideal. Another difference between this study and previous studies is that while texts were identified as coming from the institution, no specific individual at the institution was attached to the messages. By contrast, students in the Castleman & Page studies recognized the messages they received as coming from mentors they had worked with in the past.

Encouragingly, (37%) self-reported that they took advantage of a campus resource that they otherwise would not have. This is particularly informative because the survey question refers to resources, including meeting with faculty members and advisors, which were explicitly prompted by the text messages but could not be reliably measured as part of the outcomes analysis. This may suggest the value of more detailed future studies able to take more detailed

account of student interactions with campus resources. Further, despite the varying levels of satisfaction with the message types and frequency, a clear majority of students (61%) recommended expanding the outreach as-is to all students, and over a fifth (21%) were even willing to cover the cost themselves through student fees.

Analytic Plan

An intent-to treat (ITT) model was used to assess the impact of the intervention, including all students assigned to the treatment in the analytic sample even if they chose to opt-out from receiving the messages. Taking advantage of the randomized controlled trial design, unadjusted impacts are first assessed by comparing means for continuous outcomes using t-tests,

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}}$$

where X= mean; s=standard deviation; and N= sample

and comparing ratios for categorical outcomes using chi-square ratios

$$X^2 = \sum \frac{(O - E)^2}{E}$$

where O=Observed Frequency; and E=Expected Frequency.

Additionally, regression methods were used to increase precision by accounting for baseline control variables including underrepresented minority status, gender, first generation status, commuter status, Pell-eligibility, and winter 2015 enrollment.[10]

[10] These baseline control variables are included because the effect size of the differences between the treatment and control group in the baseline sample was greater than .05 standard deviations (What Works Clearinghouse, 2014).

The equation is

$$y_i = \alpha + \beta(T_i) + \gamma X_i + \varepsilon_i$$

where y_i is a student outcome, T_i is an indicator of receiving the text messaging intervention; X_i is a vector of individual-level baseline controls; and ε_i is an error term. Ordinary least squares regression is used to estimate impacts on continuous variables (GPA) and logistic regression is used to estimate the effect on dichotomous outcomes (FAFSA filing, QSC and WAC attendance, and fall retention). Treatment impacts are reported as changes in GPA points for GPA and as percentage point differences for dichotomous outcomes. Additionally, magnitudes of treatment impacts are reported as effect sizes (Lipsey, et al., 2013). To report effect size of the standardized mean difference, Hedges' g is used for continuous outcomes and the Cox index is used for dichotomous outcomes (What Works Clearinghouse, 2014).

Limitations

There are several important limitations to this study. The sample is not nationally representative, including only first-year students at a single four-year institution. Previous studies have suggested larger impacts on older students (Cannon, Missouri Chapter) and students at community colleges (Castleman and Page, 2016). Because the study is conducted at a single institution, it is also possible that there may be some level of "contamination effect," in which students receiving the treatment share aspects of the treatment with students in the control group. The analysis is limited to intent-to treat in order to take advantage of the randomization process. Finally, the study does not examine retention beyond the subsequent fall quarter.

RESULTS

Overall Impacts of Treatment

The first series of text messages delivered through the intervention were intended to increase FAFSA filing. Though all messages encouraged on-time filing and provided information about deadlines, half of the messages referred only to the deadline and its impact (the first treatment condition) while the other half also included explicit social elements (the second treatment condition). In both the unadjusted and adjusted analyses of the sub-treatment groups, there were no significant differences between either of the sub-treatments and the control. In the unadjusted analysis, all three were closely clustered with on time filing occurring at rates of 57% for students in the non-social treatment, 61% in the social treatment, and 59% in the combined treatment. Because Pell eligible students are the most likely to benefit from the need-based aid tied to the institutional priority date, a separate unadjusted analysis was performed including only Pell eligible students, resulting in an even tighter cluster of outcomes with 88% of both non-social treatment and the control group filing on time compared to 89% of the social treatment group. In a final regression-adjusted analysis controlling for a wider group of student background characteristics and treating treatment group as a categorical variable, students in the non-social treatment had a predicted probability of on-time filing of 61.2% compared to 68.2% in the social treatment and 67.9% in the control.

For the remainder of the treatment, all members of the treatment group received the same types of messages and so are treated as a single group in the analysis. As a broader group, messages were intended to impact intermediate student behaviors as well as beliefs and goals with the intention of impacting academic performance and retention to the subsequent semester. Table 4 shows unadjusted differences, while Table 5 shows regression-adjusted differences.

While for most outcomes the adjusted model produced relatively similar probabilities and differences between treatment and control, the adjusted outcomes for FAFSA filing by February 28 are noticeably higher than the unadjusted outcomes. While some of this difference may be attributable to the exclusion of winter enrollments and the disproportionately high filing rates of Pell-eligible students (those most likely to benefit from the need-based aid tied to the institutional deadlines), it is unclear why the difference is so large.

The intervention did not have a statistically significant impact on rates of on-time FAFSA filing; in both the adjusted an unadjusted model there are small but not significant decreases of roughly 5 and 2 percentage points, respectively, in the rate of on-time filing by the treatment group ($p>.05$). Utilization of the Writing Center decreased significantly for the treatment group in the unadjusted sample, with 12.1% of students in the control group attending versus 6.0% of the treatment ($p<.05$). While there was still a decrease in predicted probability from 10.6% to 5.8% in the adjusted model, that difference was too small to be significant at the $p=.05$ level. Visits to the Quantitative Skills Center decreased 1.6 percentage points in the unadjusted model but increased by 3.1 percentage points in the adjusted model, with neither difference significant at the $p=.05$ level. Effect sizes for the WACC and QSC visits, -.397 and .217 respectively, were the largest of those observed, with all others falling below .1 standard deviations.

For the broader outcomes of Spring 2015 GPA, students in the intervention group had similar GPAs in both the adjusted model (3.19 vs 3.20) and the unadjusted model (3.21 vs 3.18), with neither difference significant at the $p=.05$ level. It is important to note that because students without a Spring 2015 GPA were excluded from both analyses, the outcomes reflect spring GPA conditional upon receiving a grade in at least one course.

The primary intent of the intervention was to impact persistence in college, as measured by enrollment at the Fall 2015 census date. Students in the treatment group retained to the fall quarter at a rate 3.5 percentage points *lower* than their peers in the control group; this gap narrowed to 1.6 percentage points in the adjusted regression analysis. However, the null hypothesis that there was no difference between the treatment and control could not be rejected for either group with 90% confidence.

Variation in Impacts

An additional analysis was performed to examine whether the treatment had a disproportionate impact on outcomes for student demographic characteristics suggested by the literature to be at higher risk for drop-out including sex, having a parent who has attended college (first generation status), self-identification as a member of an underrepresented minority group (URM), and Pell eligibility. Heterogeneity of impacts is common in higher education research (Brand & Xie, 2010) and has been observed in previous studies of nudging (Castleman & Page, 2016). Interaction effects were examined between dichotomous forms of each variable and the treatment condition to explore whether the treatment had a disproportionate impact for some student subgroups. Full results for the analysis are shown in Table 6.

The impacts of the intervention on QSC attendance appear to vary based upon URM status. Students in the treatment group who self-identified as URM had a predicted probability of attending the QSC at least once during the spring quarter of 25.4%, compared to 9.8% of their URM peers in the control group ($p<.05$). By contrast, students who did not identify as URM attended the QSC at similar rates in both treatment and control groups (8.5% vs 6.7%).

There also appears to be a statistically significant interaction effect between Pell eligibility and Fall 2015 retention. While the overall difference between treatment and control

was relatively narrow, the predicted probabilities vary widely by Pell eligibility. The treatment appears to have had a positive impact on Pell eligible students, with those receiving the treatment returning at a rate of 90.4% compared with 85.8% of those in the control. However, there appears to have been an even larger negative impact on students not eligible for Pell grants, with those receiving the treatment predicted to return in the fall at a rate of 79.4% compared to 88.2% of those in the control. As with the negative association in the overall findings, there is no readily apparent reason for such a large negative effect. Although not significant, the interaction between Pell eligibility and the treatment had a similar directionality for on-time filing, with Pell-eligible students who received the treatment filing at higher rates and students who were not Pell-eligible filing at lower levels. It is important to note that because of the wide range of interaction effects observed, it is possible that these estimated impacts are due to chance alone.

DISCUSSION

There has been increased interest by institutions and third party vendors in the potential of small, automated interventions to increase student outcomes. Using a randomized experiment, this study tested whether delivering text messages built upon principles from the behavioral sciences could positively impact overall retention, academic performance, and intermediate student behaviors. An experiment focused on two subgroups of the treatment at the onset of the intervention also sought to explore whether a social framing of a message intended to increase on-time FAFSA filing had a discernably different impact compared to a similar message without a social framing.

The results of the sub-experiment examining the impact of social framing of reminders on on-time filing did not find statistically significant differences between the two treatment groups and the control. However, it may be notable that in both the adjusted and unadjusted analysis the social treatment group appears to have outperformed the non-social treatment group. The treatment groups for this analysis were particularly small, limiting the likelihood of finding significant effects. However, given the emphasis in the literature on the importance of framing, similar analysis using sub-experiments should be a regular part of large trials involving nudges in order to better understand and further refine outreach.

Overall, students receiving the treatment do not appear to have filed their FAFSA on time or to have visited campus tutoring centers at meaningfully different rates than students in the control group. Similarly, the text messages do not appear to have meaningfully impacted either the Spring 2015 GPA or the subsequent fall retention of the treatment group. These outcomes, paired with relatively high opt-out rates, suggests that text message outreach may not have been particularly effective at changing student outcomes for the full cohort at this particular four-year institution. Subgroup analysis of interaction effects, however, show potential of text messages to increase both proximate behaviors like tutoring center attendance and more distal behaviors like retention for at-risk subgroups including underrepresented minorities and students from low-income families. Survey feedback also showcased that even though students were unhappy with the frequency of the messages and some of their content, at least half of students found certain types of text messages to be “very helpful” or “extremely helpful”, more than a third of students acknowledged that their behavior had changed because of the messages, and a majority of students supported the expansion of the pilot to all incoming freshmen.

These findings suggest value in further investigation of text messaging as an intervention, particularly for students in at-risk groups. Given the necessary limitations of the present study, it will be a valuable contribution for future researchers to further explore the impact of a similar text messaging program at a broader range of institutions, possibly focused on at-risk populations. Although this intervention relied upon a third party to deliver text messages, institutions may find it more impactful if the messages are more closely tied to individuals known to students and directly affiliated with the institution. Institutions and researchers may also benefit by working together to collect qualitative data, from surveys to deep interviews, to better understand how students are engaging with and responding to these messages.

It is notable that overall differences found in this experiment are far smaller than those noted in non-randomized studies of similar text messaging programs (Carmean & Frankfort, 2013). Given results from previous research suggesting that text message prompts significantly impacted student retention at community colleges but not at four-year institutions, it is worth further investigation to better understand the impact of more regular prompts on intermediate student behaviors such as FAFSA-filing, support service usage, and GPA with a larger sample group. Should future studies replicate the finding of impacts on retention at community colleges but not at four-year institutions, qualitative study may be warranted to better understand why this is the case. The disproportionate impact on higher-risk student groups, groups underrepresented at most four-year institutions compared to community colleges, may be part of that explanation. Importantly, because the cost of delivering group text messages is very low compared to high-touch outreach, even very small increases in outcomes may fully justify their cost. However, given recent FCC rulings limiting automated text-message outreach by institutions except to student that have explicitly opted-in, institutions may wish to explore more one-to-one outreach

methods, such as phone call outreach campaigns staffed by student workers, for highest priority reminders to ensure that the greatest possible number of students are reached (Cannon, 2016).

In conclusion, simple automated outreach consisting of a text a day to all students is far from a panacea, but similar programs may provide an efficient supplement for relaying messages that decrease knowledge gaps, mitigate cognitive biases, and address challenges to motivation; this may be particularly true for students at the greatest risk of dropping-out. Institutions that are already investing in resources like financial aid, tutoring support, advising, and faculty office hours have an interest in ensuring that those assets are utilized by the students who need them most; and for the many students, particularly at commuter campuses, who have little face time with campus staff and are overwhelmed with email, it is vital that certain messages are heard. While the impacts of text message outreach may be small in some settings and methods are still being refined, future investigation and development is warranted.

Tables and Figures

Table 1. Baseline Characteristics and Equivalence

		Treatment		Control		
		Mean	SE Est	Mean	SE Est	Effect Size
Demographics	Ethnicity (%White)	31.7%	0.03	30.8%	0.03	0.03
	Ethnicity (%URM)	28.3%	0.03	34.1%	0.04	-0.16
	Gender (%Female)	50.0%	0.03	54.4%	0.04	-0.11
	First Generation (%)	51.7%	0.03	46.2%	0.04	0.13
	Commuter (%)	72.7%	0.03	78.0%	0.03	-0.18
	Pell Eligible (%)	42.7%	0.03	47.3%	0.04	-0.11
	No Cell Phone Number (%)	8.7%	0.02	8.2%	0.02	0.03
Academics	HS GPA	3.26	0.02	3.27	0.03	0.03
Enrollment	Winter15 Enrolled (% Yes)	95.7%	0.01	96.2%	0.01	-0.08

* Within the institution's data and for the purposes of this study, URM is defined as students who self-identify as Hispanic, Black or African-American, Native American, or Pacific Islander)

Table 2. FAFSA Filing by 2/28 deadline by Sub-Treatment Group (Unadjusted)

All Students	N	Treatment	N	Control	Mean Difference	p-value
Treatment 1 (Non-Social Phrasing)	150	0.57	182	0.64	-0.07	0.197
Treatment 2 (Social Phrasing)	150	0.61	182	0.64	-0.03	0.581
Combined Treatment	300	0.59	182	0.64	-0.05	0.026
Pell-Eligible Only						
Treatment 1 (Non-Social Phrasing)	67	0.88	86	0.87	0.01	0.875
Treatment 2 (Social Phrasing)	61	0.89	86	0.87	0.02	0.812
Combined Treatment	128	0.88	86	0.87	0.01	0.641

Table 3. FAFSA Filing by 2/28 deadline by Sub-Treatment Group (Adjusted)

Outcome	N	Treatment	Control	Mean Difference	p-value	Effect Size
On-time Filing Non-Soc	330	61.2%	67.9%	-6.7%	0.267	-0.178
On-time Filing Soc	330	68.8%	67.9%	0.9%	0.263	0.025

Table 4. Overall Outcomes (Unadjusted)

Outcome	N	Treatment	N	Control	Mean Difference	p-value
On-time Filing	300	59.0%	182	64.0%	-5.0%	0.279
Visited WACC	300	6.0%	182	12.1%	-6.1% *	0.019
Visited QSC	300	10.4%	182	12.0%	-1.6%	0.601
Spring 2015 GPA	263	3.19	165	3.20	-0.01	0.886
Enrolled Fall 2015	300	81.7%	182	85.2%	-3.5%	0.322

Table 5. Overall Outcomes (Adjusted)

