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Personalized Outreach to University Students With a History of Reading Difficulties: Early Screening and Outreach to Support Academically At-Risk Students

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*We examined whether identification of and personalized outreach to a group of students with a history of reading difficulties would impact their use of support services and academic outcomes. Using a brief self-report questionnaire, we identified students with a history of reading difficulties (*n = *175) and a comparison group of university students without a history of reading difficulties (*n = *100). One half of the students with a history of reading difficulties were individually invited to visit the Academic Advising Centre; the other students received standard university communications about and access to university support services. Students with a history of reading difficulties who received personalized outreach in the first semester of their studies were more likely to use the Academic Advising Centre both in the weeks directly following outreach and in their second year of study. Outreach also increased use of the Study Skills Centre, but not the Writing Centre. Further, there was evidence of a positive effect of personalized outreach on the number of credits earned. Finally, the effect of first-semester personalized outreach on use of Academic*

Advising Centre in the second year was especially prominent for students who experienced serious academic difficulties in their first year. Overall, our results show promising outcomes for a simple, proactive, cost-effective approach to identify and provide personalized outreach to academically at-risk students.

As the student population in universities becomes increasingly diverse (e.g., Lewis, Farris, & Greene, 1999), there is growing emphasis on identifying and supporting students likely to experience academic challenges early in their university experience (e.g., Noel-Levitz, Inc., 2007). Even with the use of early alert systems, universities are left to rely on relatively late indicators of need for support, such as course failure and poor class attendance (e.g., Heisserer & Parette, 2002). We report here on an empirical evaluation of a proactive approach to early identification and personalized outreach. We identified first-year students who reported a history of reading difficulties early in the academic year, and examined whether personalized outreach

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to these students during their first term in university increases their use of student services and improves their academic outcomes.

There is substantial evidence that university students who report a history of reading difficulties have far poorer word reading and reading comprehension skills than their peers without a history of reading difficulties (e.g., Deacon, Parrila & Kirby, 2006; Parrila, Georgiou & Corkett, 2007). These differences reflect, on average, four grade levels on standardized word reading and timed reading comprehension measures (Deacon, Cook & Parrila, 2012). Further, Deacon et al. (2012) reported that the reading levels of students self-reporting a history of reading difficulties were similar to those of students with a documented learning disability or dyslexia.

University students with a history of reading difficulties encounter academic challenges, as measured by traditional metrics such as grade point average (GPA) and course completion. For example, in a study of 847 first-year university students, Bergey, Deacon, and Parrila (2015) found that students who reported a history of reading difficulties obtained a first-year cumulative GPA of 2.8 (out of 4.3) in contrast to an average of 3.0 for students who reported no such history. This was a statistically significant difference (see also Chevalier, Parrila, Ritchie & Deacon, 2015). Further, in the Bergey et al. study 1 in every 3 students with a history of reading difficulties failed or withdrew from a course in their first year, but few students without a history of reading difficulties did so. This pattern of academic achievement among students who report a history of reading difficulties is somewhat different than what has been reported for students with a diagnosis of learning disabilities—including those with disabilities related to reading and unrelated to reading. Students with diagnosed learning disabilities have been reported to earn GPAs

similar to those of university students who are not learning disabled (Heiman & Precel, 2003; Hen & Goroshit, 2014; but see Witte, Philips, & Kakela, 1998). This parity in academic performance is potentially due to the accommodations offered to students with diagnosed learning disabilities and to outreach directed at these individuals. Despite below-average reading abilities, students reporting a history of reading difficulties who do not have a diagnosis must tackle the academic challenges of university without any accommodations or targeted supports.

We were interested in whether there is value in identifying and directing outreach to students with a history of reading difficulties early in their university experience, before they encounter academic difficulties. The standard early alert systems (e.g., Heisserer & Parette, 2002) typically rely on academic transcripts from the first term or first year of students' undergraduate careers. By this point, students may have experienced substantial academic difficulty, such as poor grades on several different kinds of evaluations across a number of courses. Given this context, we identified first-year students who reported a history of reading difficulties at the start of their first academic year, and examined whether proactive personalized outreach to these students during their first term in university increased their use of student services and, further, improved their academic outcomes.

In the hopes that existing academic services might support the university experience, we guided students with a self-reported history of reading difficulties to the Academic Advising Centre. Academic advising is widely offered at universities (Tagayuna, Stodden, Chang, Zeleznik, & Whelley, 2005) and might be a service of use to any students likely to encounter academic difficulty, including students with a history of reading difficulties. Academic advising often consists of centralized

university-wide academic advising centers staffed by professional advisers. Use of academic advising has been linked to important student outcomes, including student satisfaction with the university experience, gains in academic skills, and graduation rates (Bahr, 2008; Graham & Gisi, 2000; Kuh, Buckley, Bridges, & Hayek, 2006). Academic advising can support student success through multiple pathways (Metzner, 1989) as advisers provide guidance in academic planning with the broader goal of supporting students' personal development. For example, one important function of academic advising is to help students integrate academic, career, and life goals with institutional opportunities and demands (Smith & Allen, 2006). In meeting with an adviser, students connect with a knowledgeable adult within the university. The personal connection and the knowledge sharing that result can help students improve their academic skills and feel socially connected to the university community; this academic and social integration, in turn, can influence students' decisions to remain within a postsecondary institution (King, 1993; Light, 2004; Tinto, 2004).

Academic advising also connects students to other available academic services, such as writing centers and study skills workshops (Tagayuna et al., 2005; Williams, 2005). Writing centers provide students with assistance in planning and writing academic assignments. Study skills tutors and workshops provide training in time management, note taking, exam preparation and other study skills; these are competencies that students with a history of reading difficulties report lacking (Bergey et al., 2015; Chevalier et al., 2015).

We note that many factors can affect students' willingness to seek advising (for a review, see Alexitch, 2006), any number of which could also impact the likely effects of this advising. With this caveat in mind, it is perhaps not surprising that there is no clear evidence of a positive relation between use of academic advising and academic performance. Hester (2008) found no correlation between academic advising use and academic performance, whereas Robbins et al. (2009) found a negative relationship between academic advising and GPA: students who visited advising more had lower academic performance. This is not entirely surprising as weaker students are most likely to need advising, and poor academic performance may prompt students or universities to initiate advising appointments. Evidence of a positive relationship emerges from a study by Kot (2014) who demonstrated that students who used academic advising had higher first-year GPAs after controlling for a host of other factors (such as gender, high school GPA, and SAT scores; see also Keim, McWhirter, & Bernstein, 1996). Robbins et al., in turn, found that the benefits of academic advising on GPA were greatest for at-risk students (see also Carini, Kuh, & Klein, 2006), as determined by high school GPA, psychosocial factors and socioeconomic status. When such at-risk status is combined with substantive academic challenges in the first year of university, academic advising may be particularly critical to avoid cessation of university studies.

CURRENT STUDY

We first identified students with a history of reading difficulties based on their responses to a brief questionnaire. On the basis of existing studies (e.g., Bergey et al., 2015), we expected these students to be at-risk for poorer academic performance in university. We then provided targeted personalized outreach—e-mails and phone contact encouraging students to make an appointment with the Academic Advising Centre—to a group of university students with a history of reading difficulties. We examined both immediate and long-term effects of this

outreach to address three research questions. Our first research question: Will identification and personalized outreach to students with a history of reading difficulties increase use of Academic Advising Centre and other student services? To answer this question, we examined students' actual use of the Academic Advising Centre and other support services over their first 2 years of university. We investigated immediate effects in the first term by comparing service use in the weeks before and after personalized outreach, and we investigated longer term effects by assessing impact in the second term of the first year and through the students' second year of academic study.

Our second research question: Do identification and personalized outreach to students with a history of reading difficulties improve their academic performance? To evaluate the effect of advising on GPA and credit hours attempted and completed, we examined data from each of the four terms of students' first 2 years in university. As we explored potential impacts on GPA, we remained wary of the mixed pattern of results to date (e.g., Kot, 2014; Robbins et al., 2009) and of the challenges of impacting a relatively distal outcome such as GPA, likely affected by a whole host of factors (see Platt, 1988).

Finally, we asked: Is personalized outreach likely to affect use of the Academic Advising Centre in the second year for those at-risk students who earn a low GPA during their first year of study? Despite inconsistent evidence on the impacts of academic advising on academic performance (Kot, 2014), we were motivated to explore this question in part because of evidence that the benefits of academic advising on GPA are greatest for students at risk because of a combination of factors (e.g., Robbins et al., 2009). Here we evaluated the combination of a self-reported history of reading difficulty and academic difficulty

experienced in the first year of university. We addressed the three questions by comparing outcomes for students with a history of reading difficulties in two matched groups who did and did not receive personalized outreach. We included a comparison group of students without a history of reading difficulties who did not receive personalized outreach; this group provides a reference point for comparing levels of use of services, GPA, and credits completed in this specific university context.

METHOD
Participants and Screening Procedure

At the start of two consecutive academic years, all incoming first-year university students were invited via an e-mail from the University Registrar to complete online the Adult Reading History Questionnaire–Revised (ARHQ-R; Parrila, Corkett, Kirby, & Hein, 2003); 1,748 did so, reflecting a response rate of roughly 36% in each year. From this larger sample, we identified 175 students with a history of reading difficulties (HRD) and formed a comparison sample of 100 students with no history of reading difficulty (NRD) based on students' scores on the ARHQ-R (e.g., Chevalier et al., 2015; Deacon et al., 2012; Parrila et al., 2007). Only those students who met the criteria for HRD or NRD were included in analyses. All participants spoke English as their first language and were attending a postsecondary institution for the first time. Further, all participants consented to our tracking their academic progress and their use of student services. Of these participants, 79% were retained into their second year, which is similar to the institution retention rate of approximately 82% at the time of the study. Given our interest in outcomes in the first and second year of university, we only included those students who persisted to the end of their second year of studies.

Out of the 175 students with HRD, 82 were assigned to the personalized outreach group and the remaining 93 to the no personalized outreach group (34 and 38 males, respectively). As a part of this assigning process, the groups were matched on ARHQ-R proportion score, age, gender, faculty, and degree program (all $ps \geq 0.21$). The mean age of HRD participants who did and did not receive personalized outreach was similar: 18 years, 10 months (SD = 25 months) and 19 years, 0 months (SD = 20 months), respectively. At the time of completing the survey, the HRD participants were in the following faculties, with proportions reported for personalized outreach and no personalized outreach groups, respectively: arts and social sciences (26% and 23%), sciences (28% and 28%), and health professions (22% and 22%); the remaining participants (24% and 27%) were distributed across four smaller faculties.

We selected a random sample of 100 NRD students (M age = 18 years, 9 months; SD = 22 months; 45 males) who received no personalized outreach as a comparison group. We selected a smaller sample of students than was available in order to meet the statistical assumption of equal sample sizes for repeated-measures analyses of variance (ANOVA; Tabachnick & Fidell, 2008). NRD participants followed a similar pattern of faculty level enrollment as the HRD participants: arts and social sciences (32%), sciences (28%), and health professions (11%), with the remaining participants (29%) distributed across four smaller faculties.

The university from which we recruited all participants is a large research-intensive coeducational university in Eastern Canada. This university offers over 180 degree programs across 12 faculties. Approximately 30% of students at this university are from the same province, with the remaining 56% national and 14% international students.

Numerous services are offered at this university to support students' academic success, including academic advising, study skills workshops and tutors, writing tutors, and an accessibility office. The University advertises support services in several ways, including on University websites and social media platforms (e.g., Facebook), paper and electronic orientation materials, and through word of mouth from faculty and peer advisors. Academic Advising is intended primarily for all first-year and second-year students across faculties; however, all students are free to meet with any of the advisors. There is a dedicated first-year advisor who is responsible for coordinating orientation programming and matters specific to the first-year experience. Beyond second year, students are directed to see faculty-specific advisors. Our personalized outreach was conducted through the Academic Advising Centre, which is staffed by professional advisors in a central location at this university. Advisors use a student-centered, solution-focused approach to advising. In responding to students' needs, advisors may refer students to additional university services, such as the writing center and study skill tutors. Advising appointments are one-on-one sessions, typically lasting 30 minutes.

