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Intervention e-mails and retention: How e-mails tailored to personality impact an
undergraduate student's decision to return to school or not

By

John Heffernon

A Thesis Submitted in Partial Fulfillment of the

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Intervention e-mails and retention: How e-mails tailored to personality impact an undergraduate student's decision to return to school or not

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This thesis has been examined and approved by the following members of the student's committee.

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Abstract

Universities and colleges constantly face a costly problem: low student retention rates. One potential solution to low student retention is a personality-tailored e-mail intervention. The researcher tested this idea with a sample of 59 first-year students from Minnesota State University, Mankato. Participants took a personality assessment in order to measure their personality trait of sociability. Then participants were split into an experimental group and a control group based on a matched-sample paradigm that ensured sociability was not significantly different between the two groups. Participants in the experimental group received four different intervention e-mails throughout the course of the 2015 fall semester. The e-mails informed them about social events occurring on campus (i.e. football games, diversity events, and concerts) over the course of a two-week period. Four different academic outcomes were measured: GPA, course completion rates, course withdrawals, and fall-2015-to-spring-2016 retention rates. Additionally, Recognized Student Organization (RSO) membership was measured. The results demonstrated that sociability-tailored e-mail interventions have no association with course completion, course withdrawals, and retention. The results also demonstrated that sociability-tailored e-mail interventions have a negative association with GPA and RSO membership. Theoretical and practical implications for studying personality-tailored e-mail interventions and their effect on academic outcomes are discussed.

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Introduction

College Student Retention

Low student retention is a costly problem for many colleges and universities. Institutions may receive less financial support than usual from the government or from financial endowments (funds that are donated to academic institutions from alumni and organizations) and these can typically create times of financial hardship for the institution. During times like these, reducing the institution's costs becomes essential. One avenue of institutional cost reduction that might prove fruitful is improving retention rates. The financial burden of low student retention has motivated colleges and universities in the United States to emphasize the importance of detecting the factors associated with improving the retention rates of their students (ACT, 2008). About 26% of college students withdraw from their institution after their freshman year. The direct cost in the withdrawal of a student from an institution is the loss of that student's tuition payment. Along with the loss of tuition, institutions lose an average of \$5,460 from acquiring the original student and then replacing that student with another student (Raisman, 2013). So for example, a student withdraws from their institution when they have three years remaining and tuition is \$40,000 a year. The cost for that one student's decision to leave would be about \$125,460. This can add up very quickly as more and more students decide to leave a college or university.

In a study performed by the Educational Policy Institute, Inc. (Raisman, 2013), 1,669 four-year institutions in the United States were examined. According to the study, the amount of institutional revenue lost from student attrition was over

\$16.4 billion. On average, public institutions lost over \$13 million per institution and private institutions lost over \$8 million per institution.

The costs of low retention rates to colleges and universities have been identified, however there are also costs to students and the nation. Research indicates that men who have a bachelor's degree earn about 37 percent more income per year than men with only a high school diploma, while women with a bachelor's degree earn about 35 percent more per year than women who have only a high school diploma (Pascarella & Terenzini, 2005). Students who started college in the fall of 2002 seeking a bachelor's degree, but failed to graduate six years later, cost the United States \$566 million in federal income taxes and \$164 million in state income taxes (American Institutes for Research, 2011).

Low retention rates are costly on many levels; therefore it is necessary to have a more in-depth understanding of what is driving them. Since 1983, ACT has been collecting and reporting on institutional retention rates and persistence-to-degree rates. The institutional retention rate is the percentage of a school's first-time, first-year undergraduate students who continue at that school the next year. For example, a student who studies full-time in the fall semester and keeps on studying in the program in the next fall semester is counted in this rate. The persistence-to-degree rate is the percentage of a school's first-time, first-year undergraduate students who complete their program within 125 to 150 percent of the published time for the program. For example, for a four-year degree program, entering students who complete within six years are counted as graduates (FAFSA, n.d.).

Annual reports include data from more than 2,500 colleges and universities (ACT, 2013). Over a 30 year period, first-to-second-year retention rates for four-year colleges have ranged from 72.3% (2008) to 74.9% (1991) and five-year persistence-to-degree rates have ranged from 50.9% (2001) to 55.1% (1989). Overall, these retention rates have fluctuated very little, contributing to a trend that retention rates do not change much over time. Even an improvement of one or two percentage points could save these universities millions of dollars.

Both students dropping out of the institution and also transferring from one institution to another affect retention rates. The transfer process negatively impacts the original institution's retention rate and the student's graduation rate. According to a report by the University System of Ohio Institutions (Mustafa & Compton, 2014), graduation rates for students who transfer into a four-year university are 8-16% lower than for students who stay at the same university for all four years.

Given the issues surrounding low retention rates, recent research has investigated why it occurs. These studies have uncovered multiple antecedents of low retention. Because there is a real push from institutions to ameliorate retention rates, this research is important in order to first figure out how and why they happen, which is vital to improving the issues.

Research suggests there are several possible causes of low student retention. First, research shows that academic performance is a key driver of retention. According to Swenson Gougen, Hiester, and Nordstrom (2010), academic performance, measured by Grade Point Average (GPA), was positively associated with the intention to remain at the university. Their research demonstrated that

students' GPA was a significant predictor of student retention. In their analyses, cumulative first-year GPA was positively associated with coming back to college in the second year. Support for this positive relationship between academic performance and retention was also found in a study conducted by Friedman and Mandel (2011). This study demonstrated poor academic performance is one of the main reasons that some students leave college following their freshman year.