Outcome	N	Treatment	Control	Mean Difference	p-value	Effect Size
On-time Filing	459	71.4%	73.4%	-2.0%	0.683	-0.061
Visited WACC	459	5.8%	10.6%	-4.8%	0.058	-0.397
Visited QSC	459	11.2%	8.1%	3.1%	0.252	0.217
Spring 2015 GPA	425	3.21	3.18	0.03	0.588	0.000
Fall Enrollment	479	84.8%	86.6%	-1.8%	0.614	-0.089

Notes: The following covariates are included in the models: Ethnicity (URM), Gender, First Generation, Commuter, Pell Eligible, Winter 2015 Enrollment. Effect sizes are calculated in accordance with What Works Clearinghouse 3.0 (2014)

Table 6. Subgroup Analysis for Interaction Effects

Interaction Model	On-time Filing	p-value	Visited QSC	p-value	Visited WACC	p-value	Spring 2015 GPA	p-value	Fall Enroll	p-value
TM	-0.2706	0.423	0.0833	0.851	-0.658	0.205	0.0491	0.61	-0.1758	0.66
	(.337)		(.444)		(.520)		(.096)		(.400)	
TM*Female	0.3541	0.464	0.558	0.384	0.0132	0.985	-0.0256	0.845	0.0623	0.915
	(.483)		(.641)		(.697)		(.131)		(.586)	
TM	-0.129	0.67	0.1856	0.657	-0.7971	0.119	-0.0071	0.937	-0.3791	0.394
	(.304)		(.418)		(.511)		(.089)		(-0.445)	
TM*1stGen	0.082	0.87	0.403	0.529	0.271	0.696	0.0894	0.49	0.4131	0.481
	0.504		(.640)		(.695)		(.129)		(.586)	
TM	-0.1931	0.486	-0.256	0.535	-0.854	0.065	0.0486	0.534	-0.1191	0.748
	(.278)		(.413)		(.464)		(-.044)		(.371)	
TM*URM	0.4013	0.481	1.407	**0.032**	0.4586	0.51	-0.044	0.756	-0.0721	0.905
	(.570)		(.657)		(.696)		(.142)		(.602)	
TM	-0.2136	0.426	0.1639	0.742	-0.772	0.093	-0.0072	0.934	-0.6595	0.116
	(.268)		(.498)		(.460)		(-.211)		(.420)	
TM*Pell	0.6205	0.314	0.3241	0.613	0.2757	0.691	0.095	0.465	1.104	0.065
	(.617)		(.6411)		('.694)		(.130)		(.597)	
Sample Size	459		459		459		425		479	
	(20 observations dropped bc of Winter Enrolled)									
Covariates: i.PellDummy i.FirstGenDummy i.Female_RC i.URMDummy i.CommuteDummy i.WinterEnrollDummy										

Figure 3. Predicted probability of visiting QSC by URM status (p=.032)

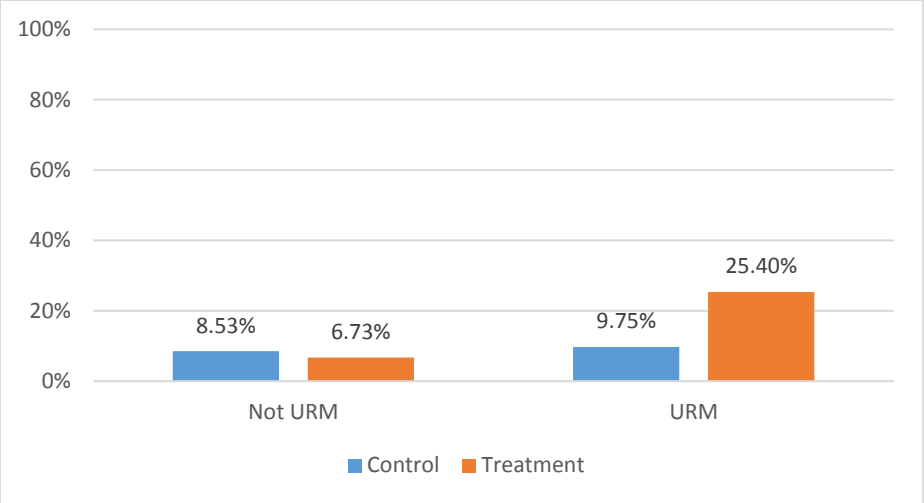


Figure 4. Predicted probability of Fall Enrollment by Pell-eligibility (p=.065)

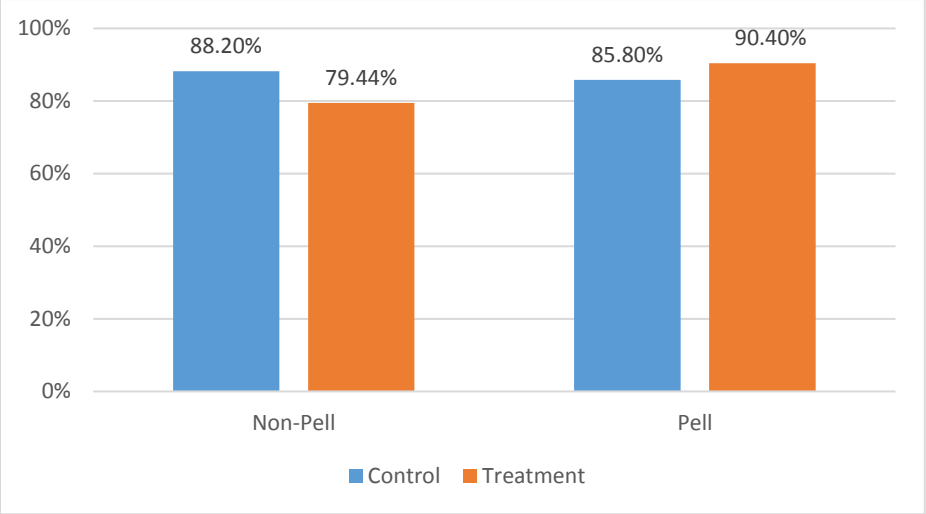
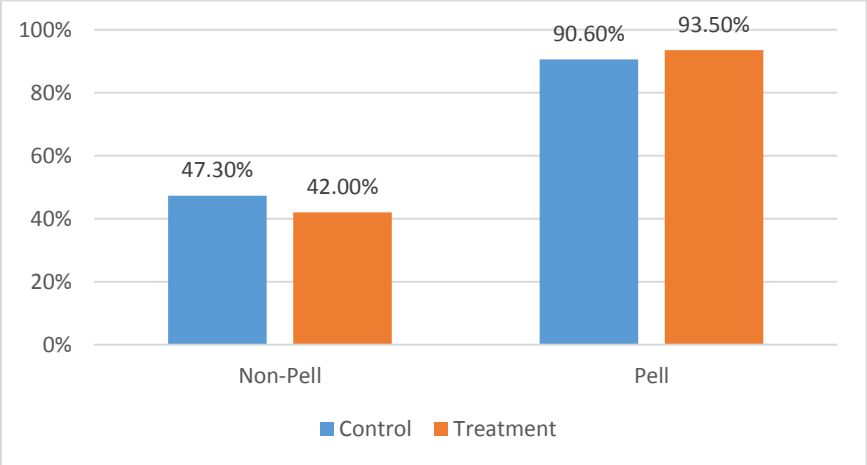


Figure 5. Predicted probability of On-time filing by Pell eligibility (p=.314)



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Appendix A: FAFSA Text Messages

Non-Social Prompt Sequence

Wed. Feb. 18

Welcome to UWB mobile support! Reply STOP to end. FAFSA priority deadline is Feb 28; have you completed yours yet? Pick: Yes, No, Maybe

IF YES: Great! You should've received an email confirmation and you'll find out about next year's fin aid package by late summerl. Call 425.352.5000 for questions.

IF NO or MAYBE: It's not too late! File for free at fafsa.gov. UWB staff want to help - call 425.352.5000 or email finaid@uwb.edu. Reply DONE after you fill it out!

Thurs. Feb. 19

Like taxes, the FAFSA has to be filed yearly. But you can file even if you or your parents' taxes are not done. Use estimates for 2/28 and update later.

Fri. Feb. 20

Would you like us to send you a reminder to complete your FAFSA by Feb. 28 so you receive all of the fin aid you can? Pick: Yes, No

IF YES: No problem. On what day next week would you like to be reminded? Pick: Sun, Mon, Tues, Wed, Thurs

RESPONSE: Great. We'll send you a reminder on [DAY] to complete the FAFSA by 2-28.

REMINDER (on whichever day they chose): Here's the reminder you requested to complete the FAFSA. Finish by Sat. 2-28 to be eligible for maximum financial aid. File for free at fafsa.gov.

IF NO: Remember to complete the FAFSA by Sat. 2-28 to be eligible for maximum financial aid. File for free at fafsa.gov; UWB's code is 003798.

Mon Feb. 23

Give yourself max eligibility for financial aid by completing your FAFSA by Saturday's priority deadline. File for free at fafsa.gov; UWB's code is 003798.

Mon. Mar. 2

If you missed the FAFSA priority date on Sat., you can still file for and receive financial aid. There is money to help you. Go to fafsa.gov to file for free.

Social Prompt Sequence

Wed. Feb. 18

Welcome to UWB mobile support! Reply stop to end. FAFSA priority deadline is Feb 28; have you completed yours yet? Pick: Yes, No, Maybe

IF YES: Great! You should've received an email confirmation and you'll find out about next year's fin aid package by early April. Call 425.352.5000 for questions.

IF NO or MAYBE: It's not too late! File for free at fafsa.gov. UWB staff want to help - call 425.352.5000 or email finaid@uwb.edu. Reply DONE after you fill it out!

Thurs. Feb. 19

*Over 50% of UWB 1st-year students have already completed their FAFSA. Join your peers and file by 2/28, even if your taxes are not done, to get max amount of financial aid!

Fri. Feb. 20

Would you like us to send you a reminder to complete your FAFSA by Feb. 28 so you receive all of the fin aid you can? Pick: Yes, No

IF YES: No problem. On what day next week would you like to be reminded? Pick: Sun, Mon, Tues, Wed, Thurs

RESPONSE: Great. We'll send you a reminder on [DAY] to complete the FAFSA by 2-28.

REMINDER (on whichever day they choose): Here's the reminder you requested to complete the FAFSA. Finish by Sat. 2-28 to be eligible for the full-range of financial aid. File for free at fafsa.gov.

IF NO: Remember to complete the FAFSA by Sat. 2-28 to be eligible for the full-range of financial aid. File for free at fafsa.gov; UWB's code is 003798.

Mon. Feb. 23

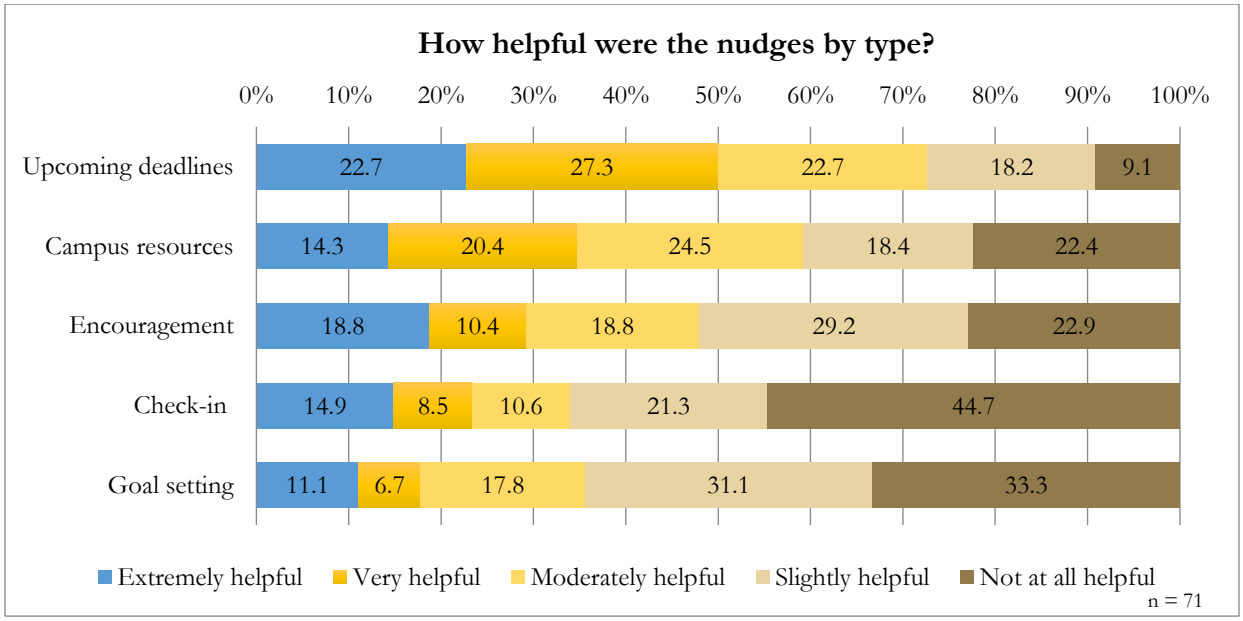
*With challenging projects, it helps to have a supporter. Who's someone you can ask to help you with the FAFSA before Feb. 28?

