A Tailored Wellness Intervention for College Students Using Internet-Based Technology: A Pilot Study

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Abstract

The purpose of this study was to develop and pilot a theory-based, computer-tailored feedback system for healthy behaviors for college students at a large, public university, aiming to enhance student wellness. A total of 1300 college students were contacted. Sixty–two students completed the eight week intervention. The participants were randomly assigned into two groups and received the survey three times, consistently receiving normative or personalized feedback. The participating sample was generally healthy and mainly comprised of freshman, Caucasian, and normal weight individuals. Repeated-measure ANOVAs were run and small significant interactions were found between the type of feedback received and some of the dependent variables. This study showed potential benefits of this intervention which can help institutions in supplying preventive services as a part of the transition to university life. Suggestions are provided for delivering preventative health services related to unhealthy diet, drinking habits, or inactive lifestyle.

Keywords: *College Students, physical activity, nutrition, drinking habits, Internet-tailored feedback*

Introduction

Obesity and weight maintenance have become important public health issues, and subsequently, methods to intervene during key life periods of weight gain have gained attention.[1] In order to address this phenomenon it is important to target health behaviors - such as diet, physical activity, and alcohol consumption that are able to support the maintenance of a healthy weight.[1]

Literature showed that many college students gained approximately between 2.5 and 4 lbs (1.13kg – 1.81kg) during their first year.[2-4] This data showed that the "Freshman 15" phenomenon is less common than expected among freshmen college students.[4] However, Levitsky and colleagues[5] found that the rate of weight gain observed in college freshmen during the first 12 weeks of the semester is considerably greater than that observed within the general adult population. This weight gain provided evidence that some students struggle to adopt or maintain healthy eating, drinking, and physical activity habits as their transition to university life. However, this emerging adult population has received far less attention in the literature compared to adolescents.[6] As the number of these emerging adults enrolling in college has increased, researchers have noted that this period is potentially a beneficial time period to address health behavior-change interventions because health behaviors established in this period are likely to persist into adulthood.[7-8]

The American College Health Association[9] stated that among the college population, 77% were engaged in moderate physical activity (57.5% 1-4 days per week; 19.5% 5-7 days per week), whereas 61.5% were engaged in vigorous physical activity (30.8% 1-2 days per week; 30.7% 3-7 days per week). Among this student population, only 19.5% and 30.7% respectively met the recommended amount of moderate and vigorous Physical Activity (PA) suggested by ACSM and CDC (i.e., approximately 150 minutes of moderate or 60 minutes of vigorous activity). Keating and colleagues[10] found a similar lack of adequate PA among their sample of student population and suggested that higher education could be one of the best contexts for addressing this "captive" audience.[10]

While physical activity levels are less than ideal, it is also important to note that additional research has assessed whether college students meet current recommendations for healthy eating and drinking patterns. For example, according to the American College Health Association[9] only 6.2% consumed the recommended 5 servings of fruit and vegetables per day, which is substantially lower than that of the overall adult population. According to the CORE Institute, 83.9% of the US college population consumed alcohol during the past year with 71.2% of these having consumed it at least once in the last month. The CORE institutes data also showed how 65.7% of underage students consumed alcohol in the previous 30 days and 45.9% of the total college population experienced binge drinking [five or more drinks (four for women) per sitting]. Because of the caloric intake from alcoholic beverages, research has shown that these students often engaged in nutritional behaviors to control their weight.[8] Schröder and colleagues[11] found that alcohol, and specifically the consumption of more than three alcoholic drinks, along with other factors such as smoking, educational level, leisure-time physical activity, energy level, and diet quality is significantly associated with the risk of abdominal obesity.