Academic performance may be the main driver of retention but it is not the only possible cause worth mentioning. Course withdrawals, course enrollment, and course completions are all important factors that influence a student's retention decision. Withdrawal from a course can often have a negative impact on a student's progression. This will be particularly true if the course is the first in a sequence of required courses. A withdrawal in this case could set a student's graduation back a year or more. Research indicates that course withdrawals are negatively associated with GPA (Hall, Smith, Boeckman, Ramachandra, & Jasin, 2003) and that students who have withdrawn from one course are likely to withdrawal from more courses in the future (Adams & Becker, 1990). This leads to the idea that course withdrawals are negatively associated with retention. Empirical evidence for this was found in a study conducted by Adelman (2006). The results of this study indicated that for any given student, when the ratio of courses uncompleted to courses completed is greater than 20%, the probability that the student will leave the institution without graduating is increased by 50%. On the other hand, research has indicated that course enrollment (Fike & Fike, 2008; Mohammadi, 1994) and course completion (Mohammadi, 1994) are both positively associated with student retention. Course

enrollment is the number of courses a student registers for in the beginning of the semester and course completions are the number of courses that a student receives a grade for in the end of the semester. Unfortunately, the bulk of the research regarding retention and course enrollment and completion has been conducted in community college settings. Future research is needed to uncover the effect course enrollment and completion has on student retention at four-year colleges and universities.

Research also suggests that influences on student retention are dynamic; small changes can lead to major shifts in student performance and retention. Kennedy, Sheckley, and Kehrhahn's (2000) study looked at a variety of potential predictors for undergraduate retention in order to explain more than the typical amount of variance of previous work. The researchers found that only institutional attachment predicted undergraduate retention at both the beginning and end of the academic year. Additionally, they found that academic performance predicted retention in the beginning of the year while academic attachment predicted retention in the end of the year. Interestingly, many of the students predicted to return instead withdrew and many of the students predicted to withdraw instead returned in both the beginning and end of the academic year. These results support the idea that the student retention decision is a dynamic one.

Even though there are many established predictors of academic performance and retention we can only predict so much. For example, typical studies have been able to explain only 20-30% of the total variance associated with retention (Kohen, Nestel, & Karmas, 1978; Mutter, 1992). One possible way to help explain student

performance and retention might be to examine individual differences among students. Individual differences, such as personality, may hold the key to explaining more variance associated with retention.

Extraversion's effect on Academic Performance and Retention

Extraversion is a personality trait that is related to a number of important aspects of the social environment in college (i.e. the number of friendships in a person's life). In order to uncover if extraversion is an antecedent to college student retention and academic performance, it would be useful to examine what the literature has to say about its association with academic performance and retention rates. Understanding extraversion itself is the first step to recognizing its potential effect.

John and Srivastava's (1999) conceptual definition of extraversion states that it "implies an energetic approach toward the social and material world and includes traits such as sociability, activity, assertiveness, and positive emotionality" (p. 121). Extroverts tend to have social status in groups, leadership positions, positive emotion expressions, and a high number of friends and sexual partners. Introverts tend to have poor relationships with their parents and are often rejected by their peers (John & Naumann, 2007).

Introverts and extroverts also differ in respect to how they respond to stimuli. In neurological terms, extravert and introvert differences in impulsiveness are due to different thresholds for excitation in the ascending reticular activating system (ARAS) and in certain cortical areas of the brain, the behavioral inhibition

system (BIS) and behavioral activation system (BAS). According to Gray (1972), the ARAS does not screen out a stimulus as effectively for introverts, allowing them to quickly become over-stimulated. Work by Gray indicates extraverts experience activation in the BAS differently than introverts do.

The neurological research supports the notion that extroverts can handle more stimuli than introverts, however it does not paint a clear picture of how that is portrayed behaviorally. The literature consistently indicates that introverts are likely to be negatively impacted as distracting stimulation increases, whereas extraverts are not (Eysenck & Eysenck, 1985). Furnham and Bradley (1997) found that introverted individuals were significantly more distracted from a variety of cognitive tasks when exposed to pop music than were extraverts. College, at times, can be a distracting environment and therefore we would expect introverts to struggle academically in college.

Another portrayal of the introvert/extrovert behavioral differences is how involved they are in extracurricular activities in college. Extraverts are more likely to be members of student clubs and organizations than introverts are (Okun, Pugliese, & Rook, 2007). Extraverts tend to enjoy social interaction and gatherings and because of these two points, they are likely to get involved in more activities and organizations on campus. This is important in regards to academic performance and retention because, if extraverts get more involved on campus, they will likely spend more time participating in university-related behaviors (i.e. going to club meetings). It is not just that interacting with people leads them to do better, however. Having more friends helps students to feel more engaged and motivated.

Extraverts who attend student organization meetings with a peer group that believes school is important should be motivated to perform better and stay in school. Conversely, extraverts who attend parties with a peer group that does not care about school should cause them to disengage with their studies, struggle academically, and be more likely to drop out or transfer. Unexpectedly, there is not much research that indicates an association between extraversion and student organization membership, other than Shertzer and Schuh's (2004) finding that in their sample, every single student leader that was surveyed identified themselves as being extroverted. According to student opinions in this study, individuals who lead the group orally seem to earn leadership positions later on if they continue to stay involved in the group.

Extracurricular activities are part of the college experience but there are other important factors to consider, such as academic performance. Research is unclear on the effect that extraversion has on college student academic performance. This is surprising since there has been a large volume of studies devoted to the topic. In a majority of studies, academic performance refers to GPA. When GPA is not the measure of interest, then often project grades and exam grades are used as the measure of academic performance.

