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Mobile Alcohol Primary Prevention: Feasibility with Urban Commuter College Students

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MOBILE ALCOHOL PRIMARY PREVENTION:
FEASIBILITY WITH URBAN COMMUTER COLLEGE FRESHMEN

A DISSERTATION

By

JANICE CHISHOLM

Concentration: HEALTH POLICY AND MANAGEMENT

Presented to the Faculty at the Graduate School of Public Health and Health Policy in partial fulfillment of the requirements for the degree of Doctor of Public Health

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ABSTRACT

Mobile Alcohol Primary Prevention: Feasibility with Urban Commuter College Freshmen

By

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Advisor: William T. Gallo, Ph.D.

The first year and possibly as early as the first two to six weeks of college are marked with personal and social transitions that may help to define academic and other behavior for new college students, including alcohol use patterns.\textsuperscript{1} Evidence suggests that alcohol use by college students negatively affects learning, retention, and graduation,\textsuperscript{2,3} and is associated with alcohol-related unintentional injury, deaths, sexual violence, suicide and other problems.\textsuperscript{4} Young adults entering college have been found to increase their usage during the transition from high school, particularly for students with certain social characteristics (male sex, history of conduct issues, peer use, etc.).\textsuperscript{5} Mediators such as coping, alcohol expectancies, drinking motives, and perceived norms have been associated with how college entry impacts first-year alcohol use; of these, alcohol expectancies have been identified as a single-strong mediator.\textsuperscript{6} Moderators such as race/ethnicity and immigration status also have been identified as significant variables that are associated with use patterns,\textsuperscript{7,8} and which taken together may produce cumulative hazard as a result of the combined effects of manifold stressors.

To date, alcohol interventions with college students overwhelmingly target mandated students. Research is needed to assess the feasibility for delaying alcohol use onset for college freshmen,
particularly, for commuter students who are not already engaged in alcohol problems, but for whom the ubiquity of advertisement and access may contribute to risk. Furthermore, much of what is known about college student use is premised on research with white students who are residents of residential campuses. Less study has been done with commuter students, a population which tends to be minority, first-generation, and to vary with respect to foreign nativity. Research is needed to clarify whether use patterns by ethnic minorities, foreign-native and first-generation students can have important long term protective effects, and if current intervention practices are appropriate for this sub-population.

This study investigates college alcohol use and tests the feasibility of a mobile primary alcohol prevention on an urban commuter campus using a repeated measures design. Outcomes of the study are the development of a primary prevention mobile alcohol intervention for use with urban commuter college students; and feasibility and acceptability of the intervention to first year urban commuter college students. We hypothesized that abstaining urban commuter students would find the primary prevention approach acceptable for delaying their use of alcohol. Furthermore, we expected intervention students to be less likely than their peers to drink, misuse or change their attitudes about drinking, or engage in other drug use than their peers at one-month follow-up.

Three central aims of this work are:

Aim 1: To systematically analyze data collected by Add Health database to identify factors that may contribute to college student alcohol uptake.
**Aim 2:** To develop a protocol for a mobile primary prevention intervention to delay alcohol uptake by college freshmen who identify as abstaining from alcohol consumption, by adapting an intervention which successfully increased readiness for change for students previously identified for, or at risk of, problem use.

**Aim 3:** To systematically analyze the feasibility (acceptability) for and identify barriers to a mobile primary-prevention intervention delivered through text messaging with a random sample of abstinent urban commuter first-time freshman college students at CUNY –Brooklyn College focusing specifically on analysis of recruitment, retention, and adherence based on thematic analysis of semi-structured interviews to elicit continued alcohol abstinence at one month-month follow-up, compared to a control group.

Main outcomes of this work are understanding factors associated with college alcohol initiation, and testing the feasibility of a mobile device for primary alcohol prevention to prolong abstinence among urban commuter college freshmen.
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DISCLOSURE STATEMENT FOR CONFLICT OF INTEREST

The author has no conflicts of interest and nothing to disclose.
DEDICATION

In loving memory of Grannymere, for remaining my hero; and Mommy for teaching me the need for and the means to a path of great heights.

To Daddy for unknowingly teaching me the power of circles.

For Karyn: Thank you for being a most willing vessel and a miraculously welcoming village!
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CHAPTER 1
INTRODUCTION

New York City Underage Alcohol Use and Consequences

Alcohol use and consequences is an important area for public health inquiry. In the United States (US) alcohol is the third leading cause of death that is behavior-related, with some 79,000 deaths attributable to excessive alcohol use, per year.\textsuperscript{10}

Alcohol is the drug of choice for many youth, making underage drinking a principal public health concern in the US. Each year thousands of youth 21 years and younger die as a direct consequence of underage drinking.\textsuperscript{11} In spite of the costs and consequences, underage drinking continues among America's youth and young adults. In New York City (NYC), alcohol-related emergency department visits for underage New Yorkers doubled from 2003 to 2009, and one in ten hospitalizations for all ages in NYC are alcohol-related\textsuperscript{12}. New York City underage alcohol use and consequences requires public health intervention.

Alcohol Use on College Campuses: The Critical Freshman Year

Research shows that college students under 21 who reported drinking in the past month increased from 45\% in 2002-2005 to 57\% in 2005-2008.\textsuperscript{13} In fact, across the US, college alcohol use is common. In 2009 alone, some 1,825 college students lost their lives due to alcohol.\textsuperscript{12} Furthermore, when compared with their peers who are not in college, full-time college or university students aged 18-21 years are more likely to drink.\textsuperscript{12}

The first year and possibly as early as the first two to six weeks of college is marked with personal and social transitions that may help to define academic and other behavior for new college students, including alcohol use patterns.\textsuperscript{1} Evidence suggests that alcohol use by college
students negatively affects learning, retention, and graduation,\textsuperscript{2,3} and is associated with alcohol-related unintentional injury, deaths, sexual violence, suicide and other problems.\textsuperscript{4,12} Young adults entering college have been found to increase their usage during the transition from high school, particularly for students with certain social characteristics (male sex, history of conduct issues, peer use, etc.).\textsuperscript{5} Mediators such as coping, alcohol expectancies, drinking motives, and perceived norms have been associated with how college entry impacts first-year alcohol use; of these, alcohol expectancies have been identified as a single-strong mediator.\textsuperscript{6} Moderators such as race/ethnicity and immigration status also have been identified as significant variables that are associated with use patterns,\textsuperscript{7,8} and which taken together may produce cumulative hazard as a result of the combined effects of manifold stressors.

**College Alcohol Interventions**

To date, interventions with college students overwhelmingly target mandated students. All the same, some first-time college students do not initiate alcohol use until they enter college; for some of these students, alcohol uptake leads to unwanted outcomes. Furthermore, much of what is known about college student use is premised on research with white students who are residents of residential campuses. Less study has been done with commuter students, a population which tends to be minority, first-generation, and to vary with respect to foreign nativity.
Statement of the Problem

Since earlier uptake of alcohol increases the risks of developing serious alcohol problems and experiencing adverse consequence and outcomes, delayed initiation can create better outcomes. Research is needed to assess the feasibility for delaying alcohol use onset for college freshmen who are not already using alcohol. Research also is needed to clarify whether use patterns by ethnic minorities, foreign-native and first-generation students can have important long term protective effects.

The literature shows that earlier uptake of alcohol increases the likelihood of behaviors that cause self-injury and harm to others. The current work is an endeavor to better understand and to target factors that may contribute to alcohol use decision-making by a largely understudied sub-population of urban commuter college students. Three chief aims for this work are:

**Aim 1:** To systematically analyze data collected by The National Longitudinal Study of Adolescent to Adult Health (Add Health) database to investigate factors that predict college student uptake of alcohol.

**Aim 2:** To develop a protocol for a mobile primary prevention intervention to delay alcohol uptake by college freshmen who identify as abstaining from alcohol consumption, by adapting an intervention which successfully increased readiness for change for students previously identified for, or at risk of, problem use.

**Aim 3:** To systematically analyze the feasibility (acceptability) for and identify barriers to a mobile primary-prevention intervention delivered through text messaging with a random sample of abstinent urban commuter first-time freshman college students at CUNY –Brooklyn College focusing specifically on analysis of recruitment, retention, and adherence based on
thematic analysis of semi-structured interviews to elicit continued alcohol abstinence at one month follow-up compared to a control group.

**Purpose and Objectives**

The goal of this study is to isolate predictors of alcohol abstaining among young adults enrolled in college or university. The study features feasibility testing of a mobile approach as a primary prevention technique with urban commuter college students. The use of mobile devices for health care is an emerging area of investigation, and has largely been focused on reducing existing behaviors (tobacco use, unsafe sexual practices, etc) as well as for chronic health care. The current study will provide new information on the feasibility of a mobile device as a strategy for primary prevention that delays alcohol uptake among urban commuter college students.

An important objective of this study is to modify Mason et al (2014) readiness to quit intervention that uses a Cloud-based Application Programmer Interface (API) to implement a text messaging service component. In the previous study, researchers sent text message sequences based on motivational interviewing using a text messaging platform designed to respond to participants’ messages with a customized, outgoing message based on the participant’s current progress criteria, or status, within the study. The current study builds on Mason et al to target a sub-population of freshman students; it uses the same intervention protocol as a primary preventive measure with abstinent urban commuter college freshmen.

In the first part of this two-part study, secondary analyses are run to help answer questions about predictors of alcohol consumption by previously uninitiated college freshmen. Specifically, analyses of the Add Health data base are performed to identify which (combination) of socio-demographic variables may be predicative of college freshman alcohol up-take, and to
learn what factors may contribute to changes in alcohol consumption by previously abstinent youth. Add health is an ongoing longitudinal study following a cohort of a nationally representative sample of (1994-95) United States 7-12th grade adolescents into young adulthood that collects contextual (family, neighborhood, community, school, friendships, peer groups, and romantic relationships) and social, economic, psychological, and well-being data. Add Health data is used to examine associations between adolescent social environments and behaviors to later health and achievement outcomes.

This study also tests the feasibility of a mobile primary alcohol prevention on an urban commuter campus. Outcomes of the second part of the study are the development and feasibility testing of a primary prevention mobile alcohol intervention for use with first-year urban commuter college students. Using the principles of feasibility study design outlined by Bowen, et al17 and Ormond et al18 this study measures general areas of focus including acceptability, demand, practicality, and expansion. The hypothesis is that abstaining urban commuter students will find a primary prevention approach acceptable for delaying their use of alcohol. Furthermore, we expect intervention students to be less likely than their peers to drink, misuse or change their attitudes about drinking, or engage in other drug use than their peers at one-month follow-up.

**Rationale**

This study contributes to historic and ongoing investigation around college alcohol use, and it provides new information on the feasibility of using a mobile device as a strategy for primary prevention that prolongs abstinence among urban commuter college students. To help prevent near- and long-term alcohol problems, this study promotes the use of primary prevention
for an understudied group. Feasibility testing and formative evaluation techniques are used to assess fidelity and evaluate the potential for future implementation.

**Delimitations of the Study**

Delimitations of the current study bear mention as they will demarcate the study's contribution to public health research on college alcohol. Research on college alcohol use and consequences typically investigates use by young adults who are enrolled in college at any level of study, from first through graduate years. In addition, the literature examines a complex variety of research questions and intervention approaches to this persistent public health concern; typically, the focus is on how to redress existing alcohol use problems. The current study is delimited to examine college alcohol attitudes, beliefs, and behaviors by freshmen who are newly enrolled on an urban commuter campus; only first time freshmen, and not upper classmen or graduate students will be targeted. This study is further delimited to examine the feasibility for using a mobile primary prevention with uninitiated students; no examination of intervention techniques for use with students who are already consuming alcohol will be explored.

**Limitations of the Study**

There are several methodological and analytical limitations of the current study. To begin, secondary analyses are being made of a data set to glean information about college alcohol use, and to isolate predictors of alcohol abstaining among college students. One significant limitation is that Add Health is not powered to study persistent abstaining (i.e. abstaining among abstainers), hence conclusions must be made with caution. In addition to limitations around proper application of secondary data analyses, the primary preventive intervention in the second part of the study is developed by modifying an existing intervention,
using randomized students' personal knowledge of and experiences with alcohol. The small sample size of selected students may limit the extent to which their recommendations are representative of or coincide with the targeted study population. Furthermore, the Chisholm Survey, though developed from existing instruments was used for the first time in this study, and had not been previously validated. Another limitation of the study is reliance on self-report since participants may offer socially acceptable responses (social desirability bias). It should be noted, however, that self-report alcohol consumption is generally considered valid with college students.¹⁹

In addition to limitations that pertain to the study design, conceptual study limitations also may exist. The proposed research is premised on Health Belief Model; however, this model comes with its own limitations. For example, aside from its focus on individual differences in beliefs and attitudes, this model does not account for other factors that influence health behaviors, including the fact that some health-related behaviors may be practiced without conscious health-related decision making processes.²⁰ In addition, the model does not consider the impact of emotions on health-related behavior, though some evidence suggests that emotions such as fear may help to forecast health-related behavior.²¹
Definition of Terms

Alcohol abstinence: Self-enforced prevention from alcohol use

Alcohol consumption or use: Any drink of alcohol which amounts to more than a few sips, and/or which is done with regularity.

Application programming interface (API): Computer programming definitions, protocols, and tools for building application software. API provides subroutine building blocks to enable programmers’ ease of programming.

Cognitive Behavior Therapy (CBT): An evidence-based therapeutic approach that focuses on changing attitudes, beliefs, and thoughts to regulate emotions and direct behavior.

Community engagement: Community engagement involves working collaboratively within a community to address issues that impact the well-being of its members.

Delayed alcohol uptake: Continued choice not to drink alcohol

(First time) college freshman: Newly enrolled college student who is beginning their first semester at college. This excludes exchange students and students who may have previously begun and then interrupted their college tenure.

Mobile intervention: Computerized health intervention transmitted through mobile telephone applications to provide just-in-time, interactive, and adaptive intervention.

Primary prevention: Measures aimed at reducing the risk of exposure before the problem emerges. Targets individuals who do not yet engage in the health behavior.

Short Message Service (SMS): A text messaging service that enables short text message exchanges between telephones and other mobile devices.

Underage drinking: Alcohol use below legal drinking age of 21 years

Young adult: Late teens to early adulthood. For the purposes of this study, we are concerned with individuals 18-22 years old.

Youths: Middle to late teens, with some overlap with young adults
Summary and Overview of Remaining Chapters

This chapter offered an overview of the dissertation topic area. The chapter laid out the variables of interest [socio-demographics, health behaviors, attitudes, beliefs]; population of study [first-time college freshmen on an urban commuter campus]; study purpose, objectives and rationale; and the delimitations and limitations of the study. Remaining chapters will present study details, findings, and inferences. Chapter 2 contextualizes the relevance and importance of the current study by providing a review of pertinent research literature. Chapter 3 outlines the methodological approach of the study, including the extrapolation and application of secondary data analyses and the development and implementation of a feasibility study to test a primary mobile intervention. Chapter 4 presents results and interpretations. Lastly, Chapter 5 proffers discussion and conclusions, including thoughts about the public health significance and implications from study findings.
CHAPTER 2
LITERATURE REVIEW

Overview

College alcohol use and its consequences have received significant research attention\textsuperscript{9,22} yet, college student alcohol use continues to be a public health problem for students, college communities, and the public at large. In fact, while there has been much investigation into causes and consequences of college alcohol use, and though numerous approaches have been implemented to mitigate deleterious outcomes for students who drink, research suggests that the dangers of college alcohol use remain. Death, accidental injury, assault, and property damage are just some of the costly effects of college drinking\textsuperscript{4,9,23}.

Alcohol use and its consequences among college students in general continues to be an important area for public health investigation. As college student demographics increasingly diversify with the advent of commuter institutions, redoubled attention is needed to ascertain if old solutions will effectively address emerging demographics. In particular, minority alcohol use is reported as being more problematic than use by white peers.\textsuperscript{24} In addition, first-generation college students may have relatively more difficulty in adapting to the college environment than their peers. Furthermore, ethnic drinking cultures may significantly influence drinking behaviors of college students with foreign-born parents. New research is needed to expand the focus on viable preventive alcohol interventions that are specifically designed to address needs of commuter college students.
Theoretical Development

College Student Alcohol Consumption

Additional study is needed to address limitations of research on college students and alcohol consumption. To follow is an examination of how we came to what we have learned to date, and recommendations for how to further the study of and intervention for college student alcohol use. Specifically, this paper calls for the coordination of treatment that targets individual students with environmental intervention programs designed to deliver primary prevention within the context of current and emerging college demographics and environment.

A significant body of research documents the causes and consequents of under-age and problem drinking as found studying white middle class college students living on college campuses. The major focus of studies to date has been on alcohol use among full-time students attending 2- and 4-year colleges, to the exclusion of part-time students. However, recent studies suggest that more and more college students are attending commuter institutions, and that while national student enrollment is increasingly diverse, commuter demographics are different than at residential schools; furthermore, the percentage of ethnic minority students has been increasing.

Other differences between the historic subject of alcohol college studies and the current student demographic has to do with the fact that part-time students have jobs, families and other activities that are not typically in the experience range of full-time residential students. It is therefore possible that alcohol use would function very differently for full-time versus part-time students. Studies also seem to suggest that alcohol use is more problematic for college students living on campuses than for those who commute; all the same this does not rule out the potential for commuters’ use to be problematic.
A seeming gap in the college student alcohol use literature does not account for the current commuter demographic and its consequential off-campus contact. As colleges are increasingly heterogeneous and students are more diverse, we need to understand the current student population. Besides having a clearer picture of how well existing strategies target college students, additional understanding is needed around what extra-campus influences may impact alcohol consumption by students who may be spending more time off campus.

Existing Research Methods for Studying College Student Alcohol Consumption

Much of the study of college student alcohol consumption has used self-report survey and focus groups, each with students and/or school administrators, faculty, and staff as subjects, and usually at a singular level of analysis. Another recent research trend in the study of college student alcohol consumption is to look at how college alcohol policy might influence student behavior.

New Research Methods for New Evidence on College Student Alcohol Consumption

To present, research seeking to uncover causes, consequences, interventions and their effects on college alcohol consumption have largely employed one or two approaches at singular levels of data. Further empirical research that makes use of multi-level methods to advance understanding of alcohol use among college students in the context of current college demographics and environment is warranted as they can be expected to provide richer, more faithful appreciation of the experiences of commuter students.

Public health study targets various sources and many levels of influence (e.g., policies, institutions, community, individual, etc). Models such as social ecological model and integrated theoretical model of drinking behavior prescribe simultaneous targeting of individual and
environmental risk factors for curbing heavy drinking.\textsuperscript{41,42} Given that factors such as intrapersonal, interpersonal, institutional, community and government policy may be counted among the various factors that affect college student alcohol consumption, it is no surprise that in efforts to deter alcohol use and resulting deleterious effects, many college campuses variously employ alcohol prevention efforts on these levels with a goal to affect student attitudes and beliefs, and to routinize discussion about alcohol use and its consequences including in the classroom.\textsuperscript{43} Research is needed that examines these multi-levels of influence; to date, the majority of studies examine one, or at most two of these levels.

The selection of an approach for integrating data is one of the greatest challenges for combining quantitative and qualitative methodologies. Merging, connecting, and embedding data are three main approaches to integrating data\textsuperscript{44} Merging data involves reporting data sets concomitantly, or transforming either data set. Connecting data calls for using the information gleaned from the analysis of one set of data to structure the other; for example, using quantitative survey information to inform interview questions. Embedding involves nesting datasets. For the current discussion, any one of these integration techniques may be useful; further investigation may be required in order to determine the most cogent combination.

Additional challenges to integrating data from into a comprehensive multi-level understanding of alcohol use among college students may be numerous.\textsuperscript{46,45} Key challenges include time and cost considerations. Sampling issues such as assuring adequate sample sizes for analyses, using equivalent samples, and employing a consistent unit of analysis across databases can also pose as challenges. Analytic and interpretation issues also may present as findings by one may contradict another data set; researchers may consider different data sets to have unequal
importance for the investigation; and underlying philosophies of the methods may not wholly coincide.

The college environment may be a risk factor for certain aspects of drinking among youth.\textsuperscript{46} Studies suggest that students increase their alcohol consumption during the first year of college.\textsuperscript{47,48,49,50} It may be that characteristics of the college environment, including architectural, organizational, and social factors contribute to drinking behaviors.\textsuperscript{51}

Campus residence setting is one college characteristic that contributes to its environment.\textsuperscript{52} Campus residence has received research attention for its potential influence on student alcohol behavior; to date, extensive evaluation has been made of student alcohol behaviors at 4-year residential college settings.\textsuperscript{53,54,55,56,57} Research suggests that 20\% of students in college take their first drink after reaching age 18 as a way to become a part of the college experience,\textsuperscript{1} suggesting that residential college entry itself is a most important factor in understanding college student behaviors around alcohol, outweighing the impact of religious affiliation, parental drinking habits, or other personal characteristics.\textsuperscript{58} Residential students are typically under the age of 25 years; enrolled as full-time students; and less likely to be employed than their commuter peers, especially off-campus.\textsuperscript{59}

Overwhelmingly, findings suggesting that residential college life may encompass features that enable alcohol use such as unstructured time, alcohol availability, and patterns of interactions with peers versus with parents.\textsuperscript{60,61} Research identifies the widespread misuse of alcohol by resident college students, noting that some 45\% of college and university students engage in heavy episodic or "binge" drinking,\textsuperscript{16,62,63,64} and that 18-22 year olds who are enrolled in the traditional college setting are more likely than their non-enrolled peers to consume alcohol, binge drink, and drink heavily, especially those residing in fraternities and
sororities. Studies also suggest that consumption increases for many college students with established problem drinking patterns, and that, college enrollment may be associated with the uptake of use by students who did not consume or consumed less before college matriculation. In addition, research suggests that alcohol use is more problematic for college students living on campuses than those living off campus. Some studies suggest that as students leave home to live in campus-based residences, they increase their alcohol consumption; furthermore students residing on campus may use more alcohol more often than commuters. Residence hall students have been shown to have a greater likelihood to consume more often, and in their dorms with large, mixed-gender groups. Male students on residential campuses have been shown to drink more than females; and with respect to race/ethnicity, white college students have the highest rate of alcohol use and problems, and African-American students the lowest. Furthermore, traditional residential campuses which are predominantly comprised of white students tend to have more problematic alcohol use, while historically black institutions have less; and, Native American/Alaska Native students and white students use the most alcohol, while black and Asian students use the least, with Latino students falling in a middle range.

Commuter students now account for some 85% of the all college students. Commuter institutions typically have an enrollment that is primarily comprised of students who do not reside on campus, though some colleges may provide limited housing components. Commuter colleges tend to cost less, and generally are more accessible for minority student populations. Commuter students are a more heterogeneous population than their residential peers, encompassing students of varying ages (though on average older than traditional aged college students), full-time students who reside with their parents, and parents with children.
They tend to be part-time students; use multiple means of transportation; juggles multiple life roles including spending more time caring for dependents and working more hours off campus, and have a broader age-range of first-generation college attendance and represent a significantly higher portion of ethnic minorities, including those with varying recent arrival and immigration status. While some research shows that students attending commuter institutions drink less than their residential peers, much less is known about specific drinking patterns of students on commuter campuses; hence interventions may fail to account for commuting college students.

Possible explanations for patterns of student alcohol consumption may be related to racial/ethnic alcohol consumption patterns. Student enrollments have increasingly diversified nationally with respect to gender, ethnicity, and social status; particularly at commuter institutions. Percentages of college students who are Hispanic, Asian/Pacific Islander, Black, and American Indian/Alaska Native have increased in the past four decades. Specifically, from the late 1970’s to the present decade, enrollment of Hispanic students increased from 4 to 15 percent; the percentage of Asian/Pacific Islander students from 2 percent to 6 percent; enrollment of Black students increased from 10 percent to 15 percent; enrollment of American Indian/Alaska Native students increased from 0.7 to 0.9 percent; while enrollment of White students fell from 84 to 60 percent.