Many interventions and programs have been developed on college campuses to help address some of the aforementioned poor health patterns, but many have failed to offer preventative services in a way that meets the student where they are. The U.S. Department of Commerce[12] report showed that 70.7% of the general population between 18 and 24 years old, among whom 86.7% were students, use the internet. This data indicates how the Internet has become extremely important in the daily life of adolescents in terms of instrumental purposes (e.g. school, information gathering).[12] In recent years the Internet has also started to be considered a useful tool to gather health related information,[13-14] and consequently a useful resource to develop, implement, and deliver behavior change interventions.[15] Some of the advantages of the Internet as a medium for intervention include the opportunity to reach a wide range of people at a low cost, and to deliver personalized and interactive feedback without face-to-face contact.[16] Many authors supported the effectiveness of Internet delivery of behavioral change interventions,[15-16] revealing the promising benefits of using the internet to promote health behaviors.[17-18]

To develop and provide individualized, tailored feedback, some researchers have started to use knowledge-based systems (KBS).[19] KBS are

software that achieve expert-level competence in solving problems in a specific task domain.[19-20] If used within the realm of health behavior change, delivered and accessed through the Internet, KBS could help in delivering these interventions by providing assessment and instant feedback, overcoming many barriers, such as time and accessibility.[21] The effectiveness of KBS has been proven in the realm of physical activity (PA),[22-24] nutrition,[24] alcohol,[25] and nicotine.[26]

Newton and colleagues[27] developed an intervention characterized by the use of a Health BehaviorAssessment (HBA) that looked at three different areas: behaviors (PA, eating, stress management) comparing them to accepted standards, readiness of change, and actual behavioral change occurred along the program. This instrument was administered through the Internet, which allowed for immediate feedback to the students. The authors noticed an improvement in many of the targeted health behaviors among those individuals who were involved in the intervention. The intervention results showed statistically significant changes between pre and post intervention health behaviors including consumption of fruits and vegetables ($p<.001$), regular pop/soda ($p=.003$), sweetened beverage ($p=.042$), and alcoholic beverage ($p=.019$). Moreover, other benefits included positive thinking ($p=.001$), creative problem solving ($p=.021$), and stress impact ($p=.035$). This study provided evidence suggesting that KBS can be an efficient and effective way of targeting college student health behavior change.

According to this study and other published research, there is a need for tailored and web-based behavior change intervention addressing the college-aged population.[28] The knowledge-based system can provide a means for assessing and providing feedback on students current health behaviors. The use of web-based computer-tailored intervention is further supported because college students are an "online population",[12] (72% of these students using the internet)[29]and the internet plays a fundamental role in their lives.[30] This study was designed to pilot test a theory-based, computer-tailored feedback system for improvement of lifestyles among college students at a large, public university.

Methods

Participants and Procedures

The design of this study is a pseudo experimental design. Prior to collecting data, approval was obtained from the Institutional Review Board (IRB) for the protection of human subjects. The informed consent was provided in a cover letter to the participants on the provided link.

Two recruitment tools were used to recruit the study sample. The "in-class" recruitment produced a sample of 566 students, while the "fact-to-face recruitment" held within a few of the institution's residence halls, produced a list of 955 email addresses. The face-to-face recruitment strategy occurred in four specific residence halls. There, students were asked for their university-specific email address to be contacted to participate in the study. Each student was told in advance about the content of the study, the IRB approval, and their eligibility to win a gift certificate through responding to the three email surveys throughout the semester. The second recruitment process took place within four major-specific introductory level classes. The researcher presented the study in these classes and obtained student email contacts with the permission of the class' instructors.

All participants were contacted by email and asked to complete the three surveys. Due to requests from participants to be removed from the list and/or to the illegible email addresses, the final sample included 1301 students. After multiple reminders during the study period to maintain the most sample, only 62 students ("Intervention or Study Sample") completed all three surveys over an eight-week period (Figure 1).

Study Design

All participants were randomly assigned to one of the two intervention's conditions by the KBS and received either the personalized (PERS) or the normative (NORM) feedback. The students who answered at least once to the survey included 303 and will be referred to as the "General Sample".