Some studies have indicated a positive relationship between extraversion and academic performance (Chamorro-Premuzic & Furnham, 2003a; Rothstein, Paunonen, Rush, & King, 1994). Meanwhile, other studies have found a negative relationship (Chamorro-Premuzic & Furnham, 2003b; Furnham & Chamorro-Premuzic, 2004; Wankowski, 1969). Others yet have found no significant

relationship between extraversion and academic performance (De Fruyt & Mervielde, 1996; Farsides & Woodfield, 2003; Joshi, 1990). The inconsistencies in the literature signify there is a need for future research.

Research indicates there is merit in assessing extraversion in the form of its two different facets (Hogan & Hogan, 2007). Those two facets are ambition and sociability. Ambition represents the need for dominance, while sociability represents the need for affiliation (Martin, Montgomery, & Saphhian, 2006). Individuals who are more ambitious tend to be energetic and competitive while individuals who are less ambitious tend to be complacent and good team players. Individuals who are highly sociable tend to be outgoing and attention-seeking while individuals who are not as sociable tend to be quiet and good at working alone. The trait of ambition is associated with leadership ability, competitiveness, and initiative while the trait of sociability is associated with a person's frequency and interest in social interaction. It should be noted that there are many possible combinations of these traits (e.g. high ambition, low sociability; low ambition, high sociability).

It is possible that the facets of extraversion separately impact academic performance. High levels of ambition may contribute to greater task engagement that leads to better academic performance. In opposition, students who are more socially inclined may spend more time and resources hanging out with friends, or partying rather than studying (Martin et al., 2006).

Sociability is related to the number and quality of one's social interactions. A number of studies suggest that social interaction helps to bolster student performance and retention (Astin, 1993; Chickering & Reisser, 1993; Tinto, 1975).

For example, when a student's friends have similar academic interests, they themselves will perform better in college. Meanwhile, other studies show the opposite—that social interaction has a negative effect on student outcomes (Burk & Larsen, 2005; Fass & Tubman, 2002; Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998). For example, animosity amongst friends, like conflict, is negatively related with school grades.

Ultimately, it appears that academic performance depends greatly on the type of social interaction someone is having. Specifically, when students have positive and growth-oriented relationships with their friends and peers they will be happier and perform better in the classroom. However, when students have difficult or conflicted relationships with their friends and peers they will have a tougher time adjusting to college and their performance will suffer.

Prior research has indicated that students who had friends that they participated in common activities with were more likely to come back to college the next year. Swenson Goguen et al. (2010) concluded just that in a study where they collected data from students at northeastern United States universities regarding the number of friends they had made in college, the quality of their college friendships, peer attachment, peer conflict, GPA, and retention through the first three semesters of college. Similarly, research by Astin (1993) revealed that friendship support is significantly correlated with high satisfaction with college. Likewise, research by Yazedijian, Purswell, Sevin, and Toews (2007) indicated that having friends with similar academic interests is advantageous for academic achievement. The results of these three studies suggest that peer relationships have

an important effect on important college academic issues, including performance and the retention decision. Sociable people typically have more friendships than unsociable people, thus there is a greater likelihood that they have friends who they participate in common activities with, friends who give them support, and friends with similar academic interests. The increased likelihood of having friends like this should help sociable students perform better in the classroom because they will have more friends to study with, thus improving their GPA. At the same time, the increased likelihood of having friends like this should keep sociable students from leaving their institution. We see similar support in work studies—having a friend at work decreases turnover (Feeley, Hwang, & Barnett, 2008).

Prior research indicates that the extraversion facet of sociability affects both retention and academic performance. One study, using a population of university freshmen students at a medium-sized Midwestern university, conducted by Martin et al. (2006) found the relationship between sociability and academic performance (GPA) was negative, but this relationship became weaker over time. Therefore, sociability was more strongly related to performance for freshmen than for fourth-year students. Likewise, a study by Haemmerlie and Montgomery (2012) also identified a strong negative association between sociability and GPA among college students. They also found a significant negative relationship between returning to school for the next academic year and sociability among male students. This research demonstrates that the sociability component of extraversion is what is driving its effect on academic performance and college student retention.

Unfortunately, the studies conducted by Martin et al. (2006) and Haemmerlie and Montgomery (2012) are the only two ever performed at this point. The results indicate that there is a negative relationship between sociability and both GPA and retention, yet we do not know how powerful and stable these effects are. In fact, in the Martin et al. (2006) study, the negative relationship between sociability and GPA became weaker over time. So there is a small amount of evidence that these relationships exist and also some evidence that they are malleable depending on the circumstances. Perhaps there is a practical form of intervention that could be utilized by colleges and universities to overcome these relationships and help sociable students perform better academically and stay at school.

E-mail Interventions

Technology, especially the Internet and e-mails, has great potential as a tool to be used to improve behaviors. The portability, immediacy, convenience, and interactivity of e-mail interventions make their success possible. However, there is only a small amount of empirical evidence that demonstrate the effectiveness of e-mail interventions. E-mails could help change behaviors but we need future research to examine this idea further in order to establish more evidence.

Research by An et al. (2006) utilized e-mail reminders to promote the use of an intervention that was designed to reduce unhealthy behaviors. Two versions of a website were set up to examine what works best in reducing smoking behavior for undergraduates at a Midwestern university. The first website (beta) was a pilot version of the second website (RealU). The beta addressed smoking cessation topics

relevant to college smokers while the RealU presented similar information but did so within the context of an online college life magazine. The RealU website provided additional attention to topics of interest for undergraduates at the university while linking back to smoking cessation messages. Additionally, participants in the RealU group received peer e-mail support.

Weekly e-mails were sent to both the beta and RealU participant groups. The e-mails invited the participants to visit the study site. After five weeks, self-reported 30-day smoking abstinence was higher for RealU intervention participants compared with the beta participants. Reasons given for the RealU's efficacy in reducing smoking behaviors come from the fact that only the RealU had support e-mails and a masked design of the website itself (An et al., 2006).