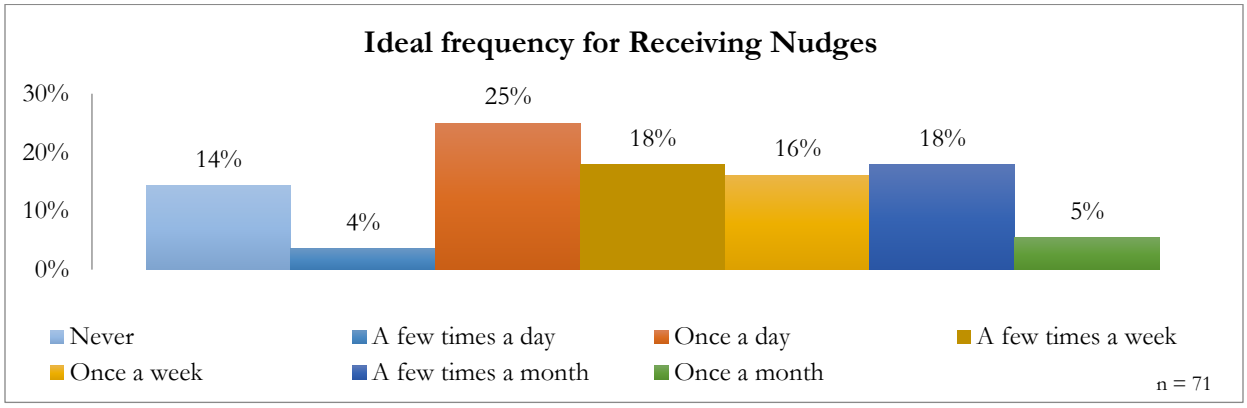
*RESPONSE: Text or email them right now to ask for their help. UWB staff also like helping you get the money you need. Call 425.352.5000 or visit http://bit.ly/uwb_aid

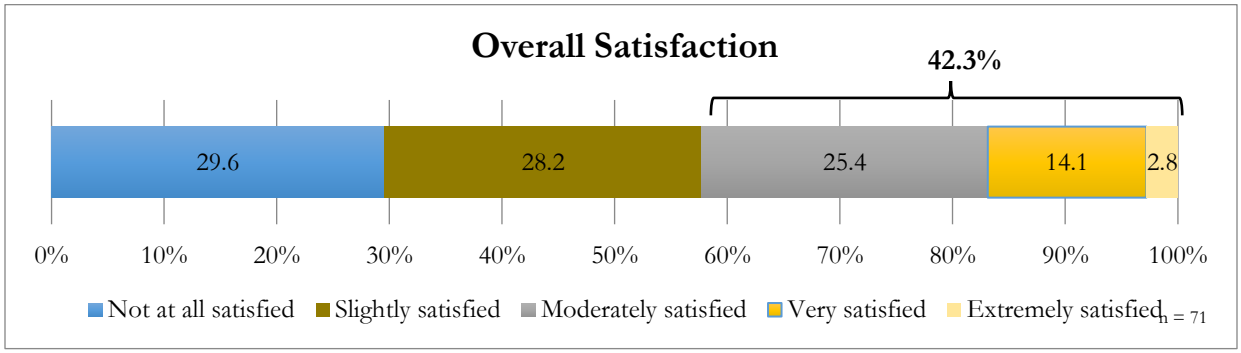
Mon. Mar. 2

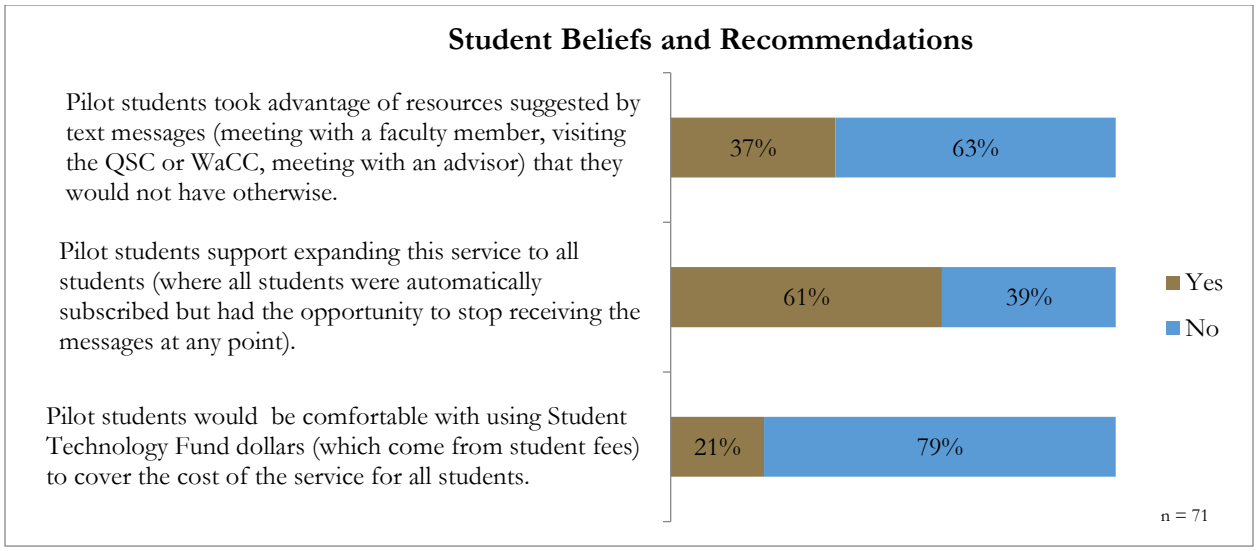
*If you have not filed your FAFSA, you can still file for and receive fin aid for school. Ask your supporter for help or UWB staff at 425.352.5000

Appendix B: Survey of Students Receiving Text Messages








Student Beliefs and Recommendations
Pilot students took advantage of resources suggested by text messages (meeting with a faculty member, visiting the QSC or WaCC, meeting with an advisor) that they would not have otherwise.
37%
63%
Pilot students support expanding this service to all students (where all students were automatically subscribed but had the opportunity to stop receiving the messages at any point).
61%
39%
Pilot students would be comfortable with using Student Technology Fund dollars (which come from student fees) to cover the cost of the service for all students.
21%
79%
Yes
No
n = 71

Missing the Trees for the Forest:
Reporting Practices and Student Outcomes in Wisconsin For-Profit Higher Education

Russell Cannon

For-profit colleges and universities (FPCUs) have grown rapidly in recent years, mainly by enrolling students from historically underrepresented and disadvantaged backgrounds, disproportionately in high-demand areas such as business and healthcare, and increasingly through programs delivered online (Deming, Goldin, & Katz, 2013). This expansion has brought heightened attention to both the costs and outcomes of these institutions.

For profit colleges appear to be costlier for taxpayers and students alike. Although they account for only about 10% of undergraduate enrollments, FPCU students receive 20% of Pell Grant and 42% of GI Bill dollars (Baum et al., 2015). FPCUs also generate $43,383 in federal student loan debt for every credential awarded, compared to $21,827 at private non-profits and $16,247 at public institutions (Carey & Dillon, 2011). Nearly 16% of FPCU student borrowers default on their loans within three years, compared to roughly 12% of borrowers at public institutions and 7% of borrowers at non-profits (Baum et al., 2015).

Given these expenses and higher default rates, there has been increased interest in understanding the success of students at FPCUs as captured by measures including retention, graduation, and subsequent employment. Viewed as simple sector-level averages, the FPCU sector performs worse than its public and private non-profit counterparts on each of these measures (Looney & Yannelis, 2015; Deming, Goldin, & Katz, 2012; Angulo, 2016; Lynch, Engle & Cruz, 2010). The recent mass closure of Corinthian Colleges and the subsequent

forgiveness of the student loan debt of its current and former students has further highlighted the potential risks of the sector (FSA, 2015).

The political discourse on the costs and outcomes of FPCUs has been sharply divided. Critics have called for greater accountability, charging that the sector suffers from misaligned incentives and inferior modes of delivery that yield unacceptably high dropout and loan default rates (Deming, Goldin, & Katz, 2012; US Senate Health, Education, Labor and Pensions Committee, 2012; Angulo, 2016; Lynch, Engle & Cruz, 2010). Simultaneously, proponents of FPCUs have hailed them as innovative boons to access for place-bound students of underrepresented backgrounds that are more sensitive to labor market demands and deliver outcomes strong for the programs they offer and the students they serve. While acknowledging a few "bad apples," they have largely called for deregulation (Bellin, 2016; Terkel, 2014; Hagelskamp et al., 2013; Hess & Horn, 2013; Opoien, 2015). In this contested space, published guidance to potential students often takes the form of noting the higher costs, lower employment rates, and higher-default rates of for-profit colleges as a sector while also referencing the "huge range among for-profits" and explicitly encouraging students to "shop around" and "do your research" (Snider, 2014; Center for Online Education, 2015).

Although FPCUs have been part of the American higher education landscape for over a century and account for 42% of the past decade's postsecondary enrollment growth, researchers and policymakers still know relatively little about the success of their students (Hentschke, Tierney, & DeFusco, 2014; Baum et al., 2015; Deming et al., 2014). Both sides of the debate reference federal data in their claims and published college guides direct potential students to federal resources to inform their college search, yet these sources offer an incomplete picture of student outcomes at postsecondary schools generally (Jaquette & Parra, 2014) and for-profit

institutions in particular (Jez, 2014; Deming, Goldin, & Katz, 2013; Chung, 2012). Though often treated only as a technical question in policy debates, the way that data about colleges is gathered is intricately connected to how they are understood and regulated. As a result, FPCUs have been at the center of national calls for schools to provide more detailed information on student success (Deming, Goldin, & Katz, 2012; Cellini & Turner, 2016).

A growing group of scholars, think tanks, and policymakers have called for the development of a research agenda around FPCUs (Hentschke, Tierney, & DeFusco, 2014; Jez, 2014; Deming, Goldin, & Katz, 2013; Hagelskamp et al., 2013; U.S. Senate, 2012; Kinser, 2007). Leading the list of recommendations from a 2012 Senate Report on FPCUs is a directive to "enhance transparency by collecting relevant and accurate information about student outcomes" (9). More broadly, recent Senate testimony by the former head of the National Center on Education Statistics emphasized the importance of gathering data on student outcomes at the certificate and associate degree level as well as by program area, noting that "what a student studies is often more important than where they study it" (Schneider, 2015). Yet federal efforts to collect program-level data on FPCUs have been narrow and restricted (Stratford, 2013).

Deming, Goldin, and Katz specifically note that such "data limitations" have over-simplified the existing literature on FPCUs, obscuring important sources of variation in the quality of particular programs within institutional averages. In particular, they charge that "future research should examine the extensive heterogeneity in programs in the for-profit sector" (2013, 143). Similarly, Hagelskamp et al. in a recent report by Public Agenda noted that "existing federal data do not capture the wide variety of students and institutions that make up the sector" and cite in particular that comparison between institutions is "hampered" by challenges including a lack of "program-level information" (2013, 5). Even the largest trade group representing

FPCUs, which has lobbied heavily against additional federal data collection focused on for-profits, has agreed with the premise the outcomes vary significantly by institution and program; their contention has instead been that a similar level of scrutiny should be applied to public and non-profit institutions as well (Gunderson, 2014).

Source materials for this type of research are limited. Noting federal regulations that require state authorization for all postsecondary institutions, some researchers have highlighted information collected by state regulatory agencies as potentially valuable sources (Jez, 2014; Cellini & Goldin, 2012). Recent research by Cellini and Goldin took advantage of data from Wisconsin's state regulatory agency to describe vast differences in cost between similar programs offered at FPCUs eligible for Title IV aid, which are included in federal data collections, and FPCUs that are not eligible for Title IV aid, which are absent from federal data (2012). However, because only one year of data was available at that time from the agency's new collection process, the authors were not able to examine whether outcomes varied by tuition and Title IV status, potentially justifying the higher costs. In another set of recent research advances, groups like American Institutes for Research and College Measures have been able to take advantage of new state longitudinal datasets in Texas, Virginia, and Florida to demonstrate that program-level variation in student outcomes often matches or exceeds institutional variation; however, because these datasets focus on public institutions, they have not been able to perform similar analysis on for-profit institutions (Schneider, 2012; Schneider, 2013; Schneider, Massa, & Vivari, 2015).

This study contributes to the limited literature on FPCUs by performing exploratory analysis to shed light on the heterogeneity in program area outcomes within and across for-profit institutions, informing broader national conversations around their funding and regulation. It

does so by examining a data set on FPCUs collected by the state regulatory agency in Wisconsin, the Educational Approval Board (EAB). The EAB's novel collection process has attracted the attention of other researchers because it includes a broader set of both institutions and students while also allowing for the analysis of basic trends in enrollment, persistence and employment outcomes, and tuition pricing at the program-level (Cellini & Goldin, 2012).

The study poses the following research questions:

- Are student outcomes in certificate programs eligible and not eligible for Title IV aid associated with program cost?
- How much do student outcomes of retention, graduation, and employment vary at the program-level for the most popular program areas *across* for-profit institutions operating in Wisconsin? (inter-institutional variation in program-level outcomes for like-programs)
- How much do student outcomes of retention, graduation, and employment vary at the program-level *within* for-profit institutions operating in Wisconsin? (intra-institutional variation in program-level outcomes)
- Are there associations between program-level characteristics (Title IV eligibility, in-state status, online status, and program area) and student outcomes?

The following section examines the existing literature on the growth and student outcomes of the for-profit sector as well as the extent and limitations of the data sources most commonly used by researchers and policymakers to examine FPCUs. Subsequent sections note the characteristics of the EAB data set and the context of its collection, provide descriptive analysis of the data, and note findings and implications.

LITERATURE REVIEW

Growth and Student Characteristics of FPCUs

Understanding student outcomes at FPCUs has become increasingly important following rapid growth in both the number of such institutions and their enrollments over the past fifteen years. The count of degree-seeking undergraduate students attending FPCUs increased more than ten-fold during this period, from roughly 150,000 to over 1.5 million, as did overall enrollment (including part-time, graduate, and non-degree granting enrollment), from roughly 240,000 to 3,820,000 students (Ginder & Kelly-Reid, 2013; Baum & Ma, 2013).[11] This growth has far outpaced enrollment expansion in other sectors; while for-profit enrollment accounted for only 2% of higher education enrollment in 1995, by 2010 it accounted for 11%. Associate degrees awarded by FPCUs increased at a rate six times that of community colleges, and the percentage of overall Associate degree awarded by FPCUs increased from 10% to 22% (Gilpin, Saunders & Stoddard, 2015).

Nearly all students at FPCUs can be classified as "non-traditional" based on the categories typically referenced in the retention literature (Bean & Metzger, 1985); a disproportionate number of students are above the age of 24, many students attend part-time, nearly all campuses are commuter-only, and both individual courses and entire programs are increasingly offered entirely online. Just 75% of undergraduate students at FPCUs have a high school diploma, compared to 85% of community college students and 95% of students at public

[11] These estimates are derived from the 2011-12 National Postsecondary Student Aid Study (NPSAS:12). While the focus of NPSAS:12 on 12-month enrollment provides a more accurate count than often-cited IPEDS fall enrollments, it still represents only institutions receiving Title IV funding and NCES has acknowledged that FPCUs are underrepresented in the sample generally; it thus likely understates total for-profit enrollment. Recent research suggests that an accurate count of FPCUs would increase for-profit enrollment numbers by nearly 700,000 and nearly double the number of for-profit institutions (Cellini, 2012).

and non-profit four-year colleges (Deming, Goldin & Katz, 2013). FPCU students are also disproportionately members of underrepresented minority groups, from low-income families, and female (Baum & Ma, 2013; Chung, 2012). The average family income of dependent students at FPCUs is roughly half that of peers public and non-profit institutions considered non-selective[12], and 29% of students are single parents compared to 12% of students at community colleges (Deming, Goldin & Katz, 2013).

Because of their student demographics and, as some research suggests, their business practices, Title IV-eligible FPCUs also receive a highly disproportionate amount of federal student aid (Bennett, 2013; Cellini, 2012; Baum et al., 2015; Baum & Payea, 2011). Half of students enrolled in a bachelor's degree program in these schools recieve out total loan amounts of over $40,000 compared to 20% in private non-profits and only 12% of students public institutions. While FPCUs accounted for roughly a tenth of overall postsecondary enrollment in 2013-14, they received a fifth of all federal Pell grant dollars and more than two-fifths of GI Bill dollars that same year (Baum et al., 2015). Federal aid reliance is particularly notable at these institution because FPCUs collect 89% of revenues from tuition and fees, compared with 39% at private non-profit institutions and 29% at public institutions (Ginder and Kelly-Reid, 2013; Cellini, 2012).

Although FPCUs enroll high numbers of aid-eligible students, the amount of aid received is a function of both need and tuition, and Title IV eligible for-profit institutions also tend to charge much more than public institutions for similar degrees (Kofoed, 2014; Cellini & Goldin, 2012). In 2009 FPCUs charged an average of $15,000 annually in tuition for an associate degree

[12] Deming, Goldin and Katz's analysis is of the Beginning Postsecondary Study (BPS) 04/09, which defines "non-selective" as four-year institutions either have explicitly open admission or being in the bottom 15 percent of median SAT/ACT scores and in the bottom 15 percent of applicants denied admission

program, compared to an average of $2,300 in-state tuition at community colleges (Baum & Ma, 2013). The gap remains wide even after accounting for aid; using BPS 04/09, Deming, Golding & Katz estimate the net annual tuition, the amount students must pay out of pocket after factoring in grant-aid and tuition forgiveness policies, to be roughly $5,500 at FPCUs compared to $3,500 at non-selective public and non-profit colleges and less than $750 at community colleges (2013). Importantly, these comparisons focus on schools that are eligible for federal Title IV aid. Cellini and Goldin found that FPCU certificate programs that were not Title IV eligible cost significantly less than similar programs eligible for Title IV aid, and that the level of tuition varied based upon limits on Title IV aid set by the federal government in aid-eligible programs but not in those programs ineligible for aid (2012).

The disproportionate draw of Title IV and tuition dollars by for-profit institutions is often cited alongside concerns about student outcomes as the primary justifications for directing additional scrutiny towards the sector (US Senate Health, Education, Labor and Pensions Committee, 2012; Deming, Goldin & Katz, 2013; Lynch, Engle & Cruz, 2010).

Student Outcomes at FPCUs

Given the significant cost of a for-profit education to students and tax-payers, it is not surprising that outcomes at FPCUs are often framed against a backdrop of student debt and subsequent repayment. On average, students at FPCUs are more likely to take out Title IV loans, have higher debt levels, and have lower rates of repayment than their peers at public and not-for-profit institutions (Looney & Yannelis, 2015). Although degree-programs at FPCUs are predominantly 2-year associate programs, former students of FPCUs have similar loan balances six years after initial enrollment as students from non-selective non-profit or public four-year

institutions ($7,460 vs $8,153) and more than twice the balances of students at community colleges (Deming, Goldin, & Katz, 2013). Students at for profit colleges are also far more likely to take out Title IV loans, with 67% of students in two year programs at FPCUS taking out loans in 2012 compared to 47% at non-profits and 17% at publics (Hillman, 2015). Of even greater concern to regulators are the loan default rates of students at for-profit institutions. Although the three-year default rates at FPCUs have declined from the frequently cited 21.8% rate of the 2010 cohort, 15.8% of students beginning at FPCUs in the 2012 cohort went on to default on their student loans within three years, compared to just 6.8% of students at private institutions and 11.7% of students at publics (USDOE, 2015).

Outcomes of debt and repayment are closely connected to completion rates and, for those who do complete, the relative value of degrees in the employment market. A 2009 review of the literature on student loan default by Gross, Cekic, Hossler and Hillman found that "completing a postsecondary program is the single strongest predictor of not defaulting regardless of institution type" (25; Woo, 2002). Steiner and Teszler found that students completing a program defaulted at a rate of 2% compared to 14% for those who did not complete (2005). Even among those students who do not complete, steps towards attainment including year-to-year retention, credits earned, and progression towards a degree also have a strong positive relationship with avoiding default (Christman, 2000; Podgursky et al., 2002; Herr & Burt, 2005).

Analysis of BPS: 04/09 data performed by Deming, Goldin & Katz suggested that, controlling for observable student characteristics, students at for profit institutions actually retain for one year and complete single-year certificate programs at higher rates than their counterparts at public and non-profit institutions, a difference that the authors suggest may be attributable to the relevance of programs offered, clear program paths, and general absence of remedial courses

in typical for-profit programs (2013; Rosenbaum, Deil-Amien & Person, 2006). However, they found that students completed at lower levels in longer programs, showing a deficit of 12% to 19% in BA or AA completion, and one of 5% when compared only to students at open-access community colleges (Deming, Goldin & Katz, 2012).

The literature on student success and retention of non-traditional students that make up the majority of FPCU enrollments emphasizes that while "off-campus" environmental factors may play the greatest role, many of the key academic variables that remain influential, including advising, major certainty, job certainty, and course availability (1985), may be best understood as located at the program-of-study level (Bean & Metzger, 1985; Pascarella & Chapman, 1983; Vorhees, 1987; Pascarella, Duby, & Iverson, 1983). Importantly, the students for whom these factors are most relevant are often excluded by definition from the cohorts that serve as the basis of institutional retention and graduation rates in federal reporting (Jez, 2015).

Even if students complete their degree program, the ability to gain employment is crucial to repayment. In one survey of individuals who defaulted on student loans, 83% of former FPCU students cited unemployment as a primary cause for their default compared to 74% of former community college students and 64% of former public or non-profit four-year students (Dynarski, 1994). FPCU alumni also report a general skepticism on the value of their degrees; in a nationally representative survey, only 37% of FPCU graduates described the cost of their degree as "well-worth it" compared to 30% responding "wasn't really worth it" and 32% noting "remains to be seen" (Hagelskamp et al, 2013). Researchers working with the Beginning Postsecondary Study data set have shown that even controlling for student background characteristics, graduates of FPCUs were less likely to find employment both during the recession (Deming, Goldin, & Katz, 2013; Lang & Weinstein, 2012; Lang & Weinstein, 2013)

and during early stages of the economic recovery (Looney & Yannelis, 2015). Lang and Weinstein found both employment and salary variability to be particularly pronounced between majors, noting that differences between majors were large relative to differences between institution types, suggesting that in addition to differences in student characteristics, lower outcomes at for-profits might be partially attributable to their disproportionate offerings of program areas with lower earnings (2013).

Limitations to the labor-market benefits of an FPCU degree have also been demonstrated in recent field experiments. Dariola et al. submitted 9,000 fictitious resumes and found that resumes listing an associate degree from an FPCU were no more likely to generate an interview request from an employer than an otherwise similar resume listing a degree from a community college or listing no degree at all (2014). A similar study by Deming et al. focused on baccalaureate degrees found that 7.1% of resumes noting an FPCU business degree submitted to business openings received employer follow-up compared to the 9.1% for otherwise similar resumes noting a degree from an open-access public college. Notably, differences were smaller for healthcare positions and were not significant if the resume included another externally validated quality indicator such as an occupational license (Deming et al., 2014).

Differences in employment outcomes may be partly attributable to levels of employer familiarity with for-profits. In a recent study, employers were provided with lists of schools in their immediate geographic area grouped by type and were asked to describe how familiar they were with them. Roughly 76% of employers reported that they “do not know anything” about local for-profit institutions compared to 41% for local community colleges, 13% for public universities, and 26% for private non-profits. Although employers self-report a generally positive view of the FPCUs with which they are familiar, with 69% rating them as “excellent” or “good,”

they are still much more likely to hold a positive view of community colleges (80%), public universities (95%), and private non-profits (94%) (Hagelskamp et al., 2013).

Researchers have similarly observed gaps in subsequent earnings between graduates of FPCUs and their counterparts and public or non-profit institutions (Cellini & Turner, 2016; Hoxby, 2015; Lang & Weinstein, 2013). In their weighted analysis, Cellini and Turner found that certificate students at FPCUs earned about $2,500 less annually than similar students completing certificate programs at community colleges. Notably, however, their analysis also found significant heterogeneity by field of study; among the fields examined, only students in cosmetology programs fared better than peers in similar programs at community colleges (2016).

Research similarly suggests a connection between what students study and subsequent student loan default. There is some limited evidence that once source of increased default may relate to higher debt-loads associated with programs of study (Harrast, 2004). There is more research linking program of study to increased likelihood of default through likelihood of employment and levels of post-graduate earnings (Herr & Burt, 2005; Steiner & Teszler, 2005; Schwartz & Finnie, 2002).

Nearly all of the existing research on student outcomes at FPCUs has focused on national sector-level analyses that paint all for-profits with a broad brush. Yet FPCUs vary widely in the markets in which they are located, the form of their offerings, and the ways that students engage with them. Although 86% of FPCUs are located in metropolitan areas, their growth has been targeted; a majority of FPCUs have seen little or stable growth in enrollments, yet nearly a third saw enrollments increase by more than 50% over six years (Cottom & Goldrick-Rab, 2012). Although historically more likely to be specialized, offering only few specialized certificates or degrees, today for-profits are more likely to be “comprehensive institutions,” offering degrees in

multiple programs at multiple degree levels. Though this diversity suggests the need for a more nuanced analysis, current federal data collection practices obscure the diversity of FPCUs and their programs (Cellini & Goldin, 2012; Cottom & Goldrick-Rab, 2012).

Limitations of Reporting at For-Profits

Public understanding and formal study of the heterogeneity of for profit colleges is limited by the data available to researchers (Jez, 2015; Deming, Goldin, & Katz, 2013). There are three sources of data that underlie nearly every major analysis of for-profit postsecondary education. First is the National Center for Education Statistics' (NCES) Integrated Postsecondary Data System (IPEDS), a federal repository of primarily institution-level data submitted annually by institutions in compliance with the Higher Education Act (HEA) in order to maintain their eligibility for Title IV aid. Second are the institution-level data on student loans and subsequent default collected by the Office of Federal Student Aid. Finally, there are the longitudinal surveys conducted by NCES including the National Postsecondary Student Aid Study (NPSAS), the Beginning Postsecondary Study (BPS), and the National Longitudinal Survey of Youth (NLSY) which gather student-level data only intended to be representative at the national (and, in some isolated cases, the state) level (Jez, 2015). Although even close observers of higher education may be unfamiliar with the nuances of these data sets, statistics derived from these sources live behind both public narratives about higher education and nearly all modern efforts to rate and regulate postsecondary schools (NASFAA, 2014).

Every year, thousands of higher education institutions across the country provide data to IPEDS, the primary source of data on accredited institutions of higher education eligible for Title IV aid. IPEDS currently consists of nine annual surveys covering elements ranging from fall

enrollments and 150% graduation rates to institutional finance and human resources. While by far the most extensive collection of postsecondary data, it also has many limitations- most of which are mirrored by the other federal data sources (Jaquette & Parra, 2014; Jez, 2015).

Completion of IPEDS surveys is required only of institutions receiving Title IV funding. Both the reporting on loans and default information and the national longitudinal surveys similarly include data exclusively from Title IV institutions (Jaquette & Parra, 2014). While this strategy captures most associate and baccalaureate degree programs, it misses many certificate programs offered by both for-profit and not-for-profit institutions. It is estimated that thousands of for-profit institutions do not report to IPEDS either because they are too small or because they are not recipients of Title IV funding (Cellini & Goldin, 2012; Hagelskamp et al., 2013).

Additionally, while IPEDS is a the primary source of institutional student outcome measures such as graduation rates, transfer-out rates, and retention rates, these numbers are based only on strictly defined cohorts that align more closely with a "traditional" understanding of the college student. One-year retention rates, for example, are typically derived from only the incoming cohort of fall students who attend full-time and who have never before been primarily enrolled in higher education. At for-profits this cohort may only represent a tiny fraction of incoming students each academic year (Tierney & Hentschke, 2007). While federally reported loan and default data pulls information for all borrowers, the federal BPS, the source of nearly all of the published attempts to control for student and program area characteristics in analysis of students outcomes at for-profit institutions, only reflects the outcomes of first-time, first-year students (Deming, Goldin, & Katz, 2012; Guryan & Thompson, 2014).

Finally, with the exception of the IPEDS Completions report (which includes annual institutional counts of degrees produced by major), all data provided to IPEDS and to the

Department of Education is produced at the campus or institution level, rather than at the program level, obscuring both where programs are offered and the success of those offerings (Deming, Goldin, & Katz, 2013). Upper Iowa University for example, which operates 10 extension centers or "teaching sites" across the country, including two in Wisconsin, reports all of its enrollment to the federal government as a single Iowa campus. Unpacking online enrollment is even more complex. The for-profit University of Phoenix, the country's largest college, submits a single online enrollment report. A researcher looking at a federal report of FPCU enrollment would see the University of Phoenix's online program represented as a single campus in Phoenix, Arizona that happens to enroll roughly 250,000 students, vastly overstating online enrollment in Arizona and understating it everywhere else (NCES, 2014). Further, because institutions have leeway on whether they report at the campus or institution level, otherwise similar institutions may aggregate their data in different ways and may even elect to shift between the campus and institutional level from survey to survey (Jaquette & Parra, 2014).

Institutional level reporting also obscures program characteristics that may be similar across institutions but may cause wide variation within single institutions. As such, weak programs can be hidden by acceptable institutional averages and strong programs can be hidden by lower institutional averages. Although the major longitudinal studies do collect information on program enrollment, their aim is to gather a representative national sample and not to be representative at either the school or even the state level. Therefore, they cannot be used to examine outcomes at the individual program level and cannot consider intra- and inter-institutional program-level variation (NCES, 2014). The federal government has waged a multi-year effort to require FPCUs and community colleges to report on employment and loan repayment outcomes at the program level through Gainful Employment requirements. This

effort, however, has been mired in negotiations and court proceedings since 2012 (Angulo, 2016; Stratford, 2013).

Programs are a crucial level of analysis in for-profit higher education. FPCUs, often characterized as more attuned to market forces, have been shown to develop and grow programs in specific fields quickly. Between 2000 and 2009, a period of increased shortages for healthcare workers, offerings of health services programs at FPCUs grew at more than twice the rate of the public and non-profit sectors (Deming, Goldin, & Katz, 2013). It is also in these spaces that students may be most closely connected with the academic variables described by Bean and Metzger as most closely related to retention outcomes for non-traditional students (1985).

Further complicating program comparisons in recent years has been the growth of online education. Very little is known about the differences in outcomes between programs similar in focus but delivered in online and offline mediums (Deming, Goldin & Katz, 2012). The program-level variation of online programs is of immediate relevance to state regulatory agencies charged with overseeing FPCUs because of the recently proposed State Authorization Reciprocity Agreement (SARA). Under SARA, which has already been adopted in all but thirteen states, online institutions are approved by the state where their base campus is located, limiting the ability of states to regulate online programs enrolling their residents but physically based outside of their borders (Sabin, 2014).

The existing federal survey and reporting strategy for postsecondary education has left analysts with few resources in their attempts to examine for-profit education at the program level (Deming, Goldin, & Katz, 2013). A growing number of scholars have recommended smaller-scale studies taking advantage of data sets collected by individual institutions, accrediting

agencies, state regulatory agencies that oversee FPCUs, and state longitudinal datasets (Cellini & Goldin, 2012; Jez, 2015; Hentschke, Tierney & DeFusco, 2014; Schneider, 2015b).

SETTING

The state of Wisconsin provides a useful illustration of the expansion of the for-profit sector, efforts to better understand and regulate FPCUs, and the political nature of those efforts. Although Wisconsin has proved a fertile ground for the expansion of for-profit education, the state is typically absent from "top-10" lists of for-profit enrollment growth ("An Enrollment Surge…", 2010). This absence may be due in part to the eccentricities of IPEDS. An analysis of IPEDS reports suggests a count of 55 for-profit institutions in the state (compared to a total of 67 non-profit and public campuses) educating roughly 16,000, or 6% of all postsecondary enrollees in the 2012-13 academic year, placing Wisconsin near the middle of the pack (NCES 2014). Yet as is often the case with FPCUs, the true picture is more complex.

While other states including Florida, Michigan, Missouri, and Tennessee have made recent efforts to collect better data on FPCUs, two key elements are unique to the strategy of Wisconsin's Educational Approval Board (EAB). First, instead of requesting a "snapshot" view of students, looking at enrollment at a particular moment in time, or adopting a limited cohort model akin to IPEDS, the agency requires that institutions adopt a cohort model that includes all incoming students from all sources at any time in the academic year (Sabin, 2014). Second, rather than only collecting data on institutions headquartered in their state, EAB requires all providers enrolling any student with a primary residence in the state of Wisconsin to report at the campus and program level. Within the state of Wisconsin, the EAB places the same requirements upon the publicly-traded corporate online provider and the rural family-owned truck driving

school; both must report on each campus, including "teaching sites without administrative components," and program that serves Wisconsin residents. This requirement also means that unaccredited proprietary institutions that do not receive Title IV funding, and are thus exempted from both federal reporting and longitudinal surveys, are still required to report to the EAB (Dies, 2014; Cellini & Goldin, 2012).

As illustrated in Table 1, this more precise method of collection results in significantly higher counts for both campuses and enrollments. In 2014, the most recent year for which data is available from both sources, EAB reports that 79 for-profit campuses are headquartered within the state and that for-profit schools enroll Wisconsin residents in 169 online or branch campuses, many of which are not reported separately to NCES. EAB's enrollment estimates of new students alone comes to over 18,000; summing 2014 new starts with continuing students from the 2013 and 2012 cohorts yields an enrollment of over 30,000, suggesting a much higher total enrollment of Wisconsin students in FPCUs than represented in the federal dataset[13]

Table 1.

2014 For-Profit Campus and Enrollment Data	**IPEDS**	**EAB**
WI For-Profit Campuses	55	79
For-Profit Campuses Enrolling WI Residents	Unknown	169
WI Enrollment at For-Profits	15,547 (Fall total) 26,067(12 mo. total)	30595 (3 cohorts only)
Distinct Programs with New Students >0	Unknown	398

(NCES, 2015; EAB, 2015)

Wisconsin has also become a national focal point in the debate regarding how to regulate for FPCUs. Although the EAB has long collected data from Wisconsin FPCUs, "a litany of concerns regarding the business practices of for-profit higher education institutions" and a

[13] In 2014 the EAB did not collect total enrollment counts for for-profit campuses.

subsequent wave of Milwaukee for-profit campus closings between 2010 and 2012 served as an impetus for a realignment of tracking and accountability efforts (Sabin, 2014,1). Following extensive pushback, efforts to enforce "some of the nation's strictest performance standards" initially tied to the results of new reporting process were rolled back after just one meeting of the ten member oversight panel (Fain, 2013). More recently, the state's governor has proposed the defunding the Wisconsin EAB "to reduce fiscal and regulatory burden" on for-profits operating in the state (Opoien, 2015; Simmons, 2015).

Wisconsin is also one of the thirteen states that have not yet signed on to State Authorization and Reciprocity Agreement, and EAB and the governor's office have also been at odds over its potential adoption (Straumsheim, 2014; nc-sara.org, 2016). The intent of SARA is to both reduce the reporting burden for distance education providers while also easing the regulatory burden on individual states (nc-sara.org, 2016; Simmons, 2015). The Educational Approval Board has countered that the SARA may not hold institutions accountable for the same level of quality and will restrict the state's ability to provide data on student outcomes. Importantly, funding for the Educational Approval Board is currently provided by a fee structure imposed on institutions under the oversight of the organization; the EAB has noted that removing online institutions from its purview would both decrease the agency's ability to regulate Wisconsin institutions and that these remaining institutions would bear an increased financial burden (EAB, 2015).

Data

The program-level data used for the analysis is derived from the Wisconsin Education Approval Board's (EAB) new survey of for-profit institutions operating in the state. Beginning in 2012, outcomes are tracked based on a "12-month cohort" of students, a method in which the

"incoming" cohort (the sum of "new starts," "transfers in," and "transfers from") is always equal to the "outgoing cohort" (the sum of "transfers out," "transfers to," "drops," "completers," and "continuing next year") and in which "employed" and "employed verified" are subsets of "completers." This method of reporting is distinct from both practice in Wisconsin prior to 2012 and reporting processes in most other states ("Authorized Institutions…", 2014), which more often use point-in-time snapshots or total enrollments rather than tracking a group over the course of a year.

Although the EAB dataset currently contains only three years of data, this allows for informative analysis of graduation and employment outcomes of certificate and associate programs that make up the vast majority of FPCU enrollments as well as two year retention for baccalaureate programs. In 2012, the base year of the analysis, 126 institutions with 156 campuses provided instruction to at least one new Wisconsin student, and 83 institutions with 104 campuses had at least one program enrolling more than 9 new Wisconsin students.

There were 1322 programs enrolling at least one new Wisconsin student, however only about a third of these (444) had entry cohorts greater than nine. Both these programs and new student enrollments were relatively evenly distributed across certificate programs (114 and 6,334), associate programs (146 and 5819), and baccalaureate programs (136 and 4004). Together, programs across these three levels made up 89% of all programs and 93% of enrollments among programs with cohorts greater than 9, with the balance made up of master's, post-master's, and doctoral programs.

Among programs enrolling at least nine students, more than a third are offered online, with the proportion increasing by degree level from 3.5% in certificate programs to 58.1% of baccalaureate programs. Conversely, less than a quarter (24%) of programs are offered by

institutions based in the state of Wisconsin, with the proportion declining across degree levels from 51.8% of certificate programs to only 14.0% of BA programs. Nearly 85% of these programs are eligible for Title IV funding, allowing students enrolled in these programs to apply for federal financial aid. Title IV eligibility is also closely correlated with program level; although less than half (41.2%) of certificate programs are eligible for Title IV aid, all associate and baccalaureate programs with enrollments greater than nine are eligible.

As might be expected, total cost (the tuition and fee expenses for the full duration of the program) increases with length of program. However, while the increase from two-year associate programs to four-year baccalaureate programs is roughly proportionate to the length of the program, with both roughly doubling, average total cost more than triples between single year certificate programs and two year associate programs.

Table 2. 2012 Cohort Characteristics

	FPCU Programs with New Starts n>0	FPCU Programs with New Starts n>9	Certificate Programs with New Starts n>9	Associate Programs with New Starts n>9	Baccalaureate Programs with New Starts n>9
Institutions	126	83	57	19	24
Campuses	156	104	63	36	32
Total Programs	1322	444	114	146	136
Total New Starts	20572	17486	6434	5819	4004
% Online	43.0%	36.4%	3.5%	26.7%	58.1%
% In-State	12.6%	24.0%	51.8%	19.9%	14.0%
% Title IV Eligible	92.1%	84.9%	41.2%	100.0%	100.0%
Average Total Cost	$40,145	$37,525	$9,857	$36,405	$62,319

One challenge of the data source is that it is structured to facilitate analysis of "dropouts," which have been the focus of EAB's reporting (Sabin, 2015). While academic retention,

graduation, and employment rates can be derived from the data, they must be separately calculated. Definitions for each and the process for their calculation are noted in the description of outcomes below.

Each program in the EAB dataset is categorized by a 6-digit Classification of Instructional Program (CIP) code, a standardized taxonomy for program area. CIP codes are provided by the institutions, and are an addition to the dataset since Cellini and Goldin's analysis in which program areas were assumed based on program names (2012). I convert these to 2 digit CIP codes to ensure large enough groups for analysis, focusing in particular on CIP codes 51 (Health Services), 52 (Business) and 43 (Security and Criminal Justice) because of their large representation in the dataset. Combined, these program areas account for the majority of programs with cohorts greater than nine, and, with the exception of security and criminal justice certificate programs, are well-represented at each degree level (Table 3).

Table 3. 2012 Program and Student Distribution by 2-Digit CIP Family

		Certificate		Associate		Bachelor		Total	
CIP Code	CIP Family	#	%	#	%	#	%	#	%
1	Agriculture, Agriculture Operations, and Related Sciences.	5	4.4%		0.0%		0.0%	5	1.3%
3	Natural Resources and Conservation.		0.0%		0.0%	2	1.5%	2	0.5%
9	Communication, Journalism, and Related Programs.		0.0%	1	0.7%	1	0.7%	2	0.5%
10	Communications Technologies/Technicians and Support Services.	1	0.9%	4	2.7%	2	1.5%	7	1.8%
11	Computer and Information Sciences and Support Services.	3	2.6%	15	10.3%	13	9.6%	31	7.8%
12	Personal and Culinary Services.	1	0.9%	3	2.1%	1	0.7%	5	1.3%
13	Education.	4	3.5%		0.0%	5	3.7%	9	2.3%
15	Engineering Technologies/Technicians.	1	0.9%	7	4.8%		0.0%	8	2.0%
19	Family and Consumer Sciences/Human Sciences.		0.0%	1	0.7%	1	0.7%	2	0.5%
22	Legal Professions and Studies.	1	0.9%	7	4.8%	2	1.5%	10	2.5%
23	English Language and Literature/Letters.		0.0%	1	0.7%	2	1.5%	3	0.8%
24	Liberal Arts and Sciences, General Studies and Humanities.		0.0%	2	1.4%		0.0%	2	0.5%
30	Multi/Interdisciplinary Studies.		0.0%	1	0.7%	3	2.2%	4	1.0%
31	Parks, Recreation, Leisure, and Fitness Studies.		0.0%	2	1.4%	3	2.2%	5	1.3%
32	Basic Skills.	2	1.8%		0.0%		0.0%	2	0.5%
38	Philosophy and Religious Studies.		0.0%		0.0%	1	0.7%	1	0.3%
42	Psychology.		0.0%	1	0.7%	7	5.1%	8	2.0%
43	Security and Protective Services.	1	0.9%	23	15.8%	19	14.0%	43	10.9%
44	Public Administration and Social Service Professions.	3	2.6%	2	1.4%	4	2.9%	9	2.3%
45	Social Sciences.		0.0%		0.0%	1	0.7%	1	0.3%
46	Construction Trades.	2	1.8%		0.0%		0.0%	2	0.5%
47	Mechanic and Repair Technologies/Technicians.	7	6.1%		0.0%		0.0%	7	1.8%
48	Precision Production.	1	0.9%		0.0%		0.0%	1	0.3%
49	Transportation and Materials Moving.	16	14.0%		0.0%		0.0%	16	4.0%
50	Visual and Performing Arts.	2	1.8%	6	4.1%	14	10.3%	22	5.6%
51	Health Professions and Related Clinical Sciences.	45	39.5%	39	26.7%	20	14.7%	104	26.3%
52	Business, Management, Marketing, and Related Support Services.	19	16.7%	31	21.2%	35	25.7%	85	21.5%
	Grand Total	114	100.0%	146	100.0%	136	100.0%	396	100.0%

In addition to extensive outreach, training, and documentation on the reporting process provided to colleges, the EAB performs a series of validity checks on the data. These include scans of variation in dropout levels, employment rates, and student satisfaction. The distribution of institutions across the scale has provided some indication that institutions are reporting accurately. The data is also reviewed for outliers, many of which are targeted for follow-ups. In total, roughly 24 institutions in the 2012 cohort were directly contacted for in-depth follow-ups to verify their reported data (Dies & Sabin, 2014).

Analysis and Description of Outcomes

In the first section an exploratory scatterplot analysis is performed for business and health programs at the certificate level to examine the degree to which program cost is associated with student outcomes among similar programs. Business and health programs were selected because they represent the largest program areas at the certificate level. Because of the similarity between retention rates and graduation rates at the certificate level, analysis is performed only for graduation and employment.

A series of descriptive analyses are performed for the outcomes of academic retention rate, graduation rate, and employment rate at both the intra-campus and intercampus levels. Academic Retention is a calculated field defined as the percentage of all “new starts” or “transfers in” in the entry year of the cohort who are either a) still enrolled in the same program or b) have graduated from the program at the close of the 2014 reporting period, the most recent available data. Ranges of academic retention are examined for similar program types by program level for certificate, associate, and baccalaureate students.

Graduation Rate is a calculated field defined as the percentage of all "new starts" or "transfers in" in the initial of the year of the cohort who have graduated by 2014. Because the three years of available data are less than the four-year 100% duration of a baccalaureate program, graduation ranges are provided only for certificate and associate programs.

Employment rate is a calculated field defined as the percentage of graduates recorded as subsequently employed.[14] As with graduation rates, because the three years of available data are less than the four-year 100% duration of a baccalaureate program, employment rates are shown only for students in certificate and associate programs.

The first set of descriptive analyses examines the variation in institutional outcome averages at the degree level across institutions. This type of reporting most closely replicates the institutional reporting that is the current standard for IPEDS and most other federal data sources, illustrating degree level outcomes across the institution. The second analysis takes account of both degree level and program area to examine variation in outcomes for similar programs across institutions. The selection set consists of health and business certificate programs; health, business, and criminal justice associate programs; and health, business, and criminal justice baccalaureate programs because these program areas account for the majority of enrollment at each degree level. Programs are only included if the initial incoming cohort had more than 9 students.

A third set of descriptive analyses chart variation in student outcomes within programs of a similar degree level within the three institutions with the greatest number of programs at the

[14] The EAB collects data on "self-reported employment" and "verified employment," with the latter requiring documented evidence of employment. Because so few programs provide data for "verified employment," I use self-reported employment as a basis of employment rates.

given level, highlighting the degree to which outlier programs may be hidden by institutional averages. For all analyses, programs are only included if the initial incoming cohort had more than 9 students.

Finally, exploratory regression analyses are performed for each degree level and outcome type to examine the association between the program level characteristics and student outcomes. The equation is

$$y_i = \alpha + \beta(T_i) + \gamma X_i + \varepsilon_i$$

where y_i is the outcome of interest, T_i is an indicator Title IV, In-State status, and Online Status of the program; X_i is a vector of program-level baseline controls; and ε_i is an error term. A generalized linear model from the binomial family is used to account for program size. For the outcomes of academic retention and graduation, new student enrollments are treated as the number of trials while the number of students retained or graduated represent the respective number of successes. For the outcome of graduate employment, the total number of program graduates are treated as the number of trials while the number of graduates employed represent the number of successes. A logit link function is used to transform the response to fit a 0-1 scale in alignment with the 0-100% scale of retention, graduation, and employment rates.

FINDINGS

Our study sought to examine whether outcomes varied with cost in certificate programs eligible and ineligible for Title IV aid, to explore inter- and intra-institutional variation in student outcomes, and to observe the degree to which program level characteristics were associated with student outcomes in Wisconsin FPCUs. Below, I first examine the relationship between program

cost and student outcomes at institutions eligible and not eligible for Title IV aid. I then separately examine the student outcomes of academic retention, graduation, and employment, examining for each descriptive representations of the amount of variation across programs and colleges as well as within institutions. I additionally explore for each student outcome the correlation between outcomes and both program and campus-level characteristics.

Program Cost and Student Outcomes at T4 and NT4 institutions

Table 4 below displays mean tuition, graduation rate, and employment rate for the subset of Title IV-Eligible (T4) and Not Title IV-Eligible (NT4) certificate programs in the CIP families of health and business. On average, T4 certificate programs cost significantly more than their NT4 counterparts for similar program areas. Yet while NT4 health programs cost nearly four times as much on average as NT4 business programs, the average cost of T4 health programs is only about 6% higher than T4 business programs. Notably, while graduation rates are lower on average for T4 programs than for NT4 across both program types, employment rates among those students who graduate from T4 institutions appear to be higher than those of students graduating from NT4 programs.

Table 4. Characteristics of Certificate Programs by Title IV Eligibility and Program Area

	Health		Business	
Program Type	NT4	T4	NT4	T4
n	24	21	10	9
Average Tuition (SD)	$3832 ($1919)	$15351 ($3841)	$990 ($959)	$16269 ($4057)
Grad Rate (SD)	0.806 (0.245)	0.458 (0.242)	0.796 (0.195)	0.367 (0.227)
Emp Rate (SD)	0.549 (0.348)	0.751 (0.188)	0.433 (0.428)	0.924 (0.128)

Figures 1-4 below illustrate the association between total program cost and the outcomes of graduation rate and employment rate by program type. There appears to be a slight positive association between program cost and both graduation and employment rates for students in T4 business programs; for health programs, however, the relationship between cost and graduation rates is negative and there does not appear to be a meaningful trend for employment rates. While there is a slight negative correlation between program cost and both graduation and employment rates for business programs, the trend is reversed for health programs. This may suggest that the impact of tuition and these student outcomes may vary by program area or that there is simply no stable relationship between tuition and student outcomes without accounting for additional variables.

Figure 1. Business Certificate Graduation Rate by Tuition

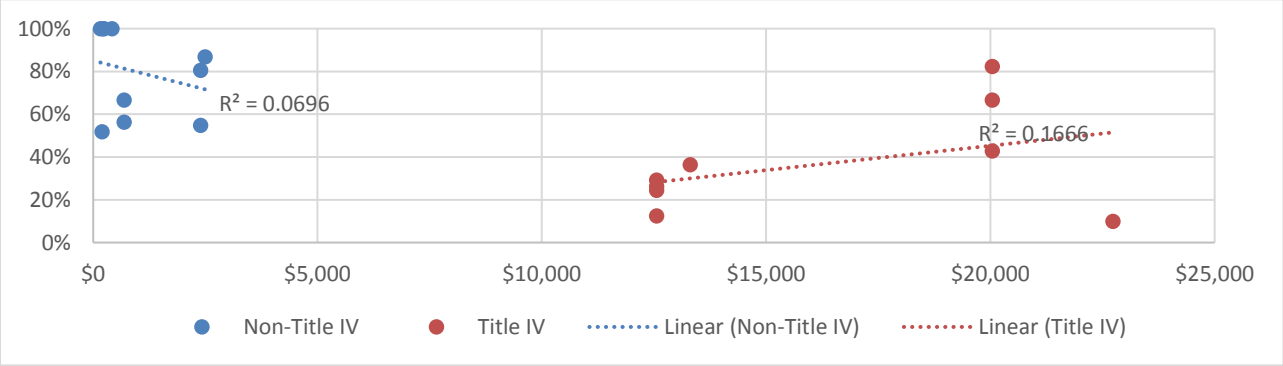


Figure 2. Business Certificate Employment Rate by Tuition

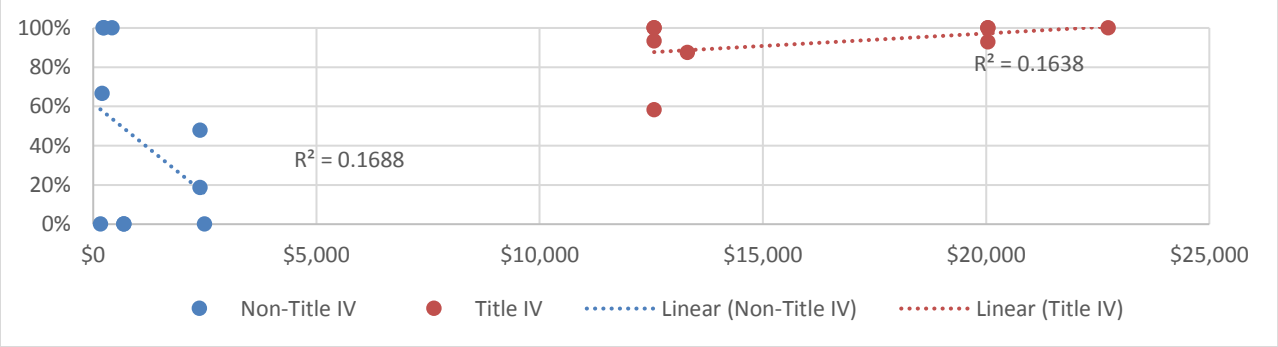


Figure 3. Health Certificate Graduation Rate by Tuition

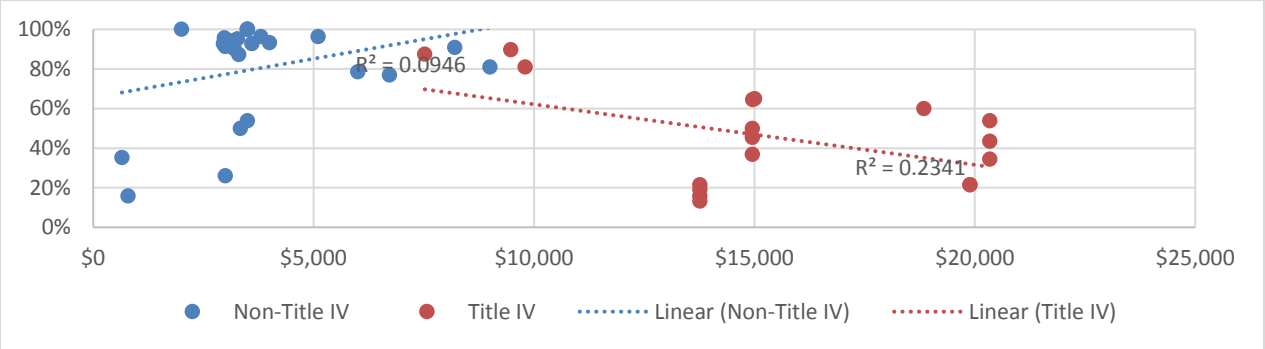
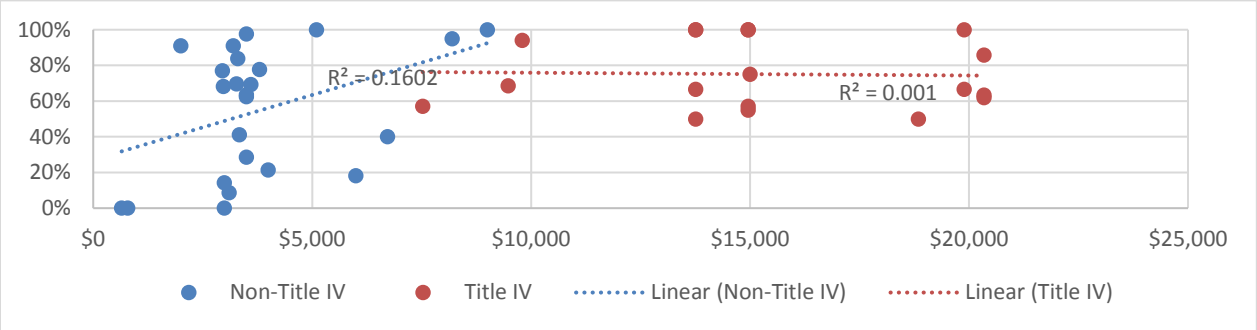


Figure 4. Health Certificate Employment Rate by Tuition



Variation in student outcomes by program type and degree level

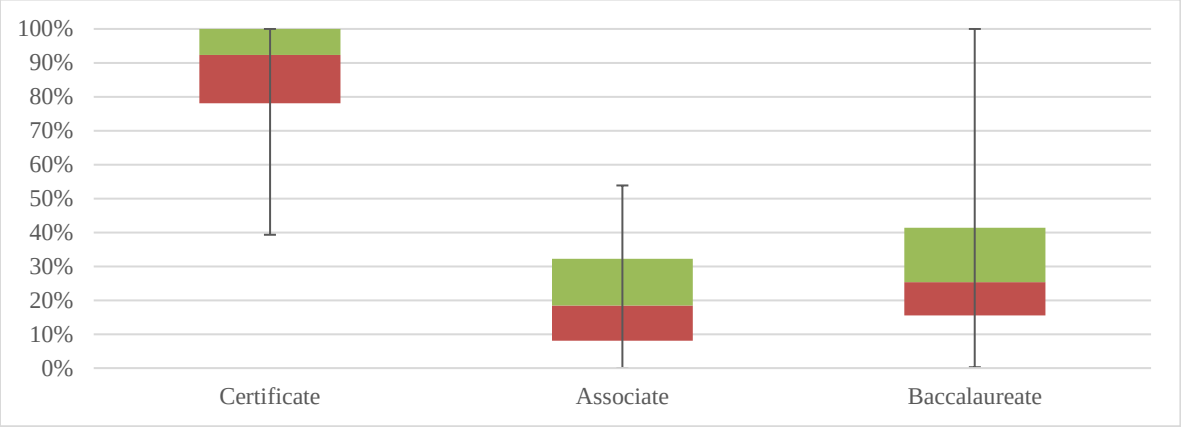
Academic Retention

Three years after initial enrollment, institutional means for academic retention within certificate programs (85%) are four times those of associate programs (21%) and two and half times those of baccalaureate programs (32%) (Figure 5). Gaps between certificate and associate and baccalaureate programs remain but are significantly narrowed for programs within the same area (Figure 6). Students in certificate health programs are enrolled or have graduated at rates 30 percentage points higher than peers in associate programs (68% vs 38%). The difference is even wider in business programs, with students in certificate programs are more three times as likely

to be enrolled or graduated compared to their associate-seeking peers (63% vs 19%). Students in baccalaureate programs largely fall somewhere in-between at the three year mark, with 33% of students still enrolled in bachelor's health programs and 34% of students still enrolled in bachelor's business programs. Notably, while the inter-institution examination of retention shows baccalaureate programs performing above associate programs, the mean retention rate for students in baccalaureate health programs is higher than that of students in associate health programs. Criminal justice programs, offered in meaningful numbers only at the associate and bachelor levels in Wisconsin, have retention rates that align more closely with business at the associate level with a 24% completion rate, and near business and health for baccalaureate degrees at 31%.

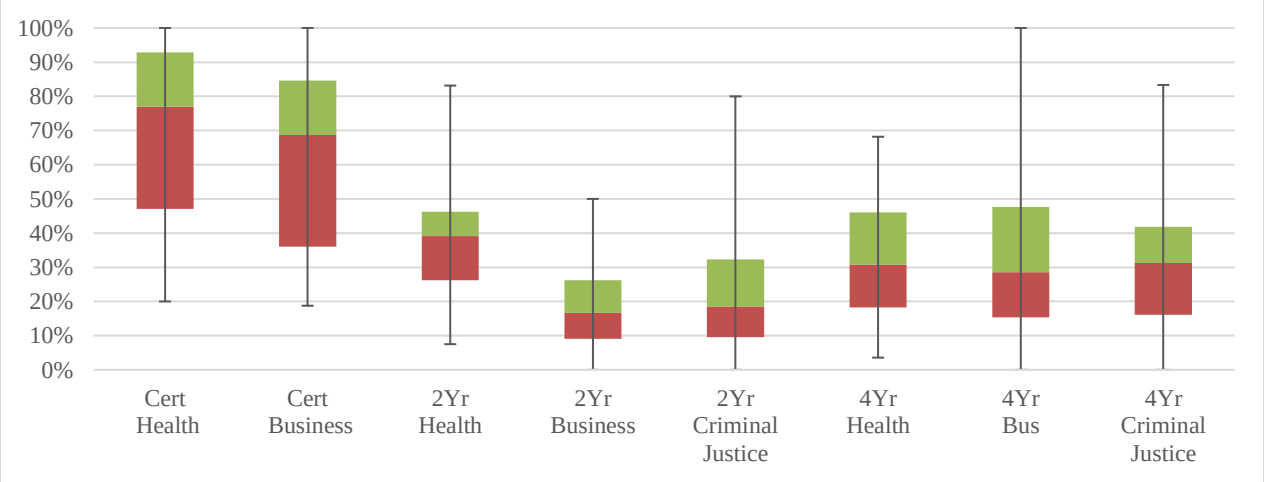
Figure 7 examines the three institutions with the largest number of programs at each given degree level. Ranges and standard deviations of retention rates within Rasmussen College (0.184) and Stratford Career Institute (0.158) are comparable to those between institutions at the certificate level (0.177); while both range and standard deviation was smaller at Universal Technical Institute (0.083), UTI also had the fewest certificate programs. Standard deviations of associate level programs within individual institutions, which ranged from 0.134 to 0.152, were also similar to standard deviations between institutions at the associate level (0.168). Within-institution standard deviations were lower for baccalaureate programs, ranging from 0.121 to 0.171, were smaller that between institutions at the baccalaureate level (0.230) yet still suggest programs vary widely within the same institution.

Figure 5. Inter-institution Retention Rate Variation by Degree Level



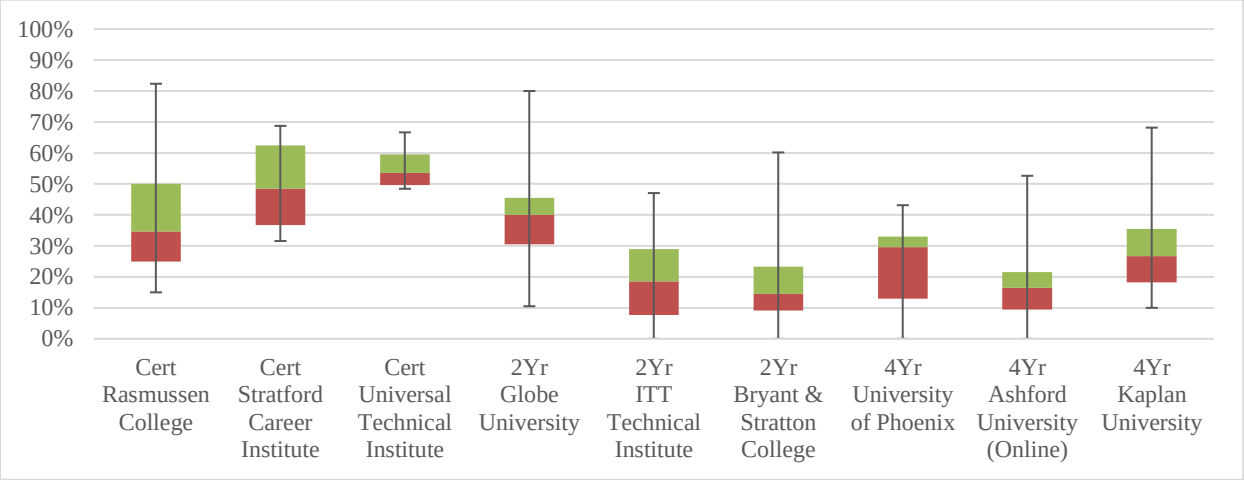
	Certificate	Associate	Baccalaureate
n	57	19	24
Mean	0.849	0.211	0.319
Median	0.923	0.185	0.253
SD	0.177	0.168	0.230

Figure 6. Inter-institution Retention Rate Variation by Degree Level and Program Area



	Cert Health	Cert Bus.	2Yr Health	2Yr Bus.	2Yr Crim. Justice	4Yr Health	4Yr Bus.	4Yr Crim. Justice
n	45	19	39	31	23	20	35	19
Mean	0.685	0.633	0.383	0.194	0.237	0.325	0.336	0.330
Median	0.769	0.688	0.391	0.167	0.185	0.308	0.286	0.313
St. Dev	0.271	0.292	0.185	0.145	0.195	0.195	0.253	0.220

Figure 7. Intra-institution Variation in Retention Rate for Institutions with Largest Number of Programs at Degree Level and Program Area



	Cert Rasmus-sen College	Cert Stratford Career Institute	Cert Universal Tech. Institute	2Yr Globe U.	2Yr ITT Tech. Institute	2Yr Bryant& Stratton College	4Yr U. of Phoenix	4Yr Ashford U. (Online)	4Yr Kaplan U.
n	30	6	4	43	21	20	17	16	10
Mean	0.393	0.496	0.556	0.384	0.188	0.185	0.247	0.172	0.287
Median	0.347	0.485	0.536	0.400	0.185	0.145	0.296	0.164	0.267
SD	0.184	0.158	0.083	0.134	0.145	0.152	0.140	0.121	0.171

In the regression analysis, both institutional and program level elements are statistically significant predictors of academic retention (Table 5). There is a large, negative correlation between Title-IV eligibility and retention in certificate programs, with students in Title IV eligible programs having a 55.6% predicted probability of retention compared to 81.8% of students in programs not eligible for Title IV aid. While online delivery is negatively associated with retention at the associate level (19.1% vs. 30.2% predicted probability), the association is positive at the baccalaureate level (28.9% vs. 24.2%) and is not significant at the certificate level. In-state status is positively associated with retention at the certificate level (predicted probability of 81.2% vs. 60.0%) and baccalaureate level (predicted probability of 42.0% vs 24.6%), but is

negatively associated with retention at the associate level (predicted probability of 20.2% vs. 29.5%). Five of the analyzed program areas were significant predictors of retention at the certificate level, fourteen were significant predictors at the associate level, and four were significant predictors at the baccalaureate level.

Table 5. Relationship between Program-level Characteristics and Academic Retention

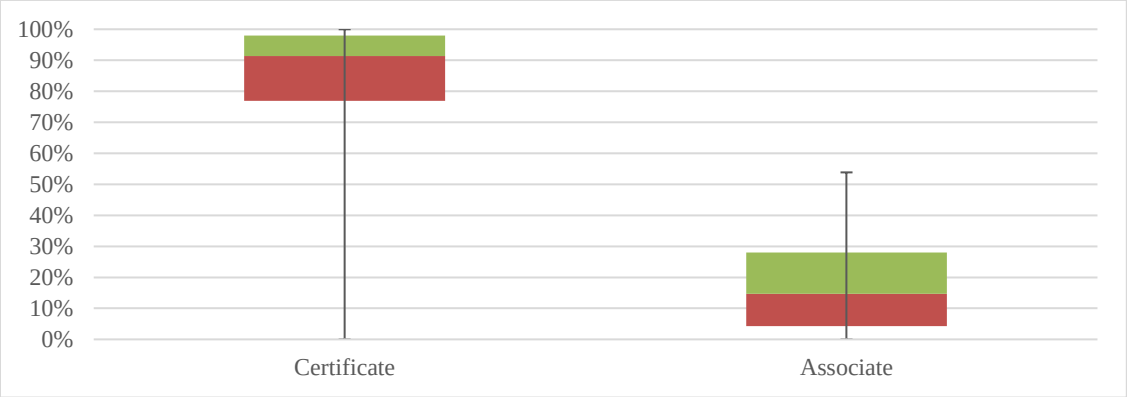
	Certificate			Associate			Bachelors		
CIP	Coefficient	SD	*p*	Coefficient	SD	*p*	Coefficient	SD	*p*
9	0.940	0.791	0.234				-1.482	1.099	0.178
10	14.343	1450.278	0.992	-0.321	0.410	0.433	-2.667	1.070	0.013
11	-0.034	0.291	0.906	-1.918	0.404	0.000	-0.123	0.366	0.737
12	0.761	0.413	0.065	-1.875	0.437	0.000	-2.659	1.086	0.014
13	-0.283	0.309	0.360				-0.713	0.420	0.090
15	15.327	961.402	0.987	-1.865	0.426	0.000			
19				-2.760	0.833	0.001	-0.470	0.861	0.585
22	-0.056	1467.805	1.000	-1.486	0.451	0.001	-0.622	0.717	0.386
23				-1.804	0.869	0.038	0.000	0.540	1.000
24				-0.929	0.528	0.078			
30				-1.340	0.450	0.003	-0.172	0.400	0.667
31				-1.514	0.620	0.015	-1.482	0.693	0.033
32	-2.496	0.324	0.000						
38							0.223	0.645	0.730
42				-1.804	0.869	0.038	-0.421	0.377	0.264
43	-1.454	0.437	0.001	-2.038	0.402	0.000	0.012	0.358	0.972
44	-0.620	0.333	0.063	-1.757	0.441	0.000	-0.035	0.386	0.927
45							-0.588	0.853	0.491
46	15.816	971.193	0.987						
47	0.063	0.256	0.805						
48	1.235	0.553	0.025						
49	-0.086	0.250	0.730						
50	-0.912	0.296	0.002	-0.873	0.404	0.031	-0.782	0.376	0.037
51	-0.386	0.239	0.107	-1.121	0.387	0.004	0.558	0.350	0.111
52	-0.645	0.238	0.007	-2.015	0.393	0.000	0.015	0.349	0.966
Title IV	-1.475	0.073	0.000						
Online	17.451	521.182	0.973	-0.632	0.090	0.000	0.253	0.093	0.007
In State	1.230	0.074	0.000	-0.539	0.079	0.000	0.833	0.134	0.000
n	209			146			136		

Graduation Rate

Graduation rates three years after enrollment largely follow a pattern similar to retention across the examined program types and levels. In a comparison of institutional means by degree level, certificate programs have graduation rates (82%) more than four times those of associate programs (19%) (Figure 8). As with retention, the gap between certificate and associate programs is significantly narrowed when programs in the same areas are examined, with the gap wider in business (56% vs 11%) than in health (68% vs 35%) (Figure 9). Unlike retention, however, where health, business, and criminal justice rates are relatively similar, graduation rates for business and criminal justice degrees (11% and 15%) fall far below rates in health (35%).

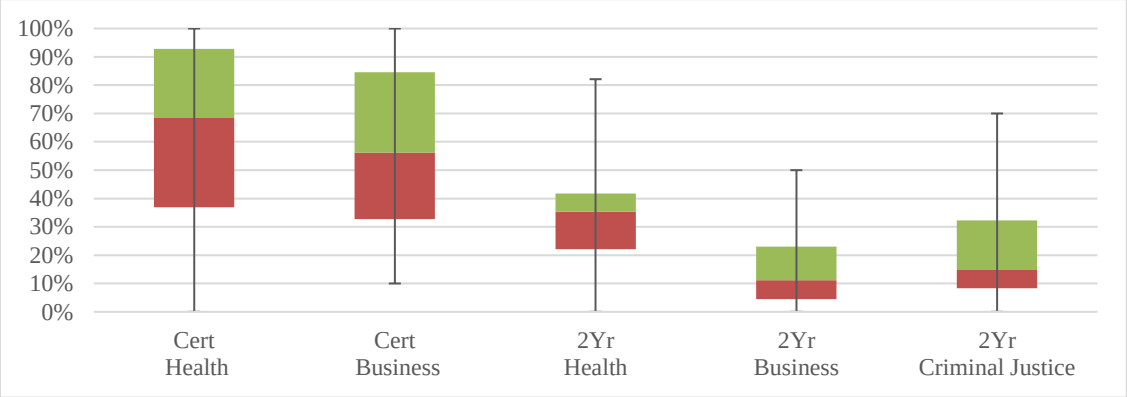
Although there are clear outliers, mean institutional graduation outcomes are relatively tightly clustered when looking only at degree level, with certificates clustering at the top of the scale and associate programs clustering near the bottom with respective standard deviations of roughly .22 and .17. The spread of graduation outcomes widens substantially at the certificate level when observed by area, with both examined program areas having standard deviations approaching 0.31. While associate degree programs are more tightly clustered, in part because of the proportion of programs with 0% graduation rates, there is at least as much variation at this level as between institutions. Notably, there is a great deal of variation in program completion rates within institutions. Figure 10 examines the three institutions with the largest number of programs at the noted degree level. In a pattern similar to the retention analysis, all but one of the examined institutions the spread of program completion rates exceeds 40 percentage points, with within-institution standard deviations ranging from .083 to .187 in certificate programs and from .130-.155 in associate programs.

Figure 8. Inter-institution Graduation Rate Variation by Degree Level



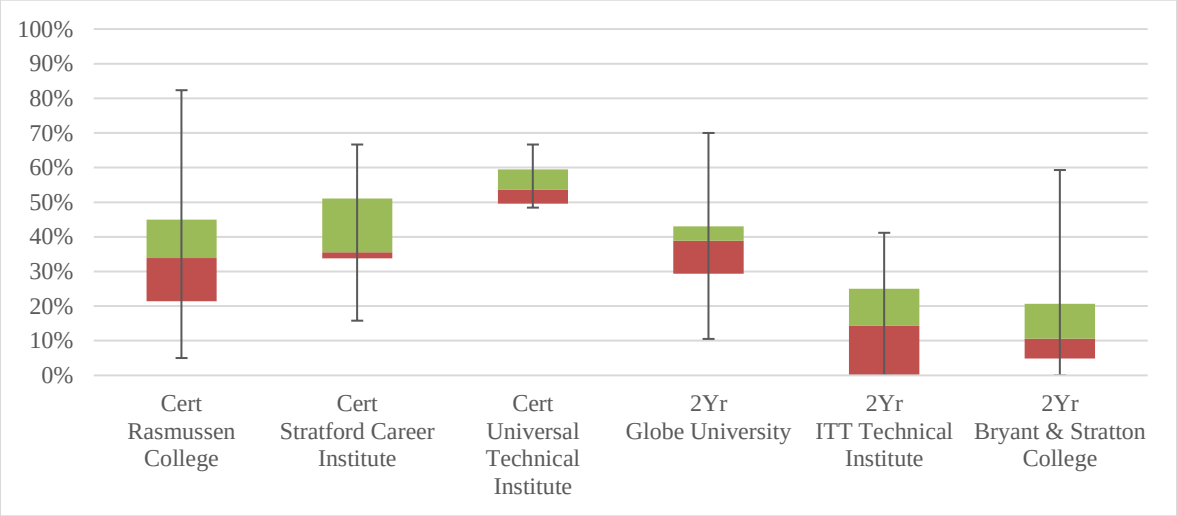
	Certificate	Associate
n	57	19
Mean	0.822	0.186
Median	0.914	0.147
SD	0.223	0.169

Figure 9. Inter-institution Graduation Rate Variation by Degree Level and Program Area



	Cert Health	Cert Business	2Yr Health	2Yr Business	2Yr Criminal Justice
n	45	19	39	31	23
Mean	0.639	0.594	0.350	0.168	0.214
Median	0.684	0.563	0.353	0.111	0.148
SD	0.308	0.309	0.199	0.156	0.194

Figure 10. Intra-institution Variation in Graduation Rate by Degree Level for Institutions with Largest Number of Programs at Degree Level



	Cert. Ramussen College	Cert Stratford Career Institute	Cert Universal Technical Institute	2Yr Globe University	2Yr ITT Technical Institute	2Yr Bryant & Stratton College
n=	30	6	4	43	21	20
Mean	0.347	0.405	0.556	0.366	0.157	0.147
Median	0.339	0.355	0.536	0.389	0.143	0.106
SD	0.187	0.181	0.083	0.130	0.136	0.155

The regression analysis suggests that Title IV status is negatively associated with program completion at the certificate level (Table 6). Among certificate students in Title IV programs, 53.3% are predicted to graduate in three years compared to a probability of 72.5% for students in programs that are not Title-IV eligible. As with academic retention, there is a negative association between online status and graduation at the associate level (predicted probability of 17.0% vs. 30.8%). There is a positive significant association between online status and completion at the certificate level (predicted probability of 95.9% vs. 61.9), however this association is accompanied by a large standard deviation, likely due to a small number of high-

enrollment online certificate programs in the dataset with nearly 100% completion rates. In-state status is positively associated with graduation rates at the certificate level (predicted probability of 82.2% vs 47.6%) but negatively associated at the associate level (17.8% vs. 30.3%). Multiple program areas have significant associations with graduation at the certificate or associate level, with Health Professions, Visual and Performing Arts, Public Administration and Social Services, and Security Protective Services having negative associations at both the certificate and associate level and Personal and Culinary Services having a positive association at both degree levels.

Table 6. Relationship between Program-level Characteristics and Graduation

	Certificate			Associate		
CIP	Coefficient	SD	*p*	Coefficient	SD	*p*
9	-4.146	1.052	0.000			
10	14.878	1747.855	0.993	-0.344	0.410	0.402
11	-0.193	0.266	0.469	-2.152	0.406	0.000
12	1.004	0.401	0.012	-1.955	0.439	0.000
13	-0.180	0.290	0.534			
15	15.864	1159.300	0.989	-2.133	0.429	0.000
19				-2.781	0.834	0.001
22	14.654	1655.074	0.993	-1.679	0.455	0.000
23				-1.825	0.870	0.036
24				-1.076	0.534	0.044
30				-1.508	0.455	0.001
31				-1.838	0.645	0.004
32	-2.420	0.307	0.000			
42				-1.825	0.870	0.036
43	-1.083	0.430	0.012	-2.256	0.404	0.000
44	-0.696	0.333	0.037	-2.015	0.450	0.000
46	16.352	1171.252	0.989			
47	0.344	0.226	0.129			
48	1.494	0.551	0.007			
49	0.151	0.220	0.492			
50	-0.549	0.274	0.045	-1.014	0.405	0.012
51	-0.597	0.207	0.004	-1.341	0.388	0.001
52	-0.212	0.205	0.302	-2.343	0.396	0.000
Title IV	-1.140	0.071	0.000			
Online	3.278	0.509	0.000	-0.725	0.095	0.000
In State	1.862	0.073	0.000	-0.654	0.082	0.000
n	209			146		

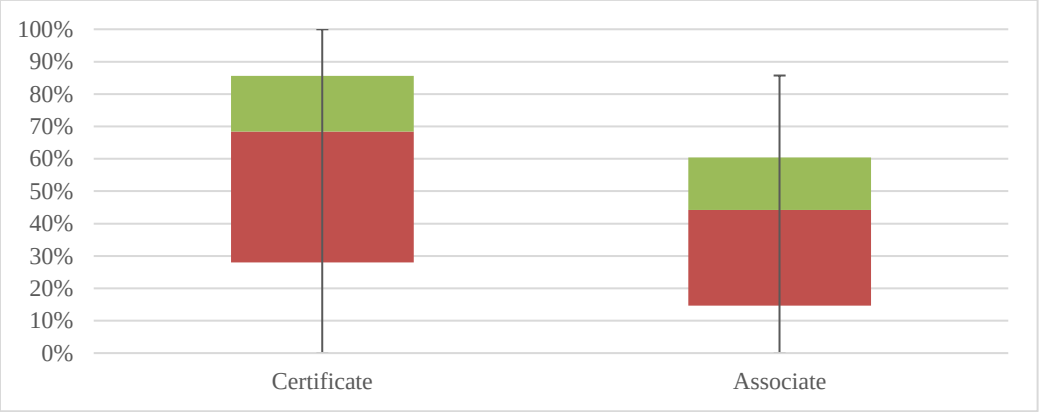
Employment Rate of Graduates

In comparison to trends observed for retention and graduation rates, mean institutional employment rates by degree level vary more at both the certificate and associate level, and the gap between the mean of certificate and associate means is narrower (60% vs 40%) (Figure 11). It is important to note that programs with a 0% graduation rate, which were primarily located at the associate level, were not included in the analysis.

Among similar programs, employment rates varied much more widely among certificate programs in health than business programs, in part because of the high number of business programs reporting a 100% employment rate of graduates (Figure 12). While all associate degrees had large ranges, health programs had a standard deviation nearly half that of business and criminal justice programs as well as a mean roughly 25 percentage points higher (71% vs 45% and 47% respectively).

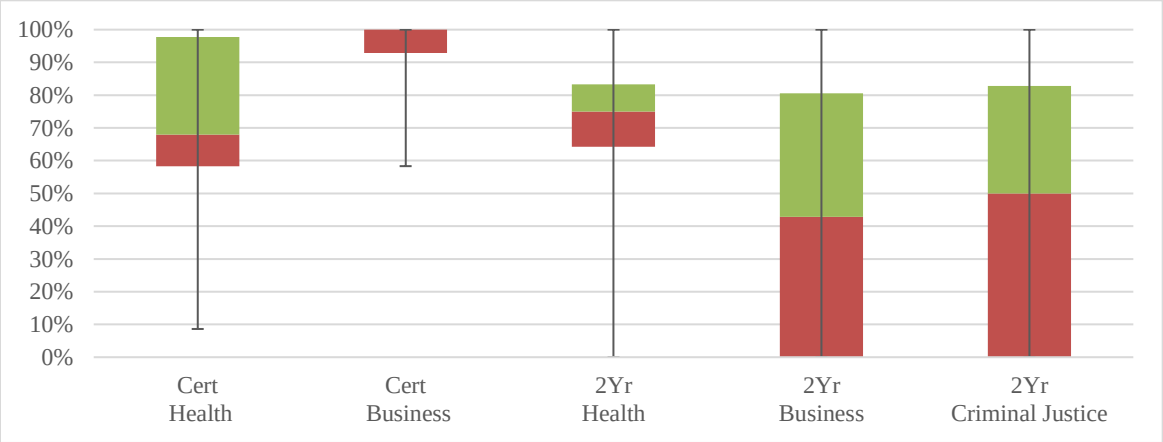
Within institutions, certificate employment outcomes ranged from 0% to 100% with a standard deviation of .237 at Rasmussen College, which had the greatest number of offerings (Figure 13). Although offering fewer certificates, the range of outcomes at Stratford Career Institute and Universal Technical Institute were particularly narrow and at opposite extremes; employment rates at Universal Technical Institute fell between 85% and 100% while all programs at Stratford Career Institute reported a 0% employment rate among certificate graduates, resulting in respective standard deviations of .061 and 0. At the associate degree level within institutions, two of the institutions had programs that ranged from 0% to 100% employment and the third ranged from 20% to 100% employment with standard deviations ranging from .222 to .344.

Figure 11. Inter-institution Employment Rate Variation by Degree Level



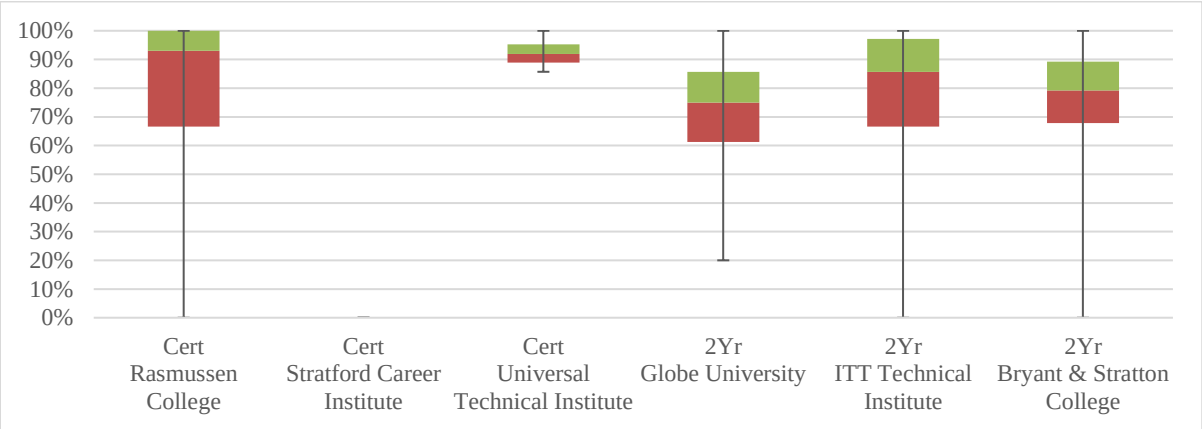
	Certificate	Associate
n	56	11
Mean	0.595	0.396
Median	0.684	0.442
SD	0.331	0.301

Figure 12. Inter-institution Employment Rate Variation by Degree Level and Program Area



	Cert Health	Cert Business	2Yr Health	2Yr Business	2Yr Criminal Justice
n	18	9	37	27	19
Mean	0.722	0.924	0.705	0.449	0.469
Median	0.679	1.000	0.750	0.429	0.500
SD	0.245	0.136	0.229	0.401	0.389

Figure 13. Intra-institution Variation in Employment Rate by Degree Level for Institutions with Largest Number of Programs at Degree Level



	Cert Rasmussen College	Cert Stratford Career Institute	Cert Universal Technical Institute	2Yr Globe University	2Yr ITT Technical Institute	2Yr Bryant & Stratton College
n=	30	6	4	43	15	16
Mean	0.817	0.000	0.924	0.724	0.716	0.716
Median	0.931	0.000	0.919	0.750	0.857	0.792
SD	0.237	0.000	0.061	0.222	0.344	0.289

Title IV status had a significant positive association with employment outcomes for graduates of certificate programs, with 73.3% Title IV program graduates predicted to be employed compared to 54.8% of graduates of programs that are not Title IV eligible (Table 7). While online status had a negative association with employment for associate degree graduates (predicted probability 16.0% vs. 64.0%), there was a positive association for certificate programs (98.2% vs. 61.7%). As with the graduation analysis, the coefficient for online status for certificate programs was accompanied by a large standard deviation owing to the small number of programs. Similar to both the retention and graduation analysis, there was a positive association between in-state status and employment for certificate programs (65.4% vs 61.3%).

Unlike retention and graduation, however, there was also a positive association between in-state status and employment among associate programs (58.5% vs. 51.2%). Notably, the differences in predicted probability between in-state and out-of-state status were narrowest for employment. Among the program areas, only criminal justice at the certificate level (which contained only one program) had a significant association with employment rates. In another divergence from retention and graduation rates, only one program area at the associate level, Engineering Technologies, had a significant association with employment, whereas nine program areas at the certificate level were significantly associated with employment.

Table 7. Relationship between Program-level Characteristics and Employment of Graduates

	Certificate			Associate		
CIP	Coefficient	SD	*p*	Coefficient	SD	*p*
9	-16.855	1660.270	0.992			
10	-1.585	0.660	0.016	-0.857	0.580	0.140
11	-1.224	0.294	0.000	0.730	0.621	0.240
12	-5.233	0.617	0.000	1.291	0.816	0.114
13	-2.131	0.313	0.000			
15	16.416	748.542	0.983	2.190	0.825	0.008
19				-13.673	2023.430	0.995
22	12.353	1068.604	0.991	-0.884	0.702	0.207
23				-13.673	2023.430	0.995
24				0.741	0.990	0.454
30				-15.719	1592.070	0.992
31				17.447	1126.918	0.988
32	-1.050	0.387	0.007			
42				-13.673	2023.430	0.995
43	-16.664	836.282	0.984	0.399	0.611	0.513
44	-0.134	0.667	0.840	-16.263	1120.644	
46	-2.839	0.346	0.000			
47	0.137	0.269	0.609			
48	-0.418	0.543	0.441			
49	-0.005	0.211	0.981			
50	-3.286	0.364	0.000	-1.039	0.583	0.075
51	-0.663	0.212	0.002	0.496	0.559	0.374
52	-1.867	0.215	0.000	0.005	0.594	0.994
Title IV	1.000	0.103	0.000			
Online	6.131	0.459	0.000	-2.594	0.245	0.000
In State	0.217	0.095	0.022	0.440	0.171	0.010
n	204			128		

DISCUSSION

As FPCUs grow in number, enrollments, and scope, there is growing national concern over both their costs and student outcomes, particularly those outcomes associated with the eventual ability to repay loans. Because of the limitations of the federal data sources used for this analysis, researchers have had limited ability to examine diversity of student outcomes at for-profits and their association with program level characteristics. This study took advantage of data from a state regulatory agency to explore how student outcomes in certificate programs eligible and not eligible for Title IV aid varied by program cost, the amount of variation in student outcomes across program areas both between and within institutions, and the degree to which program-level characteristics were associated with student outcomes at each degree level.

Our first set of analyses confirms Cellini and Goldin's observation that Title IV eligible programs cost significantly more than similar Non-Title IV eligible programs, with almost no overlap in tuition levels. The addition of student outcomes unavailable to Cellini and Goldin provided the ability to explore whether there was a stable relationship between cost and student success. Within the sample, Title IV programs have much lower graduation rates than their Non-Title IV counterparts; there are several potential reasons for this difference. Title IV funds are intended to make higher education more accessible reducing upfront costs; it may be that these programs have higher enrollments of students from low-income backgrounds and that these same students face greater challenges to graduation. If, as Cellini and Goldin suggest, the availability of Title IV aid has the unintended impact of causing eligible institutions to raise their tuition (one explanation for why the average Title IV tuition rate is so much higher than for similar Non-Title IV programs), it may also be that loan aversion or concern about long-term costs dissuades students who begin Title IV programs from finishing them.

The higher subsequent employment rates of Title IV program graduates similarly suggest multiple possible explanations. It may be that the regional accreditation required for Title IV eligibility results in higher quality programming or additional prestige recognized by employers. Given the higher long-term costs of Title IV programs, however, higher employment rates may simply represent selection bias, with students willing to pay higher costs more likely to already be employed or to have backgrounds and resources that position them better in the employment market. It also appears that explanations may vary by program area; while, for example, within Non-Title IV business programs there appears to be negative correlation between program cost and both graduation and employment, the trend is reversed for health services programs.

Because Non-Title IV institutions are not required to participate in the major federal surveys or data reporting, future research should consider using student-level data from individual institutions to better understand how student-level characteristics interact with program costs and student outcomes. Qualitative inquiry examining program structures and requirements or conducting more in-depth interviews with students and employers may also help to better uncover reasons for the variation within specific program areas.

Confirming previous research on program outcomes at public postsecondary institutions, the analysis shows that retention, graduation, and employment rates of graduates at FPCUs vary at similar or greater rates across program types and within institutions as they do between institutional averages across institutions. Analysis by program area also highlights trends not visible when simply comparing institutional means. For example, while baccalaureate programs have higher mean retention rates than associate programs overall, that trend is reversed among programs in health services. Similarly, the analysis of associations between program-level characteristics and student outcomes largely confirms EAB's concerns about online programs

when they are offered at the associate degree level. However, although there were only a small number of online programs at the certificate level and only retention was analyzed for baccalaureate program outcomes, online programs appear out-perform in-person programs at the certificate and baccalaureate levels.

The analysis of inter-institutional outcomes that take into account program area and the examination of variation in intra-institutional outcomes suggests that the range of outcomes at FPCUs are far more diverse than are typically depicted, and regression results suggest that program level data points can have significant explanatory power for this diversity. These findings suggest the value of reporting information on student outcomes not only as program level means by institution, but by program area, including information about where the program is based and how it is delivered and funded. It may also suggest caution in using institutional averages to advise students and to inform regulation; institutions with acceptable averages may house programs with far lower performance. If institutional average remains an important metric for regulation, then it may make sense to hold institutions to different levels of scrutiny based upon their program offerings. There may also be potential to project outcomes based upon the planned distribution of enrollments across programs a new institutions intends to offer, allowing regulatory agencies to be more proactive supporting institutions with higher risk programs; this could be particularly helpful given the increasing number of new FPCUs.

It is important to note that this method of reporting requires institutions to perform detailed tracking of student level data, yet the subsequent roll-up of this information to the program level prevents researchers and policymakers from taking into account the myriad of student level characteristics that may underlie these outcomes. Students with particular academic or demographic backgrounds may cluster in particular programs; this information is also not

discernable from the data. The state-level nature of the collection also presents particular challenges for schools with campuses in multiple states or with online offerings enrolling students across the country; rather than producing a single student-level file, a patchwork of state regulations may require these FPCUs to perform a separate analysis for each state in which they operate, catering to a variety of definitions that limit the comparability of the data.

Policy organizations and non-profit foundations have increasingly advocated for a federal unit-level records systems (Miller, 2016). In addition to providing a standard reporting practice for all institutions, such a system could also take advantage of resources such as the federal tax database to examine earnings outcomes and, because of the more granular level of reporting, would allow states like Wisconsin to conduct narrower analyses focused only on their own students. This remains the ideal for policymakers, researchers, and potential students alike. Efforts to increase the representation of FPCUs in major federal surveys like the National Postsecondary Student Aid Survey and the Beginning Postsecondary Survey are also important steps in the right direction that will allow researchers to examine unit level student outcomes contextualized by granular transcript data.

In an era with reasonable, concurrent pressures for rapid innovation, increased access, and actionable accountability, a more nuanced understanding of the outcomes of FPCUS is a legislative, social, and consumer imperative. Existing federal reporting methods and data sources paint an informative but incomplete picture of the sector. In the absence of centralized student level data, new and alternative methods of reporting can provide a lens through which to both better understand the limitations of existing methods and explore the potential of new ones. Continued overreliance on existing sources without exploring the potential explanatory power of

broader data sets may result in misguided efforts to describe, regulate, and incent the for-profit sector, masking informative complexity and missing the trees for the forest.

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