After completion of each of the three surveys, the students in the PERS group received personalized feedback which was developed by the lead author and delivered through the Knowledge Based System (KBS). The researcher, who analyzed all the possible combinations of responses that the system could receive, produced a theory-based paragraph for each combination of responses, which together formed the personalized feedback. The personalized feedback

provided the individual with a description of their current behaviors. It also included suggestions to develop, improve, and/or maintain a healthy lifestyle. This personalized feedback was based on Nutritional and Physical Activity Guidelines for Americans [30-32] found in the scientific literature. It was characterized by its ability to integrate the personal response of the individuals with the contextualized information and the scientific literature. Instead, all participants in the NORM group were provided with the same normative feedback not considering their individual's responses. This feedback was developed by the researcher and based on the Guidelines for Americans and the scientific literature, and simply listing the guidelines only.

The first administration of the survey was held during the third and fourth weeks of the spring semester of 2011, the second during the seventh, and the third during the tenth week. Email addresses were sent in groups to avoid spam walls. These emails addressed the researcher and five students at a time. All participants were told that upon their completion of the study they will be rewarded $10. The researcher provided the instructors with the same text of the email asking them to forward it to their classes.

Study Measures

The theoretical frameworks to make up the questionnaire were the Transtheoretical Model of Change (TTM) and the Theory of Planned Behavior (TPB).[33-34] Dillman's[35] principles of tailored design were used for the development of survey in addition to other health behavior surveys.[27, 36-38]

The survey's pool of questions had a total of 80 items across four main sections: Introduction (three questions), Physical Activity Behaviors (twelve questions), Eating Behaviors (fourteen questions), and Drinking Behaviors (twelve questions). The three behavior-specific sections were similar in their structure, while the other sections were alternatively presented during the three administrations of the survey. Five main sections characterized each portion of the survey. Each one of the behavioral sections included: a) descriptive questions (between four and nine items); b) a stage of readiness item (one item), c) a question focusing on intentions to behave (one item), d) barriers (seven - six items), e) perceptions of peer behavior (one – four items), and eventually, if necessary, f) follow up TPB related questions (three items).

The first set described the level of engagement in the specific behavior (e.g., "In a usual week how many days do you do 30 or more minutes of moderate activity (only count bouts of at least 10 minutes)?"). These questions were characterized by answer options targeting behaviors on a ratio scale. The second set addressed the individual's readiness of change regarding this behavior (e.g., "Which of these statements most closely reflects you in your exercise behavior?"), characterized by a multiple choice answer in which each level characterized one of the five stages of change. The third section analyzed the individual's intention to behave (e.g., "I will eat healthy in the next month" and "How important is it for you to maintain moderate drinking"). The individual response was based on a six-point Likert scale response option. The fourth subsection looked at the individual's perception of the general institution-specific student population characteristics within the specific behavior (e.g., "In the last month, in your opinion, how many days does an average student drink?").

The last section looked at the barriers preventing the engagement in these behaviors (e.g., "Which of the following barriers interfere with or prevent you from eating healthy?"), and the response was a yes-no dichotomous option. The core of each survey administration included between 54 and 58 questions. Additional nine questions were asked following a score equal to or less than four to the question about the likelihood to engage in the behavior (i.e. "I will exercise regularly in the next month").

A draft of the survey, including the entire pool of items, was piloted during the spring 2010 semester in a general introductory class with eight freshman students. This group of students completed it in an average time of 14 minutes, providing generally positive feedback.

Analysis

Demographics have been analyzed for each sub-sample reporting mean and standard deviation of all continuous variables and percentages of frequency for each categorical variable. The impact of intervention was analyzed by running a series of 2 (feedback type) x 3 (time) repeated measure ANOVAs, run for each of the dependent variables. In these analyses the independent variables were the assigned group (Normative vs. Personalized) and the time points during the intervention (T1, T2, T3), whereas the dependent variables were: days with

moderate physical activity, days with vigorous physical activity, days with stretching, days with strength activity, servings of fruits and vegetables per day, days with at least one drink, number of drinks per day, days with five or more drinks in a week, number of episodes with five or more drinks in a month, likelihood to engage in each of these behaviors and perceived importance of them.

Results

The general sample consisted of individuals who completed the survey at least once during the Fall and Spring semester (N=303). This sample included mostly white/Caucasian (n=255; 84.2%) and freshman students (n= 203; 67%). In terms of sex, the individuals in this sample were slightly more likely to be male (n=163; 53.8%) and to live in the residence halls (n= 222; 73.3%). These individuals reported living a healthy (n= 203; 67%) or very healthy life (n= 58; 19.1%), being mostly within a normal BMI range (BMI 18.5-24.9) (n=134; 57.6%).

The general sample was characterized mostly by healthy individuals who met the guidelines for all the major dependent variables such as: moderate physical activity (n=153; 50.5%), vigorous physical activity (n=185; 61.1%), consumption of fruits and vegetables (n= 84.5; 84.5%), moderate PA (n=185; 61.1%), and heavy drinking (n=228; 75.2%). This sample seemed to be inclined to being engaged in a healthy lifestyle, in all considered behaviors, also attributing moderately high importance to the engagement the healthy lifestyle (Table 2).

Comparable similarities were also shown in looking at their readiness to change. Most of the individuals in this sample were already involved in an active lifestyle (n=64; 21.1% in Action; n=122; 40.3% in Maintenance), while only a little more than a third of this sample were already eating healthy (n=47; 15.5% Action; n=61; 20.1 Maintenance), and only 39.8% (n=11; 3.6% Action; n= 104; 34.3% Maintenance) were already engaged in a moderate drinking habit (Table 1). During the spring semester, 211 students completed the survey at least once and 62 (20.46% of the general sample) completed the three administrations. The intervention sub-sample (62) was mostly characterized by older (M=19.39; SD=1.853), Caucasian (n=59; 93.7%) women (n=37; 58.7%). They were most likely to be freshmen (n=37; 58.7%) with a normal BMI (n=36; 57.1%), living a healthy (n=47; 74.6%) or very healthy (n=9; 14.3%) lifestyle.

The intervention sub-sample was also characterized by the majority of the individuals stating that they were already engaging in an active lifestyle (n=28; 44.4% Maintenance, n=12; 19% Action) and highly rating the importance of a physically active life (M=5.24; SD=0.843). Only a third of the individuals in this sample (n=19; 30.1%) were already engaged in a "healthy" diet, characterized by five servings of fruits and vegetables a day. However, every participant valued this behavior highly (M=5.08; SD=0.997) and assigned a high likelihood to engage in it (M=4.71; SD=1.183). Half of the sample (n=31; 50%) considered themselves already experiencing a "healthy" drinking behaviors, rating moderately high both the importance (M=4.13; SD=1.914) and the likelihood of engaging in healthy drinking behaviors (M=4.13; SD=1.914) (Table 1).

Impact of the Knowledge-Based System

The impact of intervention was analyzed by running a series of 2 (feedback type) x 3 (time) repeated measure ANOVAs. In each of the following four reported interactions, the Mauchly's test for sphericity indicated that this assumption was met (Moderate PA: W = 0.926, df = 2, p = .103; Drinks per Day: W = 0.956, df = 2, p = .287; Alcohol Likelihood W = 0.911, df = 2, p = .092; Alcohol Importance W = 0.982, df = 2, p = .631), so no corrections were applied to the F-ratio computations. Some small but statistically significant effects were found in the interactions between the received feedback variable and a few of the main dependent variables over time. These interaction effects will be discussed in detail below. In the remainder of the two-way models, no statistically significant main effects or interactions were found over time for fruit and vegetable intake, vigorous physical activity, or any of the other attitudinal variables across the three health behaviors.

Moderate physical activity: The effect of the interaction between Moderate PA and the type of feedback suggests that overall there was a small, but statistically significant increase in the level of PA of participants over the eight week intervention period [F(2,120)=3.93, *p*=0.02, ES=0.06, Obs.Pow=0.698]. As shown in Table 2, the normative group showed a slightly larger change in terms of average days of moderate activity (Personalized 0.23; Normative 0.39). Overall, there was not a significant main effect for time (*p*=0.314), but there was a main effect for the group. This means that there were differences among groups regardless of time effect [F(1,60)=

4.238, p=0.044, ES=0.066, Obs.Pow=0.526]. On average, the Normative group average score on Moderate PA was higher than the Personalized group (Table 2).

Alcohol use over time: In terms of the drinks per day variable, the interaction of the two variables suggested a small, significant increase in terms of drinks per day [F(2,120)=3.53, p=0.03, ES=0.058, Obs.Pow=0.647]. The individuals in the normative feedback group showed a slightly larger change in their average of drinks per day than the personalized feedback group (Personalized -0.14; Normative 0.50) (Table 2). Also, the change in drinking habits was in the opposite direction for the individuals in the personalized feedback group. In other words, over time the number of drinks per day decreased in the personalized feedback group, whereas it increased in the normative feedback group (Table 2). Overall, there was not a significant main effect for time (p=0.238) or for group (p=0.527). Another small interaction effect was found between the level of self-reported likelihood of engaging in healthier drinking and the type of feedback [F(2,120)=3.229, p=0.04, ES=0.058, Obs.Pow=0.604]. The Personalized group showed a greater change in terms of its likelihood to engage in moderate drinking (Personalized 0.75; Normative -0.43). This effect showed how the individuals in the group receiving the personalized feedback increased their likelihood to drink moderately, while the normative feedback group decreased their likelihood to drink moderately. Overall, there was no significant main effect for time (p=0.823) or for group (p=0.318).

The interaction between the importance attributed to moderate drinking and the type of received feedback produced another, although not statistically significant, small effect [F(2,120)=2.960, p=0.056, ES=0.055, Obs.Pow=0.565]. While the personalized feedback maintained the same level of attributed importance, the normative feedback group decreased in this variable (-0.48). Overall, there was no significant main effect for time (p=0.093) or for group (p=0.504). In all these analyses, due to sample size smaller than expected, the levels of observed power did not reach the needed 0.8 suggested by Cohen[39]. Therefore, the probability of finding a statistically significant difference was lower than desired.

Discussion

The participants who volunteered in this study were likely to meet the guidelines for physical activity, nutrition, and diet as gathered by the survey, and showed a relatively high likelihood to engage in these behaviors in the future. The healthy characteristics of the sample were confirmed by comparing them to other studies' samples. Only 4.8% of the intervention sub-sample experienced heavy drinking in the previous month, while a higher percentage (7.5%) was noted in the 2008 National Survey on Drug Use and Health.[38] Another comparison concerns the dietary guidelines. The majority of the general (n=220; 72.6%) and the intervention sub-sample (n=49; 79%) reported meeting the fruits and vegetables guidelines, while Racette and colleagues[47] found that one third of their college students sample met this guideline. Anding and colleagues [48] found that 43% of college women followed at least one of the dietary guidelines.

This substantially healthier nutrition could also have been influenced by the fact that the sample in this study was mostly living in the residential halls or at least recruited outside of the residential halls' cafeteria, where fruits and vegetables are easily accessible. This consideration can be sustained also by the fact that around 50% of the study sample in all three administrations of survey, respectively 48.4% (n=30), 43.5% (n=27), and 51.6% (n=32) reported eating meals in the residence hall cafeteria 4 out of 7 days a week. This tendency to be healthier than the general population can be justified by the hypothesis that, generally, healthier or more conscientious individuals are more inclined to join health-related interventions.[44] However, these healthy attitudes and behaviors of the sample may have also created a ceiling effect, rendering both forms of the intervention less effective.

Despite this potential ceiling effect, the self-reported likelihood of these individuals to engage in all sorts of health behaviors increased slightly over the eight-week intervention. The greater effects might be due to the influence that online self-testing and the informative aspect of the intervention had on these individuals.[44] Regardless of the small size of these changes, all values generally showed a high consideration for the behaviors, inferring that participation might have reinforced their habits. Comparing the two sub-samples of personalized and normative feedback revealed no major differences between the two groups over time. Therefore, the tailored intervention did not show the intended effect in most dependent measures.

Both sub-samples showed small increases in their level of physical activity. However, they presented a small decrease in their consumption of fruits and vegetables per day, and also an increase in both numbers of alcoholic drinks per day and numbers of days with at least one alcoholic drink. However, the personalized feedback showed a small decrease in both moderate and heavy drinking. Interestingly, these individuals varied in their readiness to change in some of these behaviors, showing progression in both physical activity and drinking habits. According to these results, regardless of the small size of the sample, it is possible to state that this intervention showed some increases in relevant health behaviors of the college students and more specifically the participants of this study. The results of this study suggest that interventions tailored towards college students may positively support and/or initiate a healthier lifestyle. However, further research should be conducted with a larger sample size.

The potential public health effects of this and similar tailored interventions could be positive, even with small effects, when applied on a larger scale.[43] The small impacts of this intervention found in this study can be due to the length and the structure of the intervention or the nature and form of the offered feedback. Among this group of individuals, only a small percentage (<10%) participated in the entire intervention. This small percentage, based on the obtained demographics, might have been the healthiest portion of the recruited sample, and therefore the most interested in a health-based intervention.

In terms of cost of the interventions, although the final cost per user in this study was approximately $40, the low delivery cost for the overall survey sample ($2 per person) suggests that this intervention is an affordable approach with a potential for wide delivery. Despite the small impacts found in this study that can be due to the aforementioned reasons, if the intervention encourages participants to adopt more positive attitudes and behaviors, this approach could be easily justified and repeated with future groups of students. The survey also gathered, in its last administration, some evaluative open comments from the participants, not discussed here, confirming that a prevention program that specifically addresses college students and delivered through the Internet could be feasible and efficient, as suggested in previous studies.[40-42]

Limitations

A major limitation of this study has been represented by the recruitment and by the maintenance of the initial sample. This difficulty is evident in the difference in participation between the fall and the spring administrations, where the presence of academic incentive, 5% of the final grade, created a higher number of responses.[40] The investigators who piloted the study in Spring 2010 also confirmed the potential beneficial effects of having the survey linked to a class structure and providing an academic incentive. As in Newton et al[27], this study was also unable to reach the entire incoming freshmen class, thus limiting external validity. Problems were also created by the self-selecting process of the participating sample. Self-selection resulted in a sample mostly consists of individuals already healthy or at least aware of or curious about a healthier life style, rather than the part of the population that was initially thought of as the target of the intervention. Other challenges related to the small sample size could be due to the survey in its length and content, and to the difficulties experienced with the system. The extensive length of the questionnaire could potentially have affected the participation of the students. Moreover, the focus on alcohol consumption could have been considered a "threatening" issue because of the average age of the majority of the sample. Another barrier linked to the limitation can be caused by the length of the study, 8 weeks, and in the lack of a long-term follow up.

Conclusion

Future studies may want to look at the possibility of increasing the level of the external validity in this type of intervention. With this goal in mind, future studies trying to address only freshmen and college students might want to consider establishing cooperation with the participating institution to be able to access the email list of the entire freshmen class, and provide them with this service as an integral part of the introductory classes.[49] Furthermore, future studies could create a specific class incorporating the intervention as well as some educational modules focusing on these behaviors.

To decrease the attrition and increase the external validity, these interventions could be provided as a "welcoming" service to all incoming freshman students. The need of this sort of structured intervention has also been sustained by Carey and colleagues[46] who found that alcohol risk reduction interventions were effective in influencing healthier drinking behaviors. Similar interventions could also

be effective in addressing other health behaviors. Using bigger and different incentives[41] could increase the sample size and reduce attrition. More personalized emails, or if possible, accessing the participants' phone numbers to send the automatic text message reminders, might be useful ways to address the high attrition rate problem. The effectiveness of KBS in delivering health behavior change interventions has already been supported. [22-26] Therefore, future studies might want to focus on a more in depth and a more structured feedback with a simpler survey format. These studies could also look at the use of alternative and integrated strategies, such as Experiential Sampling Methods, and alternative forms of feedback, such as audio and printed feedback.

The preventive aspects of this type of intervention could provide institutions with a useful tool to supply helpful services to their students and with small changes in the structure of the survey and of the intervention, eventually to their faculty and staff. The preventive aspects, if validated, could help institutions limit drop out problems caused by alcohol misuse.[45] It will also enable the institutions to address the direct and indirect consequences of unhealthy diet or inactive lifestyle through the delivery of "curative" health services.

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Figure1: Flow Chart on Sampling and Data Gathering Procedures

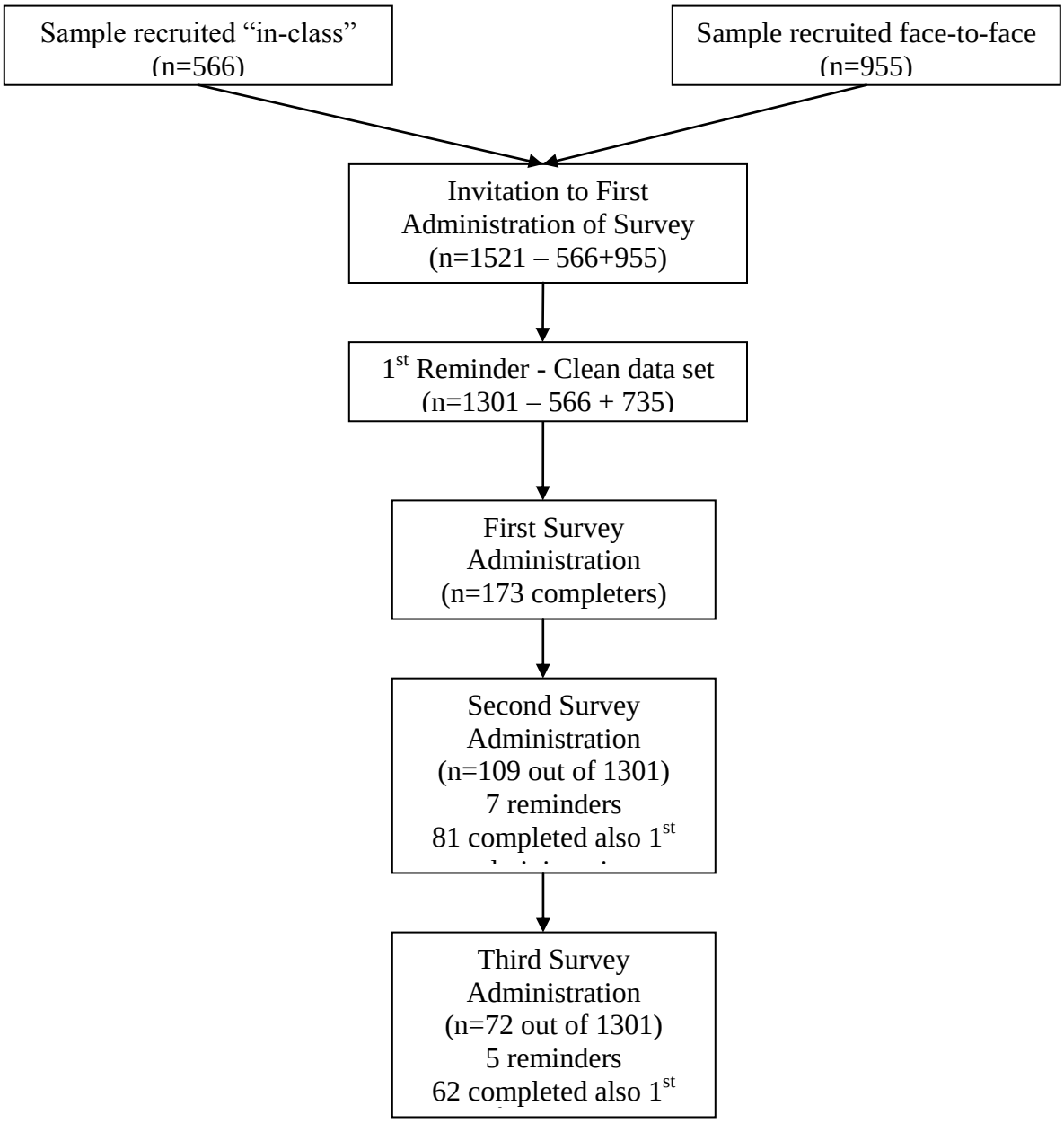

Table 1 Percentage of Individuals Meeting Guidelines of Health Behaviors

	General Sample (N=303)			Intervention Sample (n=62)		
Guidelines	Male (%)	Female (%)	Total (%)	Male (%)	Female (%)	Total (%)
Moderate PA	50.3	51.1	50.5	36	43.2	40.3
Vigorous PA	63.2	59	61.1	68	70.3	69.4
Combined PA	88.9	83.9	86.3	76	83.8	80.6
Servings F&V	71.2	74.8	72.6	80	78.4	79
Al Moderate	56.4	66.2	61.1	84	67.6	74.2
Al Heavy	68.1	83.5	75.2	92	97.3	95.2

Variables:

- Moderate PA: Moderate Physical Activity
- Vigorous PA: Vigorous Physical Activity
- Combined PA: Sum of Moderate and Vigorous Physical Activity
- Serving F & V: Servings of Fruit and Vegetables
- Al Moderate: Moderate Drinking
- Al Heavy: Heavy Drinking

Table 2 Comparison of the Data Related to Health Behaviors, the TPB of the Complete Sample Participating in the Study, looking at Different Points

	Time 1		Time 2		Time 3	
	Mean	SD	Mean	SD	Mean	SD
Moderate PA	4.06	1.863	4.13	2.028	4.37	1.681
Vigorous PA	3.23	1.970	3.48	1.973	3.31	1.714
Servings F&V	7.40	3.396	7.39	3.423	6.98	3.257
Days w/1 drink	0.93	1.260	1.08	1.297	1.15	1.365
Drinks per day	0.70	1.094	0.93	1.436	1.00	1.0547
Binge /Week	0.60	1.045	0.61	1.061	0.69	1.288
Binge /Month	0.83	1.044	0.92	1.076	0.76	0.862

	Time 1		Time 2		Time 3	
	Mean	SD	Mean	SD	Mean	SD
PA						
Likelihood	4.84	1.570	4.90	1.479	4.94	1.329
Importance	5.24	0.843	5.23	0.895	5.16	1.059
NU						
Likelihood	4.77	1.122	4.90	1.127	4.84	1.119
Importance	5.08	0.997	5.21	0.908	5.15	0.956
Al						
Likelihood	4.13	1.914	4.12	1.966	4.36	1.919
Importance	4.46	1.679	3.98	1.904	4.36	1.740

	Time 1	Time 2	Time 3
	%	%	%
PA			
Precontemplation	3.2	1.6	4.8
Contemplation	8.1	6.5	4.8
Preparation	24.2	22.6	30.6
Action	19.4	24.2	17.7
Maintenance	45.2	45.2	41.9
NU			
Precontemplation	1.6	0	0
Contemplation	14.8	11.3	12.9
Preparation	52.5	45.2	48.4
Action	11.5	19.4	9.7
Maintenance	19.7	24.2	29
Al			
Precontemplation	14	18.6	21.3
Contemplation	7	6.8	4.9
Preparation	24.6	23.7	23
Action	5.3	5.1	1.6
Maintenance	49	45.8	49.2

Variables:

- Moderate PA & Vigorous PA: Moderate Physical Activity & Vigorous Physical Activity
- Serving F & V: Servings of Fruit and Vegetables
- Days w/1 drink & Drinks per Day: Days with at least 1 drink & the Number of drinks in a day
- Binge /Week and Binge /Month: Number of binge drinking episodes in a week or in a month
- Likelihood and Importance: Likelihood to engage in the behaviors and importance attributed to the behavior