Regardless, the beta group still had success in helping students develop smoking cessation behaviors. It appears that something besides the differences in the experimental (RealU) condition led to control (beta) condition participants' change in behavior. The effect of weekly e-mail reminders cannot be ruled out as a potential driver for increasing the amount of self-reported 30-day smoking abstinence in beta website users. Unfortunately, since e-mail reminders were used for both the experimental and control groups we cannot accurately illustrate their effect so more research is needed on the effect of e-mail reminders.

Prior research conducted by Bombem, Canell, Bandoni, and Jaime (2014) investigated the efficacy of e-mail interventions as a means to modify behavior. The researchers were interested in changing dietary behavior of adult workers in a large city in the country of Brazil. The intervention was implemented through interactive

software that sends recommendations about diet and physical activity by e-mail. Data were collected for all participants using a 24-hour dietary recall. Diet quality was assessed and scored from inadequate to recommended consumption. The results of this study revealed that e-mail interventions do, in fact, have utility. The intervention led to significant improvements in diet quality. Interestingly, the workers who had the worst diet at the beginning of the study were those who were the most prone to the interventions' effects.

A study performed by Bendtsen and Bendtsen (2014) compared text message (SMS) interventions to e-mail interventions for high and low risk drinkers at a Swedish university. Intervention messages were sent out at specific times to best reduce drinking behavior (i.e. in the late afternoon on a Friday before students are likely to go get a drink). Their findings indicate that both SMS and e-mail interventions were the reasons for decreased drinking behavior, 54% and 21% respectively. A likely reason for the reduced effectiveness of the e-mail intervention compared to SMS was that the e-mails were less likely to be read within an hour of when the intervention message was sent out. Additionally, students were less likely to drop out of the study if they were in the e-mail cohort compared to the SMS cohort, 5% and 20% respectively. E-mail interventions could potentially lead to the same amount of behavior change when there is not a major necessity to have the e-mails read within a specific time frame (i.e., one hour after the message is sent). Bendtsen and Bendtsen's (2014) study reveals another interesting finding. It appears their participants did not prefer one kind of intervention to the other. Both e-mail and SMS interventions seemed to lead to equal amounts of satisfaction.

Overall, it appears there are positives and negatives to using any kind of electronic communication-based intervention. The literature shows the utility of e-mail interventions is threefold: they can lead to behavioral changes, they are equally satisfying for participants when compared to similar interventions, and they are simple to use while being cost-effective. Even with some established research, more is needed to determine the effectiveness of e-mail interventions. Earlier research focuses mostly on how e-mail interventions affect unhealthy behaviors. Future research should look to take e-mail interventions into a new domain (e.g. their effect on important academic decisions).

The Current Study

Colleges and universities are looking for ways to improve student retention rates. A simple and cost-effective solution that may be useful is measuring student personality, and then tailoring specific e-mail interventions to students.

Extraversion is one trait that the previous research seems confused with in terms of how it relates to academic performance and retention.

The purpose of the current study will be to determine if intervention e-mails have the influence to increase students' positive, university-related activities (i.e. joining student organizations, participating in on-campus activities, spending more time studying, etc.) and lessen the likelihood of students participating in negative, non-university-related activities (i.e. partying). It has been indicated in the literature that the social aspect of extraversion (sociability) is a key driver of student academic performance, retention, and student organization membership.

The intervention e-mails will include information about a range of social activities (i.e. sports, diversity, self-improvement, etc.) occurring on campus during a given time period. If the intervention e-mails work in the intended way, then students who receive the e-mails should perform better academically, be more likely to remain at the university, and participate in more student organizations.

Based on the previous research, five hypotheses were developed.

Hypothesis 1: Students who receive intervention e-mails will have a significantly higher GPA than students who do not receive intervention e-mails.

Hypothesis 2: Students who receive intervention e-mails will be significantly less likely to withdraw from courses than students who do not receive intervention e-mails.

Hypothesis 3: Students who receive intervention e-mails will have significantly higher course completion rates than students who do not receive intervention e-mails.

Hypothesis 4: Students who receive intervention e-mails will have higher first-semester-to-second-semester retention rates than students who do not receive intervention e-mails.

Hypothesis 5: Students who receive intervention e-mails will participate in student organizations at a higher rate than students who do not receive intervention e-mails.

Method

Sample

Freshmen and first-year transfer students entering Minnesota State University, Mankato were recruited to participate in a study on student engagement during the 2015 fall semester. Students participated on a strictly voluntary basis.

The entire sample ($N = 177$) was broken down into three subsamples for similar research projects. One of the three subsamples ($N = 59$) was utilized in the current study. With regards to the subsample used in this study, 37 participants freely shared demographic information involving ethnicity while 39 participants shared demographic information involving age and gender. Of the sample that shared demographic information, 76.92% were female and 79.49% were white only. The age range of participants was from 17-21 years old with the average participant's age being 18.72 years old.

Measure

Sociability. The instrument utilized for assessing participant personality was the *Hogan Personality Inventory (HPI)*; Hogan & Hogan, 2007). The *HPI* has 206 items and measures seven personality traits: adjustment, ambition, sociability, likeability, prudence, intellectual curiosity, and school success. Each item is written as a statement to which the respondent can answer "True" or "False."

The alpha coefficient for sociability is 0.83 (Hogan & Hogan, 2007). Some example sociability items are "I am often the last to leave parties," "Happiness is more important than fame," and "I enjoy telling jokes and stories." These items focus on the social attributes of the respondent such as: how much they enjoy social gatherings, seek attention, and believe they are entertaining.