Personalized Outreach Procedure

In mid-October of students' first year, a first-year advisor from the Academic Advising Centre sent a personalized e-mail to participants in the HRD personalized outreach group. A reminder e-mail was sent in mid-November. The initial and reminder e-mails emphasized that advising was useful for all students, encouraged students to make an appointment with a first-year advisor, and provided information on how to book an appointment (e.g., online or by e-mail or phone). The e-mails outlined the topics advisors can provide guidance on, including but not limited to course selection,

degree options, educational and career goals, and academic difficulties. In addition to e-mail communication, a trained peer advisor phoned the participants in the HRD personalized outreach group for whom phone numbers were available (approximately 65% of sample). As with the e-mail communication, the purpose of the phone call was to encourage the student to make an appointment with a first-year advisor and to explain the services available through advising. In order to achieve a sufficient sample for the analyses, first-year personalized outreach procedures were conducted for 2 consecutive academic years. Procedures were the same for each academic year.

The HRD no personalized outreach and the NRD groups received no specialized communication beyond the university's standard practice, which included information on the university's website and a pamphlet on services available in orientation packages. All students, regardless of the group to which they were assigned, had equal access to the Academic Advising Centre, and the intervention consisted only of personalized outreach in the form of e-mail and phone communications. In the reporting of results, we use the term *outreach* as shorthand for personalized outreach for ease of narration.

Measures

Adult Reading History Questionnaire-Revised. History of reading difficulties was assessed with the elementary school scale of the ARHQ-R (Parrila et al., 2003), which is based on the Adult Reading History Questionnaire (Lefly & Pennington, 2000). The ARHQ-R elementary school scale consists of eight items that assess the extent to which individuals report experiencing difficulty learning to read and spell in early childhood (e.g., How much difficulty did you have learning to read in elementary school?). Responses were indicated on a 5-point Likert-type scale with descriptors

for each point on the scale. Respondents completed the measure online using a survey-delivery platform that was screen-reader compatible. The scale had good reliability (Cronbach's α = .89). Prior research has shown that students' self-reported ARHQ-R scores can be used to identify students who have lower scores on standardized measures of word reading and reading comprehension (Deacon et al., 2006; Deacon et al., 2012; Parrila et al., 2007) and who have lower academic achievement (Bergey et al., 2015; Chevalier et al., 2015).

Summed scores were calculated and transformed to create a score that ranged from 0 (*no difficulty*) to 1 (*widespread difficulty*). Consistent with prior literature, students with scores equal to or greater than .37 were classified as having a history of reading difficulties and students with scores equal to or below .25 were classified as having no history of reading difficulty (e.g., Chevalier et al., 2015; Deacon et al., 2012; Parrila et al., 2007). Students with scores greater than .25 and less than .37 were excluded from analyses to ensure a clear division between students with and without a history of reading difficulties.

Academic Advising Centre, Writing Centre, and Study Skills Centre Usage. Students' use of the Academic Advising Centre, Study Skills Centre, and Writing Centre was obtained from student services' records in their appointment management software. Visits were measured by the count of appointments to each centre. Visits to the Academic Advising and Writing Centres entailed one-on-one interactions with support service staff; visits to the Study Skills Centres entailed either one-on-one interactions or small group workshops. All centres are within the same institutional office of academic support services and therefore share some advertising and refer students among centres. Each centre has a distinct location on campus and each conducts independent advertising.
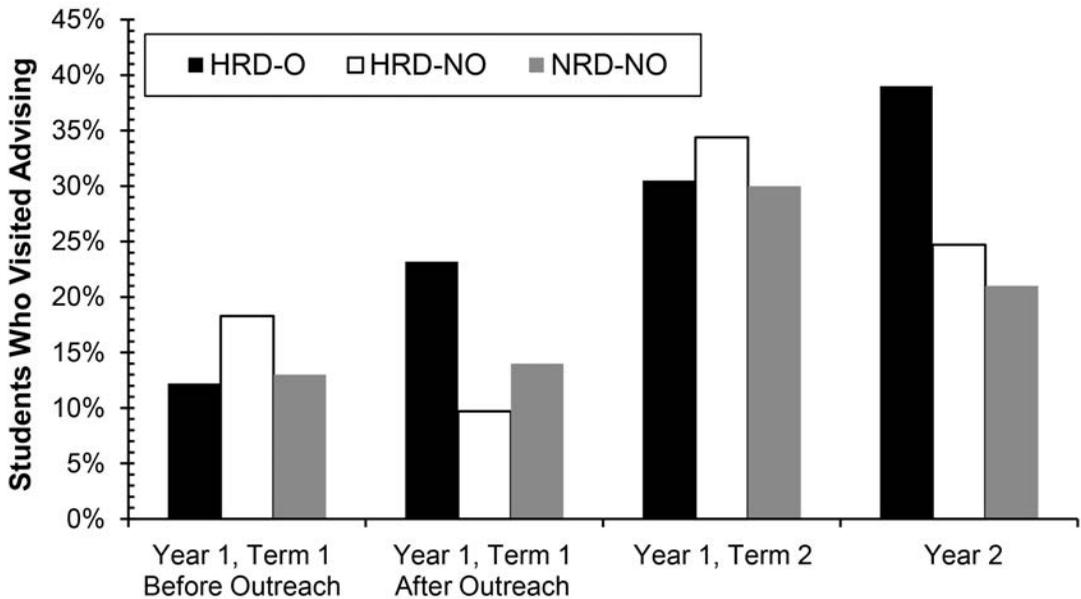
FIGURE 1. Percentage of Students Who Visited Academic Advising
at Least Once During Each of the Four Time Periods

Note. HRD-O = students with a history of reading difficulties who received outreach; HRD-NO = students with a history of reading difficulties who did not received outreach; NRD-NO = students without a history of reading difficulties who did not received outreach.

Academic Progress. Academic progress data were obtained from the registrar's office at the end of each academic year. We analysed cumulative GPA (possible range of 0.0 to 4.3), as well as both the number of credit hours attempted and earned each semester (possible range of 0 to 21 per semester).

Demographic and Degree Information. Demographic variables of gender and age, and program variables of faculty and degree were collected from registrar records.

RESULTS
Outreach Effects on Use of the Student Services

First, we investigated whether students who received personalized outreach were more likely to visit the Academic Advising Centre (see Figure 1). We analysed the dichotomous

(visit vs. no visit) data with a series of logistic regressions at each of four time points: Year 1 Term 1 before outreach, Year 1 Term 1 after outreach, Year 1 Term 2, and Year 2. In each analysis, the dependent variable was visit to the Academic Advising Centre during that time period. The predictor was group: students with a history of reading difficulties who received personalized outreach (HRD-O), students with a history of reading difficulties who did not receive personalized outreach (HRD-NO), and students with no history of reading difficulty who did not receive personalized outreach (NRD-NO). Dichotomizing the data in this way allowed us to directly address our research question by evaluating the likelihood that students would come in for a visit after the outreach, which was the expected outcome for our intervention given that the outreach simply invited students to make an advising

appointment. We also examined whether the outreach would increase the number of times students would access services by completing parallel analyses using the total number of visits made to support services in a given time period, instead of the dichotomized variables. The data on the total number of visits to support services were highly positively skewed, with many people that did not attend at all, as well as some heavy users with as many as 6 visits in a given time period. Given the abnormality of this data, we used nonparametric statistics. Results based on the total number of visits were similar to those we describe below using the dichotomous variables, with one minor exception (see results for effects on use of the Study Skills Centre).

The three groups had similar likelihoods of attending the Academic Advising Centre in Year 1 Term 1 before the outreach and in Year 1 Term 2 (all χ^2s ≤ 1.6, all ps ≥ 0.46); however, the groups differed in their likelihood of attending advising both in Year 1 Term 1 after the outreach, $\chi^2(2) = 6.17$, $p = 0.046$, $R^2N = .04$, $R2CS = .02$ and in Year 2, $\chi^2(2) = 7.69$, $p = 0.021$, $R^2N = .04$, $R2CS = .03$. Table 1 reports on follow-up analyses of the significant effects. After the outreach in Year 1 Term 1, students in the HRD-O group were 2.78 times more likely to attend the Academic Advising Centre than were students in the HRD-NO group. In their second year, students in the HRD-O group were 1.96 times more likely to attend the Academic Advising Centre than were those in the HRD-NO group. In sum, relative to students who did not receive outreach, students with a history of reading difficulties who received personalized outreach were more likely to attend the Academic Advising Centre at least once both immediately after receiving outreach and in their second year of study.

Next, we examined the impact of outreach on the use of the Writing Centre and Study

TABLE 1.

Coefficients for Significant Logistic Regressions of Group on Students Using Academic Advising

Coefficient	b	SE	Odds Ratio [95% CI]
Year 1 Term 1 After Outreach			
HRD-O to NRD-NO	0.49	0.30	1.64 [0.91, 2.94]
HRD-NO to HRD-O	−1.04*	0.44	0.36 [0.15, 0.84]
HRD-NO to NRD-NO	−0.54	0.38	0.58 [0.28, 1.22]
Year 2			
HRD-O to NRD-NO	0.62*	0.26	1.85 [1.12, 3.06]
HRD-NO to HRD-O	−0.67*	0.33	0.51 [0.27, 0.98]
HRD-NO to NRD-NO	−0.05	0.27	0.95 [0.56, 1.61]

Notes. Regressions were run twice at each time point with different reference categories in order to obtain all three comparisons as each was relevant to the results. As they were the same regression, the reported overall statistics were the same. HRD-O = students with a history of reading difficulties who received outreach; HRD-NO = students with a history of reading difficulties who did not receive outreach; NRD-NO = students without a history of reading difficulty who did not receive outreach.
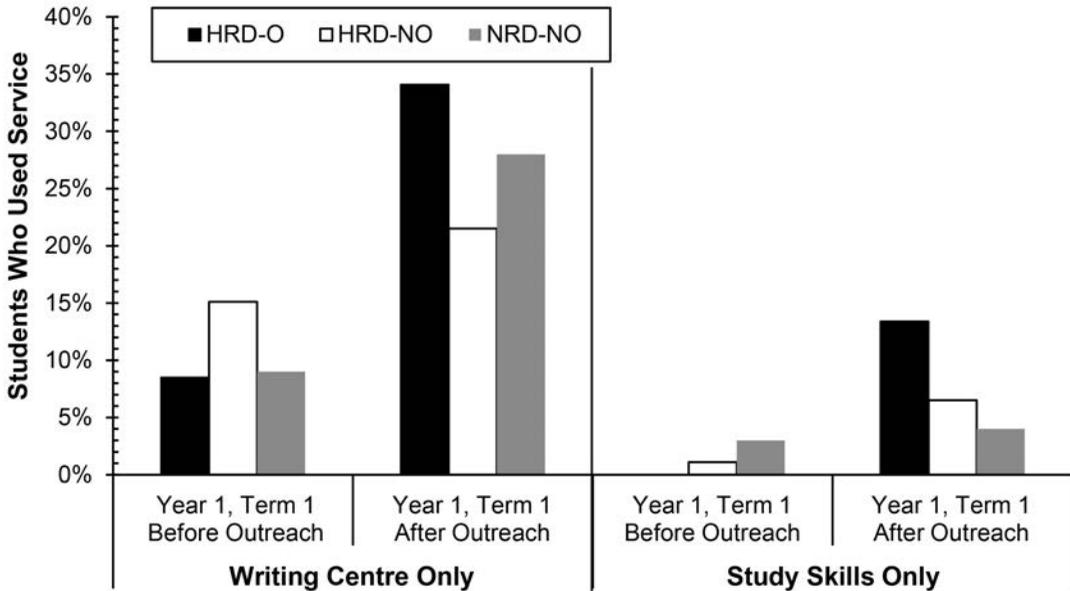
* $p < 0.05$.

FIGURE 2. Percentage of Students Who Used the Writing Centre and the Study Skills Centre at Least Once Before and After Outreach

Notes. After Outreach includes Year 1 Term 1 After Outreach, Year 1 Term 2, and Year 2. HRD-O = students with a history of reading difficulties who received outreach; HRD-NO = students with a history of reading difficulties who did not received outreach; NRD-NO = students without a history of reading difficulties who did not received outreach.

Skills Centre. These services had low rates per time period; for example, across groups in Year 1 Term 2, 31.6% of students used the Academic Advising Centre, but only 9.1% and 1.5% of students used the Writing and Study Skills Centres, respectively. Given these low rates, we combined data for the three time periods following outreach, reporting on use of each service for two time periods: before outreach (in Year 1 Term 1) and after outreach (from Year 1 Term 1 post outreach through to the end of Year 2). Results suggest that targeted outreach led to increased use of the Study Skills Centre: before outreach, the three groups were equally likely to visit the Study Skills Centre, $\chi^2(2) = 3.78$, $p = 0.15$; after outreach, group differences in the percentage of students who visited the Study Skills Centre approached significance, $\chi^2(2) = 5.66$, $p = 0.06$, $R^2N = .05$, $R2CS = .02$. Using a Kruskal-Wallis test, this

difference approached significance with the total number of visits to the Study Skills Centre, H = 5.95, $p = .05$; (see Figure 2 for a visual presentation of the data). Planned post hoc comparisons in the form of Mann-Whitney tests indicated that the HRD-O group had a higher number of total visits than the NRD-NO group ($p = .022$, $r = -.17$), with no significant differences between the HRD-O and HRD-NO ($p = .12$) or the HRD-NO and NRD-NO groups ($p = .44$). In contrast to effects of outreach on the use of Study Skills Centre, results indicate no differences in the likelihood of using the Writing Centre between the three groups at least once before, $\chi^2(2) = 2.40$, $p = 0.30$, or after outreach, $\chi^2(2) = 3.51$, $p = 0.17$.

To summarize, these analyses suggest that identification and personalized outreach increased the number of students visiting the

Academic Advising Centre in the first term immediately after the outreach and also in the second year of academic study. Results also suggest that identification and outreach led to an increase in use of the Study Skills Centre, but not of the Writing Centre.

Outreach Effects on Academic Improvement

Our second question was whether there was an impact of identification and outreach on academic achievement, as quantified by cumulative GPA and the number of credit hours earned in each term (see Figure 3).

A repeated measures ANOVA on GPA with group (HRD-O, HRD-NO, NRD-NO) as the between-subjects variable and time (Year 1 Term 1; Year 1 Term 2; Year 2 Term 1; Year 2 Term 2) as the within-subjects variable showed a main effect of time, $F(3, 789) = 4.50$, $p < 0.01$, $\eta_p^2 = 0.02$, reflecting a linear decrease in GPA over the four terms, $F(1, 263) = 6.06$, $p = 0.01$, $\eta_p^2 = 0.02$. There was also a main effect of group, $F(2, 263) = 8.74$, $p < 0.001$, $\eta_p^2 = 0.06$. Tukey's HSD post hoc comparisons indicated that the NRD-NO group had significantly higher GPAs than both the HRD-O and HRD-NO groups ($ps < 0.01$), with no significant differences between the HRD-O and HRD-NO groups ($p = 0.98$). Critically, there was no significant Group × Time interaction, $F(6, 789) = 0.28$, $p = 0.95$, suggesting that the identification and outreach had no measurable impact on GPA.

Data for the number of credit hours attempted and number of credit hours earned was negatively skewed (see Table 2). Given this abnormal distribution, we analyzed the data with nonparametric Kruskal-Wallis tests at each term with group (HRD-O, HRD-NO,
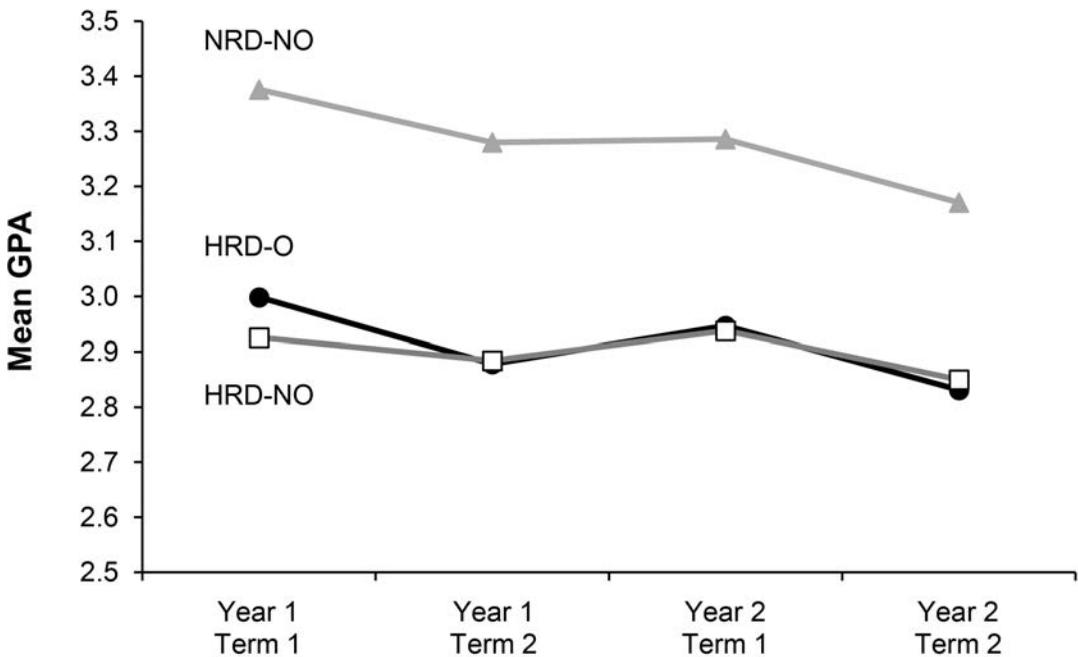

FIGURE 3. Cumulative GPA During Years 1 & 2

Notes. Grade point average (GPA) scale ranged from 0.0 to 4.3. HRD-O = students with a history of reading difficulties who received outreach; HRD-NO = students with a history of reading difficulties who did not receive outreach; NRD-NO = students without a history of reading difficulties who did not receive outreach.

TABLE 2.

Means, Medians, and Mean Ranks for Credit Hours Attempted
and Credit Hours Earned

		Credit Hours Attempted			Credit Hours Earned		
		HRD-O	HRD-NO	NRD-NO	HRD-O	HRD-NO	NRD-NO
Year 1 Term 1	*M*	14.02	14.33	14.80	13.32	13.20	14.42
	M Rank	123.95	139.72	147.92	123.90	133.75	153.51
Year 1 Term 2	*M*	13.93	13.90	14.56	13.12	12.74	14.00
	M Rank	133.66	125.63	153.07	133.15	124.73	154.33
Year 2 Term 1	*M*	14.05	13.77	14.34	13.43	12.76	13.98
	M Rank	134.77	128.99	149.03	136.15	124.32	152.24
Year 2 Term 2	*M*	12.79	13.00	14.04	12.20	12.10	13.26
	M Rank	131.36	126.20	154.44	133.18	126.18	152.95

Notes. HRD-O = students with a history of reading difficulties who received outreach; HRD-NO = students with a history of reading difficulties who did not receive outreach; NRD-NO = students without a history of reading difficulty who did not receive outreach. Median = 15.00 for all except for Credit Hours Earned, HRD-NO, Year 2, Term 2 median = 12.00.

NRD-NO) as the between-subjects variable. In Term 1, there were no group differences in the number of credits attempted (H = 5.59, $p = .06$), while there was a difference in the number of credit hours earned (H = 8.00, $p = .02$). Pairwise comparisons indicated that the HRD-O group earned fewer credit hours than the NRD-NO group ($z = -2.74$, $p = .02$, $r = -.20$), while there were no differences between the HRD-O and HRD-NO groups ($z = -0.90$, $p = .37$) or between the HRD-NO and NRD-NO groups ($z = -1.89$, $p = .18$). In Term 2, the pattern was different, with significant group differences in both the number of credit hours attempted (H = 8.06, $p = .02$) and earned (H = 8.56, $p = .01$). Pairwise comparisons indicated that the HRD-NO group both attempted ($z = -2.76$, $p = .02$, $r = -.20$) and earned ($z = -2.83$, $p = .01$, $r = -.20$) fewer credit hours than the NRD-NO group, while there were no differences between the HRD-NO and HRD-O groups (all $zs < 0.77$, all $ps = 1.00$) or between the HRD-O and NRD-NO groups (all $zs < -1.96$, all $ps > .15$). In Term 3, there was once

again no group difference in the number of credits attempted (H = 4.15, $p = .13$), while there was a group difference in the number of credit hours earned (H = 7.24, $p = .03$). Pairwise comparisons indicated that the HRD-NO group continued to earn fewer credit hours than the NRD-NO group ($z = -2.68$, $p = .02$, $r = -.19$), while there continued to be no differences between the HRD-NO and HRD-O groups ($z = 1.08$, $p = 0.84$) or between the HRD-O and NRD-NO groups ($z = -1.49$, $p = .41$). Finally, in Term 4, the pattern was similar to what was found in Term 2, with group differences in both the number of credit hours attempted (H = 8.46, $p = .02$) and earned (H = 6.88, $p = .03$). Pairwise comparisons indicated that, once again, the HRD-NO group both attempted ($z = -2.73$, $p = .02$, $r = -.20$) and earned ($z = -2.53$, $p = .04$, $r = -.18$) fewer credit hours than the NRD-NO group, while there were no differences between the HRD-NO and HRD-O groups (all $zs < 0.53$, all $ps = 1.0$) or between the HRD-O and NRD-NO groups (all $zs < -2.16$, all $ps > .09$).

To summarize, before the outreach could have affected the number of credit hours earned, students in the HRD-O group generally earned fewer credit hours than the comparison group of university students with no history of reading difficulties (NRD-NO) despite attempting a similar number. In the three terms following outreach, however, the HRD-O group consistently both attempted and earned as many credit hours as university students with no history of reading difficulty (NRD-NO). In contrast, the HRD-NO group earned fewer credit hours than university students with no history of reading difficulty (NRD-NO) in Terms 2, 3, and 4, both when they attempted a similar number of credits (Term 3) and when they attempted fewer (Terms 2 & 4).

We examined the correlations between credits attempted and GPA to evaluate whether attempting fewer credits had a positive impact on GPA. For all three groups, we found the number of credits attempted had a moderate, positive relationship with GPA (rs ranged from .16 to .36); therefore, regardless of group, we observed no negative impact on GPA when students attempted more credit hours. It is interesting to note that, given this finding, it may be that the students are withdrawing from attempted courses rather than failing them, which would not affect their GPA. This would, however, still affect how many credits are earned and the length of time until degree completion.

Outreach Effects on Lower Performing First-Year Students

We conducted further analyses with a subgroup of students with GPAs at or above 1.7 (grade equivalent of *C–*) and below 2.3 (*C+*) at the end of their first year to evaluate the effects of personalized outreach. We chose 1.7 as the minimum GPA, as this is the lowest cumulative GPA above the institutional cutoff for academic dismissal for students who have completed a minimum of 24 credits hours. Our range included the cutoff for academic probation (cumulative GPA < 2.0 after completing 24 credit hours), a designation that often leads to the university encouraging, but not requiring, students to visit the Academic Advising Centre. As such, we identified a subset of students (HRD-O, *n* = 11; HRD-NO, *n* = 18; NRD-NO, *n* = 4) on the threshold of academic dismissal as they moved into their second year.

With this sample, we conducted chi-square analyses to evaluate whether the number of students who attended the Academic Advising Centre at least once differed from the number expected. These were 3 (Group) × 2 (Visit/No Visit,) chi-squares conducted at each of four time points (Year Term 1, before outreach; Year Term 1, after outreach; Year 1 Term 2; Year 2). Given the small sample sizes and the presence of cells with expected counts of less than 5, Fisher's exact test was used to determine significance (following on Field, 2013). All Year 1 analyses were nonsignificant (all *ps* ≥ 0.41). The chi-square was significant in the second year (χ^2 = 7.94, *p* = 0.02; see Table 3); students in the HRD-O group were 8.75 times more likely to attend the Academic Advising Centre than were those in the HRD-NO group (95% CI [1.53, 50.11]). These effects are much larger than those for the overall sample (contrast to 1.96 times at the same time point). We could not calculate odds ratios for comparisons with the NRD-NO group as none of the students in the NRD-NO group attended the Academic Advising Centre in their second year. These findings suggest that outreach had a very large effect on the use of the Academic Advising Centre in the second year by students with a history of reading difficulties who experienced serious academic difficulties in their first year.

To explore alternative explanations for

TABLE 3.

Summary of χ^2 Analysis of Group by Academic Advising Use in Year 2

Student Group	Value	Did Not Attend Academic Advising	Attended Academic Advising	Total
HRD-O	Observed	4.0	7.0	11.0
	Expected	7.7	3.3	11.0
	Percentage Within Group	36.4%	63.6%	
	Standardized Residual	−1.3	2.0*	
HRD-NO	Observed	15.0	3.0	18.0
	Expected	12.5	5.5	18.0
	Percentage Within Group	83.3%	16.7%	
	Standardized Residual	0.7	−1.1	
NRD-NO	Observed	4.0	0.0	4.0
	Expected	2.8	1.2	4.0
	Percentage Within Group	100.0%	0.0%	
	Standardized Residual	0.7	−1.1	

Note. HRD-O = students with a history of reading difficulties who received outreach; HRD-NO = students with a history of reading difficulties who did not received outreach; NRD-NO = students without a history of reading difficulties who did not received outreach.

* $p < 0.05$.

this pattern of results, we conducted further analyses to examine whether the university's own outreach to students on academic probation (GPAs between 1.7 and 2.0) might have affected our results. Our follow-up analyses showed that none of the students with GPAs between 1.7 and 2.0 in either the HRD-NO or the NRD-NO groups (out of 6 and 3 students, respectively) visited the Academic Advising Centre in their second year. In contrast, 4 of the 5 students within this GPA range in the HRD-O group visited the Academic Advising Centre in their second year. As such, and in sharp contrast to identification and outreach on the basis of self-reported history of reading difficulties, any institutional outreach to students in the HRD-NO group on the basis of poor academic performance does not appear to have resulted in visits to the Academic Advising Centre in their second year.

DISCUSSION

Students with reading difficulties are considered to be academically at risk given prior evidence of reading impairment and low academic performance, as measured by GPA and course completion (Bergey et al., 2015; Chevalier et al., 2015). We screened for a self-reported history of reading difficulties among first-year students on a university-wide basis in two consecutive academic years and invited one half of students with a history of reading difficulties to visit the Academic Advising Centre. Students who received personalized outreach through personalized e-mails and a phone call showed an increase in use of the Academic Advising Centre and the Study Skills Centre, but not the Writing Centre. Further, although personalized outreach did not appear to affect academic performance as measured by GPA, there was evidence of

an effect on both the number of credit hours attempted and the number of credit hours earned. Finally, personalized outreach had a particularly strong impact on the likelihood of turning to the Academic Advising Centre in the second year for students with a self-reported history of reading difficulties who experienced serious academic challenges in their first year of university. Taken together, these results suggest that identification of and personalized outreach to students with a history of reading difficulties is a proactive and low-cost way to connect students who are at risk for academic difficulty with existing university services. The primary contribution of this work lies in demonstrating the value of identification of and proactive outreach to students with a history of reading difficulties, for whom there is little available knowledge on best practices in these domains.

Outreach to students with a history of reading difficulties clearly had a positive impact on use of the Academic Advising Centre in the weeks directly following the personalized outreach and in the students' second year of study. Increased use of the Academic Advising Centre for two time periods shows persistence of these effects. A likely explanation of the absence of an increase in use of the Academic Advising Centre in the second term of first year comes from academic advisors at our institution who noted that students are likely to visit the Academic Advising Centre in the second term of first year on their own initiative to choose courses for their second year of study. The high overall use in this term may have left little room for the effects of our personalized outreach to emerge. Overall, we think that the increased use of the Academic Advising Centre is important because it connects students one-on-one with a well-resourced member of the university community. Students with a history of reading difficulties typically fly under the radar of most university student support services. This connection to the Academic Advising Centre is likely to increase students' sense of academic and social integration in the institution (Tinto, 1993; see also DaDeppo, 2009).

We also saw that personalized outreach resulted in an increase in visits to the Study Skills Centre, revealing an effect on more distal service/use outcomes. An increase in use of Study Skills workshops and tutors may be particularly important as these services are designed to improve learning and study strategies, an area of demonstrated deficit for students with a history of reading difficulties (e.g., Bergey et al., 2015; Chevalier et al., 2015; Kirby, Silvestri, Allingham, Parrila, & La Fave, 2008). Our study demonstrates that identification and outreach to at-risk students encourage their use of services designed to support learning of these skills.

We saw no similar increase in use of the Writing Centre, which might be related to the fact that, at this university, the Writing Centre is much more widely advertised around campus than the Study Skills Centre is. As such, connecting students to the Academic Advising Centre might have increased awareness of the Study Skills Centre, leading to an increase in its use. Our results provide behavioral data that aligns with prior research indicating that referring students to additional academic resources and supports is an important function of academic advising (Smith & Allen, 2006).

Our second outcome of interest was academic performance as measured by GPA and credit hours attempted and earned. Our outreach to students with a history of reading difficulties did not show evidence of an impact on GPA; we did, however, see some tentative effects on credit hours. In the first term, before the outreach could have had an impact, students with a history of reading difficulties who received personalized outreach

earned fewer credit hours than university students with no history of reading difficulty despite attempting a similar number of credits; then, in each of the three terms following personalized outreach, they both attempted and earned as many credit hours as university students with no history of reading difficulty. In contrast, students with a history of reading difficulties who did not receive personalized outreach both attempted and earned a similar number of credit hours to university students with no history of reading difficulty during their first term; however, they earned fewer credit hours than university students with no history of reading difficulty in each of the three following terms, regardless of whether they attempted a similar number (as in Term 3) or attempted fewer (as in Terms 2 and 4). This set of results is not picture perfect: preferably, there would be clear differences between students with a history of reading difficulties who did and did not receive personalized outreach. Nevertheless, we think that the differences in contrast to university students with no history of reading difficulty are worth considering, particularly given prior evidence of lower rates of course completion by students with a history of reading difficulties (Bergey et al., 2015). Lower rates of course completion might have ripple effects on both university completion and successful transition to the workforce. In studies of university students with diagnosed learning disabilities, degree completion is a critical factor in employment rates (Madaus, 2006; Murray, Goldstein, Nourse, & Edgar, 2000). We do not know whether the same is true for students who self-reported a history of reading difficulties, but we think that the number of credits earned is a highly meaningful outcome for the population examined in this study, many of whom do not have a diagnosis of a reading disability. Our outreach moved students with a history of reading difficulties one step closer

to successful degree completion, an important component in the achievement of academic and career goals.

It is worth considering why our outreach approach did not have a measurable impact on GPA. This lack of impact fits within the mixed picture to date of prior research on the impacts of academic advising on GPA, with null, negative, and positive relations emerging (e.g., Hester, 2008; Robbins et al., 2009). To our knowledge, no prior research has focused specifically on students with a history of reading difficulties. Further, little of the available research includes an experimental design like we report on here. A case in point: evidence of a positive relation between use of academic advising and GPA revealed by Kot (2014) might have been influenced by individual differences beyond the substantive controls included in his study. Further, we need to remember that GPA is a distal outcome influenced by a whole host of factors (e.g., Robbins, Allen, Casillas, Peterson, & Le, 2006). In our design, for example, positive effects are dependent on students' responding to personalized outreach by visiting advising, a link likely affected by a host of factors (for a review see Alexitch, 2006). Should this visit take place, it would also have to lead to changes in student behaviour in ways that lead to achieving higher grades in their courses. There is some evidence that this multistep connection might have been effective for course completion, but not in a way that led to overall change in GPA. Taken together, these are promising outcomes that should inspire future research into how to impact the approaches to learning and study taken by at-risk students in a way that positively impacts their academic performance.

Finally, identification and personalized outreach were particularly important for students with a history of reading difficulties who also experienced serious academic diffi-

culties during their first year. Within this group, students who received personalized outreach were 9 times more likely to attend the Academic Advising Centre in their second year than were those who did not receive this outreach; this effect is over 4 times larger than the positive effect of personalized outreach for the overall sample. These results suggest a long-lasting impact of early personalized outreach on students' willingness to seek assistance later in their academic career, most prominently when students with a history of reading difficulties are also experiencing academic difficulty. These findings resonate with prior work showing particularly strong benefits for academic advising for at-risk students, identified on other bases (see e.g., Robbins et al., 2009).

Personalized outreach has important implications for academic advisors and university policy makers in demonstrating the value of a cost-effective outreach procedure that draws on universal design principles to meet the learning needs of all students (e.g., Getzel, 2008). In our personalized outreach, students with a history of reading difficulties were explicitly told that advising is useful for all students, not just for students who are struggling, to avoid possible concerns about stigmatization by connecting students with the services that are available and recommended to all university students. For students with diagnosed learning disabilities one barrier to accessing student services lies in their not wanting to disclose their disability (e.g., Denhart, 2008; Hartman-Hall & Haaga, 2002). In our view, there is a parallel for students with a history of reading difficulties who may avoid student services in part because of concerns about revealing current difficulties face-to-face. These students may experience fewer reservations about revealing earlier reading difficulties in an online questionnaire, such as the one used in this study. Personalized

outreach on the part of the university early in these students' academic careers might go some distance in reducing barriers to accessing services, particularly if students are reminded that academic difficulties are commonplace and that support services are designed for all students. The practical value of our approach also stems from the modest demands placed on universities and support service providers. Our approach offers a low-cost way for large universities with centralized advising to identify at-risk students at the start of their university experience and to connect them with services that are already in place.

In terms of theoretical implications, we turn to Tinto's (1993) prominent model of student departure from postsecondary institutions. According to this model, students' interactions with faculty and staff are important contributors to academic performance and academic and social integration, which in turn influence students' decision to persist or leave postsecondary education. Although we do not know if this is the case with students with a history of reading difficulties, empirical work with students with disabilities suggests that they are more likely to persist to graduation if they are socially and academically engaged on campus (Mamiseishvili & Koch, 2012). In the theoretical model, the number and quality of interactions with academic advisors, study skills tutors, and other academic support staff can help students improve academic performance and can help them feel integrated into the institution, both of which may support retention.

Based on this model, Tinto stressed the importance of three best practices with at-risk students that resonate with the approach evaluated here. Tinto suggested that the institution should (a) assess incoming students' skills; (b) proactively intervene with students before problems arise; and (c) support the development of students' basic academic skills,

such as reading, studying, and learning skills. On the first front, screening students with the ARHQ-R identifies incoming students who may be academically vulnerable based on prior reading difficulties; prior research indicates this self-report can serve as a rough proxy for actual reading skills (Deacon et al., 2012). Second, our personalized outreach was proactive by contacting students at the start of their first year before any academic difficulties are recorded on a transcript. This extends prior early alert approaches, such as those relying on failure of individual courses or exams (e.g., Heisserer & Parette, 2002), to a much earlier time point. Beyond making this outreach earlier, the shift in the reason for the outreach from course failure to questionnaire responses could increase the likelihood of uptake of the outreach. Third, our approach connected students one-on-one with a knowledgeable advisor who could help them connect with a network of institutional resources to develop the skills they need.

Certainly there might be more effective approaches. For example, assessing in-coming reading skills with standardized measures of reading ability, mandating advising for all at-risk students, or requiring intensive developmental education courses for those with skill deficits might all be effective, but these are also likely to be impossible, impractical, or undesirable policies. The approach tested here offers a proactive, simple and cost-effective way of identifying and providing personalized outreach to at-risk students, one that could be very useful for large universities with a similar advising structure.

The implications of our results need to be considered against the study's limitations. First, we limited our evaluation to students with English as a first language and those entering university for the first time. We did so because there were too few students with English as their second language (ESL) or students returning to postsecondary education to examine these groups separately. This would be particularly important for ESL students; reporting on early reading difficulties might be fundamentally different depending on the nature of the first language or on a bilingual reading experience. Second, we do not have data on use of advising beyond that gathered by our institutions' tracking system. Students may have used informal advising, for example, by contacting faculty or other students, and we do not have any data on this alternative advising. Third, passage of time and students' natural progression through their academic career likely influenced their use of support services. Our analyses examined group differences at single points in time and did not fully account for time-dependent factors that may have influenced service use. Fourth, reliable prior achievement data (e.g., high school GPA, SAT scores) or additional demographic data (e.g., socioeconomic status, first-generation postsecondary student) was not available and our groups might have been dissimilar in aspects that may have influenced achievement and support service use. Fifth, one factor that moderates the effects of advising on educational outcomes is the quality of the advising experience (Metzner, 1989; National Survey of Student Engagement, 2005); unfortunately, student perceptions of the quality of the advising experience were not available for inclusion in this study. Finally, we did not include a comparison group of students without a history of reading difficulties who received personalized outreach. Future research that includes such a comparison group would provide a valuable extension of this study. In the absence of such a study, we caution against the assumption that personalized outreach meets a unique need of students with a history of reading difficulty: it is possible that personalized outreach is effective for most university students, regardless of reading history.

In conclusion, students with a history of reading difficulties who were individually invited to visit the Academic Advising Centre did so to a greater extent than those who were not, both in the weeks directly following personalized outreach and in their second year of study. The effect of personalized outreach on use of the Academic Advising Centre in the second year was especially prominent for those students who experienced serious academic difficulties in their first year. Beyond use of the Academic Advising Centre, personalized outreach also increased use of the Study Skills Centre and had a positive effect on the number of credits earned. Overall, our results show promising outcomes for a simple cost-effective approach to identification of and personalized outreach to academically at-risk students that will be particularly useful for larger universities with centralized advising systems.

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