Various studies have examined racial-ethnic alcohol use and outcome differences of youth, in general. Some literature suggests that African-American/Black youth have lower patterns of use than whites, although African-American/Blacks with consumption problems tend to have more severe problems. How this pattern of use and problem plays out in the college campus has been examined, and at least some suggest that the reverse is true on college
campuses, with white students having more severe drinking problems than African-
American/Black students.\textsuperscript{46,99} In fact, national surveys of college students have repeatedly
shown that white students report the highest prevalence of heavy drinking,\textsuperscript{7,26} including with first
year students.\textsuperscript{100,101} However, some research suggests that while whites mature out of drinking
problems in their later 20’s, Black drinking increases from young adulthood to middle age.\textsuperscript{102,103}
Further, some research suggests that acculturation may diminish the protective effect of race and
ethnicity among youth and college students.\textsuperscript{8,9} Specific research is needed to examine college-
attendance generation, racial/ethnic and immigration effects on urban commuter student use
patterns.

\textbf{College Alcohol Intervention Strategies}

The public health model typically involves three levels of prevention. Primary prevention
focuses on reducing the incidence or prevalence of behaviors and related problems by
influencing knowledge, attitudes and behaviors. Secondary prevention interventions focus on
eyearly identification, referral and treatment of identified individuals, with an aim to catch a
disorder before it fully manifests. Tertiary prevention comprises the treatment of individuals
with fully manifested problems. In contrast to secondary and tertiary prevention interventions
which treat individuals who show symptoms and/or already manifest health behaviors of interest,
primary prevention targets populations before they exhibit symptoms.

In light of the serious consequences associated with college student alcohol misuse,
various approaches to control alcohol consumption and related behavioral problems have been
explored. To date, the overwhelming majority of alcohol interventions encompass secondary and
tertiary individual or policy approaches. Individual treatments frequently use behavioral
interventions to identify alcohol use triggers, and employ skills training to provide education on
refusal skills and behavioral management techniques. Other interventions with a cognitive focus address thoughts and perceptions that lead to problematic behaviors. Motivational interviewing is another common genre of interventions designed to enhance self-awareness of problem behavior, and steer efforts toward behavioral change.\textsuperscript{104} Research in this area generally focuses on the efficacy of alcohol-specific policies such as raising the minimum legal drinking age to 21, increasing alcohol taxes and increasing the enforcement of drinking-driving laws. Another area of interest has been with regards to environmental safety measures that reduce the incidence of alcohol-related trauma for this population.

Recent studies that assess college interventions and those comparing and evaluating the efficacy of various interventions that target identified students show some progress in reaching mandated students.\textsuperscript{31} For example, the success and widespread use of brief interventions including Brief Alcohol Screening and Intervention for College Students (BASICS),\textsuperscript{105} regarded as an NIAAA Tier I\textsuperscript{24} approach, has been repeatedly documented for use with mandated students.\textsuperscript{106,107,108,109,110,111,112,113,114} BASICS places each identified student in a one-on-one session with a trained motivational interviewing facilitator to talk about personalized alcohol use and consequences, and normative perceptions of peers’ use. BASICS and iterations of the brief intervention format also have been combined with other intervention elements such as personalized feedback interventions (PFIs), normative reeducation\textsuperscript{115,116} personalized normative feedback (PNF) and readiness to change\textsuperscript{117} to some success. More recent interventions make use of brief intervention techniques in electronic formats, with some research suggesting that incorporating personalized feedback with computer- or Web-delivered brief interventions in a college setting can motivate students and teach them important behavior-changing skills.\textsuperscript{118,119,120} A number of web-based programs are being used on US campuses to reduce student alcohol use,
including Alcohol 101-Plus, AlcoholEdu, Alcohol-Wise, and e-CheckUptoGo. These computerized interventions are used at college campuses across the US to some success with high-risk college student drinkers using targeted feedback based on drinking norms.\textsuperscript{121,122,123,124} While they may address the needs of students who have established drinking patterns, these interventions focus on interrupting harmful behavior and do not offer protection for students who have not initiated alcohol use.

**Implications for Primary Prevention**

There is substantive evidence to support the delay of alcohol use initiation among college students. For example, recent research indicates that young adults may be less sensitive to the effects of alcohol and more sensitive to stressors;\textsuperscript{125} the age of first use and time between first use and first intoxication may impact future alcohol behavior patterns;\textsuperscript{126} underage drinkers are predisposed to severe consequences including blackouts, hangovers, and alcohol poisoning;\textsuperscript{127,128} prolonged alcohol use is associated with injury\textsuperscript{129} and multiple social\textsuperscript{130} harms; and there is evidence of long-term physiologic and medical vulnerabilities for minority groups.\textsuperscript{131,132,133} Associations between early use and later problems, including developing an alcohol use disorder in young adulthood are well documented.\textsuperscript{134,135} Research is needed to further the role for primary prevention as an alcohol strategy with college students in order to delay use onset.

Primary alcohol prevention that addresses total populations including those who are not selected to receive services based on their symptoms and behaviors has not been the principal focus of college alcohol intervention research nor implementation. It is well established that increased risk for addiction is associated with earlier onset of use,\textsuperscript{136} therefore impeding onset has potential public health importance. If it is the case that not all students entering college come with established drinking behaviors, and that within the first few weeks’ new students may be
exposed to health and other behavior-setting elements that may lead them to alcohol use and consequences, research is needed to examine the use of approaches to prevent alcohol use by college students.

While the overwhelming majority of interventions have been designed for and report results pertaining to outcomes for mandated students, a recent study implies a protective effect of personalized feedback for those who do not drink.\textsuperscript{137} This and similar findings\textsuperscript{138} suggest a role for preventive interventions with the college population;\textsuperscript{139, 140} students at commuter institutions where ethnic and nativity minority groups and those with first-generation college attendance are disproportionately represented may especially benefit. To help prevent near- and long-term alcohol abuse, this study will promote primary prevention for this understudied group despite the lower drinking rates of ethnic and racial minority college students.

College alcohol interventions and the studies designed to assess them usually apply interventions to address college students who are engaged in or at risk for alcohol problems. Research is needed to examine the feasibility for preventing urban commuter college student alcohol use. Numerous interventions have been developed to reduce college alcohol use including brief motivational enhancement interventions, social norms campaigns, and use restriction policies.\textsuperscript{31}

The Case for Technology

Technological approaches offer promise for primary prevention with college students.\textsuperscript{141} Mobile phone interventions and other electronic tools to improve physical health are referred to as mHealth.\textsuperscript{142} Mobile technological interventions include cellular telephones, hand-held palmtops, blackberries, and web-based protocols to collect health behavior data and share psycho-education. Mobile technologies offer cost-effective, portable, and time-saving means for
delivering tailored messaging to promote healthy behaviors and positive behavior change and collecting near real-time data.\textsuperscript{143,144,145,146} Recent reviews of mobile health interventions have found positive health changes associated with the use of mHealth\textsuperscript{147,148,149} in improving preventive health behaviors in sexual health and risk behavior\textsuperscript{150,151} and smoking cessation,\textsuperscript{152,153} and among chronic clinic care behaviors, each in a variety of settings and with a variety of subjects, including some college students.\textsuperscript{154} A recent review of mobile technologies for various health behaviors identified 27 studies with only a single study addressing alcohol use on a college study sample.\textsuperscript{155} Other studies using college students found reduced use on a number of observed parameters (alcohol-related knowledge, attitudes, readiness to change, etc.), and at one to 3 month intervals to follow-up,\textsuperscript{156,157,158} though some studies are not able to establish results due to loss to follow-up beyond 3 months.\textsuperscript{159,160}

Mobile phone ownership and the use of short message service- texting is ubiquitous globally,\textsuperscript{161,162} particularly among racial minorities (African-Americans in particular) and young adults,\textsuperscript{163} including college students. Mobile phone-based interventions are recognized as evidence-based, recommended approaches for treating health concerns. Based on the student demographics, both with respect to alcohol use patterns and regarding mobile technology usage, harnessing mobile texting as a method for alcohol prevention among urban commuter college students warrants further investigation.

A Role for Abstinence?

It is now common among colleges and universities to offer mandatory as well as voluntary alcohol awareness and prevention programs. Unless it is indicated for students with identified alcohol issues, in most cases, college and university-based universal alcohol programs focus on delivering information about the consequences of alcohol use.\textsuperscript{164} In fact, while the
research literature is not clear about the best approach for messaging youth and young adults about alcohol; recent literature suggests that abstinence messaging can delay alcohol initiation with inexperienced college students. All the same, youth and young adult alcohol messaging remains an area of debate: On one hand, alcohol abstinence messaging focuses on consequences of any underage consumption. On the other hand, messages using a harm reduction approach emphasize moderate, safer drinking.

Researchers need to better understand and implement effective strategies to prevent alcohol use by urban commuter college students. Problem drinking, defined on a continuum from moderate to heavy to binge drinking is a preventable cause of morbidity and a leading cause of death. In young adults (18-24 years), alcohol is commonly used and abused. Young adults tend to drink heaviest in their late teens and early twenties, and some 90% of their alcohol consumption is binge drinking. Underage consumption of alcohol accounts for 11% of all alcohol consumed in the United States (US). For urban commuter students it may be especially important to refine expectations and affect use patterns with targeted strategies. The role of technologic interventions to address this need will be examined in the current work.

**Analysis of the Research Literature**

The following is a brief overview of approaches used to examine and intervene to deter college alcohol use and consequences. The chapter concludes with thoughts that are offered regarding how we might overcome some of the challenges inherent in these methods of study and intervention.

Current research on college alcohol use largely builds on a handful of landmark large-scale survey studies about prevalence and trends in alcohol use among American college students. In this type of research, the survey is used as a systematic method for gathering
information from a sample of individuals, in order to construct quantitative descriptors of the attributes of the college student population. To follow is an overview of the contributions and potential limitations of data gleaned from the Harvard School of Public Health College Alcohol Study (CAS); Core Institute (Core), Southern Illinois University; Monitoring the Future (MTF), University of Michigan. These carefully structured studies are widely recognized for their pioneering and ongoing work to glean information directly from college students concerning their beliefs about and their consumption practices around alcohol. Data from these landmark studies has been used extensively in the field both as a framework for alcohol policy discussions, and as an impetus for further study. These studies, their contributions, and limitations are used as a starting point to explore appropriate research methods for studying alcohol consumption and harm in the emerging urban commuter college demographic.

The College Alcohol Study was designed as a self-administered survey mailed to a national representative sample of US based or born 4-year college students. The survey included responses from a wide range of students, enabling inferences to be made about the college students as a whole, and comparisons among groups of students based on characteristics.

The CAS selected colleges proportionate to their enrollment size, and then randomly selected a fixed number of students. The survey was administered four times to more than 50,000 students. The sample was nationally representative of 120 United States (US)-based 4-year colleges between 1993 and 2001. The CAS survey provides information about college student alcohol behavior, attitudes, and beliefs. The series made use of large samples, enabling the ability to study subgroups; furthermore, participants were randomly selected, suggesting that findings could generate national estimates. The study also captured institutional level data, an
important level of information for understanding a key potential factor influencing student behavior. The study also made use of repeated surveys, permitting study over time.

Core Alcohol and Drug Use Survey measures use of alcohol and other drugs, was designed for use with college students, and invites voluntary participation by institutions. The study has had cycles since 1989. Like the CAS, this study uses large samples, and collects institutional-level data. Besides collecting behavior data, this survey asks questions about alcohol-related attitudes and beliefs. Of note is that because it is a self-selected sample, the Core is not nationally representative. Core is a cross-sectional study, observing and comparing different individuals with the same characteristics, at one specific point in time. Cross-sectional studies are descriptive studies that are used to describe some feature(s) of the population, such as prevalence of alcohol use; they may be used to support inferences of cause and effect. Difficulty in recalling past events may also contribute bias.

The Core survey uses a very large number of participants, thereby providing statistical power for highly stratified demographic analyses. CORE provides a general picture of chronological trends over time however, since cohorts were not matched in terms of numbers or institutional composition, survey results do not provide reliable year-to-year trend data.

Since 1976, MTF has conducted annual nationwide surveys of about 17,000 high school seniors, with annual mail follow-up surveys, including to individuals who are currently full-time college students. MTF aims to measure alcohol, tobacco, and other drug use. It is a longitudinal study, and shares the advantage of CAS and CORE for maintaining long-term trend data. This study includes college students and their same-age peers who do not attend college, but it does not have institutional-level data. The MTF shows strength in its ability to measure overall trends.
of US college alcohol consumption. MTF provides a comprehensive picture of chronological trends in alcohol (and other drug) use. The numbers of students are somewhat consistent over the years, and they were chosen using constant methods. The study’s relatively small sample sizes limit extensive stratified demographic descriptions within the collegiate population.

Together, CAS, Core, and MTF have provided us much information that underlies our current understanding about the prevalence and extent of college student alcohol use. Advantages of using surveys to study current college alcohol beliefs and behaviors include the relative in-expense, quick creation and easy administration, and the collection of a large amount of (wide-ranging) data in a relatively short period of time. Self-report surveys also permit participants to enjoy anonymity and confidentiality, and they allow researchers to collect data regarding behaviors that cannot be observed directly or that it would not be ethical to simulate in a laboratory setting.

Building on knowledge gleaned from these and similar surveys, a variety of interventions have been implemented and tested for efficacy and effectiveness in addressing college alcohol use and consequences. Recent years have seen the development of various technology-dependent interventions aimed at reducing college alcohol use and consequences.\textsuperscript{179} Today, it is fairly common for colleges and universities to provide students with access to the Internet, and in turn, to require completion of computer-based modules of individual-level preventive and corrective alcohol interventions which typically proffer a computerized brief motivational interview. Mixed reviews suggest that while these approaches may be impactful in the shorter or longer term for students with problematic drinking histories, lo-risk or students who are uninitiated to alcohol may not experience the same benefit,\textsuperscript{180,181} with non-drinkers potentially at risk for negative outcomes.\textsuperscript{182}
The remainder of this chapter will review emerging research on preventive college alcohol interventions. The discussion will examine evidence for preventive interventions that aim to deter the onset and ill-effects of college student alcohol consumption, and includes research with a focus on risk factors, predictors, and other implications for prevention interventions of college alcohol use.

Bingham et al (2010) conducted a randomized control trial (RCT)\textsuperscript{183} and a 3-month follow-up efficacy evaluation (Bingham et al 2011)\textsuperscript{184} of their web-based brief motivational alcohol prevention intervention program, "Michigan Prevention and Alcohol Safety for Students" (M-PASS) with 1,137 randomly sampled first-year college students, that tested efficacy of a web-based brief motivational alcohol prevention/intervention. M-PASS was crafted with an objective to change alcohol attitudes, beliefs, behaviors, and consequences; it was designed to reduce alcohol-related risk among high-risk drinkers, prevent alcohol-related risk by increasing risk avoidance among low-risk drinkers, and delay the onset of drinking among non-drinkers.

Four 10- to 15-minute interactive online sessions providing individually-tailored feedback were delivered to first-year college students over 9 weeks. Non- and low-risk drinking participants received risk prevention, while high-risk drinking participants received a risk-reduction intervention. Intervention group participants attended four online M-PASS sessions, and received feedback regarding individual drinking patterns and concepts which were based on four behavior change theories. The interactive online sessions were designed to raise awareness and explore student’ priorities and how alcohol use affected them; examine benefits and barriers to behavior change; and explored options and alternatives to avoid alcohol-related risks. Accordingly, students were led through their choice of two goal-setting exercises. Control
completed a mid-phase survey. Both intervention and control groups were surveyed at baseline, post-test, and at a 3-month follow-up on their alcohol attitudes, beliefs, behaviors, and consequences.

Researchers found that M-PASS was associated with change, lower drinking/driving tolerance, fewer reasons to drink, use of more strategies to avoid at-risk drinking, especially amongst women. Researchers found positive effects for both men and women on stage of change, drinking behavior, drinking motivation and attitudes, and use of risk-reduction strategies. Specifically, prevention effect on drinking behavior in women’s frequency of binge drinking, and the use of strategies to avoid at-risk drinking and related risks. Prevention effect on alcohol-related attitudes was evident for stage of change for both men and women, and for reasons to drink for women. Overall, more prevention effects were observed for non-drinkers than for low-risk drinkers, and behavioral change for intervention students.

Findings by Bingham et al support the use of technology-based programs to reduce alcohol use and consequences among college students. The preventive intervention showed effects for college students, successfully altering alcohol use and related risk behaviors, as well as attitudes toward alcohol-related risk. Most significantly, the study has implications for the inclusion of technology-based interventions for primary prevention with non-drinking and low-risk drinking students, making it a relevant and important study for informing the current research about college alcohol use, and the potential role for technology-based primary prevention.

Study limitations include an uncontrolled potential for cross-group contamination, since students could freely interact with students from either the intervention and/or control groups. In addition, the study did not provide information regarding the amount or quality of student-
computer interactivity. The inability to assess students’ actual interactivity with the web program makes it impossible to assess whether certain amounts or quality of exposure, and not merely messaging impacted thought and behavior changes. Furthermore, like the overwhelming majority of studies assessing and treating college alcohol use, this study relied on self-report and was therefore prone to reporting bias. Finally, the study admitted to the under-representation of Black students, an important subpopulation in urban commuter college environments.

Croom, K, et al (2009)\textsuperscript{185} conducted a randomized prospective controlled delay treatment study to assess short-term effectiveness of a web-based alcohol education program on entering freshmen. One of the first to study the implications of a web-based intervention on incoming freshmen, researchers administered AlcoholEdu for College,\textsuperscript{186} a commercial alcohol education to an entire class of first-year students to test its effect on drinking prevalence, behavior, and harm. AlcoholEdu for College is an interactive online alcohol prevention program that is widely used in higher education. AlcoholEdu for College entails a pretest of alcohol knowledge, a pre-course survey on drinking behavior, attitudes, and demographics, and an interactive alcohol education course. After the interactive module, students complete a post-course knowledge exam and survey to assess alcohol behavior and attitudes.

Croom et al tested AlcoholEdu in a rural, Northeastern private college, with incoming first-year students (n=3216) who were randomized to a control (n=1608) or intervention (n=1608) group. Controls were instructed to complete a survey and knowledge test the summer before college. Four to six weeks after their arrival on campus, they completed a follow-up survey of behaviors and harms followed by an invitation to complete the online course. Intervention students were asked to complete the pre-course survey and test, the online course,
and final exam prior to coming to campus. Four to six weeks after their arrival on campus, intervention participants completed the post-intervention attitudes and behavior survey.

Researchers assessed alcohol use, high-risk behavior, protective behavior, harm, and post-intervention alcohol knowledge as primary outcome variables, and found no significant difference between the intervention and control groups. Other findings included that compared to controls, intervention group participants had significantly higher alcohol-related post-course knowledge; though, protective behavior, risk-related behavior, high-risk drinking, and alcohol-related harm was not better in the intervention group. Croom et al concluded that in isolation, alcohol educational programs have a limited efficacy for changing college alcohol-related high-risk behaviors. The study pointed to the need for a close examination and careful accounting for important developmental considerations when interventions are developed to target youth and young adults, lest efforts to right-size their understanding lead to a relaxing of their concern.

Croom et al has implications for the current study- research which strategically developed the method and content of messages using a focus group. Croom et al highlights the significance of examining how alcohol-related behaviors and harms may be altered based how and what information is provided and perceived among youth and young adults.

Lovecchio, CP, Wyatt, TM, DeJong, W. (2010) also studied AlcoholEdu for College 8.0. The RCT, designed to evaluate the short-term impact of AlcoholEdu was conducted during early fall with full-time, with 1,620 matriculated first-year students who were ≥18 years. The global intervention was designed for the entire first-year population, prior to or soon after matriculation arrest the potential for an onset of alcohol use and abuse patterns. Investigators were interested to identify mediating cognitive and motivational factors on reported changes in drinking behaviors.
Students were randomly assigned to either a treatment group or an assessment-only control group. Both groups of students completed a baseline survey and knowledge test. Treatment group students finished the course, took a second knowledge test, and 30 days later completed a post-intervention survey. Control group students completed the post-intervention survey and knowledge test during the same time period.

Lovecchio et al found that AlcoholEdu 8.0 had a positive impact on the first-year students’ alcohol-related attitudes, behaviors, and consequences. Treatment group students were found to have significantly lower level of alcohol use, fewer negative drinking consequences, and less positive alcohol-related attitudes. Contrary to expectation, the treatment group reported statistically larger decreases in responsible drinking behaviors. No statistically significant differences were found between the treatment and control groups for five of the composite variables: high-risk alcohol behaviors, protective alcohol behaviors, drinking-related psychological consequences, acceptance of others’ everyday alcohol use, and negative expectancies about drinking. Implications for the current study include the potential for impact as per intervention timing—immediately before or soon after matriculation, for first year students.

Study limitations include that research was conducted at a single, mid-sized private university, limiting the applicability of findings. In addition, the study did not account for the possibility of cross-contamination by students assigned to control and treatment groups; thereby potentially drive results towards null (though this was not found). Finally, as with like investigations, findings are based on self-report, and subject to reporting bias. Greater attrition amongst control than treatment group was mentioned but not specifically examined by investigators.
In summary, emerging research examines and aims to prevent college alcohol use and consequences using single-level designs which largely employ self-reporting and build on research literature that caters to an historic college demographic and environment. Comprehensive, multi-level approaches to the study of and intervention development for college alcohol use and consequences would add to knowledge in this area by offering an understanding about modern-day student characteristics, college environments and surrounding contexts, and how these may interact to influence consumption and consequences. Research to study budding college populations and implement primary prevention that uses current technologies is indicated.
CHAPTER 3

METHODOLOGY

Chapter 3 will present the methods and procedures of the current study. This two-part research is comprised of a secondary data analysis to glean information about whether and what factors might predict college alcohol use; and a feasibility study to test the acceptability and application of a mobile alcohol primary prevention intervention for use with urban commuter college freshmen. The chapter is divided into sections that present research questions, theoretical framework and study design; and in turn, for secondary data analysis and then for the feasibility study, description of the subjects, description of the research instrumentation, and analyses.

Research Questions

The aims are reflected in the following research questions that guide this study:

**Aim 1:** Systematically analyze Add Health for predictive college alcohol uptake factors.

a. Does college attendance predict changes in alcohol use for previously abstinent youth?

b. What characteristics might predict alcohol abstinence among college students?

**Aim 2:** Adapt a readiness for change intervention to a primary prevention mobile intervention.

a. Can a community engagement model be practiced for developing an effective intervention?

**Aim 3:** Systematically analyze the feasibility for a mobile primary-prevention intervention.

a. Is a mobile primary prevention intervention feasible for delaying alcohol uptake?

Theoretical Framework

This work is premised on the Social Cognitive Theory and Health Belief Model. Social Cognitive Theory is a learning theory that posits that learned behavior through replication of others’ is central to the very survival of human beings; as such, an individual's knowledge acquisition is partially related to observing others within the context of social interactions, experiences, and outside media influences. In particular, Social Cognitive Theory holds that
the closer the identification between the observer and a self-efficacious model, the more likely will be the observer’s learning; as such, observing a model performing a behavior and taking note of the consequences of that behavior, an individual can internalize and use this information to guide subsequent behaviors. Social Cognitive Theory, then, can help to explain how moderators such as race/ethnicity, generation of college attendance, and nativity help to determine college students’ motivation for, affect toward, and alcohol behavior.

Health Belief Model is a widely used, empirically supported health behavior change model to explain and predict health-related behaviors, especially as concerns responses to health services.\textsuperscript{189,190,191} Per Health Belief Model, in the presence of a stimulus or cue action, beliefs about susceptibility to and the seriousness (severity) of health problems, perceived benefits of action and barriers to action, and self-efficacy explain health behavior uptake (or refusal). The model holds that individuals who perceive a health issue as serious will tend to take preventive measures to reduce its severity or prevent its incidence. Similarly, individuals who perceive that they are susceptible to a health issue will tend to take preventive measures to reduce their risk for that health issue. Perceived benefits and barriers will also motivate health behavior; here, individuals will be more likely to choose healthful behaviors when perceived benefits outweigh perceived barriers. Health Belief Model can help to explain the role for alcohol expectancies, perceived drinking norms, coping, and drinking motives for college alcohol behaviors. Based on this model, the current intervention will increase perceived susceptibility to and perceived seriousness of the severity of college alcohol use by providing information about its prevalence and consequences; increase perceived benefits by providing information about reducing risk; increase self-efficacy and decrease perceived barriers by providing information about support or
other resources. Taken together, Social Cognitive Theory and Health Belief Model lay the foundation for the current work.

This work also employs a community engagement approach to adapt an existing intervention for use with a new population. Community engagement involves working collaboratively within a community group to address issues that impact the well-being of group members. Community engagement has been used as a vehicle for promoting behavioral and other changes amongst the members of a community, and has been incorporated in various operatives to improve community health. The continuum of community involvement practices revolves around recognizing and proactively seeking out a community's common set of goals, values, and concerns, to insert them into work by and for the community.

Content for the text messages used in the feasibility study are premised on cognitive behavioral therapy (CBT) and promoting self-efficacy. CBT prescribes the support of proactive, conscious cognitive engagement and (re)education to foster deliberate health choices and behaviors. CBT entails recognition, understanding, and the conscious use of mental rules to guide behavior. While CBT traditionally is used to address existing diagnoses and problems, its underlying reliance on active, informed cognitive self-regulation to determine health behaviors and outcomes is being applied to the development of a preventive SMS interface.

Finally, protocol and tools for the current research were submitted for review and approval by the City University of New York Integrated Review Board. The original application for review was submitted on March 27, 2017, and two subsequent amendments were submitted on August 3, 2017 and November 8, 2017. Application and amendments were reviewed and approved by an expedited review panel. The current research was approved through April 16, 2020.
Study Design

This study combined quantitative and qualitative methodologies to answer research questions about influences on underage drinking among modern-day college students. An integrated multi-method approach can be used to gain multidimensional insight into contributing factors, and potentially sure-up validity and reliability of the information obtained by maximizing the strengths and minimizing the weaknesses of each type of data. Specifically, the use of self-report survey, a student focus group, and semi-structured individual interviews were employed. A contemporary understanding of the patterns of use will be essential for developing policy and practice that effectively secures students’ health, well-being, and achievement.

The first part of this research employs a two-period, longitudinal design that uses data from Wave III (baseline) and Wave IV (follow-up) of the National Longitudinal Study of Adolescent to Adult Health (Add Health). The follow-up period, or study frame, is approximately 7 years. The second part of this research entails a feasibility study of a mobile primary prevention with Brooklyn College first semester freshmen. Of interest is the applicability of an adapted mobile intervention for use with urban commuter students who have not initiated alcohol use. To follow are details describing instrumentation, participants, and study procedures of each part of the research, in turn.

Add Health: Description of the Research Instrumentation

The National Longitudinal Study of Adolescent to Adult Health (Add Health) is a school-based, nationally representative, longitudinal survey of U.S. adolescents who were enrolled in grades 7-12 in 1994-95 (study baseline/Wave I). Data are collected via self-administered, in-home or in-school, questionnaires from adolescents, their fellow students,
school administrators, parents, siblings, friends, and romantic partners via a clustered sampling
design. Data include information on respondents’ social, economic, psychological, and physical
well-being with contextual data on the family, neighborhood, community, school, friendships,
peer groups, and romantic relationships. Four Waves of data have thus far been collected: Wave
2018) is in data collection phase.

This study used data from Wave III and Wave IV of the Public-Use Add Health. Wave
III data were collected via in-home interviews with respondents aged 18 to 26 years old, as well
as through interviews with 1,507 of their romantic partners. Respondents were administered
survey questions on their family, relationships, sexual experiences, childbearing, and educational
histories, labor force involvement, civic participation, religion and spirituality, mental health,
health insurance, illness, delinquency and violence, gambling, substance abuse, and involvement
with the criminal justice system. Wave IV in-home interviews were conducted in 2008 and
2009, when the original Wave I respondents were between the ages of 24 and 32 years.
Longitudinal survey data were collected on social, economic, psychological, and health
circumstances of respondents, as well as longitudinal geographic data. Survey questions were
expanded on educational transitions, economic status and financial resources and strains, sleep
patterns and sleep quality, eating habits and nutrition, illnesses and medications, physical
activities, emotional content and quality of current or most recent romantic/cohabiting/marriage
relationships, and maltreatment during childhood by caregivers. Dates and circumstances of key
life events occurring in young adulthood were also recorded, including a complete marriage and
cohabitation history, full pregnancy and fertility histories from both men and women, an
educational history of dates of degrees and school attendance, contact with the criminal justice
system, military service, and various employment events, including the date of first and current jobs, with respective information on occupation, industry, wages, hours, and benefits. Finally, physical measurements and bio-specimens were also collected at Wave IV, and included anthropometric measures of weight, height and waist circumference, cardiovascular measures such as systolic blood pressure, diastolic blood pressure, and pulse, metabolic measures from dried blood spots assayed for lipids, glucose, and glycosylated hemoglobin (HbA1c), measures of inflammation and immune function, including High-sensitivity C-reactive protein (hsCRP) and Epstein-Barr virus (EBV).

**Description of Participants**

The final analytic Add Health sample includes n = 1,370 observations. It was created in the following manner: from the 4,882 Add Health participants in the core sample at Wave III (i.e., eligible sample), we isolated n = 1,781 individuals who indicated that they were currently attending college or university, either part-time or full-time. Wave III and Wave IV data were then merged to extract the outcome variable (i.e., abstains from alcohol at Wave IV). Next observations with missing data were identified in one or more of the study variables. Of the n = 411 observations with missing data, roughly half (n = 211) were eliminated due to missing follow-up data at Wave IV; these were assumed to be systematically no different from those which were used for analyses. Among Wave III predictor variables, the majority of the missing data were in the variables describing political leaning (n = 110). The remainder of the missing data was distributed as follows: has intimate partner (n = 19), has mentor (n = 4), currently employed (n = 2), religious affiliation (n = 23), BMI (n = 34), has had vaginal intercourse (n = 16), depressed (n = 2), suicidal thoughts within last year (n = 29), has volunteered within the past
year (n = 4), has donated blood within the past year (n = 4), registered as organ donor (n = 17), has savings account (n = 4), purchased lottery tickets (n = 5).

**Procedure**

**Data Set-up:** The Two-Wave data records are arrayed in a single observation, in which all explanatory variables are measured at Wave III and the outcome is measured at Wave IV. No time-dependent variables—which would capture cross-wave changes in explanatory variables—are included in this analysis.

**Variables and Recoding**

**Outcome variable:** Abstains from alcohol, determined at Wave IV, is a binary (0, 1) variable indicating no use of alcohol since the Wave I data collection period. It is based on participants’ responses to the following survey question: Since June 1995, have you had a drink of beer, wine, or liquor more than 2 or 3 times? Do not include sips or tastes from someone else’s drink.

**Independent (predictor) variables:** Predictor variables, measured at Wave III, conform to several general categories which are main areas of investigation for this field of research: socio-demographic attributes, religion and politics, physical well-being, health behaviors, mental health, civic and volunteer activity, and risk.

*Socio-demographic predictors:* Biological sex is a binary variable (1 = female, 0 = male). Age is a continuous variable, ranging from 18 to 28. Race is represented by 4 binary dummy variables, (white (referent), black or African American, Native American or Alaska Native, Asian or Pacific Islander). (This simplified race categorization—established by interviewer observation—is used in place of the more complex scheme attached to participant self-identification, which permits indication of multiple race categories. Hispanics, whose
phenotypical presentation may be Afro- or European-dominant, are likely included in both white and African American categories.) Has intimate partner is a binary variable. As there is no direct query regarding partnership in the survey, we inferred intimate partner status based on responses to the survey question, “How committed are you to your relationship?” Respondents who provided valid responses were assigned a 1 (= has intimate partner), and those who were noted as “legitimate skip” in the survey were assigned a 0 (= does not have intimate partner). Adopted is a binary variable (1 = yes, 0 = no). This variable was based on the survey question, “Were you ever adopted?” Has mentor is a binary variable (1 = yes, 0 = no), based on responses to the survey question, Other than your parents or step-parents, has an adult made an important positive difference in your life at any time since you were 14 years old? Currently employed is a binary variable (1 = yes and 0 = no) based on responses to the question, “Do you currently have a job?”

Religion and Politics: Religious affiliation is represented by 4 binary (0, 1) dummy variables: non-religious (referent), Christian, Jewish, and other. We created the “other” variable from original categorical responses, due to the small number of respondents who reported religious affiliation outside of the aforementioned religions. This variable was based on the survey question, “What is your present religion?” Political leaning is represented by 3 binary (0, 1) dummy variables: moderate (referent), liberal, and conservative, based on the survey question, “In terms of politics, do you consider yourself conservative, liberal, or middle-of-the-road?”

Physical Well-being: Self-rated health is a 5-level ordinal variable where 1 = poor, 2 = fair, 3 = good, 4 = very good, and 5 = excellent. This variable was modified (reverse coded) from the original coding to be more intuitive (i.e., higher values = better health), and was based on the survey question, “In general, how is your health?” BMI is a continuous variable that measures body-mass index. It was calculated based on respondents’ reports on their height and weight. We
used the formula $\text{BMI} = \frac{\text{weight in lbs.}}{((\text{height in feet} \times 12) + (\text{height in inches})^2) \times 703}$ to compute the value of BMI. BMI calculation was based on data from the survey questions, “What is your current weight in pounds?” and “How tall are you in feet (and inches)?”

Health Behaviors: Has smoked within past 30 days is a binary variable (1 = yes, 0 = no), based on responses to the survey question, “Have you ever smoked at all in the past 30 days?” Participated in sports 1+ times per week is a binary variable (1 = yes and 0 = no), based on responses to the survey question “In the past seven days, how many times did you participate in strenuous team sports such as football, soccer, basketball, lacrosse, rugby, field hockey or ice hockey?” Has had vaginal intercourse was a binary variable (1 = yes, 0 = no). This variable was based on the survey question (with specific explanation), “Have you ever had vaginal intercourse?” (Vaginal intercourse is when a man inserts his penis into a woman’s vagina.).

Mental Health: Depression is a 4-level ordinal variable where 0 = never or rarely, 1 = sometimes, 2 = a lot of time and 3 = most of the time or all of the time. This variable was based on a single item (You were depressed, during the past seven days) from a mental health battery in the Wave III survey. Suicidal thoughts within last year (i.e., suicidal ideation) is a binary variable (1 = yes, 0 = no), based on the survey question, During the past 12 months, have you ever seriously thought about committing suicide?

Civic and volunteer activity: Has volunteered within the past year is a binary nominal variable (1 = yes, 0 = no), based on the survey question, During the last 12 months did you perform any unpaid volunteer or community work? Has donated blood within the past year is a binary nominal variable (1 = yes, 0 = no), based on survey question, Have you donated blood, plasma, or platelets during the last 12 months? Registered as organ donor is a binary nominal variable (1 = yes and 0 = no), based on a survey question Are you registered as organ donor?
Risk profile: Has savings account was a binary nominal variable (1 = yes, 0 = no), based on the survey question Do you have a savings account? Bought lottery tickets was a binary nominal variable (1 = yes, 0 = no), based on the survey question, Have you ever bought lottery tickets, such as daily, scratch-offs, or lotto?

Analysis

All statistical analyses were conducted using SAS, v 9.2. SAS is a well-trusted and recognized data analysis software for advanced analytics, multivariate analyses, predictive analytics and other data mining and manipulation.

Pre-estimation analysis: All variables were checked for outliers and illogical values (e.g., missing data codes). The potential impact of “missingness” was determined by comparing the final analytic sample (n = 1,370) to the group that was eliminated based on missing data (n = 411). We used t-tests to compare means of continuous and ordinal variables, and chi-square tests to compare relative proportions of nominal variables. The results suggest that the retained and discarded samples are largely similar. However, three differences were indicated. The sample of eliminated observations was more likely to be Black/African American (p > .01), less likely to have volunteered in the past year (p < .05), and less likely to report being an organ donor (p < .001) than the sample analyzed in the study.

Descriptive and inferential analysis: Univariate methods were used to describe the sample. Number (and percent) were generated for categorical variables, and mean (with standard deviation, minimum and maximum) for continuous and ordinal variables. Multivariable logistic regression was applied to investigate the relationship between predictor variables and abstaining from alcohol at Wave IV. In the logistic regression model, the outcome variable was covared
with its equivalent at Wave III. This approach, in which the lag of the outcome variable is included as an explanatory variable, was deemed preferable to selecting and analyzing the sample of abstainers at Wave III, whose rather small size (n = 343) would have necessitated exclusion of low-prevalence explanatory variables. (Low-frequency variables possess too few observations that satisfy the condition of the predictor (e.g., was adopted) and the outcome (i.e., remained abstinent from alcohol) among the limited sample of Wave III abstainers).

**Statistical interpretation:** Direction, magnitude, and statistical significance of coefficients on explanatory variables were examined to infer potential associations between such variables and the study’s outcome. Beta-coefficients were transformed to odds ratios (with 95% confidence limits) for ease of interpretation. Odds ratios on binary explanatory variables (e.g., has a savings account) indicate the log odds of abstaining from alcohol at Wave IV for individuals with the given trait (e.g., has a savings account) relative to those without the trait (e.g., does not have a savings account). Odds ratios on dummy variables are interpreted relative to the omitted category. Thus, the odds of abstaining for participants who indicated they are members of a Christian religion is interpreted relative to participants who indicated that they are non-religious (referent). The odds ratios on nominal and continuous variables are “marginal effects.” They indicate the log odds of abstaining at Wave IV associated with a one-unit, positive, change (e.g., one additional year of age or one unit higher in self-rated health) in the explanatory variable.

**Model fit & influence of prior abstinence:** The Hosmer and Lemeshow goodness-of-fit statistic for the logistic regression model was generated. Because this statistic is less intuitive than the explained-variance goodness-of-fit measure (R-square), a linear probability regression model
also was run, applying ordinary least squares regression to the binomial outcome to generate the traditional goodness-of-fit measure. The R-square (0.23) of the overall model is reasonable, considering the longitudinal nature of the data; it does, however, suggest that the model’s error term includes the effects of omitted variables. The linear probability model also was used to investigate how much relative variance is explained by prior abstinence versus other explanatory variables. The concern was that abstaining at Wave III was solely, or almost exclusively, responsible for Wave IV abstinence. This concern is partially confirmed. (See Results section for further information.) The R-square on the model in which Wave IV abstinence was regressed on its Wave III lag was 0.18, which suggests that all of the additional predictor variables yielded no more than 5% more explained variance. (To be clear, the 5% change is in absolute terms. The relative change is 28%.)

Supplementary Analysis: Several additional variables were tested in the models. These included low-prevalence variables associated with engagement with criminal activity (e.g., victim of beating, had been arrested), and variables associated with other measured factors (e.g., importance of marriage, importance of religion). Such variables were omitted from the final analysis because they either (a) caused practical problems with model fitting/coefficient generation, (b) did not materially add to the models, or (c) both.

Feasibility Study: Mobile Alcohol Primary Prevention

Study Origins

Originally designed to be an efficacy study to determine the impact of a mobile preventive intervention on delaying alcohol uptake in freshman students, this study was altered
to measure feasibility because of recruitment limitations. The original plan was to recruit at the
student health center; this potentially would have provided a large, captive base for student
recruitment and follow-up. While the Student Health Director initially expressed a great interest
in this study and what it might offer to students and to the health center in general, these plans
could not be realized due to competing NIH research with better resources and incentives.
Recruitment limitations included an inability to mandate participation, no power of staff nor
incentives, and the absence of a captive audience.

Since the student health center was no longer available to serve as a site for the study, the
principal investigator contacted the Dean of Students who, having reviewed the IRB clearance
with appropriate qualified Brooklyn College personnel, readily agreed to host the study. With
assistance from the Dean of Students and designated staff, the study was re-situated to take place
during dedicated freshman events. While participation in freshman events enabled a base for
recruitment, it did not remove the aforementioned recruitment limitations; these issues also
affected the ability to schedule focus groups because the freshman events did not provide a
forum through which to 1) recruit a sufficient number of captive students; nor 2) compel those
recruited to respond to requests to meet. Specifically, the study was designed to host two
separate focus groups, however, a sufficient number of students to support two focus groups did
not respond to requests to meet.

**Approach and Guiding Principles**

Feasibility studies help researchers to discern if an intervention is appropriate for
additional study. Feasibility studies are generally conducted before pilot testing to assess the
acceptability and suitableness of the intervention, and appropriateness and fit of study processes
and tools. The main aim of a feasibility study is to evaluate whether or not the intended
intervention or study has merit and is operable as designed. The goal of the second part of the current research was to develop and test the feasibility for a primary prevention mobile alcohol intervention for use with urban commuter college students.

The current study uses the principles of feasibility study design outlined by Bowen, et al (2010), who suggest a specific framework to assess feasibility studies which outlines eight specific areas of focus. Acceptability refers to how the targeted population relates to the intervention. Demand measures the likelihood that the intervention will be made use of, for the intended purpose, by the target population. Implementation concerns whether and how well an intervention can be put into operation so that it meets its intended population and outcome targets. Practicality assesses whether and how well the intervention can function in the face of resource restrictions. Adaptation examines to what extent intervention protocol may be changed to suit environment modifications. Integration focuses on how much adaptation may be required for the intervention to be incorporated into a standing program. Expansion projects the capacity of a successful intervention to address anew target or different position. Limited-efficacy testing refers to narrow intervention outcome testing. Taken together, these eight areas of focus provide standards for establishing and evaluating the rigor of feasibility study. For this study, five of the eight prescribed focus areas are asked of or emerge in discussion with the participants during the participant interviews, in the final phase of the feasibility study: acceptability, practicality, demand, expansion, and limited-efficacy testing. Table 1 maps the questions and participant responses which coincide with these five areas of focus. The remaining three areas of focus—implementation, adaptation, and integration—are used to frame the investigator’s assessment of the study process.
Table 1. Bowen et al (2009) Feasibility Study Areas of Focus Mapped to Post-Intervention Interview Questions

<table>
<thead>
<tr>
<th>Area of Focus</th>
<th>Description</th>
<th>Key Questions from Post-Intervention Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptability</td>
<td>Examine how targets/implementers react</td>
<td>3, 10-12</td>
</tr>
<tr>
<td>Demand</td>
<td>Gather data on estimated use/observe selected intervention activities</td>
<td>15</td>
</tr>
<tr>
<td>Practicality</td>
<td>Extent to which intervention can be fully implemented</td>
<td>1,4,5,6,13</td>
</tr>
<tr>
<td>Expansion</td>
<td>Examine potential success with different population/setting</td>
<td>7</td>
</tr>
<tr>
<td>Limited-efficacy testing</td>
<td>Limited test of intervention</td>
<td>8,9</td>
</tr>
<tr>
<td>Adaptation</td>
<td>Change program contents/procedures for a new situation</td>
<td>16</td>
</tr>
</tbody>
</table>

Also informing this study are specific guiding questions as outlined by Orsmond & Cohn (2015). According to Osmond et al (2015) there are five main objectives that should serve to guide a feasibility study; to some extent, these overlap with the areas of focus prescribed by Bowen et al (2010). The first main objective is to evaluate whether eligibility criteria and recruitment processes are reasonable for what is being studied. The second objective is to assess the strength of study procedures to address the intended study question(s) and the targeted population. Objective number three revolves around evaluating the acceptability and suitability of the intervention and study protocol; this objective coincides with Bowen et al (2009)’s acceptability area of focus. The next objective is to examine whether adequate resources are available for the intervention or study. The fifth and final objective focuses on whether it is reasonable to expect the intervention to meet its aim for the target population; this preliminary
assessment of intervention viability and potential coincides with Bowen et al (2010) practicality and limited-efficacy testing. Three of these five objectives were used to guide in study development, implementation and evaluation:

1. How many students were recruited? Can we recruit appropriate participants?
2. How appropriate are the data collection procedures for the intended population and study purpose?
3. Does the research team have the resources and ability to manage the study and intervention?

The feasibility pilot study engaged Brooklyn College freshmen who were randomly assigned to one of three conditions: a focus group to develop instrument messages; and a feasibility trial with a control and intervention group. Acceptability interviews also were conducted with intervention group participants. The feasibility study used a repeated measures design to provide descriptive data around alcohol initiation and intervention status (key independent variable) and other student variables including race/ethnicity, nativity status, and status of family college attendance for students at an urban commuter campus. The feasibility study made use of two instruments; one for screening purposes, and the other to assess alcohol attitudes, beliefs, and behaviors before and after submission to a 6-week mobile primary prevention intervention. A month long interval was introduced between the intervention and post-intervention data collection. The feasibility study was conducted between August 2017 and March 2018. Recruitment lasted two months.

**Description of Instrumentation**

CRAFFT (Appendix B1), a brief behavioral health screening tool that is used to assess substance-related risks and problems in youth under 21 years, was used to screen students for
participation eligibility. The acronym CRAFFT spells out the 6 items in main part of the assessment – Car, Relax, Alone, Forget, Friends, Trouble. CRAFFT Screening tool has been shown to have high sensitivity and specificity, internal consistency, and test-re-test reliability; it has been validated for up to the age of 26 years old and is a recommended tool for clinical use with 12-18-year-old patients. CRAFFT was administered after students were consented. Only students who scored as abstinent (responded “No” to the first three CRAFFT questions) were deemed to be eligible.

The Chisholm College Alcohol Experience Survey (Chisholm Survey) (Appendix B2) was designed expressly for use in this study to collect students’ demographic information, and to capture students’ attitudes, beliefs, and behaviors around college alcohol. Chisholm survey was developed as an adaptation of questions from an existing instrument that has been used to assess alcohol use and problems for youth and young adults: Core Institute’s Campus Assessment of Alcohol and Other Drug Norms (Core) (Appendix B3). The Core Institute maintains a national database of data collected from their short (23-item) and long (39-item) surveys to capture college students’ alcohol attitudes, beliefs, and behaviors. The Chisholm Survey used questions from the Core long survey.

The Chisholm Survey contains a total of 79 mixed-style socio-demographic items, and attitude, belief and behavior questions that were adapted from the Core. Questions include yes/no/I do not know; Likert Scale; and multiple choice configurations. Some questions contain skip-logic options. The Chisholm Survey was built on SurveyGizmo, a commercial online survey software tool with an open application programming interface (API) that enabled direct programmer interface, including data collection and manipulation. SurveyGizmo was used both
to build and to launch timed, targeted emails containing the Chisholm Survey for participant completion and submission.

**Description of Participants**

Subjects for the feasibility component of this research were first time Fall 2017 Brooklyn College freshmen. Eligible students were freshmen who pre-screened on the CRAFFT as abstinent, were at least 18 years old and able to provide informed consent, no more than 21 years old, and who owned a mobile telephone with texting.

**Procedure**

**Participant Recruitment**

Freshmen were recruited while they attended two separate freshman activities: Freshman Orientation and ‘First Year Thursdays’. Freshman Orientation was sponsored by Student Affairs. Recruitment at Freshman Orientation was conducted on the two consecutive days of the event. First Year Thursdays is a year-long recurring, two-hour voluntary meeting time designated for Freshman learning around campus resources and activities to promote self-help and provide supports; topics include stress management, financial literacy, study strategies, etc. Recruitment was conducted for five consecutive weeks at this weekly First College Year-sponsored activity.

In each recruitment forum, a research associate set up a table in the area designated for Orientation or First Year Thursdays activities. The research associate approached students individually, or greeted them as they approached the table. In both forums, before consenting students, the research associate introduced herself, provided a brief overview of the study, explained the voluntary nature of student participation, and inquired if the student wanted to learn more in order to participate.
Freshmen who scored as abstinent in the feasibility study were given brief information about the study and invited to participate. Interested eligible freshmen were asked to sign and date an Informed Consent Form prior to any further baseline clinical and demographic data, randomization, and treatment allocation. Consents for audio-taping were obtained for focus group and interview participants.

Figure 1 describes the main components of the study and the number of participants in each phase. To follow is a brief description of the feasibility study phases. Note that students were randomly assigned to participate exclusively in a single group (focus, intervention, control) within the study phases:

1. Phase A: Focus group to adapt SMS messages for the alcohol prevention program;

2. Phase B: Alcohol prevention program comprised of intervention with SMS alcohol prevention text messages, or control group who completed baseline and 1-month post-intervention phase surveys.

3. Phase C: Intervention students were individually interviewed about their experiences with the program, including its acceptability and their suggestions for refinements.
Protocol Development

The second aim of the study was to develop a protocol for a primary prevention mobile alcohol intervention with college students by adapting a treatment protocol created by Mason et al (2014) that successfully increased readiness for change for students previously identified for or at risk of problem use using formative research techniques. Mason et al (2014) assessed the feasibility and effectiveness of an alcohol counseling intervention that adapts a 20-minute in-person motivational interviewing intervention using text messages to college students (18-23 years) who were identified with problem alcohol use to increase readiness to change and reduce substance use risk behaviors. Personalized text messages were sent over four days using TROPO, a commercial Cloud-based Application Programmer Interface (API). After
screening positive for problem alcohol use, students were randomized to intervention or control groups and assessed 1 month after intervention. The intervention consisted of sending four to six daily text messages for 4 days to the intervention group; participants made brief responses. Measures included psychiatric symptomatology; substance use; problem drinking; alcohol expectancies; and steps towards alcohol reduction. ANOVA analyses comparing control and intervention groups revealed that the intervention group increased in readiness to change from baseline to follow-up (p=.01); showed an increase in confidence in their ability to change drinking behavior, and increased intentions to reduce alcohol use. The study concluded that text messaging can effectively be used as a means to deliver preventive interventions.

The current study examined the behavior and factors that have potential to influence alcohol use behavior choices of abstaining freshmen. Mason et al (2014) was adapted in terms of the content of the messages; how often the messages were delivered as determined by formative methods; the duration of the study: 1-month follow-up; and what was measured, post-intervention: drinking beliefs, intentions and behavior, and not psychiatric symptomatology; substance use; problem drinking; steps towards alcohol reduction, etc. as these are not the focus of this inquiry and would not be appropriate measures for abstaining students.

For this study, the Mason et al (2014) treatment protocol was modified to replace quit messages with information that reinforces the benefits of abstinence and the consequences of alcohol use by college students. A community engagement approach was used to create the new protocol. Specifically, five randomly selected Brooklyn College freshman recruits were convened for a two-hour focus group to discuss the content and timing of delivery for protocol messages. Open-ended questions were read from a script by a moderator. Students were asked to discuss their thoughts about the following topics: 1) college alcohol use, including self-efficacy,
behavioral intentions, knowledge, attitudes, and practice; 2) effective abstinence messages for use with peers, including social norms, and environmental factors around college student alcohol use; 3) the potential effectiveness of telephone texts; and 4) what effects can be expected from a primary mobile prevention initiative. Specifically, participants were asked to assess and propose messages for use with freshmen to prolong their abstinence from alcohol consumption.

Participants reviewed and reacted to a series of messages to illicit intention/use behavior information (“What do you think about college student drinking?” “Have you thought of having an alcoholic drink…?” “Do you spend much of your time with non-drinkers or drinkers?” “Where do you spend your leisure time?”) and/or provide information regarding benefits of abstinence and consequences for using alcohol (“Did U know that ALCOHOL_USE_% of other 18–23 year olds drink less than you? How’s that for you? Txt: surprised, unsure, upset.’”), and to propose what they believed would be effective messages. Participants also were asked for their reactions to various text messaging timing and frequency options (daily, 2-4 times daily, weekly, etc), and to propose what they believed would be an effective timing sequence. At the conclusion of the focus group session, participants summarized emerging themes and stated their final word on what they believed would be effective messages and timing. The moderator ended by answering participants’ questions and synopsizing how the gathered data would be used.

The group discussion was audio-taped and later transcribed immediately after the focus group sessions. Content analysis was conducted where a detailed review of the transcript was performed to identify themes of interest and document text message recommendations. Themes were incorporated into text messages for use to implement the feasibility test. (Appendix C).
Implementation

The third and final aim of the study was to systematically analyze the feasibility for and barriers to a mobile primary-prevention intervention delivered through text messaging with urban commuter college students focusing specifically on analysis of recruitment, retention, and adherence based on thematic analysis of semi-structured interviews of a pilot group. Sixteen randomly selected students were randomized into an intervention and control group of 8 students each. All feasibility pilot participants were assessed at baseline, and at 1-month post intervention using CRAFFT. Participants’ intentions, attitudes, and beliefs about college student alcohol use will be assessed based on their responses to post-intervention administration of the Chisholm Survey.

In keeping with results of the focus group, the students in the intervention group received two, weekly text messages over a period of consecutive weeks. The Short Message Service (SMS) or text messaging service component used a commercial Cloud-based Application Programmer Interface (API) called TextIt (TextIt, 2012-17). Students randomized to the intervention received welcome text messages describing the program. Since weekend drinking behavior is prevalent amongst college drinkers including freshmen, intervention students were sent text messages on Thursdays asking for their drinking attitudes and beliefs. On Fridays, intervention students received text messages.

Post Intervention

One month after the intervention was completed, the researcher conducted (30 minute) interviews with the intervention participants to determine students’ thoughts about acceptability and sustainability of the intervention. A series of open-ended questions using a variety of questioning styles (content mapping and mining techniques; explanatory probing) were used
to learn about participants’ perceptions of the ease, usefulness, accessibility, and impact of the intervention on their alcohol attitudes, beliefs, and behaviors. Questions were designed to elicit feedback on participation barriers and incentives, recommendations for improving outreach, recruitment, and retention. Impressions and observations were recorded immediately following key informant interviews, and audio-taped discussions were transcribed. Key questions were grouped thematically to be used for reference and as prompts. Responses to these questions are summarized in Chapter 4 and discussed in Chapter 5.

**Analysis**

Quantitative survey data were assessed with descriptive methods using SAS v 9.2. Number and percent were generated for categorical variables at baseline by intervention status, noting qualitative differences in the distribution of such variables, as there was not sufficient sample size to draw meaningful inference from quantitative techniques. Qualitative differences then were assessed in several key variables *within the intervention group* between baseline and follow-up.
CHAPTER 4
RESULTS

This chapter of the dissertation will present the results. The chapter has been divided to
treat findings around secondary analyses of Add Health data, and then findings from the feasiblity study, in turn. Each of these two larger sections is further sub-divided into descriptive and other categories of interest, as indicated by questions posed for that part of the research. Specifically, Add Health findings revolve around descriptive and multivariate results. For the feasibility study, after descriptive data are presented, the remaining discussion is subdivided to present results from the three phases of the study, namely focus group, intervention, and post-intervention, and according to the framework and guiding principles that were used to develop and examine the feasibility study in congruence with recognized standards for this type of study.

Add Health

Descriptive results

The sample (n = 1,370) is described in Table 2. At both Wave III and Wave IV, the majority of participants were alcohol consumers (82.1% and 84.7%, respectively). With regard to socio-demographic predictors, the majority of the sample was female (59.5%) and White (72.0%) and had a mean age of 21.2 years. The majority did not have an intimate partner (75.2%), had a mentor (83.7%), and were employed (69.0%). With regard to religion and politics, the majority of participants were Christian (74.7%) and approximately half (50.7%) identified as moderate. With regard to physical well-being, the majority of respondents rated their health as a 4 out 5 (“very good”) on a Likert scale. The majority of participants did not smoke within the past 30 days (76.5%) and were sexually active (80.2%). Approximately 6.6% of participants had suicidal thoughts. Lastly, with regard to risk profile, the majority of participants had a savings account (72.6%) and over half (54.2%) had purchased lottery tickets.
One relevant statistic that is not evident from Table 2 is the migration of Wave III abstainers to active alcohol consumers. Of the 245 abstainers at Wave III, only 117 continue to abstain at Wave IV.

Table 2. Description of AddHealth Sample (n=1,370)

<table>
<thead>
<tr>
<th>Socio-demographic predictors</th>
<th>Number (%)</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>555 (40.5)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>815 (59.5)</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>21.2 (1.7)</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>987 (72.0)</td>
<td></td>
</tr>
<tr>
<td>Black or African American</td>
<td>302 (22.0)</td>
<td></td>
</tr>
<tr>
<td>Native American or Alaska Native</td>
<td>12 (0.9)</td>
<td></td>
</tr>
<tr>
<td>Asian or Pacific Islander</td>
<td>67 (4.9)</td>
<td></td>
</tr>
<tr>
<td><strong>Has intimate partner</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>340 (24.8)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1030 (75.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Has mentor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1147 (83.7)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>223 (16.3)</td>
<td></td>
</tr>
<tr>
<td><strong>Employed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>945 (69.0)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>425 (31.0)</td>
<td></td>
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<tr>
<td><strong>Religion and politics</strong></td>
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<td></td>
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<tr>
<td><strong>Religious affiliations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>221 (16.1)</td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>1024 (74.7)</td>
<td></td>
</tr>
<tr>
<td>Jewish</td>
<td>18 (1.3)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>107 (7.8)</td>
<td></td>
</tr>
<tr>
<td><strong>Political affiliations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liberal</td>
<td>352 (25.7)</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>694 (50.7)</td>
<td></td>
</tr>
<tr>
<td>Conservative</td>
<td>324 (23.7)</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
<td></td>
</tr>
</tbody>
</table>

**Physical well-being**

<table>
<thead>
<tr>
<th>Self-rated health</th>
<th>4.1 (0.8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6 (0.4)</td>
</tr>
<tr>
<td>2</td>
<td>41 (3.0)</td>
</tr>
<tr>
<td>3</td>
<td>246 (18.0)</td>
</tr>
<tr>
<td>4</td>
<td>556 (40.6)</td>
</tr>
<tr>
<td>5</td>
<td>521 (38.0)</td>
</tr>
</tbody>
</table>

**Health behaviors**

<table>
<thead>
<tr>
<th>Smoked within past 30 days</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>322 (23.5)</td>
</tr>
<tr>
<td>No</td>
<td>1048 (76.5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Has had vaginal intercourse</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1099 (80.2)</td>
</tr>
<tr>
<td>No</td>
<td>271 (19.8)</td>
</tr>
</tbody>
</table>

**Mental health**

<table>
<thead>
<tr>
<th>Suicidal thoughts</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>91 (6.6)</td>
</tr>
<tr>
<td>No</td>
<td>1279 (93.4)</td>
</tr>
</tbody>
</table>

**Risk profile**

<table>
<thead>
<tr>
<th>Has savings account</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>994 (72.6)</td>
</tr>
<tr>
<td>No</td>
<td>376 (27.5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bought lottery tickets</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>743 (54.2)</td>
</tr>
<tr>
<td>No</td>
<td>627 (45.8)</td>
</tr>
</tbody>
</table>

**Multivariable results**

Table 3 contains the results of multivariable regression models that describe the relationship between abstaining from alcohol, measured at Wave IV, and predictors of abstaining, measured at Wave III. The explanatory model includes participants’ “abstaining status” at Wave III which, once more, means that odds ratios are interpreted as the log odds of abstaining at follow-up (Wave IV), controlling for (but not conditional on) abstinence at baseline (Wave III). Several variables are predictive of abstaining at Wave IV. Variables that are
positively associated with abstaining at Wave IV comprise abstaining at Wave III (Odds Ratio (OR) = 7.94; 95% Confidence Interval (CI) = 5.42, 11.63); female sex (OR = 2.04; CI = 1.35, 3.07), age (OR = 1.34; CI = 1.20, 1.48), other religious affiliations (OR = 2.62; CI = 1.22, 5.66), and participating in sports 1+ times per week (OR = 1.89; CI = 1.21, 2.97). One variable is negatively associated with abstaining at Wave IV: history of buying lottery tickets (OR = 0.50; CI = 0.35, 0.72).

Table 3. Wave III predictors of abstaining from alcohol at wave IV, (n = 1,370)

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstain wave III</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7.94***</td>
<td>5.42, 11.63</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>ref.</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>2.04***</td>
<td>1.35, 3.07</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.34***</td>
<td>1.20, 1.48</td>
</tr>
<tr>
<td><strong>Religious affiliations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>ref.</td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>1.38</td>
<td>0.77, 2.48</td>
</tr>
<tr>
<td>Jewish</td>
<td>1.20</td>
<td>0.14, 10.07</td>
</tr>
<tr>
<td>Other</td>
<td>2.62*</td>
<td>1.22, 5.66</td>
</tr>
<tr>
<td><strong>Participated in sports 1+ times per week</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1.89**</td>
<td>1.21, 2.97</td>
</tr>
<tr>
<td>No</td>
<td>ref.</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>ref.</td>
<td></td>
</tr>
<tr>
<td><strong>Bought lottery tickets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.50***</td>
<td>0.35, 0.72</td>
</tr>
<tr>
<td>No</td>
<td>ref.</td>
<td></td>
</tr>
</tbody>
</table>

Hosmer & Lemeshow Goodness of fit = 3.89; p = .87

*p<0.05; **p<0.01; ***p<0.001
Summary of Findings

Secondary analyses of Add Health data revealed that while the overwhelming majority of participants in Waves III and IV consumed alcohol, a total of 117 of the 245 abstainers at Wave III continued to abstain at Wave IV. The profile for alcohol abstaining suggested predictors of abstinence, including abstinence at Wave III, single, white, other religion-practicing female who engaged in sport activities one or more times per week, and had no history of buying lottery tickets.

Feasibility Study- Mobile Primary Prevention Program

Descriptive Results

Demographic Attributes

Table 4 contains demographic data on the sample, stratified by intervention status. As noted in the previous chapter, all 16 participants, regardless of intervention status, are college freshman between 18 and 21 years of age. All participants moreover report living off campus, being single (i.e., unmarried), and being New York state residents. The distribution of full-time (87.5%) and part-time (12.5%) students is identical. Race and gender distributions vary, with notable differences in the proportion of Asians (0% in intervention group; 50% in control group) and Blacks (25% in intervention group; 12.5% in control group). The predominant living arrangement among both groups is “with parents.” The intervention group included a higher proportion (87.5%) of US-born participants than the control group (37.5%), and as expected, a higher proportion of individuals who reported English as the language spoken at home (62% vs. 25%). Although difficult to assess, given the numerous categories, parental education appears to differ slightly across the two groups. Members of the intervention group, for example, report a lower proportion of “less than high school” education for both mothers and fathers, and a higher
proportion of associates and bachelor’s degrees (combined), than do members of the control
group. Additionally, all 8 members (100%) of the intervention indicate that a family member
attended college, whereas 7 members (87.5%) of the control group indicated so. Responses to
employment status were quite similar; no student in either group reported working full-time, and
the majority (62.5% in the intervention group and 87.5% in the control group) reported not
working.

Table 4. Demographic Characteristics of Intervention Group members and Control Group
Members

<table>
<thead>
<tr>
<th>Demographic Variables</th>
<th>Control Group Number (%)</th>
<th>Intervention Group Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of participants</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>College Classification</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>8 (100.00)</td>
<td>8 (100.00)</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time</td>
<td>7 (87.50)</td>
<td>7 (87.50)</td>
</tr>
<tr>
<td>Part-time</td>
<td>1 (12.50)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-21</td>
<td>8 (100.00)</td>
<td>8 (100.00)</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>0 (0.00)</td>
<td>1 (0.00)</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>4 (50.00)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Black/African American</td>
<td>1 (12.50)</td>
<td>2 (25.00)</td>
</tr>
<tr>
<td>White</td>
<td>3 (37.50)</td>
<td>4 (50.00)</td>
</tr>
<tr>
<td>Other</td>
<td>0 (0.00)</td>
<td>1 (0.00)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2 (25.00)</td>
<td>3 (37.50)</td>
</tr>
<tr>
<td>Female</td>
<td>6 (75.00)</td>
<td>5 (62.50)</td>
</tr>
<tr>
<td><strong>Residence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Off-campus</td>
<td>8 (100.00)</td>
<td>8 (100.00)</td>
</tr>
<tr>
<td>Living arrangements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>House/condominium/apartment</td>
<td>7 (87.50)</td>
<td>7 (87.50)</td>
</tr>
<tr>
<td>Residence hall</td>
<td>1 (12.50)</td>
<td>1 (12.50)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lives with</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Roommate(s)</td>
<td>1 (12.50)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Parent(s)</td>
<td>7 (87.50)</td>
<td>6 (75.00)</td>
</tr>
<tr>
<td>Other</td>
<td>0 (0.00)</td>
<td>1 (12.50)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Permanent residence</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>New York State</td>
<td>8 (100.00)</td>
<td>8 (100.00)</td>
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</table>

<table>
<thead>
<tr>
<th>County of birth</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>3 (37.50)</td>
<td>7 (87.50)</td>
</tr>
<tr>
<td>Other</td>
<td>5 (62.50)</td>
<td>1 (12.50)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Citizenship</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>7 (87.50)</td>
<td>8 (100.00)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Language spoken at home</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>2 (25.00)</td>
<td>5 (62.50)</td>
</tr>
<tr>
<td>Other Language</td>
<td>6 (75.00)</td>
<td>3 (37.50)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mother’s education</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than high school</td>
<td>2 (25.00)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Graduated high school</td>
<td>0 (0.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Trade/technical school</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Some college, no degree</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Associates degree</td>
<td>0 (0.00)</td>
<td>2 (25.00)</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>2 (25.00)</td>
<td>2 (25.00)</td>
</tr>
<tr>
<td>Advanced degree</td>
<td>1 (12.50)</td>
<td>3 (37.50)</td>
</tr>
<tr>
<td>Unknown</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Father’s education</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than high school</td>
<td>2 (25.00)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Graduated high school</td>
<td>0 (0.00)</td>
<td>2 (25.00)</td>
</tr>
<tr>
<td>Trade/technical school</td>
<td>1 (12.50)</td>
<td>2 (25.00)</td>
</tr>
<tr>
<td>Some college, no degree</td>
<td>2 (25.00)</td>
<td>2 (25.00)</td>
</tr>
<tr>
<td>Associates degree</td>
<td>0 (0.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>2 (25.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Advanced degree</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Unknown</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
</tbody>
</table>
Alcohol attitudes, beliefs, and behaviors

Responses to items that reflect participants’ attitudes, beliefs, and behaviors regarding alcohol (Table 5) are remarkably similar in the intervention and control groups, although there appear to be differences in interpretation of the first item in this set. For example, in the first item, which concerns alcohol as a social stimulant or stress-reliever, 2 of the 8 members (25%) of the intervention group marked “none of the above,” suggesting that they thought alcohol served no social or stress-relieving purpose, whereas numerous members of the control group indicated that alcohol could serve as an “ice breaker” (12.5%), “stress reliever” (12.5%), and "other” (37.5%), and none of the members in the intervention group marked these responses. Two of the 8 (25%) members of each group selected more than one social use for alcohol. The results for the second item, “what influences drinking decisions,” are similar across the two groups. Most of the intervention group members (75%) as well as control group members (62.5%) responded “I do not drink,” which eliminates other possible responses, though, 2 (25%) of the control group members suggested other influences, including peers, consequences, and family traditions.
Table 5. Alcohol Attitudes, Beliefs, and Behaviors, by Intervention Status

<table>
<thead>
<tr>
<th></th>
<th>Control Group Number (%)</th>
<th>Intervention Group Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of participants</strong></td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Effect of alcohol</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No answer</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>“Breaks the ice”</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Makes it easier to deal with stress</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Gives people something to talk about</td>
<td>0 (0.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Eases female/male bonding</td>
<td>0 (0.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Gives people something to do</td>
<td>0 (0.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Exclusive/none of the above</td>
<td>0 (0.00)</td>
<td>3 (37.50)</td>
</tr>
<tr>
<td>Other</td>
<td>3 (37.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>More than one selection</td>
<td>2 (25.00)</td>
<td>2 (25.00)</td>
</tr>
<tr>
<td><strong>What influences decisions about drinking</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do not drink</td>
<td>5 (62.50)</td>
<td>6 (75.00)</td>
</tr>
<tr>
<td>Friends/peers use alcohol</td>
<td>1 (12.50)</td>
<td>2 (25.00)</td>
</tr>
<tr>
<td>Family traditions and activities</td>
<td>2 (25.00)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td><strong>Social atmosphere in Brooklyn College promotes alcohol use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0 (0.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>No</td>
<td>5 (50.00)</td>
<td>5 (50.00)</td>
</tr>
<tr>
<td>Don’t know</td>
<td>3 (18.75)</td>
<td>2 (25.00)</td>
</tr>
<tr>
<td><strong>Age when first drank alcohol</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not drink</td>
<td>7 (87.50)</td>
<td>6 (75.00)</td>
</tr>
<tr>
<td>&lt;10</td>
<td>0 (0.00)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>11-17</td>
<td>0 (0.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>18-20</td>
<td>1 (12.50)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td><strong>Frequency of alcohol use within the last year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not use</td>
<td>7 (87.50)</td>
<td>5 (62.50)</td>
</tr>
<tr>
<td>Once</td>
<td>1 (12.50)</td>
<td>3 (37.50)</td>
</tr>
<tr>
<td><strong>Change in alcohol use in the past 3 months</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased</td>
<td>0 (0.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>I have not used alcohol</td>
<td>8 (100.00)</td>
<td>7 (87.50)</td>
</tr>
<tr>
<td>Survey Question</td>
<td>Group 1</td>
<td>Group 2</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td><strong>Friends’ perception of your drinking</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t disapprove</td>
<td>2 (25.00)</td>
<td>2 (25.00)</td>
</tr>
<tr>
<td>Disapprove</td>
<td>3 (37.50)</td>
<td>5 (62.50)</td>
</tr>
<tr>
<td>Strongly disapprove</td>
<td>3 (37.50)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td><strong>Times you held a drink with intent of not drinking</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 times</td>
<td>8 (100.00)</td>
<td>7 (87.50)</td>
</tr>
<tr>
<td>1 to 3 times</td>
<td>0 (0.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td><strong>Refused alcohol in the past 3 months</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 times</td>
<td>5 (62.50)</td>
<td>5 (62.50)</td>
</tr>
<tr>
<td>1 to 3 times</td>
<td>2 (25.00)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>4 to 9 times</td>
<td>1 (12.50)</td>
<td>3 (37.50)</td>
</tr>
<tr>
<td>10 or more times</td>
<td>0 (0.00)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td><strong>It is okay to drink in college</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2 (25.00)</td>
<td>4 (50.00)</td>
</tr>
<tr>
<td>No</td>
<td>4 (50.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Do not know</td>
<td>2 (25.00)</td>
<td>3 (37.50)</td>
</tr>
<tr>
<td><strong>Have thought of having an alcoholic drink while in college</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0 (0.00)</td>
<td>2 (25.00)</td>
</tr>
<tr>
<td>No</td>
<td>6 (75.00)</td>
<td>5 (62.50)</td>
</tr>
<tr>
<td>Do not know</td>
<td>2 (25.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td><strong>There are consequences for drinking alcohol while in college</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7 (87.50)</td>
<td>7 (87.50)</td>
</tr>
<tr>
<td>No</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Do not know</td>
<td>0 (0.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td><strong>Drinking alcohol interferes with homework and studying</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7 (87.50)</td>
<td>5 (62.50)</td>
</tr>
<tr>
<td>No</td>
<td>1 (12.50)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Do not know</td>
<td>0 (0.00)</td>
<td>2 (25.00)</td>
</tr>
<tr>
<td><strong>Alcohol causes shame/embarrassment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7 (87.50)</td>
<td>4 (50.00)</td>
</tr>
<tr>
<td>No</td>
<td>1 (12.50)</td>
<td>3 (37.50)</td>
</tr>
<tr>
<td>Do not know</td>
<td>0 (0.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Alcohol causes arguments, fighting, bad feelings w/ family/friends</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td>7 (87.50)</td>
<td>1 (12.50)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>There are benefits to avoiding alcohol for college students</th>
<th>Yes</th>
<th>No</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6 (75.00)</td>
<td>1 (12.50)</td>
<td>1 (12.50)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>There are benefits to drinking alcohol for college students</th>
<th>Yes</th>
<th>No</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 (12.50)</td>
<td>6 (75.00)</td>
<td>1 (12.50)</td>
</tr>
</tbody>
</table>

Several other findings deserve mention. For example, a higher percent of the intervention group members (37.5%) as compared to the control group (12.5%) indicated having used alcohol in the past year, despite their current abstinence. Moreover, roughly one third (37.5%) of members in each group refused a drink in the past 3 months, suggesting exposure to alcohol and individuals who drink. In contrast, the majority (75%) of both groups suggest that their friends "disapprove" or "strongly disapprove" of their drinking, while half of the intervention group and one quarter of the control group suggest that it is “okay to drink in college,” and the vast majority of participants (75% in both groups) indicate that there are generally “benefits to avoiding alcohol for college students.” These avoidance statistics are underscored by high (50% and higher) proportions of participants (in both groups) who suggest that alcohol has adverse consequences, including academic (“interferes with studying”), social (“causes shame/embarrassment”), and interpersonal (“causes arguments, fighting, bad feelings”).

Table 5 contains responses to items specific to Brooklyn College’s policies and programs for alcohol and drug prevention. In general, participants indicate that the college is concerned
about prevention. However, none of the intervention group participants and roughly half of control participants are aware that the college has an alcohol/drug policy. Further, none of the intervention group participants and only 25% of control group participants indicate knowing of the college’s alcohol/drug prevention program.

Table 6. Attitudes toward and Knowledge of Brooklyn College Policies and Programs

<table>
<thead>
<tr>
<th></th>
<th>Control Group Number (%)</th>
<th>Intervention Group Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of participants</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Brooklyn College is concerned about preventing alcohol and/or drug use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7 (87.50)</td>
<td>4 (50.00)</td>
</tr>
<tr>
<td>No</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Do not know</td>
<td>0 (0.00)</td>
<td>4 (50.00)</td>
</tr>
<tr>
<td><strong>Brooklyn College has alcohol/drug policy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4 (50.00)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Do not know</td>
<td>4 (50.00)</td>
<td>8 (100.00)</td>
</tr>
<tr>
<td><strong>Brooklyn College has an alcohol and drug prevention program</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2 (25.00)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Do not know</td>
<td>2 (25.00)</td>
<td>8 (100.00)</td>
</tr>
</tbody>
</table>
Pre-post changes in intervention group

Several key variables that are potentially modifiable as a result of the intervention are quantitatively analyzed in Table 6. Three-month historical alcohol use responses suggest that a slightly higher proportion (12.50%) of participants reported increased alcohol use at the pre-intervention interview than at the post-intervention interview (0.00%), an expected finding considering the objectives of the intervention. This statistic is supported by responses to the CRAFFT tool, in which no participant at follow-up reported alcohol consumption in the past 12 months, compared with 37.5% at the baseline (Table 7). Similarly, changes in the distributions of items that suggest the concern of, and responsibility to, the Brooklyn College community appear to demonstrate a slight positive effect of the intervention. The results indicate slightly higher proportions of agreement with “feeling valued as a person,” being “cared about” by Brooklyn College faculty, and being “responsible to contribute to other students’ well-being.”

Responses to the CRAFFT instrument also suggest positive effects of the intervention (Table 7). At follow-up, no intervention group member reported smoking marijuana or hashish in the past 12 months, compared with 37.5% at baseline, and none reported riding in a vehicle with an impaired driver, also compared with 37.5% at baseline.
<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th>Intervention Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Intervention Number (%)</td>
<td>Post-Intervention Number (%)</td>
</tr>
<tr>
<td>Total</td>
<td>8 (100.00)</td>
<td>8 (100.00)</td>
</tr>
<tr>
<td>Alcohol use changes in 3-month period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased</td>
<td>0 (0.00)</td>
<td>3 (37.50)</td>
</tr>
<tr>
<td>I have not used alcohol</td>
<td>8 (100.00)</td>
<td>5 (62.50)</td>
</tr>
<tr>
<td>Feel valued as a person</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>0 (0.00)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Disagree</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Neutral</td>
<td>0 (0.00)</td>
<td>2 (25.00)</td>
</tr>
<tr>
<td>Agree</td>
<td>5 (62.50)</td>
<td>5 (62.50)</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>1 (12.50)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Do not know</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Brooklyn College faculty cares about students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td>0 (0.00)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Neutral</td>
<td>2 (25.00)</td>
<td>4 (50.00)</td>
</tr>
<tr>
<td>Agree</td>
<td>3 (37.50)</td>
<td>3 (37.50)</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>2 (25.00)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Do not know</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Have responsibility to contribute to other student well-being</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td>1 (12.50)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Neutral</td>
<td>3 (37.50)</td>
<td>2 (25.00)</td>
</tr>
<tr>
<td>Agree</td>
<td>3 (37.50)</td>
<td>4 (50.00)</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>1 (12.50)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Brooklyn college encourages to help others</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td>1 (12.50)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Neutral</td>
<td>2 (25.00)</td>
<td>3 (37.50)</td>
</tr>
<tr>
<td>Agree</td>
<td>3 (37.50)</td>
<td>3 (37.50)</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>1 (12.50)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Do not know</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Student adheres to college policy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>0 (6.25)</td>
<td>1 (12.50)</td>
</tr>
<tr>
<td>Agree</td>
<td>4 (50.00)</td>
<td>4 (50.50)</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>3 (37.50)</td>
<td>3 (37.50)</td>
</tr>
<tr>
<td>Do not know</td>
<td>1 (12.50)</td>
<td>0 (0.00)</td>
</tr>
</tbody>
</table>
Table 8: CRAAFT Variables, Intervention and Control Group Members, Pre- and Post-intervention

<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th></th>
<th>Intervention Group</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-</td>
<td>Post-</td>
<td>Pre-</td>
<td>Post-</td>
</tr>
<tr>
<td></td>
<td>Intervention</td>
<td>Intervention Number (%)</td>
<td>Intervention Number (%)</td>
<td>Number (%)</td>
</tr>
<tr>
<td></td>
<td>Number (%)</td>
<td></td>
<td>Number (%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8 (100.00)</td>
<td>8 (100.00)</td>
<td>8 (100.00)</td>
<td>8 (100.00)</td>
</tr>
<tr>
<td>Drank alcohol during the past 12 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3 (37.50)</td>
<td>0 (0.00)</td>
<td>3 (37.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>No</td>
<td>5 (62.50)</td>
<td>8 (100.00)</td>
<td>5 (62.50)</td>
<td>8 (100.00)</td>
</tr>
<tr>
<td>Smoked marijuana or hashish during the past 12 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3 (37.50)</td>
<td>0 (0.00)</td>
<td>3 (37.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>No</td>
<td>5 (62.50)</td>
<td>8 (100.00)</td>
<td>5 (62.50)</td>
<td>8 (100.00)</td>
</tr>
<tr>
<td>Used other means to get high during the past 12 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3 (37.50)</td>
<td>0 (0.00)</td>
<td>3 (37.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>No</td>
<td>5 (62.50)</td>
<td>8 (100.00)</td>
<td>5 (62.50)</td>
<td>8 (100.00)</td>
</tr>
<tr>
<td>Has ridden in a car driven by someone who was high or had been using alcohol or drugs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3 (37.50)</td>
<td>0 (0.00)</td>
<td>3 (37.50)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>No</td>
<td>5 (62.50)</td>
<td>8 (100.00)</td>
<td>5 (62.50)</td>
<td>8 (100.00)</td>
</tr>
</tbody>
</table>

Pre-post changes in control group

As expected, participants in the control group did not exhibit the same sort of positive changes in behavior and attitudes as members of the intervention group did. The most remarkable difference is in 3-month changes in alcohol use. Contrary to the behavior of the intervention group, the control group reported more alcohol use than at the baseline. Three of the 8 (37.50%) of control group members indicated that they used alcohol in the previous three months, compared with zero members who reported drinking in the 3-month period prior to the study baseline (Table 7). (The reader should note that this change is contradicted by responses to
the CRAFFT tool, in which no respondents in the control group admitted alcohol use in the previous year.) The positive distributional changes observed in the social-emotional variables observed in intervention group are, moreover, not apparent among control group members. There are slight positive movements (i.e., toward “agreement” in responses), but these are offset by slight negative (i.e., toward “disagreement”) movements.

**Focus Group Analysis** (text messages)

As a result of the focus group conducted on October 6, 2017, the following concepts emerged from the conversations with the students: acknowledgement, encouragement, information, and inspiration. These conceptual themes formed the basis of the text messages that were developed for the study. Table 10 lists each text message that was sent during the study period, along with the timetable (e.g., the date the message was sent).

**Table 10. Text messages log**

<table>
<thead>
<tr>
<th>Date Sent</th>
<th>Text Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/23/2017</td>
<td>Congrats on all of your hard work at Brooklyn College, thus far! Did you know that college alcohol use is associated with poorer academic outcomes? Stay focused and continue to strive!</td>
</tr>
<tr>
<td>11/24/2017</td>
<td>Did you know that alcohol use by college students negatively affects learning, retention, and graduation? Always be the best version of yourself!</td>
</tr>
<tr>
<td>12/1/2017</td>
<td>The midterm to finals crunch is on for Brooklyn College freshmen... You've GOT this! Staying alcohol-free will help you to remain alert and make sound decisions. Think ahead!</td>
</tr>
<tr>
<td>12/7/2017</td>
<td>You know you best!! Think ahead, stay ahead: Use good judgment in your surroundings. Choose healthy ways to join-up with peers!</td>
</tr>
<tr>
<td>'Tis the season to be...inspired, clear-minded, and choosy Did you know that college alcohol use has been linked to unintentional injury, deaths, sexual violence, suicide and other problems? Find healthy ways to have fun!</td>
<td></td>
</tr>
</tbody>
</table>
Post-intervention Interview Analysis (feasibility questions)

This study used the general areas of focus suggested by Bowen et al (2010) to determine program feasibility. Using Bowen et al (2010) principles of feasibility study design, this study measures acceptability, demand, practicality, expansion and limited efficacy.

Acceptability measures how the target population (and interveners) respond to the intervention. The following key questions were used during the post-intervention interviews to assess acceptability:

1) Did any text message make you uncomfortable? If so, describe the message and discuss how.
2) Was it helpful to receive the text messages? If so, how did they help?
3) Were there any aspects of the text messages or the program in general that did not work for you? And, if so what and how could we improve?
4) Were there any aspects of the text messages or the program in general that worked for you? And, if so what and how could we improve?
5) Does it make sense to send messages via texts?
Overall, in response to acceptability questions, the participants indicated that receiving the text messages was comfortable; messages were clear; and the process was helpful without being unhelpful in any way. Specifically, when asked about the clarity and level of discomfort, participants responded:

"..the messages were direct but they were open; they did not judge or try to make me feel bad in any way."

"..the messages were clear and they were fine"

When asked to discuss whether receiving the text messages was helpful, students responded:

"It was helpful because, like I said, some kids are always talking about how they are going to drink and party, and they make it sound like they are having a good time. So, even when I don't want to drink, it was like good to get a text to make sure that I remember, you know, like that drinking can interrupt what I am trying to do; they reminded me that there are consequences and problems that I am not here for, you know?"

"It was helpful because there are so many things going on now that I am in college. Before I came here my parents were like take it slow and stay focused. They never went to college so they are really, I don't know, maybe anxious that I get good grades and finish college. The text messages kind of reinforced what they say and made me want to just stay focused."

On the whole, students’ responses to measures of intervention acceptability suggest that students found the intervention and intervention protocol to be acceptable. The intervention was described as being acceptable even for students who reported that they know that they do not want to drink; they claimed that it was helpful to receive text messages that reinforce their decision to not drink alcohol.

*Demand* measures estimate use of an intervention by examining its use in a specified population. To assess demand for the program in this study during the post-intervention interviews, the following key questions were posed:

1) Do you think that other freshmen who do not drink would benefit from receiving the text messages? If so, how would they benefit? If not, why not?
2) What, if anything we can do differently to encourage students to continue with the program once they start?

Example responses to demand questions, include:

“Yeah, other kids who don't drink would benefit so that they can stay on track and not get confused by others who want to drink.”

“I definitively think that other freshmen who don't drink would like getting the texts. For one thing, the texts let you know that you are not the only one who is not drinking and getting drunk, and that being safe is ok. I think that a lot of freshmen are going to start drinking when they get here. If they get the text messages, they will have a better reason not to drink.”

“Others who do not want to drink would appreciate getting regular, anonymous texts to help them stay on track.”

Overall, participants indicated that they believed other freshmen would be likely to make use of the intervention. Responses to demand questions in this study suggest that the intervention could create demand by the target population.

**Practicality** assesses how well an intervention can be implemented in the face of time, resource, and other restrictions. During the post-intervention interviews, the following key questions were asked to assess the practicality of the program:

1) Please discuss any barriers and incentives regarding the program. Was there anything about the program that kept you from participating? Anything that motivated you to participate?

2) Was the program too long? How long do you think the program should last?

3) What about the timing of the text messages? Were messages sent frequently enough? Too frequently?

In response to practicality questions, participants generally indicated that the intervention was well-received, in spite of any logistical limitations. In particular, students reported:

“..it was easy to do. I really didn't have to do anything, except read the messages, so I mean, it was east to do. There wasn't anything out of the way or like hard to do so I just participated, you know? I mean all I had to do was read the messages, so...”
“No, could have been longer, like through the first year to help make freshman year a full success.”

“Weekly messages was good. We got about two messages every week, and that was fine. I think it should not be more frequent than that, though.:

Students’ responses seem to indicate that students found the intervention and protocol easy to attend to, and reasonable with regards to program length and timing. These and other questions suggest that the intervention is practical for implementation for the designated target group.

*Adaptation* emphasizes making changes to a program in order to satisfy novel circumstances. To measure adaptation, students were asked for their recommendations for the use of the program with the freshman population. A single question was posed to assess adaptation, namely:

“Ok, thank you for your thoughtful responses. Now, please tell me any of your recommendations for improving outreach, recruitment, and retention. Should we change the way that we got students involved? How about what, if anything we can do differently to encourage students to continue with the program once they start? Were there any text messages that you would change or reword? How would you change it (them)?”

Students recommended specific modifications to achieve optimal recruitment and retention outcomes for study participation; they variously responded about adaptation as pertains the study and the intervention. For example:

“I think it would be good to let all the freshmen get texts because it could help kids to know that all of us are going through this, like training.”

“Maybe you should make it a part of a class, or give credit for joining the study.”

“The texts told me about college drinking but they did not tell me about Brooklyn College drinking. I am really curious what is happening here on campus besides what I can see.”
In each case, students reflected that the study and the intervention was on the right track. In addition, each response points to adapting recruitment and outreach practices (for the study), as well as to revisions for the intervention content and protocol.

*Expansion* measures projected program success with a different population or in another setting. The concept of expansion of the program emerged during the post-intervention interviews in response to various questions, and particularly when students were asked to provide feedback. Specifically, the moderator offered:

1) “Ok, thanks for your thoughts. Finally, please provide any other feedback about your experience with the intervention. Anything at all that you want to say.”

Example responses to this open-ended question to assess expansion, include:

“Well, I think the texts are a good idea, but all freshmen should get them. And, maybe even other students should get them, too because they really help you to remember why you should not drink in college. I think that the texts should keep going and not stop because then you can keep getting reminders. Since it's on the phone it's easy to read because I always have my phone, everybody is always reading their texts”

“It was a good experience. I think it was helpful to get the messages, but sometimes I wonder what others were thinking if they got messages. All in all though, it was good.”

“I liked participating and I think that it would be a good extension of the study to bring the participants together. What did the other students think about the study? Did it help them? Maybe if we know each other we can help each other to keep on the path.”

Each of the above responses suggest the student’s believe that the intervention has merit and could be expanded upon. The first student offered suggestions about ways to enhance the intervention protocol so that it would meet or exceed the intended outcome. The second and especially the third response illustrate students’ interests in connecting with other participating students, with a suggestion that students could enhance their outcomes by exchanging notes with other students. This may point to room for a peer interaction component for the study, and any future intervention implementation.
Limited efficacy testing focuses on conducting preliminary examination of the intervention impact. The following key question was used to measure limited efficacy:

1) Did the text messages influence your behavior, and if so, how?

To follow are examples of participants’ responses when asked about the intervention’s influence on their thinking and/or behavior:

“It was good to get the texts because, I know I'm not going to drink, but kids are always talking about it. The texts were like a reminder, even though I already know that I don't want to drink.”

“Personally, I liked getting the messages. I think they could have influenced my behavior because some of the students here speak about drinking like it's just another thing that you do in college. Then I would get a message and think about how I want to graduate on time and everything. I think it was helpful.”

“For me, I feel that I already knew that I do not want to drink. It was good to get messages to check in on what I think, so I think they did influence me to not start drinking.”

Judging from the participants’ responses when asked about the intervention’s efficacy, it appears that the program may have the potential to influence thinking and behavior of the target group. All the same, because of the very limited statistical power based on the number of participants, as well as the limited follow-up period among other limitations, firm conclusions about program efficacy cannot be extrapolated from this finding.

Taken together, participants' responses to the measures used to assess the feasibility of the mobile primary alcohol prevention program suggest that the intervention is acceptable, practical, adaptable, has the potential for demand and expansion, and may be efficacious with the target population of alcohol-abstaining urban commuter freshmen for the intended purpose of delaying alcohol uptake while in college. Of the remaining feasibility study focus areas, implementation was used in combination with Orsmond and Cohn (2015) objectives and guiding questions to study research and intervention development, implementation, and evaluation; where it makes sense, objective and guiding questions were used in concert with areas of focus
to assess research and intervention feasibility. Specifically, the following questions were used by the principal investigator to examine research and intervention processes:

1. How many students were recruited? Can we recruit appropriate participants?
2. How appropriate are the data collection procedures for the intended population and study purpose?
3. Do participants find the study procedures and intervention suitable and acceptable?
4. Does the research team have the resources and ability to manage the study and intervention?

Recruitment of study participants is an essential aspect of a feasibility study. Since the main aim of a feasibility study is to determine whether or not the research of interest can be conducted, identifying and recruiting the appropriate participants is a contingency for this type of study; it is only by being able to engage the appropriate audience that we can learn about research plausibility for intended targets. For the current study, freshman students were recruited during two separate non-mandatory new student activities that took place just before and immediately upon the commencement of fall semester classes: orientation and "First Thursdays", respectively. Each of the recruitment events was a tabled activity, meaning that students were invited to circulate around and stop by a number of tables that were set up with various themed informational materials. At each event, the principal investigator set up and sat behind a table containing study materials: consents, screening and informational surveys, investigator contact information, etc. Students also were approached individually by the principal investigator, and invited to participate. Recruitment efforts proved challenging on several spheres. Students were not mandated to attend either of the recruitment events, nor were they made aware of the study recruitment before they arrived at orientation and "First Thursdays". Students arrived with a focus on the business that they were about: Retrieving orientation materials, and getting freebies
to help to ease their way into college life. Serving as a participant in a study was not what they came for, nor were they compelled to listen to the recruitment offer, nor sign up to participate. As a result, the study not only did not have a captive audience, recruitment efforts were immediately competing with official college activities for the students' attention.

After two months of recruitment, a total of eight-two students were consented for this study; and of those fifty-five students were found to be eligible. In spite of the recruitment challenges, eligibility criteria for the study were feasible and appropriate for the purpose of the intervention program. Students who did not qualify to participate screened as already using alcohol; primary prevention of alcohol use would not make sense for those students. The twenty-seven students who did not qualify for the study were presumed freshmen who were 18 to 21 years old, as they were attending freshman-only events, they read and signed consents that identified the study participant age as 18 to 21 years old, and they verbally affirmed their freshman and age status when asked during the consenting process. The consents and CRAFFT, the screening tool that was used to determine eligibility, do not ask for demographic information, therefore it is not possible to compare eligible to ineligible consenters on demographic and other characteristics. Discussion regarding comparisons of demographic and other characteristics between intervention and control participants is treated at the beginning of this chapter.

Evaluating data collection procedures and outcome measures is another essential area for review for a feasibility study. According to Orsmond et al (2015), assessment of procedures and measures can inform about the accessibility of the measures of interest to the target population; appropriateness of measures for the intended targets and outcomes; and the completeness and usability of the data. For the current study, there were two sets of measures for which data collection procedures and outcome measures were assessed: text message content from the focus
group, and experience measures from the intervention group. In each case, participants consented to audio recording; this along with field notes served as the primary method for collecting the raw data.

The focus group was asked to contribute to the development of messages that would help to deter non-drinking freshmen from initiating alcohol consumption. Repetition for confirmation with focus group members and carefully maintained field notes were used to test the veracity of the resulting text messages developed out of the focus group discussion. Focus group members were readily able to respond with their opinions about message content, and careful review of audio tapes for discussion transcription proved a straightforward data collection methodology. As this study pioneers the use of a mobile program for primary alcohol prevention with this population, there were no other studies with which to compare notes regarding the message content, in particular. In spite of this limitation, this assessment suggests that feasible, suitable and appropriate outcome measures and data collection procedures were in place for this aspect of the study.

Post-intervention interviews also were assessed for the need for procedural revisions and measures refinements. Interviews were conducted for approximately thirty minutes, one-on-one with each participant who was randomized to the intervention group. Participants consented to audio-taping and were asked a series of questions about their experiences with the mobile alcohol prevention program. Participants responded with ease, and their responses suggested that data collection procedures for post-intervention participant interviews were feasible, suitable, and appropriate for the target population and intended outcomes.
Acceptability was previously discussed in this chapter. Orshmond et al (2015) suggest that feasibility studies can be improved while they are in progress by evaluating the acceptability and suitability of the intervention and study procedures for participants. Discovery and response to this key area of interest for a feasibility study, can lead to more productive follow-up efficacy testing. Specifically, acceptability and suitability for participants can be addressed through assessing participant study retention, adherence, understanding, burden, and satisfaction; and evaluating for unexpected adverse effects.

As was previously discussed, based on participant responses to key questions asked during the post-intervention interviews, this study was found to be acceptable by participants. In addition, all eligible students who responded to contact following the initial consent and screening participated fully and to study completion, once enrolled. Furthermore, participants in post-intervention interviews offered that the study was not burdensome, nor were any adverse outcomes reported.

Evaluating study resources, management and implementation is another central consideration for a feasibility study. The ability of investigators to find appropriate funding, space, time, and tools will immediately impact a study's viability. In addition, investigator expertise, skills and ethics will necessarily weigh on how well a study is conducted, and how much it might be trusted. Owing to the fact that the intervention under investigation is a mobile program, much of this study was conducted remotely. As a result of the remote nature of this study, there was minimal need for space; and time and tools were readily managed using computer software and applications. The principal investigator is a ranking public health administrator with well over two decades is well versed in the intervention investigation, development, and management. In addition, as a doctoral candidate in public health policy and
management in excellent standing, the principal investigator has experience and expertise in social and public health investigation, including with human subjects. The principal investigator also is trained in interactive technology.

While basic resources and investigator experience and expertise are sufficient for the demands of the current study, the absence of funding and other supports for this study contributed to recruitment challenges at the outset of the study; this directly impacts power. Future programming should be developed with adequate resources to attract and secure participants, as well as to engage study personnel. Specifically, funding for monetary or class credit incentives, and/or other means for capturing student notice such as mandating participation might have increased student response, thereby increasing measurement power, etc. Additional study personnel might also assist in enhancing recruitment efforts, as well as with data entry and management.

The final objective/guiding question as outlined by Orsmond et al (2015) is evaluating responses to the intervention; this coincides with Bowen et al (2010)'s limited efficacy testing. Of interest is whether the intervention can do what it is designed to do with the target group. As previously discussed in this chapter, participant responses to post-intervention interview questions do suggest that the intervention has promise for the intended outcomes with the target population.

Summary of Findings

The first phase of the feasibility study was with the focus group. Phase one of the feasibility study resulted in students' contributions to the development of the messages that were used in the intervention phase of the feasibility study. Students emphasized the importance of
communicating acknowledgement, encouragement, information, and inspiration; these themes were reflected in the final messages that were sent during the six weeks of intervention.

The six-week mobile primary prevention program comprised the second phase of the feasibility study. The program was conducted with students that were randomized to either an intervention or control group. While there appear to be some demographic differences between the intervention and control groups around race-ethnicity, language spoken at home, level of parental education and other family member attendance at college, pre-intervention the two groups are remarkably similar in their responses to questions to gauge alcohol attitudes, beliefs and behaviors. Some differences suggesting positive intervention outcomes emerge in post-intervention responses to alcohol attitudes, beliefs, and behavior questions.

The final phase of the feasibility study consisted of post-intervention interviews. Interview results suggest the feasibility of introducing a mobile primary alcohol prevention program to freshmen at this urban commuter college. Program feasibility is suggested in terms of acceptability/suitability, demand practicality, adaptation, and limited efficacy. Limited efficacy results from this phase of the study are especially promising as they point to a positive trend in alcohol attitudes, beliefs, and behaviors for intervention as compared with control group participants. In addition to the assessment by participant measures to assess feasibility for mobile primary alcohol prevention for this target population, study processes appear to indicate feasibility with regards to recruitment, data collection procedures and outcome measures. The assessment of study resources, management, and implementation identified the absence of funding and other supports for this study as needed areas for focus and development.
CHAPTER 5

DISCUSSION and CONCLUSION

Review of Purpose/Objectives, Literature, Hypotheses, Methods

This final chapter of the dissertation will review the dissertation, discuss implications, and form conclusions based on analyses. The chapter is divided into a review of purpose and objectives, and discussion and implications.

To follow is a review of purpose and objectives. This section of the dissertation presents an examination of literature, hypotheses, and methodological approach of the research.

Review of Purpose and Objectives

The purpose of this study was to identify predictors of alcohol abstaining among college students and test the feasibility of a mobile primary alcohol prevention program on an urban commuter college campus. Three chief aims motivated this work:

**Aim 1:** To systematically analyze data collected by Add Health database to investigate factors that predict college student uptake of alcohol.

**Aim 2:** To develop a protocol for a mobile primary prevention intervention to delay alcohol uptake by college freshmen who identify as abstaining from alcohol consumption by adapting an intervention developed by Mason et al (2005), which successfully increased readiness for change for college students previously identified for, or at risk of, alcohol use.

**Aim 3:** To systematically analyze the feasibility for a mobile primary alcohol prevention for urban commuter first-time freshman college students to determine the merit of developing and implementing an intervention for further study.

For each study aim, research questions were posed. In particular, this research asks whether college attendance predicts changes in alcohol use for previously abstinent youth; investigates the use of a community engagement model for developing an effective intervention; and assesses feasibility for implementing a mobile intervention with urban commuter freshmen.
Review of Literature

To date, research on college alcohol use typically reflects the work of select large-scale survey studies about prevalence and trends in alcohol use among US college students. In much of this work, quantitative descriptors of college student attributes are derived from survey samples that are taken directly from college students about their alcohol attitudes, beliefs, and consumption practices. Resulting data have been used to form college alcohol policy, develop interventions and programs, and catalyze further study.

While historic approaches to studying college student alcohol use and consequences has been a productive area of public health inquiry resulting in the development of promising practices and the universality of mandated campus policy, the prevalence and persistence of college alcohol behaviors and resulting deleterious outcomes recommend the need for new study and intervention methodologies. Existing data and emerging questions suggest that the problems of college alcohol may look differently depending on student characteristics and campus environmental factors; and that the time for intervention may be as early as the first few weeks of a student's entry into college (or before), during the transition from high school.

New research that examines modern-day campus environments and takes into account social and other factors that impact contemporary student populations is indicated. In particular, more notice must be made of students who have yet to initiate alcohol use. As such, research and interventions that look to delay students' uptake of alcohol can innovate a new era of primary prevention that targets populations which may ultimately be at greatest risk for alcohol consequences. Essentially, the success of research and programming to address the persistent public health problem posed by college alcohol use will depend on early intervention that optimizes impact, suitability for the target, and leveraging current technologies.
Review of Methods

The research was comprised of a secondary data analysis of publically available data to identify predictive factors for college alcohol use; and a feasibility test of a mobile alcohol primary prevention intervention for use with urban commuter college freshmen. Analyses for each of the two parts of this study were conducted independently, though the design of the feasibility study was predicated on findings of the secondary analyses.

The analytic Add Health sample includes n = 1,370 observations of merged Wave III and Wave IV data, from which the outcome variable- abstains from alcohol was extracted. The Two-Wave data records were displayed in a single observation, with explanatory variables measured at Wave III and outcomes measured at Wave IV. The outcome variable was collected at Wave IV. This binary variable (0, 1) indicated no use of alcohol since the Wave I data collection period. Independent (predictor) variables included socio-demographic attributes, religion and politics, physical well-being, health behaviors, mental health, civic and volunteer activity, and risk.

Pre-estimation analyses were run using t-tests to compare means of continuous and ordinal variables, and chi-square tests to compare relative proportions of nominal variables. Descriptive and inferential analyses were conducted using univariate methods. The sample was described using number for categorical variables, and mean for continuous and ordinal variables. Multivariable logistic regression was applied to investigate the relationship between predictor variables and abstaining from alcohol at Wave IV. Statistical interpretation to infer potential associations with study outcome was achieved by examining direction, magnitude, and statistical significance of coefficients, with beta-coefficients transformed to odds ratios to enhance interpretation accessibility. A goodness of fit measure was generated using the Hosmer and
Lemeshow goodness-of-fit statistic for the logistic regression model, in combination with a linear probability regression model. Finally, to assess the proportion of Wave III abstinence as a predictor for the outcome, the linear probability model also was used to investigate how much relative variance is explained by prior abstinence versus other explanatory variables.

The subjects used in the feasibility study were first time college freshmen at an urban commuter college who were randomly assigned to one of three conditions: a focus group to develop instrument messages; a control or intervention group in a feasibility trial. Eligible students were freshmen who pre-screened as abstinent, were at least 18 years old and able to provide informed consent, no more than 21 years old, and who owned a mobile telephone with texting. Subjects assigned to the feasibility study were surveyed using a screen for alcohol experience and a separate instrument for alcohol attitudes, beliefs, and behaviors pre and post a 6-week mobile primary prevention period, and following a one-month interval. Assessments were made for alcohol initiation and intervention status (key independent variable) and other student variables including race/ethnicity, nativity status, and status of family college attendance.

Quantitative survey data were assessed with descriptive methods. Number and percent were generated for categorical variables at baseline by intervention status, noting qualitative differences in the distribution of such variables, as there was not sufficient sample size to draw meaningful inference from quantitative techniques. Qualitative differences then were assessed in several key variables within the intervention group between baseline and follow-up. Two overlapping paradigms comprising a total of eight exhaustive measures were used to assess intervention and study feasibility.
Discussion and Implications

To follow is the final section of the dissertation. The discussion and implications offers a summary of findings, interpretations, and literature support; discussion of study problems, limitations and practical implications; and suggestions for future research.

Summary of Findings, Interpretations, and Literature Support

The first aim of this research was to systematically analyze data collected by the Add Health publically available database. Of interest was investigating factors that predict college student uptake of alcohol. Specifically, this aim was directed towards the following research questions: Does college attendance predict changes in alcohol use for previously abstinent youth? What characteristics might predict alcohol abstinence among college students?

The analysis of the data collected relative to the principle objectives of the first phase of the study indicated that a majority of college and university students who participated in the Add Health longitudinal study drank alcohol. Of the students who reported abstinence, close to 50% of abstainers at Wave III abstained at Wave IV, indicating that the majority of the students transitioned to alcohol use by Wave IV. A compelling, exclusive profile for abstainers at Wave IV is not immediately decipherable based on the available data, though some characteristics emerge as being associated with abstinence for this group of Add Health participants. In particular, the majority of abstainers at Wave IV were single, 'other' religion, politically moderate white females who reported that they engaged in at least weekly exercise, and did not play lotto.

Findings from analyses of the Add Health data comparing Waves III and IV to identify whether college attendance influences alcohol beliefs and behaviors, and which student characteristics might predict alcohol abstinence have important implications for the current
research. Taken together, analyses of Add Health data indicated that college alcohol use remains a public health problem, and that more research is needed to uncover factors contributing to students' alcohol attitudes, beliefs, and behaviors in order that targeted, effective interventions may be introduced. To begin, findings show that the majority of college students who participated in the study reported alcohol use; this coincides with much research in this area, and supports the goals of the current research to further our understanding of the public health burden of college alcohol use. In addition, this finding is important for the current research because it reinforces our understanding that alcohol uptake is taking place during college years: at least some of the students who report eventual use, transitioned to alcohol consumption during or following college attendance. Reflecting on what we know about the complexity of health decision-making during young adulthood due to significant biological, physical, emotional, and lifestyle changes that occur during this period, current study findings reinforce a public health need to recognize college transitions as a potential risk factor for initiation of alcohol consumption (and later problem drinking). While it seems to reinforce key understandings, the data also seems to add to the many unanswered questions that remain in this area of study. For example, participants were 18-26 years old during Wave III, a typical age range for the majority of traditional undergraduate study, yet, it is not possible to decipher the context (freshman or other college year) within which transitions took place: This data is not able to identify when (and why) students shifted from abstainer to alcohol user, nor can it point us to clues for changing the mechanisms that result in college alcohol use and consequences. Furthermore, study findings point to the fact that abstinence at Wave III is the single most predictive factor for abstaining at Wave IV. In the end, however, we do not know why some students transitioned, and abstainers abstained; key to guiding future study and intervention.
Findings, interpretation and implications of the Add Health data in the current research support a need for additional research to explore and enhance understanding of the factors that may influence decision-making around college alcohol initiation, including identifying and targeting factors that prolong abstinence and improve long term outcomes. To date, the research literature is inconsistent with respect to the initial age of alcohol initiation and later problem drinking behaviors.\textsuperscript{202} Furthermore, research suggests that for youth transitioning to young adulthood, decision-making around alcohol initiation is complex, and in fact, may be a potential risk factors for initiation of alcohol consumption (and problem drinking).\textsuperscript{203} Other research points to the need for more investigation on transition points for older youth and alcohol initiation. To present, much of the research on decision making around alcohol initiation and the effects of underage drinking has focused on young adolescents, and those still in high school or younger.\textsuperscript{204,205,206} Less research has been devoted to understanding the factors that may influence alcohol initiation among underage youth during the crucial transition from high school through college\textsuperscript{4,207} Furthermore, there are wide variations in drinking patterns in adolescents and young adults,\textsuperscript{4} and trends which show increasing changes and disparities in alcohol use and misuse relative to gender/race/ethnicity as individuals age.\textsuperscript{208} These trends underscore the need to better understand the social and cultural factors that contribute to patterns of college alcohol initiation and consumption.\textsuperscript{209}

The second aim of this study was to develop a protocol for a mobile primary prevention intervention to delay alcohol uptake by college freshmen who identify as alcohol abstaining. The study employed a community engagement model to adapt an existing intervention for use with a new population.
The community engagement model was successfully used in this research. Students from the initial study recruitment were randomly assigned to form a focus group. The focus group of five first-time freshmen were invited to craft messages for use with their peers, to delay alcohol uptake. The focus group met a single time to review and adapt messages from a previous study to increase readiness for change for college students deemed to be using or at risk of alcohol use. Work of the focus group resulted in messages that were used in the next phase of the research, during feasibility testing.

Community engagement approaches are increasingly used to make behavioral and other changes in a community's practice through discussion and work with the community to create those changes. Proactive engagement with the subjects of inquiry makes it possible to establish trust and create mutual transparency, thereby potentially enhancing outcomes. Students who participated in the focus group expressed a vested interest in remaining alcohol-free; their concern about the subject matter, along with their lived-experience as first time freshmen enabled the success of their task in the focus group.

The third and final aim of this research was to test the feasibility of implementing a mobile primary alcohol prevention program for use with urban commuter first-time college freshmen to delay alcohol uptake. This last phase of the study involved the analysis of intervention feasibility across a variety of indices, as well as an assessment of the study's processes.

The analysis of the data collected relative to the principle objectives of the final phase of the study indicated that it is feasible to introduce a mobile primary alcohol prevention program to alcohol abstaining freshmen at this urban commuter college. Assessments by participant measures indicated program feasibility with regards to acceptability/suitability, demand
practicality, adaptation, and limited efficacy. Measurements of study processes also indicated study feasibility in terms of recruitment, data collection procedures and outcome measures. An evaluation of study resources, management, and implementation pointed to a need for funding and other resources, though there was no indication that these deficits interrupted the program's viability for purposes of the current research. Especially interesting from this phase of the study is the fact that some of the students who were randomized into the intervention group had relatively positive outcomes as compared with their control peers.

The success of the feasibility study as assessed through participant and study process measures adds an important area of focus to public health interest in college alcohol use and consequences. Whereas, in response to the ongoing prevalence of college drinking and resultant issues, study and intervention in this arena has placed emphasis on secondary and tertiary prevention for students with existing alcohol use problems; the current research suggests a need to add primary prevention to the discussion. To present, less attention has been placed on the study of and program development around alcohol primary prevention for students who choose to abstain. It is reasonable to argue that constraints on public health resources require that we make careful decisions in the interest of maximizing limited resources. All the same, those decisions should be made with the interest of the entire population in mind. In the case of college students, those interested in refraining from or delaying the use of alcohol may be ignored to their potential detriment. Research shows that delayed uptake results in better outcomes for students and the surrounding community. Results from the current study suggest better outcomes for students exposed to the intervention. In fact, the current study documents that abstaining students on an urban commuter campus are interested in learning about abstinence strategies; furthermore, even those students who are practicing abstinence are exposed to offers to drink (in
spite of their reporting that their friends would disapprove or strongly disapprove if they drink). It is evident from the current study that alcohol is available on campus; and it shows up around students who are not interested in consuming it. If it is the case that delayed alcohol uptake results in better outcomes, perhaps this is a nexus at which the public health community would do well to observe its mantra to prevent instead of having to cure.

Results from the final phase of the feasibility study raise questions about factors that impact college alcohol initiation. While there is some evidence in the research literature that delaying alcohol uptake is beneficial to youth and young adults, much of the research on decision making around alcohol initiation and the effects of underage drinking has focused on young adolescents or those still in high school or younger. Further study is needed to explore and enhance understanding of the factors that may influence decision-making around alcohol initiation and transition points for young adults. Trends which show increasing changes and disparities in alcohol use and misuse relative to demographic characteristics (gender, race-ethnicity, etc) as individuals age underscore the need to better understand the social and cultural factors that contribute to patterns of alcohol initiation and consumption.

Discussion of the Problems and Limitations

There were a number of problems and limitations that were encountered in the process of implementing this research that should be considered when interpreting these data. Research limitations in the current work include approach, analysis, and conceptual constraints that may have important implications for current study conclusions, as well as considerations for future study.

One of the methodological limitations of the current study derive from the fact that the study's first phase was a secondary analysis of a data set that was not powered to study persistent
college student alcohol abstaining, though the aim for using this data was to glean information about college alcohol use, and to isolate predictors of alcohol abstaining among college students. Proper application of secondary data analyses is critical for any study that relies on secondary data to elucidate research questions and findings. Conclusions about alcohol abstaining and any student characteristic predictors must be made with the caveat that students did not directly respond to a question(s) about their ongoing abstinence expectations or experiences. At best, the data can point to characteristics which may be associated with, but are not predictive of alcohol abstinence with this population.

Another study design limitation was found in the development of the mobile primary preventive program that took place in the second part of the study. The intervention was developed by adapting an existing intervention based on students' exposure to alcohol. The small sample size potentially limits the representativeness of participants' offerings; this in turn, may temper the intervention's fit with a wider audience. Conclusions about the appropriateness of the resulting program protocol must be drawn with full acknowledgement that the questions and comments that were developed may not be an exact fit for use with the wider freshman population. Further testing of the program is indicated before it can reasonably be put to future, more wide-spread use.

As the sole tool used to collect participants' alcohol attitudes, beliefs, and behaviors the Chisholm Survey played an important role in answering questions about alcohol-abstinent students' exposure to and experiences of alcohol. The fact that the Chisholm had not been previously validated is a potential liability that may have implications for this study's ability to report on student characteristics, and their perceptions, intentions, and activity around alcohol use. Results taken from students' responses to Chisholm items may be speculative, at best. In
addition, the Chisholm should be validated with a representative group from the target population before it may be relied upon for future use.

Another limitation of the study is reliance on self-report since participants may offer socially acceptable responses (social desirability bias). Since the study is interested in examining students' actual experiences and activities in order to better understand how to intervene, as needed, response validity is critical. All the same, sufficient research literature has established that college student self-report on alcohol consumption is generally considered valid.

Conceptual study limitations also may exist in the current research. Specifically, since this research is premised on Health Belief Model; since this model does not account for other factors that influence health behaviors, and the model does not consider the impact of emotions on health-related behavior, cautious conclusions must be drawn about what drives participants' alcohol behaviors. Future research will do well to explore how other frameworks which account for the role for emotional and other health behavioral motivators may more completely support the nature of this inquiry.

Finally, this research met with significant problems because of recruitment limitations. Recruitment limitations included an inability to mandate participation, no power of staff nor incentives, and the absence of a captive audience; these issues emerged in spite of diligent, timely, and exhaustive efforts on the part of the principal investigator to establish alliances with seemingly appropriate partners. The study was redesigned from an efficacy to a feasibility study to address recruitment constraints, however, this change did not completely remedy recruitment constrictions and their consequences. For example, instead of two focus groups of 5-8 participants in keeping with the initial study design, the study was comprised of a single 5-person focus group. While this group proved sufficient for the purpose of crafting effective messages for
use with peers, having an additional focus group could have provided additional perspectives and recommendations that may have enriched the final product. Going forward, additional measures should be taken to maximize on any and all available resources that may help to engender partnership and enhance outreach and recruitment; these may include eliciting research funding to enable monetary incentives; enlisting graduate Fieldwork and/or Capstone students to serve as research associates; and incorporating study participation into course requirements or other mandated student activities.

Discussion of Practical Implications

There were a number of findings derived from the current study which have practical implications for others involved in research or applied practice in the area. To follow is a very brief overview.

The current research points to a need for considering new targets and expanded approaches for inquiry pertaining to college alcohol use and consequences. Study findings suggest a need to recognize the college transition as a potential risk factor for alcohol uptake. For example, participating fall semester first-time freshmen reported that they refused alcohol, suggesting their exposure to it, even while they report that their closest friends would not approve of their use. On the face of it, this seems a potential contradiction. It may be that students are being exposed to alcohol in the college atmosphere even when they and their friends do not condone and are not interested in its use. Since some of the students who initially expressed an interest in remaining abstinent later reported using alcohol, unsolicited exposure to alcohol may be a risk factor, and an area for college administrator and other campus personnel to attend.
This research also found that many students in the feasibility study reported that they were not aware of or were uncertain about campus alcohol policies and practices, even though the college in question has an established alcohol and drug policy, as well as intervention services. The slight differences between intervention and control groups in their after-intervention responses to this and related items such as awareness of programs or belief that the college has an interest in campus alcohol behaviors may suggest a need to enhance new freshman education around campus alcohol policies and services.

This research points to potential policy implications. Findings suggest the need for investment in practice to require institutions of higher learning to identify and attend to varying student presentations. For students who prefer to abstain from alcohol, opportunities to seek out and engage in alternative activities may not be adequate for protecting students from an environment which may expose them to alcohol permissiveness. Institutions of higher learning and researchers would do well to explore the place for policy that is specifically pointed at safeguarding deliberate abstainers.

**Suggestions for Further Research**

Ongoing interest in college alcohol use and consequences will continue for the foreseeable future. This area of public health concern is rooted in a number of contributing factors which together may enable and even promote the use of alcohol by college students. Some factors include alcohol advertising, neighborhood alcohol outlets, and campus alcohol policy and enforcement; these issues are beyond the scope of this work. The fact that college student use often results in deleterious outcomes validates the investment of attention and resources to this area of inquiry. Future research in this area will benefit from the current
research as it makes plain a number of challenges, and calls to the fore an area of research that has until now remained largely unexplored.

The study met with practical limitations and challenges that may be instructive. Recruitment limitations that stem from having no funding, few alliances, and not being able to require student participation created particular hardships. While they are treated elsewhere in this manuscript; they bear repeating because of their significant impact on the power of this research. Implications for future researchers and applied practitioners include the utility in aligning early on with appropriate campus partners to identify resources and collaborators.

The results of the feasibility study suggest that some first-time alcohol abstaining freshmen may benefit from receiving text messages that check-in, inform and encourage students both on and off the topic of college alcohol use. Future research might build on the mobile primary alcohol prevention feasibility study with an efficacy study that addresses conceptual, methodological, design and practical limitations; meets power indices; and is designed with a more extensive intervention and follow-up periods. Additionally, students' positive responses to receiving periodic messages regarding an area that is not an indicated problem may suggest that there is room for exploring the use of a similar program in other areas of interest to students.

Due to their wide-spread use, ease of operation, adaptability to user profiles, and efficient data collection and manipulation capability, mobile phones are potentially effective public health intervention tools for use with youth and young adults. Outcomes from this study suggest preliminary evidence that a primary alcohol prevention program using SMS text messaging is feasible and acceptable for use with alcohol inactive freshmen at an urban commuter campus. Future study in this area will make use of texting and other contemporary technologies that enable interactivity between program participants and investigators in order to enhance real-time
experiences and real-time interface. An important consideration would be the availability of trained personnel to troubleshoot technological and technical issues, manage message and intervention delivery, and provide ongoing data collection and analysis.
APPENDIX A: SCRIPTS

1. RECRUITMENT SCRIPT

Title of Research Study: Exploring feasibility for/efficacy of alcohol primary prevention with urban commuter college freshmen

Principal Investigator: Janice Chisholm, DPHc
Student

Excuse me, do you have a minute? My name is Janice Chisholm. I am a doctoral student at CUNY School of Public Health, and I am working on my dissertation research study.

This research study will explore college student alcohol attitudes, beliefs, intentions, and specific drinking patterns and study the effects of a prevention intervention.

Are you interested in hearing more about our study? Is it OK for me to continue? If individual says “no, not interested” stop, say thank you but do not continue. If he/she says yes, then continue.

I am approaching you to see if you would like to be in the study. This study is not part of your studies here at Brooklyn College. We are approaching every freshman who comes in for orientation, today. This research is separate from your studies here at Brooklyn College, and whether you decide to hear more about the research will not affect your studies.

So, are you interested in hearing some details about the research study? If not interested, thank the individual for his/her time. If interested, then move to the consent form.

Thank you again for your willingness to participate. I will now review consent forms with you.
2. FOCUS GROUP DISCUSSION GUIDE

Total Participant time required: 1-2hrs

OVERALL QUESTION TO ANSWER IN FOCUS GROUP DISCUSSIONS:

The purpose of this research study is to learn about attitudes, beliefs, intentions and specific drinking patterns of students on commuter campuses; to examine college-attendance generation, racial/ethnic and immigration effects on urban commuter student use patterns; and to develop and implement an effectiveness study of a mobile primary preventive intervention with students who attend a commuter institution.

Focus groups will be used:

• To develop a protocol for a primary prevention mobile alcohol intervention with college students by adapting a treatment protocol that successfully increased readiness for change for students previously identified for, or at risk of, problem use.

Below is a general guide for leading our focus groups. We may modify this guide as needed as each focus group will inform the subsequent groups.

Before the group begins, conduct the informed consent.

I. Introduction (10 m)

• Welcome participants and introduce yourself.
• Explain the general purpose of the discussion and why participants were chosen.
• Discuss the purpose and process of focus groups
• Explain the presence and purpose of recording equipment.
• Outline general ground rules and discussion guidelines such as the importance of everyone speaking up, talking one at a time, and being prepared for the moderator to interrupt to assure that all the topics can be covered.
• Review break schedule and where the restrooms are.
• Address the issue of confidentiality.
• Inform the group that information discussed is going to be analyzed as a whole and that participants’ names will not be used in any analysis of the discussion.
• Read a protocol summary to the participants.

This study is intended to elicit students’ knowledge, attitudes, self-efficacy, behavioral intentions, and practice as well as on saliency, social norms, and environmental factors around college student alcohol use.
Students will be asked to discuss their thoughts about college alcohol use; effective abstinence messages for use with peers; the potential effectiveness of telephone texts; what effects can be expected from a primary mobile prevention initiative.

Discussion Guidelines:

We would like the discussion to be informal. You do not need to wait to be called on to respond to questions or join the discussion. Please respond directly to the comments other people make and to any questions that are posed. Please let us know if you do not understand a question. We are here to ask questions, listen, and make sure everyone has a chance to share.

We would like to make sure that everyone has a chance to contribute to the discussion. To do so, we may interrupt you, or we may call on you directly.

We do ask that we all keep each other’s identities, participation and remarks private. We hope you’ll feel free to speak openly and honestly.

As discussed, we will be tape recording the discussion, because we don’t want to miss any of your comments. No one outside of this room will have access to these tapes and they will be destroyed after our report is written.

Let’s start by going around the room, one at a time, and introduce ourselves. Tell us your first name, your year at CUNY, and your major. And one fun fact about yourself. I’ll start.

II. Topic Generation (50-90 minutes)
The focus group facilitator will explain:

This group is convened to adapt text message sequences that will be piloted with CUNY freshmen to better understand college alcohol use. Participants in the pilot will receive and reply to customized, outgoing messages about alcohol abstinence benefits and use consequences. This focus group’s task will be to generate content for the text messages based on students’ knowledge, attitudes, self-efficacy, behavioral intentions, and practice as well as on saliency, social norms, and environmental factors around college student alcohol use.

If there is some confusion during the discussion about how a topic is relevant clarifying comments will be requested, but the conversation will quickly move on.

Let’s get started!
• The initial question:

  ➢ *Today we are here to talk about college alcohol use. What comes to mind when you think about students’ use of alcohol in college?*

• The group will provide a list of initial topics. After the responses from this prompt have been exhausted, move on.

• To encourage the interactive process:

  1. Take a topic that was just brought up and prompt the group for more information:

    ➢ *XYZ was mentioned a lot. Tell me the factors related to XYZ.*

  2. Alternatively, bring up a subject from the list to prompt the group:

    ➢ *What about ABC? What factors come to mind?*

• Give constant prompts to make certain this is a complete list of potentially relevant topics.

The following is a guideline for topic generation. The actual process may vary according to each group’s progress and the experience of previous groups. The list below explores: use/consequences, benefits/abstinence, attitudes, beliefs, norms, behaviors.

**Issues for focus group exploration:**

1. **Use/consequences:** The 23-item Rutgers Alcohol Problem Index\textsuperscript{212,213} will be used to generate questions/comments regarding alcohol-related consequences. Use/consequences questions/comments can include:
   a) What do you perceive would be the consequences of drinking alcohol while in college?
   b) What will happen if college students drink alcohol?

2. **Benefits/abstinence:**
   a) What are some benefits of avoiding alcohol for college students?
   b) What are interesting ways of having fun without alcohol, for college students?

3. **Attitudes/Beliefs:** Items from past research\textsuperscript{214,215,216} will be used to generate comments/questions regarding alcohol attitudes/beliefs, and may include:
   a) What do you think about drinking alcohol in college?
   b) What do you think about college student drinking?
   c) Do you think it is ok to start drinking while you are in college?
4. **Norms:** The Core Institute’s Campus Assessment of Alcohol and Other Drug Norms\(^1\) will be used to generate question/comments regarding perceived norms and behaviors. Perceived norms questions may include:
   a) Did U know that ALCOHOL\_USE\_\% of other 18–23 year olds drink?
   b) How’s that for you? Txt: surprised, unsure, upset.’

5. **Behaviors:** Behaviors questions may include:
   a) Have you thought of having an alcoholic drink while in college?
   b) What did you decide?
   c) What factors influenced your decision?

6. **Intervention Content/Impact**
   a) How will sending alcohol text messages affect non-using student decisions?
   b) What messages will help students understand benefits of abstaining?
   c) What messages will help students understand the consequences of drinking?
   d) When does it make sense to send alcohol text messages to students?
   e) How often should alcohol text messages be sent to college students?
   f) How will students react to text messages about college alcohol use?

**III. Closing (10 m)**
- Closing remarks
- Ask if outstanding issues/questions
- Thank the participants


\(^1\) Rutgers Problem Alcohol Index (RAPI): [http://research.alcoholstudies.rutgers.edu/rapi](http://research.alcoholstudies.rutgers.edu/rapi)


\(^1\) The Core Institute’s Campus Assessment of Alcohol and Other Drug Norms: [http://core.siu.edu/surveys/index.php](http://core.siu.edu/surveys/index.php)
3. POST-INTERVENTION INTERVIEW SCRIPT

Participant Interview Script

Introduction
We are interested in learning about students’ reactions to text messages that inquire about alcohol intentions and behaviors, and that reinforce the benefits of abstinence from and consequences of alcohol use by college students. Interviews will be used to analyze the feasibility for using text messaging with urban commuter college students, especially regarding recruitment, retention, and adherence to the intervention.

Let’s take a moment to review and complete the consents for your participation in this part of the study. Are you agreeing to participate in this interview?

If at any point you would like to discontinue this interview, you are free to do so. Your participation is entirely voluntary.

This interview will be audio-recorded to ensure the accurate transcription of your responses. All the same, your responses will be kept confidential and will be recorded anonymously.

For each question I ask, wherever possible, please provide examples so that I can get a clear picture of your experiences.

Opening Questions
M: Do you have any questions for me?
M: How old are you?
M: What year of college are you in?
M: What are you studying at Brooklyn College?
M: What is the highest level of education for your parent(s)?
M: Were you born in the US?
M: Were your parents born in the US?

Key Question
M: Please discuss any barriers and incentives regarding the program. Was there anything about the program that kept you from participating? Anything that motivated you to participate?
M: Were the directions about the intervention clear?
M: Do any questions or information in the messages need clarification?
   1. Was the program too long?
   2. Were there any questions that you did not understand?
   3. Did any questions make you uncomfortable?
   4. Were there any questions that you would change or reword?
5. Did you skip any questions?
6. Were there any aspects of the program that did not work for you?
7. Were there any aspects of the program that did work for you?

**Closing Questions**
1. Now, please tell me any of your recommendations for improving outreach, recruitment, and retention.
2. Finally, please provide any other feedback about your experience with the intervention.
APPENDIX B: INSTRUMENTATION

1. Car, Relax, Alone, Forget, Friends, Trouble – The CRAFFT Screening Tool

The CRAFFT Screening Questions

Please answer all questions honestly; your answers will be kept confidential.

Part A
During the PAST 12 MONTHS, did you:

1. Drink any alcohol (more than a few sips)?
2. Smoke any marijuana or hashish?
3. Use anything else to get high?
   “anything else” includes illegal drugs, over the counter and prescription drugs, and things that you sniff or “huff”

If you answered YES to ANY (A1 to A3), answer B1 below, then STOP.

If you answered NO to ALL (A1, A2, A3), answer only B1 below.

Part B

1. Have you ever ridden in a CAR driven by someone (including yourself) who was “high” or had been using alcohol or drugs?
2. Do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in?
3. Do you ever use alcohol or drugs while you are by yourself, or ALONE?
4. Do you ever FORGET things you did while using alcohol or drugs?
5. Do your FAMILY or FRIENDS ever tell you that you should cut down on your drinking or drug use?
6. Have you ever gotten into TROUBLE while you were using alcohol or drugs?

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2. Chisholm College Alcohol Experience Survey (Chisholm Survey)

Chisholm College Alcohol Experience Survey

Demographics: Tell us about yourself...

We would like to learn about the student make-up of the Brooklyn College freshmen who are taking this survey. The following questions are designed to help us to learn more about you.

1) What is your student classification?

( ) Freshman
( ) Sophomore, Junior, Senior
( ) Graduate/Professional
( ) Other - Write In (Required): _____________________________________________ *

2) What is your student status?

( ) Full time
( ) Part time

3) How old are you?

( ) <18
( ) 18-21
( ) 22+

4) How would you identify your race/ethnicity? (Choose all that apply)

[ ] American Indian/Alaskan Native
[ ] Asian/Pacific Islander
[ ] Black/African American
[ ] White
[ ] Hispanic/Latino (all races)
[ ] Other - Write In
[ ] Prefer not to answer
5) Do you identify as: (Choose all that apply)

[ ] Male
[ ] Female
[ ] Transgender Male
[ ] Transgender Female
[ ] Gender Variant / Non-conforming
[ ] Other - Write In
[ ] Prefer not to answer

6) What is your marital status?

( ) Single (never married)
( ) Married/Domestic partner
( ) Separated
( ) Divorced
( ) Widowed

7) Where is your current residence?

( ) On-campus
( ) Off-campus

8) What are your living arrangements?

( ) House/condominium/apartment
( ) Residence hall
( ) Sorority/fraternity
( ) Other - Write In (Required): _________________________________________________ *

9) With whom do you live? (Choose all that apply)

[ ] Alone
[ ] Room mate(s)
[ ] Parent(s)
[ ] Spouse/partner
[ ] Child(ren)
[ ] Other - Write In (Required): _________________________________________________ *
10) Where is your permanent residence?

( ) New York State
( ) USA, but other state
( ) Country other than USA

11) What is your country of birth?

( ) United States
( ) Other - Write In (Required): ________________________________ *
( ) Prefer not to say

12) What country or countries are you a citizen of? (Choose all that apply)

[] United States
[] Other - Write In (Required)
[] Prefer not to say

13) What languages are spoken in your (parents') home? (Choose all that apply)

[] English
[] African language (Kiswahili, Arabic, Hausa, etc.)
[] Chinese (Cantonese, Mandarin)
[] French
[] Guyanese
[] Haitian Creole
[] Indian language (Bengali, Hindi, etc)
[] Italian
[] Russian
[] Spanish
[] Other - Write In (Required): ________________________________ *

14) What is your mother/parent's highest level of education?

( ) Less than high school
( ) Graduated high school
( ) Trade/technical school
( ) Some college, no degree
15) **What is your father/parent's highest level of education?**

( ) Less than high school
( ) Graduated high school
( ) Trade/technical school
( ) Some college, no degree
( ) Associate degree
( ) Bachelor's degree
( ) Advanced degree (Master's, Ph.D., M.D.)
( ) Unknown
( ) Other - Write In: ________________________________________________

16) **Has anyone else in your family attended college?**

( ) Yes- Write In (Required): ________________________________________________ *
( ) No

17) **Are you working for pay? (May include fellowships, work-study, paid internships, freelancing, self-employment, etc)**

( ) Yes, full time (35+ hours/week)
( ) Yes, part time (fewer than 35 hours/week)
( ) No

18) **What is your immigration/worker status?**

( ) US Citizen
( ) Lawful Permanent Resident (Green Card holder)
( ) Other (non-LPR) immigration status
( ) Undocumented/no lawful status
( ) Unknown
( ) Other - Write In: ________________________________________________
Alcohol Attitudes, Beliefs and Behaviors

We are interested in learning about how Brooklyn College freshmen think about and experience alcohol.

19) Do you believe alcohol has any of the following effects? (Choose all that apply)

[ ] "Breaks the ice"
[ ] Enhances social activity
[ ] Makes it easier to deal with stress
[ ] Eases a connection with peers
[ ] Gives people something to talk about
[ ] Eases female/male bonding
[ ] Allows people to have more fun
[ ] Gives people something to do
[ ] Makes food taste better
[ ] Makes women sexier
[ ] Makes men sexier
[ ] Eases sexual opportunities

20) What influences your decision about having a drink? (Choose all that apply)

( ) Friends/peers use of alcohol
( ) Campus policy
( ) Possible consequences
( ) Family traditions and activities
( ) Other - Write In (Required): _________________________________________________*

21) Does the social atmosphere at Brooklyn College promote alcohol use?

( ) Yes
( ) No
( ) Do not know
22) At what age did you first drink alcohol?

( ) Do not use
( ) <10
( ) 11-17
( ) 18-20
( ) 21+

23) Within the last year, about how often have you had alcohol?

( ) Did not use
( ) Once
( ) 6 times
( ) Once or twice per month
( ) Once per week
( ) Daily

24) To what extent has your alcohol use changed in the past 3 months?

( ) Increased
( ) About the same
( ) Decreased
( ) I have not used alcohol

25) How do you think your close friends feel (would feel) about you drinking alcohol?

( ) Don't disapprove  ( ) Disapprove  ( ) Strongly disapprove

26) During the past 3 months, how many times have you held a drink in your hand (with the intent of not drinking) so that people stop bothering you about not having a drink?

( ) 0 times
( ) 1 to 3 times
( ) 4 to 9 times
( ) 10 or more times
27) During the past 3 months, how many times have you refused an offer for alcohol?
   ( ) 0 times
   ( ) 1 to 3 times
   ( ) 4 to 9 times
   ( ) 10 or more times

28) Do you think it is ok to drink alcohol while you are in college?
   ( ) Yes
   ( ) No
   ( ) Do not know

29) Have you thought of having an alcoholic drink while in college?
   ( ) Yes
   ( ) No
   ( ) Do not know

30) Are there consequences for drinking alcohol while in college?
   ( ) Yes
   ( ) No
   ( ) Do not know

31) Does drinking alcohol interfere with being able to do homework or study?
   ( ) Yes
   ( ) No
   ( ) Do not know

32) Do you think student use of alcohol can cause shame or embarrassment?
   ( ) Yes
   ( ) No
   ( ) Do not know
33) Do you think drinking alcohol can lead to arguing, fighting, or bad feelings with family or friends?

( ) Yes
( ) No
( ) Do not know

34) Do you think there are benefits to avoiding alcohol for college students?

( ) Yes
( ) No
( ) Do not know

35) Do you think there are benefits to drinking alcohol for college students?

( ) Yes
( ) No
( ) Do not know

36) Do you believe that Brooklyn College is concerned about preventing alcohol and/or drug use?

( ) Yes
( ) No
( ) Do not know

37) Does Brooklyn College have alcohol/drug policies?

( ) Yes
( ) No
( ) Do not know

38) Does Brooklyn College have an alcohol and drug prevention program?

( ) Yes
( ) No
( ) Do not know
Other Drugs: Attitudes, Beliefs and Behaviors

We are interested in learning how Brooklyn College freshmen experience other drugs (tobacco, marijuana, cocaine, etc)

39) Does the social atmosphere at Brooklyn College promote use of any drug that is not prescribed or that is used other than how it is prescribed to be used?

( ) Yes
( ) No
( ) Do not know

40) At what age did you first use tobacco?

( ) Do not use
( ) <10
( ) 11-17
( ) 18-20
( ) 21+

41) Within the last year, about how often have you used tobacco?

( ) Did not use
( ) Once
( ) 6 times
( ) Once or twice per month
( ) Once per week
( ) Daily

42) To what extent has your tobacco use changed in the past 3 months?

( ) Increased
( ) About the same
( ) Decreased
( ) I have not used tobacco
43) At what age did you first use recreational/non-prescribed marijuana?

( ) Do not use
( ) <10
( ) 11-17
( ) 18-20
( ) 21+

44) Within the last year, about how often have you used recreational/non-prescribed marijuana?

( ) Did not use
( ) Once
( ) 6 times
( ) Once or twice per month
( ) Once per week
( ) Daily

45) To what extent has your recreational/non-prescribed marijuana use changed in the past 3 months?

( ) Increased
( ) About the same
( ) Decreased
( ) I have not used marijuana

46) At what age did you first use cocaine, recreational/non-prescribed amphetamines, or recreational/non-prescribed sedatives?

( ) Do not use
( ) <10
( ) 11-17
( ) 18-20
( ) 21+
47) **Within the last year, about how often have you used cocaine, recreational/non-prescribed amphetamines, or recreational/non-prescribed sedatives?**

( ) Did not use
( ) Once
( ) 6 times
( ) Once or twice per month
( ) Once per week
( ) Daily

48) **To what extent has your cocaine, recreational/non-prescribed amphetamine, or recreational/non-prescribed sedatives use changed in the past 3 months?**

( ) Increased
( ) About the same
( ) Decreased
( ) I have not used cocaine, amphetamines, sedatives

49) **At what age did you first use hallucinogens, recreational/non-prescribed opiates, or recreational/non-prescribed inhalants?**

( ) Do not use
( ) <10
( ) 11-17
( ) 18-20
( ) 21+

50) **Within the last year, about how often have you used hallucinogens, recreational/non-prescribed opiates, or recreational/non-prescribed inhalants?**

( ) Did not use
( ) Once
( ) 6 times
( ) Once or twice per month
( ) Once per week
( ) Daily
51) To what extent has your hallucinogens, recreational/non-prescribed opiates, or recreational/non-prescribed inhalants use changed in the past 3 months?

( ) Increased
( ) About the same
( ) Decreased
( ) I have not used hallucinogens, opiates, inhalants

52) At what age did you first use designer drugs (ecstasy, MDMA, etc)?

( ) Do not Use
( ) <10
( ) 11-17
( ) 18-20
( ) 21+

53) Within the last year, about how often have you used designer drugs?

( ) Did not use
( ) Once
( ) 6 times
( ) Once or twice per month
( ) Once per week
( ) Daily

54) To what extent has your designer drugs use changed in the past 3 months?

( ) Increased
( ) About the same
( ) Decreased
( ) I have not used designer drugs

55) At what age did you first use recreational/non-prescribed steroids?

( ) Do not use
( ) <10
( ) 11-17
( ) 18-20
56) Within the last year, about how often have you used recreational/non-prescribed steroids?

( ) Did not use
( ) Once
( ) 6 times
( ) Once or twice per month
( ) Once per week
( ) Daily

57) To what extent has your recreational/non-prescribed steroids use changed in the past 3 months?

( ) Increased
( ) About the same
( ) Decreased
( ) I have not used steroids

58) At what age did you first use illegal (not allowed) and non-prescribed drugs?

( ) Do not use?
( ) <10
( ) 11-17
( ) 18-20
( ) 21+

59) Within the last year, about how often have you used illegal (not allowed) and non-prescribed drugs?

( ) Did not use
( ) Once
( ) 6 times
( ) Once or twice per month
( ) Once per week
( ) Daily
60) To what extent has your illegal (not allowed) and non-prescribed drug use changed in the past 3 months?

( ) Increased
( ) About the same
( ) Decreased
( ) I have not used other illegal drugs

61) During the past 3 months, to what extent have you experienced peer pressure to drink or use drugs?

( ) 0 times
( ) 1 to 3 times
( ) 4 to 9 times
( ) 10 or more times

__________________________________________________________

Sexual Attitudes, Beliefs and Behaviors

We are interested in learning about Brooklyn College freshmen sexual experiences

62) Did you have anal, oral, or vaginal sexual intercourse during the past year?

( ) Yes
( ) No

63) Did you drink the last time that you had sexual intercourse?

( ) Yes
( ) No

64) Did you use other drugs the last time you had anal, oral, or vaginal sexual intercourse?

( ) Yes
( ) No

65) During the past 3 months, to what extent have you thought a sexual partner was not attractive because s/he was drunk?

( ) 0 times
( ) 1 to 3 times
Let us know what you think...

66) How much do you agree with the following statement: I feel valued as a person

( ) Strongly disagree  ( ) Disagree  ( ) Neutral  ( ) Agree  ( ) Strongly agree  ( ) Do not know

67) How much do you agree with the following statement: I feel the Brooklyn College faculty care about me as a student.

( ) Strongly disagree  ( ) Disagree  ( ) Neutral  ( ) Agree  ( ) Strongly agree  ( ) Do not know

68) How much do you agree with the following statement: I have a responsibility to contribute to the well-being of other students

( ) Strongly disagree  ( ) Disagree  ( ) Neutral  ( ) Agree  ( ) Strongly agree  ( ) Do not know

69) How much do you agree with the following statement: My campus encourages me to help others in need

( ) Strongly disagree  ( ) Disagree  ( ) Neutral  ( ) Agree  ( ) Strongly agree  ( ) Do not know

70) How much do you agree with the following statement: I abide by the university policy and regulations that concern alcohol and other drug use

( ) Strongly disagree  ( ) Disagree  ( ) Neutral  ( ) Agree  ( ) Strongly agree  ( ) Do not know

Researcher use only:

CODE:

Thank You!

Thank you for taking our survey. Your response is very important to us.
3. Core Alcohol and Drug Survey (CORE)
17. **Within the last year about how often have you used...**
   (mark one for each line)
   - a. Tobacco (smoke, chew, snuff)...
   - b. Alcohol (beer, wine, liquor)...
   - c. Marijuana (pot, hash, hash oil)...
   - d. Cocaine (crack, rock, freebase)...
   - e. Amphetamines (diet pills, speed)...
   - f. Sedatives (downers, ludes)...
   - g. Hallucinogens (LSD, PCP)...
   - h. Opiates (heroin, smack, horse)...
   - i. Inhalants (glue, solvents, gas)...
   - j. Designer drugs (ecstasy, MDMA)...
   - k. Steroids...
   - l. Other illegal drugs...

18. **During the past 30 days on how many days did you have:**
   (mark one for each line)
   - a. Tobacco (smoke, chew, snuff)...
   - b. Alcohol (beer, wine, liquor)...
   - c. Marijuana (pot, hash, hash oil)...
   - d. Cocaine (crack, rock, freebase)...
   - e. Amphetamines (diet pills, speed)...
   - f. Sedatives (downers, ludes)...
   - g. Hallucinogens (LSD, PCP)...
   - h. Opiates (heroin, smack, horse)...
   - i. Inhalants (glue, solvents, gas)...
   - j. Designer drugs (ecstasy, MDMA)...
   - k. Steroids...
   - l. Other illegal drugs...

19. **How often do you think the average student on your campus uses...**
   (mark one for each line)
   - a. Tobacco (smoke, chew, snuff)...
   - b. Alcohol (beer, wine, liquor)...
   - c. Marijuana (pot, hash, hash oil)...
   - d. Cocaine (crack, rock, freebase)...
   - e. Amphetamines (diet pills, speed)...
   - f. Sedatives (downers, ludes)...
   - g. Hallucinogens (LSD, PCP)...
   - h. Opiates (heroin, smack, horse)...
   - i. Inhalants (glue, solvents, gas)...
   - j. Designer drugs (ecstasy, MDMA)...
   - k. Steroids...
   - l. Other illegal drugs...

20. **Where have you used...**
   (mark all that apply)
   - a. Tobacco (smoke, chew, snuff)...
   - b. Alcohol (beer, wine, liquor)...
   - c. Marijuana (pot, hash, hash oil)...
   - d. Cocaine (crack, rock, freebase)...
   - e. Amphetamines (diet pills, speed)...
   - f. Sedatives (downers, ludes)...
   - g. Hallucinogens (LSD, PCP)...
   - h. Opiates (heroin, smack, horse)...
   - i. Inhalants (glue, solvents, gas)...
   - j. Designer drugs (ecstasy, MDMA)...
   - k. Steroids...
   - l. Other illegal drugs...

21. **Please indicate how often you have experienced the following due to your drinking or drug use during the last year...**
   (mark one for each line)
   - a. Had a hangover...
   - b. Performed poorly on a test or important project...
   - c. Been in trouble with police, residence hall, or other college authorities...
   - d. Damaged property, pulled fire alarm, etc....
   - e. Got into an argument or fight...
   - f. Got nauseated or vomited...
   - g. Driven a car while under the influence...
   - h. Missed a class...
   - i. Been criticized by someone I know...
   - j. Thought I might have a drinking or other drug problem...
   - k. Had a memory loss...
   - l. Done something I later regretted...
   - m. Been arrested for DWI/DUI...
   - n. Have been taken advantage of sexually...
   - o. Have taken advantage of another sexually...
   - p. Tried unsuccessfully to stop using...
   - q. Seriously thought about suicide...
   - r. Seriously tried to commit suicide...
   - s. Been hurt or injured...

22. **Have any of your family had alcohol or other drug problems:**
   (mark all that apply)
   - Mother...
   - Brothers/sisters...
   - Spouse...
   - Father...
   - Mother's parents...
   - Children...
   - Stepmother...
   - Father's parents...
   - None...
   - Stepfather...
   - Aunts/uncles...

23. **If you volunteer any of your time on or off campus to help others, please indicate the approximate number of hours per month and principal activity:**
   - Don't volunteer, or...
   - 10–15 hours...
   - less than 1 hour...
   - 16 or more hours...
   - 1–4 hours...
   - Principal volunteer activity is:...
24. Within the last year to what extent have you participated in any of the following activities? (mark one for each line)
- Intercollegiate athletics
- Intramural or club sports
- Social fraternities or sororities
- Religious and interfaith groups
- International and language groups
- Minority and ethnic organizations
- Political and social action groups
- Music and other performing arts groups
- Student newspaper, radio, TV, magazine, etc.

25. In the first column, indicate whether any of the following have happened to you within the last year while you were in and around campus. If you answered yes to any of these items, indicate in the second column if you had consumed alcohol or other drugs shortly before these incidents.
- Ethnic or racial harassment
- Threats of physical violence
- Actual physical violence
- Theft involving force or threat of force
- Forced sexual touching or fondling
- Unwanted sexual intercourse

26. How do you think your close friends feel (or would feel) about you? (mark one for each line)
- Trying marijuana once or twice
- Smoking marijuana occasionally
- Smoking marijuana regularly
- Trying cocaine once or twice
- Taking cocaine regularly
- Trying LSD once or twice
- Taking LSD regularly
- Trying amphetamines once or twice
- Taking amphetamines regularly
- Taking one or two drinks of an alcoholic beverage (beer, wine, liquor) nearly every day
- Taking four or five drinks nearly every day
- Having five or more drinks in one sitting
- Taking steroids for body building or improved athletic performance

27. Do you believe that alcohol has the following effects? (mark one for each line)
- Breaks the ice
- Enhances social activity
- Makes it easier to deal with stress
- Facilitates a connection with peers
- Gives people something to talk about
- Facilitates male bonding
- Facilitates female bonding
- Allows people to have more fun
- Gives people something to do
- Makes food taste better
- Makes women sexier
- Makes men sexier
- Makes me sexier
- Facilitates sexual opportunities

28. On this campus, drinking is a central part in the social life of the following groups: (mark one for each line)
- Male students
- Female students
- Faculty/staff
- Alumni
- Athletes
- Fraternities
- Sororities

29. Campus environment: (mark one for each line)
- Does the social atmosphere on this campus promote alcohol use?
- Does the social atmosphere promote other drug use?
- Do you feel safe on this campus?

30. Compared to other campuses with which you are familiar, this campus' use of alcohol is... (mark one)
- Greater than other campuses
- Less than other campuses
- About the same as other campuses

31. Housing preferences: (mark one for each line)
- If you live in university housing, do you live in a designated alcohol-free/drug-free residence hall?
- If no, would you like to live in such a residence hall if it were available?
Overview

M: Welcome, and thank you once again for agreeing to take part in this study. As I have previously informed you, I am a doctoral student at CUNY's School of Public Health. I am conducting this study in partial fulfillment of my degree.

You were recruited to participate because you are a freshman at Brooklyn College, where this study is taking place. You were randomly selected to participate in this focus group. Your participation is voluntary, and you are free to change your mind about participating, at any time.

You may recall that you already signed consents to participate in the study. Please take a moment now to review and sign new consents, including an agreement to be recorded, if you have no objection. I would like to record this focus group so that at the end of the focus group, I can more easily transcribe what we all say. Relying only on my notes would mean that I need to write at top speed and I may miss some of what is being said. By recording, I will be better able to be true to our discussion. Note that I will not use any names in my transcriptions, so your comments will remain anonymous; and like all other aspects of the study, they are confidential and will only be used for study purposes.

Let me pause for a moment to give you a chance to read through and sign the consents. Let me know if you have any questions, and when you are ready to begin.

[Pause for 2.5 minutes. Handing out and collecting consents.]

M: Does anyone have any questions about the consents?

P1-5: [Cross talk] No

M: Does anyone have questions about or feel uncomfortable if I record the focus group?

P1-5: [Cross talk] No

M: OK, so let me begin by reminding you about the purpose of this study. This study is intended to elicit your knowledge, attitudes, beliefs, behavioral intentions, and practice around college student alcohol use.
The study is based on other research that successfully used a mobile intervention with college students who had developed alcohol use problems. Using periodic text messages, the researchers were able to help students to modify their attitudes and behaviors around alcohol use.

This focus group will help us to develop comments and questions for text messages to freshmen who have not initiated alcohol use. The goal is to delay their use of alcohol for as long as possible, because some literature shows that later initiation in alcohol use results in less problematic outcomes.

I am interested in your thoughts about college alcohol use; effective abstinence messages for use with peers; the potential effectiveness of telephone texts; and what effects we can expect from using a primary mobile prevention initiative with Brooklyn College freshmen.

And, just to be clear, whatever you say will be recorded, but your name will not appear in the transcripts, nor will you otherwise be personally identified. The information discussed is going to be analyzed as a whole. Also, the recording will be destroyed once the report is written.

Is everything clear so far? About the aims of the study and the purpose of this group?

P1-5: [Cross talk] Yes. Mmhmm. OK

I. Discussion Guidelines/Participant Introductions
M: Ok, so to make the best of the discussion, let's set some ground rules. Can we all agree that everyone will speak up, talk one at a time, and be prepared for me to interrupt, as needed, to assure that all the topics can be covered?

P1-5: [Cross talk] Yes. Mmhmm. Yep. Fine

M: Ok, so let's keep the discussion informal. I am here to ask questions, listen, and make sure everyone has a chance to share. You do not need to wait to be called on to respond to questions or join the discussion. Also, feel free to respond directly to the comments other people make and to any questions that are posed. And, let me know if you do not understand a question.

P1-5: [Cross talk] Yes. OK. Sounds fine. Good.

Let's make sure that everyone has a chance to contribute to the discussion. To do so, I may interrupt you, or we may call on you directly.

P1-5: [Cross talk] Sure thing. Yes. Mmhmm. OK

M: Let's all keep each other's identities, participation and remarks private. We all want to feel free to speak openly and honestly.

P1-5: [Cross talk] Definitely. Yes. No doubt. Of course. OK
M: Ok, let’s start by going around the room, one at a time, and introduce ourselves. Tell us your first name, your major, and one fun fact about yourself.

I’ll start: My name is Janice. I am a doctoral student at CUNY School of Public Health. I am an avid cross-fitter!

P1: Hi. My name is [Participant 1] and I am a freshman at Brooklyn College. What can I say that is fun about myself? I like the rain. (chuckles).

M: Great, thanks P1. That was great. Welcome and thanks for being here. Who wants to go next?

P2: My name is [Participant 2]. I am also a freshman at BC, and I just learned how to jump double-dutch! (laughs) Late bloomer, I guess.

M: Not so late. I still have not given up hope (chuckle). Thanks and welcome, P2. Who's next?

P3: [Participant 3]. Freshman. I like to paint..like apartments and homes, and stuff.

M: Wow! We have a talented group! Welcome and thanks for being here, P3. Next?

P4: Hello, I am [Participant 4] and a freshman. I am sure if there is anything fun that I can say about myself... I like gardening?

M: I think that sounds like a fun fact, P4! I have some of my happiest thoughts while I am tending to my trees at home. Thanks for sharing that, and for being here today. welcome. And, that leaves one more..

P5: Hi. My name is [Participant 5]. I am a freshman and I love to cook and create recipes.

M: Great! Thanks, P5. Welcome and thank you for being here. Ok, just to remind everybody, even though we have introduced ourselves, we have agreed to keep everyone's identity confidential.

P1-5: [Cross talk] Yes. Definitely. All right. OK

II. Topic Generation

M: Ok, once again, this group is convened to adapt text message sequences that will be piloted with CUNY freshmen to better understand college alcohol use. Freshmen will receive and reply to customized, outgoing messages about alcohol abstinence benefits and use consequences. This focus group’s task will be to generate content for the text messages.

If there is some confusion during the discussion about how a topic is relevant, I may ask for clarification, but we are going to try to keep the conversation moving along.

Let’s get started!
**Issues for focus group exploration:**

**Attitudes/Beliefs:** (past research\(^{218,219,220}\))

**M:** What comes to mind when you think about students’ use of alcohol in college?

**P4:** I think a lot of new college kids probably drink alcohol, or at least think about it once they get to college...probably even if they didn't think about it too much before.

**P1:** Yeah. Since I started here I heard more about alcohol and drugs than I used to; and there were kids who drank and stuff at school, so... I think it is not a good idea for students to drink because it's probably, I don't know, hard to stop once you start.

**P2, 3:** [Cross talk]: Yeah. Exactly.

**P1:** Probably, like, students fall to pressure from other students.

**P5:** Yeah, they do drink here, but I think BC students are pretty chill about drugs and alcohol. Like, I mean they don't go wild, you know? So far, there's no like campus drinking problem, I think.

**P1:** Well, some BC students do drink, though. Bad idea.

**P1-5:** [Cross talk] Yeah. True. Mhmhm

**M:** So, it sounds like some students at BC drink alcohol? Can you speak a little about what you think is the drinking culture at BC: Who drinks? Under what circumstances? Where- on campus?

**P3:** Sure, some students drink, and I think there may even be freshmen who are drinking alcohol. But, I don't think of BC as like the typical college with students running around with liquor or even beer all the time. You know, like the movie version of college. The campus is pretty tame.

**P2:** Yes, but some students are not so tame (chuckles). There are parties and socials and stuff. But to answer your question, I think that students drink just to drink since they are in college. Some do drink on campus but not really in the open.

**P4:** I think there are freshmen who drink. I would not say that the campus is entirely tame, either. I mean maybe not beer all over the lawn, but..

**P5:** I know there are freshmen who drink. (laughs)

**P1-4:** [Cross talk] Yes. For sure. Definitely.

**P4:** Still, some of us don't want to drink. Like, I know I am not going to drink, and most of my friends don't drink, but some kids end up going out with like older students, so...Anyway, it's not like hard to realize that some of the kids who drink are doing it because they want to impress.
P5: True. But I also think that some students just want to feel like they can do what they want to because now they are in college, so..

P3: Yeah, but it's not like this is really a party school or anything, though.

P1-5: Uh huh. True. Yeah

M: So, it sounds like some students at different levels are drinking, but the campus overall is somewhat moderate?

P1-5: [Cross talk] Yeah. Mhmhm. Right

Use/consequences:

M: What do you perceive would be the consequences of drinking alcohol while in college?

P4: Well, I think that it is kind of obvious that drinking does not go with school. For me, I want to be able to think straight and get my education.

P1: (chuckles) Exactly. I mean, if you are drinking, how can you think and function?

P5: Right, what is the point of drinking anyway? Isn't it so you can just forget and chill? I do not want to chill right now.

P2: I think that when most people drink it's because they want to hang out but you can't really hang out and do work at the same time so...I think it would be better to drink later and study now.

P1: Yeah, like way later, like maybe not at all. Or at least, not in college.

P3: Exactly. Everybody knows that when you drink it's easy to get out of control. It doesn't make any sense to want to get out of control if you want to study.

P4: Sometimes people might want to drink so they can test it out or experiment. But even if you are experimenting you could get into a problem. I think alcohol and college do not go together.

P3: Yeah, I mean it's alright if you want to drink, but don't expect it to not interrupt school and stuff.

M: So, what will happen if college students drink alcohol?

P2: Well. it could make it harder to get good grades and understand your work.

P4: Also, it could affect how you relate to your peers because alcohol can also change your mood or even your personality; like make you tense after you get sober.

P1: I think the most important thing for a college student is that alcohol can make you move away from your goals to get ahead in college, and even in life.
P5: Yeah, especially if the whole reason you drink is to get high anyway. (chuckles)

P1-4: [Cross talk]: Exactly. Yeah. True.

M: So, it sounds like some students at different levels are drinking, but the campus overall is somewhat moderate?

P1-5: [Cross talk] Yeah. Mmhmm. Right

M: What do you think about the fact that students at BC drink alcohol?

P3: I mean, I think BC students are pretty tame. Nobody here is gonna like go crazy with their drinking. But still...

P1: They might not get crazy, but it's still not smart.

P5: Yeah, but at least at BC you don't really feel like to have to worry that someone is going to get super dangerous from drinking. I mean, people get drunk but they are still like basically in control, you know?

P2: Yeah

P4: But that doesn't mean it's ok, though.

Benefits/abstinence:
M: What are interesting ways of having fun without alcohol, for college students?

P1: That's actually a really good point. Students do not have to drink to have fun. Me and my friends play ball, and sometimes we get together to study and just goof around.

P4: Well, it depends on what you like and who are your friends. Like, I think when we eat together like for lunch or after classes, that's about it.

P3: Yeah, I mean honestly, I am in the library a lot, so I see people in classes, and like P4 said, to get something to eat.

P4: Uhm, we sometimes go to the movies, but mostly it's that we eat together.

P5: Like, I don't think a lot of students stay around campus when they don't have classes. I mean during the day, when you have classes, then you can hang out between classes, study together... Yeah, I guess we eat lot here (laughs)

M, P1-5: (All laugh)
M: OK, it sounds like you eat, socialize between classes, play sports, and sometimes study together. Does that sound about right?


**Intervention Content/Impact**

M: Ok, so we want your help to figure out how to help BC freshmen to carefully weigh their options when it comes to drinking in college. We are considering sending regular text messages to freshmen. How do you think sending alcohol text messages may affect student decisions around alcohol?

P1: That could work. We are always on the phone and everybody checks their texts.

P2: I think that would be a good idea because students all have phones and we do read our texts all the time.

P3: I think reminder messages can be good. All of my friends are always on their phones, and I think the phones do influence what we think because we are seeing it all the time.

P5: Yeah, everything is in texts these days. I even get messages from my doctor's office, so people will look at the messages.

P4: I guess it depends on what the messages say. I mean what are you going to tell the students when you send the messages?

M: Ok, so that brings me to my next question to you. We are asking for your help to develop messages that will help college freshmen in their alcohol use decisions. So far, studies have used text messages to help students who have drinking problems to reconsider if and how much to drink. What kinds of messages do you think could be helpful to college freshmen who are not yet drinking? What should the messages say, and how do you think those messages will influence BC freshmen?

P2: Well, first of all, I think that even if you know you don't want to drink, it could be good to get feedback, or like support to not drink. I think messages should remind students about the bad outcomes and the dangers of drinking. If we could remember that alcohol could hurt us then maybe we wouldn't drink or at least be more careful.

P1: Wait, though, cause I think you don't want to like preach to students. For me, I know I don't want alcohol, but still sometimes friends and so on talk a lot about parties, but they don't talk about bad things happening; it all sounds like they are having fun (chuckles). But still, I don't want to get a message that is preaching to me, because that could make me feel...like, I dunno, like as if it makes me feel bad in some way.

P5: No, I know what you mean. If you preach when I already had my mind set, it could make me want to see what would happen.
P1: Right, like it would be counter-productive or something.

P4: I definitely agree. Message should tell students the consequences, but they should not try to convince students what to do. So, just a simple thing like telling the facts.

P1: Yes, like give factoids and statistics, or not statistics but like just a non-judgmental statement about an alcohol fact.

P3: Right, and relate it directly to consequences for college students in particular.

P2: I didn't mean that it should be preachy. I mean just tell students that when students drink these things happen that you don't want to happen.

P1,3,4: [Cross talk]. Yeah. Right. That's it.

P1: Also, though, the messages should remind students that they are in control. Let them hear that they are responsible and that their future is in their own hands, cause then they will be responsible. I think if you tell students that you respect their judgment, they will make a better decision.

P3: Yes, you have to find the right balance between holding students accountable and making them responsible. Does that make any sense?

P4: Yes, because it's one thing if you are like charging them, which is negative and makes people think you want to hold them accountable in a harsh way. It is different if you are sending a message that says you have the responsibility to make a good decision for yourself, cause that is more positive and it will encourage students to be careful.

P1: Right, so students have to make responsible decisions, and the messages can give them support by reminding them that they want to do the right thing.

P2: Ok, and also, the messages should also be kind of inspirational if they can..like don't be too gloomy as if people are going to die or something.

P3: What do you mean?

P2: Well, I mean I guess it goes back to not preaching. Like they should say that like if you drink you're going to explode and burn or something so harsh.

P1, 4, 5: (Laughter)

P3: Oh, yeah...

M: Ok, so it sounds like you think that sending text messages could help BC freshmen to make good alcohol use decisions?
P1-5: [Cross talk] Yes, Definitely. No doubt. Yep

M: It also sounds like you think the messages should be specific about alcohol use for college students, and that they should be mindful of students' ability to make good decisions, without charging them and talking at them?


M: So, do you think that we can construct some messages together? Can you offer some suggestions about what the messages should say?

P2: How about something like, "Remember to take it slow"

P1: Uhm, "Did you know that using alcohol in college causes" and then fill it in with something that is a fact. I think you need to have just one factoid statement, but that you repeat it a lot so that students get it.

P5: Right, or like, "Practice self control"

P1: "Use good judgment in your surroundings"

P4: How about, "In the face of peer pressure, make smart decisions"

P3: I think that one could seem a little finger-pointy.

P4: Ok, so what about, "If you're going to drink choose the time and the place"

P3: No! That sounds like it's ok to drink, just do it in the corner. No I think the messages could be a little general, like not each of them has to say exactly alcohol, but it should give the impression that you trust them to do the right thing.

P1: Some of the messages should be inspirational. Like not all of them have to be about don't do something. They could talk about success or the students' accomplishments.

P2: True, like tell the students that they are doing a good job and alcohol could get in the way.

P1: Yeah, that, and something to inspire, like, "Good work. Keep it up. Don't get distracted" or something like that..

P5: Yeah, cause it helps to hear that you are on the right track, too.

P4: Right, not just about how you have to be careful all the time.

M: Ok, so taking all that you have said, let's try to see if we can actually put some messages together. Tell me if I am on the right track: "Congratulations on your hard work! Did you know that college alcohol is linked to poor educational outcomes? Stay focused and continue to strive!"
P1: WOW! That is great! You got it!!

P2: Omg, that's exactly it!

P1,3-5: [Cross talk] Yes! That's it. Right. Excellent

P1: Also, another one could be like, "Be the best version of yourself!"

P5: Also say, "You've got this!"

P4: Those are good, but you also have to say something about alcohol, like why it is a problem.

P3: Yes, and like we were saying before, you could ask them about good ways to enjoy their time together; like what kinds of activities they could do together that are not dangerous and they can have fun and be safe.

M: Ok like, "Find healthy ways to have fun"

P3: Yes and, "You know you best" and about making choices and decisions.

M: So it sounds like you all think that positive messages are important. What about, "You know you best! Think ahead, stay ahead: Use sound judgment in your surroundings. Choose healthy ways to have fun and join up with your peers"

P1: Yeah, that's really good. That would be good to hear because it would remind me that I am in control and that I have goals, but it is not judgmental at all.

P5: I agree. It's really good and it combines a lot of what we said.

P4: Exactly. That is the kind of message I would be glad to get. I think that students who receive that kind of message will stick to their wish to stay away from alcohol because it will help them to realize that they are not alone thinking that alcohol is not a good idea. Also, it will kind of congratulate them for being responsible.

P2: Yeah, and is says, you know, that the student is strong.

P1-5: [Cross talk] Right. Yes. Mmmmm

M: Ok, so how often and when should messages be delivered? For example, in the other study that I mentioned, messages were sent multiple times a day for several weeks.

P3: Omg! That is way too much!

P2: That was for students with drinking problems, though, right?
P1: Yeah, so I think for students who are not drinking that would be overkill. So like, it might be better to do like two messages a week or something. And, I think you probably shouldn't do it for too, too long 'cause you're just going to get on students' nerves after a while. This should just like be for a short time.

P2: I agree. Just like once a week for like a few weeks.

P5: Yeah, no more than two times week for like a month or maybe two.

P4: If you do send two messages a week, they should be at the same time each week. Also, you could make one of the messages the same message each week, sort of like a reminder about the consequences; then the other message could be inspirational.

M: Ok, so it sounds like we are looking at up to two messages per week; one recurring message about the consequences of college alcohol use, and one inspirational message. When does it make sense to send the messages? For example, research suggests that students who drink may be more prone to drink on weekends and during breaks and holidays. When do you think it makes sense for BC freshmen to receive these messages?

P1: Thursdays and Fridays would be good.

P2-5: [Cross talk] Yes. Agree. That makes sense.

M: Ok, so Thursdays and Fridays at the same time each week. What about during breaks or holidays?

P2: You could send reminders during breaks, not so much holidays per se because different people do different things and celebrate different holidays, but we all have the same breaks.

P4: Yeah, so at breaks you can say something to remind kids to stay on track.

P3: yeah, but also like during midterms and finals, you want to say something inspirational

M: Ok, so messages should be sent up to twice weekly, on Thursdays/Fridays, with acknowledgment to midterm-finals/breaks, and with recurring "consequence"/"inspiration" messaging. Here are the messages that I have from this discussion; tell me if these make sense:

1. "You know you best! Think ahead, stay ahead: Use sound judgment in your surroundings. Choose healthy ways to have fun and join up with your peers"

2. "Congratulations on your hard work! Did you know that college alcohol is linked to poor educational outcomes? Stay focused and continue to strive!"

3. "Did you know that alcohol use by college students (OUTCOMES)? Be the best version of yourself!"

4. "The midterm-finals/break time is here. You've got this! Stay alcohol-free, remain alert, and think ahead"
5. "Find healthy ways to have fun!"

6. "You know you best! Think ahead, stay ahead: Use sound judgment in your surroundings. Choose healthy ways to join up with peers"

**P1-5:** [Cross talk] Yes. That sounds right. Those are really good. Excellent.

**M:** How do you think BC freshmen will react to receiving these text messages?

**P1:** I know it would help me because it would remind me that I am strong and right in my convictions. Because, I have already seen friends change since we got here, and I mean it's not like anyone is trying to do the wrong thing, but it is possible to go in a direction that you did not plan to go in. Text messages that make sense can probably help freshmen to, you know, stay on track.

**P3:** I think that most freshmen who receive the messages will take a moment to think before making a move that they regret. I think this will be a help for a lot of freshmen who might have older friends, or even friends who have a lot of influence.

**P2:** I completely agree. I mean, even though I know that I do not plan to use alcohol and drugs, I think even just being in this group will help me to be motivated to stay that way.

**P4:** Yeah, me too. I think that we don't really talk about this so getting regular text messages will help. Sometimes it can be easy to follow someone else, even when you think you are strong and you know the answer. Something like this can help students.

**P5:** I definitely think it could help. I mean, there could be students who are like, 'I already know that', but still if you keep getting reminders then it stays in your head.

**P1:** I think it more than stays in your head. It keeps it real, even if you thought you already made a decision, cause those decisions can get changed.

### III. Closing

**M:** Wow! This has been really productive! You have each been so incredibly attentive to this task, and very helpful. Your honesty and thoughtfulness has made this a powerful learning experience for me; it has been immensely helpful to hear from you. Thank you!

Next steps are for me to incorporate the ideas that you shared into the intervention protocol. Specifically, I will use what you offered to develop text messages for sending to participating freshmen.

Do you have any questions or other ideas before we end the session?

**P5:** Will you be contacting us again? How will we know what happens with the study--I mean, if it works?
M: That's a really good question [Participant 5]. I am going to look into that because, technically, while I still do have your contact information, typically the end of this session would mark the end of my contact with you regarding this study. You are free to use my contact to reach me it occurs to you that you have concerns or questions.

P1: Will we be receiving any of the text messages?

M: Thanks for asking that [Participant 1]. No, as I mentioned when we began, you were randomly selected into this arm of the study. Each participant will only participate in a single part of the study.

Are there any other questions, concerns, ideas that you would like to share?

P1-5: [Cross talk] No. That's it. Nope.

M: Then, once again I thank you very much for your time and focus. Each of you has been super! I wish you great success in your studies at BC and beyond!! Stay well.

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**Harvard School of Public Health: College Alcohol Study (CAS)**


**AlcoholEdu for College**


SAS


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TextIt (2012-17)


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