Student Outcomes. A total of five outcome variables were assessed. The researcher partnered with Minnesota State University, Mankato's Institutional Research department in order to assess four outcome variables. Those outcome variables are: participants' GPA during the 2015 fall semester, participants' course withdrawal rates during the 2015 fall semester, participants' course completion rates during the 2015 fall semester, and participants' first-semester-to-second-semester retention rates from the 2015 fall semester to the 2016 spring semester. Additionally, the researcher partnered with Minnesota State University, Mankato's Student Activities department in order to assess one outcome variable. That final outcome variable was participants' registration in Recognized Student Organizations (RSOs) during the 2015 fall semester.

Procedure

First-year (freshman and transfer) students were recruited to volunteer to take part in a study for the purposes of understanding student engagement. Recruitment happened through two different techniques at the beginning of the 2015 fall semester: a survey request sent to student e-mail addresses and lecture visits. Student e-mail addresses were retrieved with the assistance of the Minnesota State University, Mankato's Institutional Research department.

For the e-mails sent to first-year students, Qualtrics was utilized to create a study participation invitation survey (Appendix A). If students agreed to participate in the study, then a document was sent to them informing them how to access the *HPI* and asking for their consent. For the lecture recruiting, professors of classes

with high proportions of first-year students agreed to let the researchers stop in and give a scripted recruiting pitch (Appendix B) for the study during class time.

Students who were interested signed consent forms (Appendix C) and were e-mailed by the researchers with a document informing them about how to access the *HPI* (Appendix D). Regardless of the recruiting technique, only students who completed the *HPI* were considered participants in the study.

After the sample was determined, participants were split into matched-sample groups. All participants were ranked based on their *HPI* sociability scores and then divided based on that ranking into one experimental group and one control group. The two participants highest in sociability were matched on their scores, and then one of those two participants was randomly selected for the control group and the other one was selected for the experimental group. Then the next two participants highest in sociability were matched on their scores, and randomly split into the experimental and control groups and so forth. The experimental group received the intervention e-mails and the control group did not.

After the experimental and control groups were established, the first sociability intervention e-mail was sent to the participants in the middle of the 2015 fall semester. After the first e-mail was sent, subsequent e-mails were sent in two-week intervals to the experimental group only. A total of four intervention e-mails were sent over the course of the semester.

The e-mails' content contained information about events occurring on campus during the next two-week period (Appendix E). Participants were told about events that encompassed many potential student interests including: sports,

diversity, career/personal success, self-improvement and understanding, literature, and arts. The event date, time, and location were included. No event attendance requirement was established but participants were encouraged to attend events if they were interested.

While the experimental group was receiving intervention e-mails from the researcher, the control group received nothing. No e-mails were sent to the control group at any time during the experiment. The only time the researcher was in contact with the control group was either before the experiment began or after it concluded. Contact that occurred during those times, both before and after the experiment, involved the same messages being sent to both the experimental and control groups.

After the final intervention e-mail was sent, a behavioral check was e-mailed to the participants in both the experimental and control groups. Qualtrics was utilized to create a behavioral check survey (Appendix F). The behavioral check assessed whether participants attended social events on campus. More specifically, it assessed how many social events the participants attended in total and what kind events they attended (i.e. sports, diversity, career development, etc.).

Results

Complete data were collected for 58 participants. The data from only 56 participants was analyzed in order to ensure a matched sample, control ($n = 28$) and intervention ($n = 28$). Three demographic variables were assessed: age, gender, and ethnicity. None of those three demographics were significantly different between

experimental and control conditions. Additionally, it is important to note that there was no statistically significant difference between the control group ($M = 53.32$) and the experimental group ($M = 53.61$) in terms of sociability.

In order to test the efficacy of whether intervention e-mails increased Grade Point Average (GPA) a dependent t -test was conducted. As demonstrated by the one-tailed, dependent t -test, a significant difference in GPAs was found ($t(27) = -2.03, p = 0.03$). The GPAs for the control group ($M = 3.43$) were significantly higher than the GPAs for the experimental group ($M = 3.03$). Further, Cohen's effect size value ($d = 0.50$) suggested a moderate practical significance. The result of this t -test is the opposite of the hypothesized direction in hypothesis 1.

In order to test whether intervention e-mails increased course completion percentage a dependent t -test was conducted. As demonstrated by the one-tailed, dependent t -test, no significant difference in course completion rates was found ($t(27) = -1.39, p = 0.09$). Thus, although the course completion rates for the control group ($M = 96.71$) were higher than the course completion rates for the experimental group ($M = 91.36$), this difference was too small to be significant. Further, Cohen's effect size value ($d = 0.34$) suggested a small practical significance. Thus, hypothesis 2 was not supported.

In order to test whether intervention e-mails decreased course withdrawals a dependent t -test was conducted. As demonstrated by the one-tailed, dependent t -test, no significant difference in course withdrawals was found ($t(27) = 0.00, p = 0.50$). An equal number of participants withdrew from courses in the control group

($M = 0.11$) and in the experimental group ($M = 0.11$). Further, Cohen's effect size value ($d = 0.00$) suggested no practical significance. Hypothesis 3 was not supported.

In order to test the efficacy of whether intervention e-mails increased fall-2015-to-spring-2016 retention rates a dependent t -test was conducted. As demonstrated by the one-tailed, dependent t -test, no significant difference in fall-2015-to-spring-2016 retention rates was found ($t(27) = 0.44, p = 0.33$). Thus, although retention rates were lower in the control group ($M = 1.07$) than in the experimental group ($M = 1.11$), this difference was too small to be significant. Further, Cohen's effect size value ($d = 0.12$) suggested low practical significance. Hypothesis 4 was not supported.

In order to test the efficacy of whether intervention e-mails increased Recognized Student Organization (RSO) membership a dependent t -test was conducted. As demonstrated by the one-tailed, dependent t -test, a significant difference in RSO membership was found ($t(27) = 2.55, p = 0.01$). RSO membership was greater in the control group ($M = 1.57$) than in the experimental group ($M = 1.82$). Further, Cohen's effect size value ($d = 0.55$) suggested a moderate practical significance. The result of this t -test was in the opposite direction of the hypothesis, so although the difference was significant, hypothesis 5 was not supported.

Discussion

The main point of this study was to look at a matched sample of high sociability first-year undergraduate students and determine how intervention e-mails might affect many academic and university-related variables, including, most

importantly, their fall-to-spring retention rates. Through the matched sample design, participants were randomized to either receive intervention e-mails throughout the course of the fall 2015 semester or to receive no intervention e-mails during the semester. This is the first study to utilize sociability-tailored intervention e-mails in order to ameliorate university-related behaviors.

Five different research questions were assessed in the current study. Those research questions all contained the assumption that intervention e-mails would significantly increase university-related behaviors that would then lead to an improvement of academic outcomes. Hypothesis 1 suggested that intervention e-mails would be associated with a higher GPA. This was unsupported by the results. In fact, the results indicated that the association between intervention e-mails and GPA went in the opposite direction than what was predicted. Hypothesis 2 suggested that intervention e-mails would be associated with a higher course completion percentage. This was unsupported by the results, as no significant relationship was found. Hypothesis 3 suggested that intervention e-mails would be associated with fewer course withdrawals. This was unsupported by the results, as no significant relationship was found. Hypothesis 4 suggested that intervention e-mails would be associated with higher fall-2015-to-spring-2016 retention rates. This was unsupported by the results, as no significant relationship was found. Hypothesis 5 suggested that intervention e-mails would be associated with RSO membership. This was unsupported by the results. In fact, the results indicated that the association between intervention e-mails and RSO membership went in the opposite direction than what was predicted.

There are a number of limitations with the current study that could explain why the intervention did not work as expected. First, the most notable limitation is the small sample size. When the sample size is small it becomes even more difficult to find significant relationships from the data. This is because *t*-tests, like many statistical tests, require a larger sample size to be considered representative of populations that the results will be generalized to. To correct this issue, future research should simply seek to increase their sample when running a study of this nature. To increase sample size, future research could give more incentives to the participants of the study. Additionally, the study could be marketed to a wider range of potential participants.

A second issue of the current study is the Recognized Student Organization (RSO) data. Unfortunately, there is not a requirement at Minnesota State University, Mankato that every RSO must have a member roster. The researcher had to obtain RSO membership data through software called OrgSync. OrgSync is a program that all RSOs at Minnesota State University, Mankato must register into. Then students are welcome to sign up for OrgSync and then join their RSOs on OrgSync. Students, however, are not required to do this and because of this only a limited amount of data on RSO membership was available to the researcher. This lack of available data was likely an obstacle to finding a meaningful relationship between RSO membership and e-mail interventions. Future research at institutions where RSO member rosters are nonexistent should simply add demographic questions for their participants to answer regarding if they are members of RSOs or not.

A third limitation of the current study is the highly female sample. According to the Common Data Set initiative of Minnesota State University, Mankato's Institutional Research department, 55.62% of first-year students were female in the fall of 2015. In comparison, 76.92% of the current study's sample was female. It is difficult to generalize the results of this study to males because there were very few males in the sample. Future research should obtain a sample that is an appropriate mix of males and females.

The fourth issue of the current study has to do with the control group. The control group did not receive intervention e-mails from the researcher regarding information about social events on campus. However, the participants in the control group, like any student who attends Minnesota State University, Mankato, had multiple ways of accessing information regarding social events on campus. They could have seen posters on campus with event information, went online and examined the university's events calendar, or heard about the events from their classmates. This event information being available to all students may have produced a situation where the control group had just as much event information as the experimental group regarding social events on campus. Future research should utilize a behavioral check to determine if students in the control group actually had less knowledge about events on campus than students in the experimental group.

The final limitation is that the current study was unable to determine if students who received sociability-tailored e-mail interventions actually opened the e-mails and actually attended any of the events they were told about in the e-mails. Therefore, any effects derived from the intervention e-mails could be weak effects. A

behavioral check was sent to all participants near the end of the fall 2015 semester after all the intervention e-mails had been sent. This behavioral check asked the students to indicate if they had attended social events on campus, however it did not assess whether participants opened the e-mails. The response rate of the behavioral check was low at 33.9%, only 20 of the participants responded. The results from the behavioral check were not practically useful because of the low response rate.

Getting more responses to the behavioral check and making it more comprehensive by assessing whether participants actually opened the e-mails or not will be important for future research. Some potential suggestions that would help improve the response rate would be giving the participants additional incentives for completing the behavioral check and also having an in-person behavioral check meeting instead of a survey through e-mail that is easily missed or accidentally deleted.

A variety of studies have demonstrated the success of e-mail interventions, but those differ from this study in a number of ways. Often, these other investigations of e-mail interventions used different populations (e.g. employed adults instead of students, Bomben et al., 2014) and had different goals (e.g. reducing drinking behaviors, Bendtsen & Bendtsen, 2014). The age of this sample may have also been an issue, as younger college students are not frequent e-mail checkers, and may have overlooked the content of these e-mails. Other mediums for intervention may work better in this population (i.e. text messages, Facebook chat, or Snapchat).

In some cases, receiving e-mail interventions was negatively associated with university-related outcomes (i.e. GPA and RSO membership). This was an unforeseen consequence of the current study. Perhaps the e-mail interventions worked and students attended more university-related social events, however some other attendees at these events turned out to be students looking to promote off-campus social events (i.e. parties). So, students who went to these events on campus with good intentions may have fallen into a situation where they left the university-related event to go off-campus event later in the day (i.e. going to a house party after a football game). Additionally, students who received e-mails may have attended university-related social events on a regular basis and therefore spent a large amount of their free time at these social events. This reduction in free time could have impacted the amount of time students had to study and participate in RSOs, especially if they had additional, non-academic responsibilities (i.e. employment or volunteering).

Ultimately, the results of this study indicate e-mail interventions do not work for sociable people. Regardless, it is important to try to develop intervention methods that can effectively improve academic outcomes for those high in the trait of sociability. One suggestion for future research is to try other mediums of sociability-tailored intervention. Specifically, a text message intervention might work better. Texts are a much more common form of communication, especially among students, than e-mail and they are easier to access for many people (i.e. those without smart phones). When the intervention message can be easily accessible it improves the chances that the intervention will work. A second suggestion for

future research is to do a pre-assessment before the e-mail intervention begins. The pre-assessment would look into what kind of social events the student sample enjoys and what they do not enjoy. Then the researchers can tailor the intervention even further by crafting e-mails that are even more personable to the participants' interests. These deeply tailored e-mails might be the missing ingredient to get participants' to attend university-related events and meet people with like interests. The result of being around and befriending students like oneself would likely lead to an improvement in academic outcomes.

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Appendix A Participation Invitation Survey

You are requested to participate in research supervised by Dr. Kristie Campana on student personality and how emails increase engagement. The goal of this survey is to determine whether receiving tailored emails helps students feel more engaged when beginning college. If you have any questions about the research, please contact Dr. Campana at Kristie.campana@mnsu.edu.

If you participate in this study, you will agree to the following:

- You will fill out a short personality assessment, which will take about 15 minutes. If you are interested in receiving your results, you can provide your email address on the assessment. You may contact Dr. Campana if you have questions about your results.
- You may be asked to fill out a brief survey at the end of fall semester asking about some of the ways you have participated on campus. This survey will take fewer than 5 minutes.
- You may receive 4-8 emails throughout the year informing you of events or services you may find helpful.
- You may receive an invitation to fill out the same personality assessment again. As before, you can choose to receive your results if you wish.
- You give us permission to link your survey results to institutional research data, such as GPA, completion rates, and similar university information.

Participation is voluntary. You have the option not to respond to any of the questions. You may stop taking any survey at any time by closing your web browser. Participation or nonparticipation will not impact your relationship with Minnesota State University, Mankato. If you have questions about the treatment of human participants and Minnesota State University, Mankato, contact the IRB Administrator, Dr. Barry Ries, at 507-389-2321 or barry.ries@mnsu.edu.

Responses will be kept confidential. However, whenever one works with online technology there is always the risk of compromising privacy, confidentiality, and/or anonymity. If you would like more information about the specific privacy and anonymity risks posed by online surveys, please contact the Minnesota State University, Mankato Information and Technology Services Help Desk (507-389-6654) and ask to speak to the Information Security Manager.

The risks of participating are no more than are experienced in daily life.

There are no direct benefits for participating. Individuals who fill out the first Hogan survey will be entered into a drawing for a \$25 gift certificate to Amazon.com. Depending on Hogan Survey results, individuals selected to continue in the program will be entered into an additional drawing for a \$25 gift certificate to Amazon.com after completion of two additional surveys at the end of the school year. Society might benefit from identifying ways to keep students engaged in college.

By checking this box, you are indicating you are over the age of 18 and you consent to participate in this study.

18 or Older

Under 18

Please type your full name here to indicate your consent, OR upload a picture of your signature below.

Please upload an image of your signature here

Appendix B
Lecture Recruitment Script

Hello,

We are inviting new students, both first-year students and transfer students, to take part in a research project. If you are interested in participating in this project, you would take a short personality test at the beginning of this semester, and at the end of the semester. Some participants would also receive an additional email in the middle of the semester asking about some of your behaviors this semester. Some participants will also receive 4-6 emails about events and services on campus. Participants will be entered into a drawing for a \$25 Amazon.com gift certificate.

I am handing out some consent forms that give you more information about our research. If you are interested in participating, please sign one copy and provide your MNSU email address, and keep the second copy for your records. If you are not interested, you can hand back a copy without signing it. Please let me know if you have any questions. I will pick up both the signed and the unsigned copies in a few minutes. Thank you for your time.

Appendix C Consent Form

You are requested to participate in research supervised by Dr. Kristie Campana on student personality and how emails increase engagement. The goal of this survey is to determine whether receiving tailored emails helps students feel more engaged when beginning college. If you have any questions about the research, please contact Dr. Campana at Kristie.campana@mnsu.edu.

If you participate in this study, you will agree to the following:

- You will fill out a short personality assessment, which will take about 15 minutes. If you are interested in receiving your results, you can provide your email address on the assessment. You may contact Dr. Campana if you have questions about your results.
- You may be asked to fill out a brief survey at the end of fall semester asking about some of the ways you have participated on campus. This survey will take fewer than 5 minutes.
- You may receive 4-8 emails throughout the year informing you of events or services you may find helpful.
- You may receive an invitation to fill out the same personality assessment again. As before, you can choose to receive your results if you wish.
- You give us permission to link your survey results to institutional research data, such as GPA, completion rates, and similar university information.

Participation is voluntary. You have the option not to respond to any of the questions. You may stop taking any survey at any time by closing your web browser. Participation or nonparticipation will not impact your relationship with Minnesota State University, Mankato. If you have questions about the treatment of human participants and Minnesota State University, Mankato, contact the IRB Administrator, Dr. Barry Ries, at 507-389-2321 or barry.ries@mnsu.edu.

Responses will be kept confidential. However, whenever one works with online technology there is always the risk of compromising privacy, confidentiality, and/or anonymity. If you would like more information about the specific privacy and anonymity risks posed by online surveys, please contact the Minnesota State University, Mankato Information and Technology Services Help Desk (507-389-6654) and ask to speak to the Information Security Manager.

The risks of participating are no more than are experienced in daily life. There are no direct benefits for participating. Individuals who fill out the first Hogan survey will be entered into a drawing for a \$25 gift certificate to Amazon.com. Depending on Hogan Survey results, individuals selected to continue in the program will be entered into an additional drawing for a \$25 gift certificate to Amazon.com after completion of two additional surveys at the end of the school year. Society might benefit from identifying ways to keep students engaged in college.

Please sign below if you are over the age of 18 and consent to this study:

(Signature)

(Printed name)

(MNSU email address, so we can contact you with instructions for the personality assessment)

Please keep an unsigned copy of this page for your future reference.

MSU IRBNet ID# 764218

Date of MSU IRB approval: 9/2/2015

Appendix D Participant Login Instructions

The assessment you are preparing to complete will require approximately 15-20 minutes of your time. Please read each question and select the response that best indicates how you feel the majority of the time. There is no right or wrong answer to any particular question. Please follow the instructions below:

Access the login page at <http://www.gotohogan.com>

Note: Supported browsers are IE7+, Chrome, Firefox, Safari

Login using supplied credentials:

Hogan ID: _____ Password: _____

Note: If no language is selected, the default will be U.S. English.

Select Go to continue to Profile Page.

Complete profile by entering your Name, Email and Company ID.

Note: Company ID can be used as an additional identifier for your profile (e.g. employee ID, email, phone number, etc.). If your instructions did not include a Company ID, please enter your email address or some other unique identifier. The Company ID will not replace your Hogan ID.

Create a new password.

Note: Password must contain: Between 6 and 15 characters, at least 1 Upper case letter, at least 1 Lower case letter, at least 1 Number. A forgotten password can be reset from the login page by using your Hogan ID and email address.

Optional research information, if completed, will only be used for research studies in a non-identifiable manner.

After reviewing, check the "I agree to the Informed Consent Policy" box.

Select Go to open Assessment Menu page.

Select Start on an individual assessment to begin the assessment.

Note: You can discontinue the assessment at any time. All information submitted prior to discontinuing the assessment process will be retained. You can log back into the system using your assigned Hogan ID and the new, personalized password you created.

Select Submit to complete the assessment.

For technical assistance, please contact Hogan Assessment Systems' Customer Service Team at support@hoganassessments.com, 1-877-670-0637 (U.S. & Canada) Monday through Friday 8:00 a.m. to 5:00 p.m. U.S. Central Time.

Based on this assessment, Hogan Assessment Systems will be providing Student Success Reports in exchange for feedback. If you are interested in receiving your student report and providing feedback, please email us at

studentsuccessreport@hoganassessments.com and provide your UserID. Your report will be sent to you approximately 2 weeks later.

Appendix E
Example Intervention E-mail

Hey Everyone,

This is the first email you are receiving from signing up for the student engagement study for institutional research where you took a Hogan personality assessment.

Below is a list of all the exciting upcoming events on campus for the next two weeks! Please feel free to attend if you are interested.

Sports:

October 24: Football vs Winona State, 1pm -- Women's Volleyball vs St. Cloud State, 4pm

October 30th: Men's Hockey vs Alaska, 7pm -- Women's Hockey vs Wisconsin, Time TBD

Diversity:

October 20th: Tea Talks 12:30-1:30pm, LGBT Center

October 21st: Indigenous Film Series (American Indian Affairs) "Good Meat", 7-9p, Ostrander

October 28th: Women's Conversation Circle "Self-Care", CSU 218, 5-6pm

October 30th: Halloween Dance (Asian American Affairs) 7-11p, CSU 253

Career/Personal Success:

October 20th: Career & Internship Expo, CSU Ballroom, 9:30am-2:30pm

October 21st: Career & Internship Expo, CSU Ballroom, 9:30am-2:30pm

Counseling Center "Discover Yourself" Series:

October 21st: Self-Compassion, AH 317, 11 am

October 22nd: Strengthening Relationships, AH 317

October 27th: Overcoming Test Anxiety, CSU 204, 2pm

Appendix F Behavioral Check

Thank you again for agreeing to participate in our study!

As a mid-semester check, we wanted to learn about what experiences you have had here at MNSU. If you could answer the following questions honestly about what you have done, and how you feel about MNSU, we would greatly appreciate it!

As a reminder, if you have any questions about the study, you can email John at john.heffernon@mnsu.edu.

Those who respond by 12/01/2015 will be entered in another drawing for a \$25 Amazon gift card.

How many social (sports, diversity, career/personal success, counseling center, good thunder reading series, etc) events have you attended this semester?

Have you attended MNSU Sporting events this year?

Yes

No

Have you attended Diversity events this year?

Yes

No

Have you attended Career/Personal Success events this year?

Yes

No

Have you attended Counseling Center events this year?

Yes

No

Have you attended Good Thunder Reading events this year?

Yes

No

Please indicate how much you agree with the following statements:

I feel connected to MNSU

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

I feel involved in the campus community

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

I feel that I receive good support here at MNSU

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

I feel my experiences at MNSU are valuable.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree