2016

Loss to follow-up among participants in the real talk study: a brief motivational interview intervention to reduce teen dating violence perpetration in Boston

Velasquez, Gabriela Elizabeth

http://hdl.handle.net/2144/17040

Boston University
LOSS TO FOLLOW-UP AMONG PARTICIPANTS IN THE REAL TALK STUDY: 
A BRIEF MOTIVATIONAL INTERVIEW INTERVENTION TO REDUCE TEEN 
DATING VIOLENCE PERPETRATION IN BOSTON

by

GABRIELA VELASQUEZ

B.S., Boston University, 2010

Submitted in partial fulfillment of the 
requirements for the degree of 
Master of Science

2016
Approved by

First Reader
Emily Rothman, Sc.D.
Associate Professor of Pediatrics

Second Reader
Vickery Trinkaus-Randall, Ph.D.
Professor of Biochemistry
ACKNOWLEDGMENTS

I would like to thank Emily Rothman for allowing me to partake in the Real Talk study and for guiding me through the scientific paper writing process and data analysis, despite her constantly busy schedule. The work that you do is inspiring and I am grateful for having been a part of it. I would also like to thank Jen Paruk, who is by far the most dedicated, hard-working, and humble Research Assistant I’ve ever known—thank you for always being so supportive and for keeping all of us on the Real Talk team on track. I would also like to thank Dr. Trinkaus-Randall for her guidance during the medical school application process. Lastly, I would like to thank my family, friends, and partner—for their endless support and for cheering me on in all of my professional and academic endeavors.
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ABSTRACT 

Loss to follow-up (LTF) is an important issue that can affect the validity of longitudinal studies. Further, LTF among adolescent study participants may be predicted by variables such as substance use, educational attainment, and demographic information. The purpose of this study was to determine if alcohol or marijuana use, high school completion, or demographic information was correlated with LTF among adolescent participants in the Real Talk Study. The Real Talk study is a randomized control trial that employs a brief motivational interview intervention in a clinical setting to reduce perpetration of teen dating violence (TDV) in Boston. Current participants of the Real Talk study who were eligible for follow up comprised the study sample (N=127). Baseline characteristics on age, gender, race/ethnicity, high school completion, alcohol use, and marijuana use were analyzed using Pearson’s Chi Square, and the level of significance set to $p < 0.10$. A post-hoc analysis was conducted on frequency of alcohol use using Pearson’s Chi Square. Of the total sample, 13% were LTF (n=17). The results of the analyses indicated that there was a statistically significant difference between those LTF and those retained for gender and drinking 6 or more drinks of alcohol per occasion. Females were
more likely to be LTF than males (p<0.10), and those participants who responded “never” or “less than monthly” to the question, “how many times do you drink 6 or more drinks per occasion?” were more likely to be retained, or less likely to be LTF (p<0.10) than those who responded differently. While some of the results were consistent with the literature, it is also possible that the follow-up procedure for Real Talk ensured that there were minimal differences in LTF.
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LIST OF ABBREVIATIONS

ED........................................................................................................ Emergency Department
LTF .................................................................................................... Loss to follow-up or lost to follow-up
SES .................................................................................................. Socioeconomic status
TDV ................................................................................................. Teen dating violence
INTRODUCTION

Teen Dating Violence

Prevalence

Teen dating violence (TDV) is a serious and prevalent public health issue that is defined as, “physical, sexual, psychological, or emotional violence within a dating relationship among teens” (Centers for Disease Control, 2015). According to the Youth Risk Behavioral Survey, more than 1 in 10 high school-aged youth reported experiencing physical or sexual violence in 2013 (Kahn et al, 2013). However, there are other studies that estimate the prevalence to be higher. For example, Haynie et al (2013) found that as many as 30% of their sample of nationally representative 10th grade students experienced dating violence. Moreover there are many adverse health outcomes and negative behavior associated with TDV.

Risk factors and co-morbidities

Youth who have experienced TDV are more likely to report depressive symptomology as well as suicidal ideation (Nahapetyan et al, 2014, Exner-Cortens et al, 2013 and Haynie et al, 2013) and are more likely to engage in risky sexual behavior, have multiple sexual partners, and are at an increased risk to develop sexually transmitted infections (Reed et al, 2014, and Eaton et al, 2007). Further, TDV is associated with increased alcohol and marijuana use (Parker and
TDV is also associated with other forms of violence including community violence—disproportionately affecting African American and Latina youth (Stueve and O’Donnell, 2008). TDV is also associated with other forms of victimization and violence including sexual violence and childhood abuse (Hamby et al, 2012). Rothman et al (2010) also found a strong association between peer violence and TDV among boys and girls in Boston.

Further, there have been some studies that indicate other negative long-term effects of TDV. For example, Adams et al (2013) found that women who experienced TDV during adolescence attained less education than their counterparts, and that the low educational attainment then negatively influenced their yearly earnings over the 4-year study period. In addition to the negative societal impact TDV can have on an individual’s long-term well-being, some studies have also illustrated that those who experience TDV during adolescence are more likely to perpetrate violence and be victims of violence during young adulthood (Cui et al, 2013 and Exner-Cortens et al, 2013).

*Reciprocity in TDV*
To complicate the issue of TDV further, there is not always one clear victim and perpetrator, and violence is perpetrated bi-directionally (Foshee et al, 2007, Swahn et al, 2010, and O'Leary et al, 2008). Moreover, O'Leary et al (2008) found that adolescent females were more likely to perpetrate violence (40%) than be victims of violence (30%) whereas adolescent males were more likely to be victims of violence (31%) versus perpetrate violence (24%). Additionally, Swahn et al (2010) concluded that a higher proportion of youth in relationships that engaged in reciprocal violence experienced higher levels of dating violence compared to those youth who engaged in non-reciprocal dating violence. Lastly, Foshee et al (2007) conducted a qualitative study that highlighted some of the complexities and heterogeneity of TDV perpetration, and how the context in which perpetration occurred varies between males and females. It is therefore important to recognize reciprocity in TDV not only because a large proportion of females and males engage in reciprocal TDV, or of the varying contexts for which perpetration occurs, but because those engaged in reciprocal TDV experience higher levels of violence as well.

The prevalence, and sequelae of TDV make it an important issue in public health and therefore, specific and targeted prevention and intervention efforts need to take place to address this issue (Mulford and Giordano, 2008). However, because the typologies of TDV are complex and varied, special attention needs
to be paid not only to developing questionnaires for research, but also in addressing treatment and prevention of TDV (Foshee et al, 2007).

The reciprocal nature of TDV, and the fact that some studies have even shown that females are more likely to perpetrate than males, indicates that some interventions may need to target not just males but also females, to prevent aggression among both sexes (Mulford and Giordano, 2008).

**Brief Interventions as Tools to Change Unhealthy Behavior**

Brief interventions adapted from motivational interviews have been widely used in various healthcare settings to promote many behavior changes relative to drug use, HIV prevention among drug users, and smoking cessation (Markland et al, 2005). By definition, motivational interviewing is a technique that is client-centered and utilizes both self-efficacy and self-determination theories to intrinsically change an individual’s behavior (Markland et al, 2005). More notably in the clinical setting, brief interventions—many of which utilize motivational interviewing techniques, have been shown to successfully decrease alcohol and substance use (Dunn et al, 2001 and Whitlock et al, 2004). Further, brief interventions targeting alcohol use have shown positive effects for decreasing alcohol consumption, injuries or social consequences related to drinking, and ED visits and hospitalizations, and have been recommended for use within
Emergency Department (ED) settings (Schmidt et al, 2016 and D’Onofrio and Degutis, 2002).

When looking at adolescent populations, brief interventions in the ED setting have also been shown to be effective in achieving behavior change or in attempting to change behavior (Spirito et al, 2004, Bernstein et al, 2010, and Walton et al, 2010). Spirito et al’s study showed that for those who had already been engaging in problematic alcohol use, there was a 50% decrease in days of frequent alcohol use per month, at the 12-month follow-up, among adolescents receiving the brief intervention versus control (2004). Cunningham et al (2013), analyzed data from an ED brief intervention that looked at TDV and used both therapists and computers to conduct the intervention itself, and showed that the computer-based brief intervention was more effective at reducing moderate dating victimization after 3 and 6 months, and that the therapist-computer combined brief intervention was more effective at reducing higher levels of dating victimization after 6 and 12 months. Similarly, Walton et al (2010) analyzed results from the same ED intervention, and demonstrated a 26% reduction in self-reported peer aggression and a 25% reduction in violence-related consequences. Thus, the implications for using brief interventions in a clinical setting to reduce or prevent violence, including TDV, are significant (Neville et al, 2014).
The current study, Real Talk, is a randomized control trial testing whether a brief intervention in the clinical setting can decrease dating violence perpetration among Boston teens ages 15-19 years old (see Rothman and Na, in press).

**Loss to Follow-up in Longitudinal Studies Involving Adolescents**

Loss to follow-up (LTF) is an important factor that can have significant consequences and threaten the validity of observational and experimental studies (Grembowski, 2001). Importantly, LTF is an issue that affects certain subpopulations differently. For example, a study by Psaty et al (1994) examined the way race and ethnicity impacted LTF over 2 years, and found that African Americans were more likely to be LTF than their White counterparts. However, they also observed that within each racial or ethnic group, there were different predictors such as smoking and educational attainment that also influenced LTF (1994). Other studies have found that low educational attainment and lower socioeconomic status (SES) among adult study participants can negatively affect follow-up rates as well (Powers et al, 2015, de Graaf et al, 2013, and Blumenthal et al, 1995).

**LTF among Adolescents**

When comparing LTF rates among adolescent participants, lower educational attainment or those less oriented to academic achievement, school truancy, and
lower SES were important predictors of those more likely to be LTF (Cotter et al, 2005, Winefield et al, 1990, Post et al, 2012, and Brook et al, 1983). Further, adolescents who experienced stressful events like moving or residential instability, or those who experienced divorce in their families were also more likely to be LTF (Aneshensel et al, 1989 and Post et al, 2012). Additionally, Aneshensel et al (1989) found in their study among Mexican-American adolescent females that those who were more sexually experienced or who had ever been pregnant were more likely to be LTF. Another study measured LTF among youth in a tobacco study and found that boys were 50% more likely to be LTF than girls (Post et al, 2012).

Although there seem to be many factors that are correlated to adolescents being LTF, one that was found in much of the literature spanning from 1983 through 2012 was the issue of substance use. A number of studies found that adolescents were more likely to be LTF when they were users of alcohol, tobacco, marijuana or other illicit drugs, or at risk for alcohol and tobacco use (Brook et al, 1983, Hansen et al, 1985, Post et al, 2012, and Pappas et al, 1998). While many of the studies that found a correlation between alcohol and drug use and adolescent LTF, they also measured LTF against other variables including SES, residential mobility, or educational attainment, which may have also influenced the results (Brook et al, 1983, Hansen et al, 1985, Post et al, 2012, and Pappas et al, 1998). Even though there may be a variety of factors that
interact together to influence LTF among adolescents, alcohol and substance use appears to be a strong predictor of LTF.

**Real Talk Study**

To address the issue of TDV and reduce the occurrence of dating violence perpetration among adolescents in Boston, Real Talk, a randomized control trial, employs a brief intervention in various clinical settings at Boston Medical Center. Using motivational interviewing techniques, the researcher meets one-on-one with participants and engages them in a dialogue with the objective of helping the participants recognize and change their unhealthy physical dating behaviors. The study is approved by Boston Medical Center’s Institutional Review Board.

**Enrollment Procedure**

Youth ages 15-19 years old seeking care at Boston Medical Center's Pediatric Emergency Department and the Adolescent Clinic within the Department of Pediatrics are approached, and if interested, asked to complete an eligibility survey. If eligible, the participant is then assented if he or she is alone, or consented if he or she is with a parent/guardian and is under 18 years of age. Once consented, the participant is randomized into either the intervention or control group, and completes a baseline survey and contact information form. He or she then completes the brief intervention with the researcher if assigned to
intervention, or is then finished if assigned to control. The participant is then contacted for follow up in the next 6 months.

Follow-up procedure

After the participant completes the baseline questionnaire, the researchers conduct a “locator check” whereby participants are contacted via text, email or a phone call after 3-4 weeks to verify existing contact information. For each “locator check,” the researcher attempts to reach the participant until there is a response. After 3 months, the participant is contacted again to complete the 3-month follow-up survey. The researcher then conducts two additional “locator checks” via text, email, or phone to verify contact information. Lastly, after 6 months, the participant is contacted again and asked to complete the final 6-month follow-up survey. If the respondent fails to respond after 3 attempts during either the 3 or 6-month follow-up, the researcher may mail a post-card reminder to complete the survey, to the participant’s home address. If the respondent does not opt out in response to this reminder, the researcher may then make an in-person home visit to facilitate completion of the follow-up surveys. Financial incentives in the form of gift cards are given to all enrolled participants after completion of the baseline, 3-month, and 6-month follow-up questionnaires, as well as for every time the participant responds to a “locator check.”
Specific Aims/Objectives

Because it is important to retain participants and prevent LTF in longitudinal studies, the goal of this paper is to examine LTF rates among participants in the Real Talk study, which has a follow-up period of 6 months. Further, since much of the prior literature indicates that substance use as well as educational attainment can influence LTF, this paper will specifically examine:

(1) if LTF among Real Talk participants differs by alcohol use frequency
(2) if LTF among Real Talk participants differs by marijuana use frequency
(3) if LTF among Real Talk participants differs by dropping out of high school versus graduating high school and
(4) If LTF among Real Talk participants differs by demographic factors like age, gender, or race/ethnicity

The hypothesis for this study is that among enrolled participants of Real Talk, those that have either dropped out of high school or use alcohol or marijuana with more frequency, are more likely to be lost to follow-up compared with those participants who have graduated from school or that use less alcohol and marijuana, and that there will be no differences between participants lost to follow-up compared to those retained across demographic variables like age, gender, or race/ethnicity.
METHODS

Study Sample

To determine the sample, the number of participants eligible for follow up was calculated by subtracting the total number of enrolled participants minus the withdrawn participants\(^1\), at the time of the analysis. Once removing the withdrawn participants (n=7), the current sample on which an analysis was conducted was N=127 (Figure 1).

Figure 1. Sample Used for Analysis. The total number of enrolled participants at the time of the analysis (January 2016) was N=134. To determine the sample

\(^1\) Withdrawn participants include those who withdrew themselves or whose parents withdrew them from the study, or those withdrawn by the researchers of the study
used for analysis, the number of withdrawn participants was subtracted from the total number of enrolled to yield N=127.

**LTF designation**

To determine who among the sample (N=127) was LTF, a designation was made as to each participant’s follow-up study status. A participant was either designated as “retained,” “withdrawn” or “lost to follow up.” Those designated as “retained” included those that had been enrolled successfully in the study and were eligible for any follow-up, “lost to follow-up” (LTF) if a participant had been enrolled in the study for at least 6 months, and were due for their 6-month follow up but had not completed any follow-up surveys. Those designated as “withdrawn” included those participants who withdrew, those whose participant’s parent had withdrawn him or her from the study, or those that researchers had removed from the study². Any participant who was withdrawn was excluded from the analysis sample (Figure 1).

**Study Variables Used to Conduct Analysis**

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2 Researchers could withdraw participants if they were deemed no longer eligible for the study or were erroneously enrolled, or if they determined that the study was inappropriate or harmful for them after they were enrolled, or if the participant or participant’s parent/guardian notified the research staff of wishing to be withdrawn from the study
Gender, age, and race/ethnicity was determined from the eligibility questionnaires. Variables related to substance use and school attainment were determined from the baseline and follow-up self-reported surveys. The specific survey question responses used for the analysis were presented in Table I.

**School Attainment**

To determine if educational attainment was a factor in LTF, only the responses of those who had either completed high school or had dropped out of high school were considered. The question from the baseline and follow-up questionnaire about school was the following:

*Your current grade in school is:*
- XX grade
- Not applicable, I graduated high school/got GED
- Not applicable, I dropped out of school at grade XX
- Other

Only the last 3 responses (Not applicable, I graduated high school/got GED; Not applicable, I dropped out of school at grade XX; Other) were used in the analysis (Table 1).
**Substance Use**

Frequency of alcohol and marijuana use was reported in the baseline and follow-up surveys in response to 5 questions. To determine the frequency of alcohol and marijuana use among participants for analysis, the responses to those 5 questions were analyzed separately (Table 1).

The questions and respective response categories in parenthesis included the following:

1. How often have you had a drink of alcohol? (never, monthly or less, 2-4 times a month, 2 or 3 times per week, 4 or more times per week)
2. How many drinks containing alcohol do you have on a typical day when you are drinking? (not applicable, 1 or 2, 3 or 4, 5 or 6, 7 to 9, 10 or more)
3. How often do you have six or more drinks on one occasion? (not applicable/never, less than monthly, monthly, weekly, daily or almost daily)
4. How often do you have marijuana, even one hit (blunt, reefer, bowl)? (Never, monthly or less, 2-4 times a month, 2 to 3 times per week, 4 or more times per week)
5. How many times a day do you smoke or use marijuana on days when you are using it? (not applicable, 1 or 2, 3 or 4, 5 or 6, 7 to 9, 10 or more)
Data Analysis

Data analyses were conducted using STATA SE 13. Baseline differences in demographics, high school completion, and alcohol and marijuana use were assessed for those LTF. They were then compared to those retained longitudinally using either the Pearson’s Chi square or t test. A post-hoc analysis assessing differences within each response to question 3 about frequent alcohol use (drinking 6 or more drinks per occasion) for those LTF as compared to those retained longitudinally were also analyzed using Pearson’s Chi Square. The level of statistical significance was set to $p < 0.10$. 
Table 1. Variables used for analysis. The variables used for analysis were derived from 6 questions asked in the baseline and follow-up surveys.

<table>
<thead>
<tr>
<th>School Status:</th>
<th>Alcohol Use:</th>
<th>Marijuana Use:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Your current grade in school is:</td>
<td>1) How often do you have a drink?</td>
<td>1) How often do you use marijuana (blunt, reefer, bowl)?</td>
</tr>
<tr>
<td>-Not applicable</td>
<td>-never</td>
<td>-never</td>
</tr>
<tr>
<td>-Not applicable, I dropped out of school at grade:</td>
<td>-monthly or less</td>
<td>-monthly or less</td>
</tr>
<tr>
<td>-Other:</td>
<td>-2-4 times a month</td>
<td>-2-4 times a month</td>
</tr>
<tr>
<td></td>
<td>-2-3 times per week</td>
<td>-2-3 times per week</td>
</tr>
<tr>
<td></td>
<td>-4 or more times per week</td>
<td>-4 or more times per week</td>
</tr>
<tr>
<td>2) How many drinks containing alcohol do you have on a typical day when you are drinking?</td>
<td>-not applicable</td>
<td>-not applicable/never</td>
</tr>
<tr>
<td></td>
<td>-1 or 2</td>
<td>-1 or 2</td>
</tr>
<tr>
<td></td>
<td>-3 or 4</td>
<td>-3 or 4</td>
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<tr>
<td></td>
<td>-5 or 6</td>
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<tr>
<td></td>
<td>-7 or 9</td>
<td>-7 or 9</td>
</tr>
<tr>
<td></td>
<td>-10 or more</td>
<td>-10 or more</td>
</tr>
<tr>
<td>3) How often do you have 6 or more drinks on one occasion?</td>
<td>-not applicable</td>
<td>-not applicable/never</td>
</tr>
<tr>
<td></td>
<td>-less than monthly</td>
<td>-less than monthly</td>
</tr>
<tr>
<td></td>
<td>-monthly</td>
<td>-monthly</td>
</tr>
<tr>
<td></td>
<td>-weekly</td>
<td>-weekly</td>
</tr>
<tr>
<td>2) How many times a day do you smoke or use marijuana on the days you are using it?</td>
<td>-not applicable</td>
<td>-not applicable/never</td>
</tr>
<tr>
<td></td>
<td>-1 or 2</td>
<td>-1 or 2</td>
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<td></td>
<td>-3 or 4</td>
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<tr>
<td></td>
<td>-7 or 9</td>
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<tr>
<td></td>
<td>-10 or more</td>
<td>-10 or more</td>
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</table>

*The respondent was asked to check or write-in the respective response to each question.
RESULTS

Demographics of Sample

The sample (N=127) had a mean age of 17.8 years; 14% were males (n=18) and 86% females (n=109). The majority of the sample, 61%, self-identified as African-American (n=77), followed by Hispanic/Latino at 16% (n=20). Individuals who identified as multiracial comprised of 12% of the sample (n=15), and 7% of the sample identified as White (n=9). Less than 2% of the sample identified as either American Indian/Alaskan Native or Asian (n=2 for both), and less than 1% identified as Native Hawaiian/Pacific Islander (n=1) (Table 2).

Table 2. Descriptive characteristics of the sample. Of the total sample, N=127, average age, breakdown of number and percentages of gender, and race/ethnicity was determined.

<table>
<thead>
<tr>
<th>Entire sample N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
</tr>
<tr>
<td><strong>Age in years (mean)</strong></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td><strong>Race</strong></td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
</tr>
<tr>
<td>Asian</td>
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<tr>
<td>(continued)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>Black or African American/Afro-Caribbean</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
</tr>
<tr>
<td>White</td>
</tr>
<tr>
<td>Multiracial</td>
</tr>
</tbody>
</table>
Lost to follow-up versus retained

In this sample, 13% were LTF (n=17) and 87% were retained (n=110).

Age, Gender, Race

When comparing LTF and retained groups by gender, there was a statistically significant difference between males and females (Table 3). A greater proportion of females in this study were LTF compared to males (17% versus 0%) and the results were statistically significant (p<0.10). However, when comparing LTF and retained groups by age and by race, there was no significant difference (p<0.10) by group for either variable (Table 3).

School Status

Among those who responded that they had already graduated from high school, 88% (n=29) were retained and 12% (n=4) were LTF (Table 3). For those who had responded that they dropped out of high school, 9% were retained (n=15) versus 1.5% (n=2) LTF. Lastly, for those not in high school who selected the “other” category, 94% were retained (n=15) versus 6% (n=1) LTF. However, across all of these measures, there was no significant difference (p<0.10) between those who had either graduated from high school compared with those who had dropped out, or other\(^3\) (Table 3).

\(^3\) Other is unspecified, but can include responses or circumstances like currently enrolled in college or currently obtaining a GED or in an alternative school program
Alcohol and Marijuana Use

For the questions pertaining to alcohol use and frequency of use, only one question out of the three yielded significant differences between those respondents who were retained versus LTF (Table 3). Among participants who answered the first question of “how often do you drink?” there was no significant difference between those retained versus those LTF (p<0.10) (Table 3). Similarly, there was no significant difference between those retained versus those LTF for any of the measured responses for the second question, “How many drinks containing alcohol do you have on a typical day when you are drinking?” (p<0.10).

However, for the third question pertaining to high frequency alcohol use, “How often do you have 6 or more drinks on one occasion?” there was a significant difference between those participants who were retained versus LTF for those who answered “never” or “less than monthly” (p<0.10) (Table 4).

The post-hoc analysis (N=126) confirmed that of the 72% who responded “never” to the question, “how often do you have 6 or more drinks on one occasion?” there was a statistically significant difference between those retained (90%) compared to those LTF (10%) (p<0.10) (Table 4). Further, of the 16% who responded “less than monthly” to “how often do you have 6 or more drinks on one occasion” there was a statistically significant difference between those
retained (71%) compared to those LTF (29%) (p<0.10) (Table 4). For those participants who responded “monthly” or “weekly,” there were no statistically significant differences between those we were LTF versus those who were retained (Table 4).

Finally, for the questions pertaining to marijuana use and frequency of use, “How often do you use marijuana” and “How many times a day do you smoke or use marijuana on the days you are using it?” there was no statistically significant difference in the responses between those retained versus those LTF (p<0.10) (Table 3).

In summary, of all of the demographic, school status, and alcohol/marijuana variables assessed, there was only a statistically significant difference between those retained versus those LTF for gender, and for the responses pertaining to the question about drinking 6 or more drinks of alcohol on one occasion (p<0.10). Upon further analysis, it was determined that there was a statistically significant difference between those who responded “never” or “less than monthly” to the question, “how often do you drink 6 or more drinks on one occasion,” so that those who never drink 6 or more drinks on one occasion or drink 6 or more drinks on one occasion less than monthly are more likely to be retained (p<0.10).
Table 3. Comparison of retained versus lost to follow-up. Demographic information as well as school status, alcohol, and marijuana use were analyzed. (N=127)

<table>
<thead>
<tr>
<th>Measured variable</th>
<th>Retained n (%)</th>
<th>Lost to follow-up n (%)</th>
<th>$X^2$, p-value or Fisher’s exact*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>110 (87)</td>
<td>17 (13)</td>
<td></td>
</tr>
<tr>
<td>Age (mean)</td>
<td>17.9</td>
<td>17.5</td>
<td>1.24 (t-test), ns</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>3.24, .072</td>
</tr>
<tr>
<td>Male</td>
<td>18 (100)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>92 (84)</td>
<td>17 (16)</td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td>6.70, ns</td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td>1(50)</td>
<td>1(50)</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>1(50)</td>
<td>1(50)</td>
<td></td>
</tr>
<tr>
<td>Black or African American/Afro-Caribbean</td>
<td>69(90)</td>
<td>8(10)</td>
<td></td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>18(90)</td>
<td>2(10)</td>
<td></td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td>1(100)</td>
<td>0(0)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>7(78)</td>
<td>2(22)</td>
<td></td>
</tr>
<tr>
<td>Multiracial</td>
<td>12(80)</td>
<td>3(20)</td>
<td></td>
</tr>
</tbody>
</table>

School Status
Your current grade in school is:
(continued)
Not applicable, I graduated high school/ got GED 29(88) 4(12)
Not applicable, I dropped out of school at grade XX 11(85) 2(15)
Other 15(94) 1(6)

Alcohol
How often do you have a drink? 0.561, ns
   Never 48(87) 7(13)
   Monthly or less 33(85) 6(15)
   2-4 times a month 22(88) 3(12)
   2-3 times per week 5(83) 1(17)
   4 or more time per week 2(100) 0(0)

How many drinks containing alcohol do you have on a typical day when you are drinking? 7.85, ns
   Not applicable 60(90) 7(10)
   1 or 2 29(85) 5(15)
   3 or 4 12(80) 3(20)
   5 or 6 6(86) 1(14)
   7 or 9 2(100) 0(0)
   10 or more 0(0) 1(100)

How often do you have 6 or more drinks on one occasion? 5.66, .084
   Not applicable/ Never 80(90) 9(10)
   Less than monthly 15(71) 6(29)
   Monthly 9(90) 1(10)
(continued)
<table>
<thead>
<tr>
<th>Weekly</th>
<th>3(75)</th>
<th>1(25)</th>
</tr>
</thead>
</table>

Marijuana Use  

*How often do you use marijuana?*  

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Never</th>
<th>Monthly or less</th>
<th>2-4 times a month</th>
<th>2-3 times per week</th>
<th>4 or more times per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.41, ns</td>
<td>42(86)</td>
<td>20(100)</td>
<td>13(81)</td>
<td>12(92)</td>
<td>22(79)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

*How many times a day do you smoke or use marijuana on the days you are using it?*  

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Not applicable</th>
<th>1 or 2</th>
<th>3 or 4</th>
<th>5 or 6</th>
<th>7 or 9</th>
<th>10 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.08, ns</td>
<td>49(88)</td>
<td>29(91)</td>
<td>15(83)</td>
<td>8(80)</td>
<td>2(67)</td>
<td>5(83)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

*ns=not statistically significant*
Table 4. Comparison of retained versus lost to follow-up post-hoc analysis. (N=126)

<table>
<thead>
<tr>
<th>Responses to “How often do you have 6 or more drinks on one occasion?”</th>
<th>Sample, N (%)</th>
<th>Retained n (%)</th>
<th>Lost to follow-up n (%)</th>
<th>$X^2$, P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>91 (72)</td>
<td>82 (90)</td>
<td>9 (10)</td>
<td>3.38, 0.066</td>
</tr>
<tr>
<td>Less than monthly</td>
<td>21 (16)</td>
<td>15 (71)</td>
<td>6 (29)</td>
<td>5.00, 0.025</td>
</tr>
<tr>
<td>Monthly</td>
<td>10 (8)</td>
<td>9 (90)</td>
<td>1 (10)</td>
<td>0.107, ns</td>
</tr>
<tr>
<td>Weekly</td>
<td>4 (3)</td>
<td>3 (75)</td>
<td>1 (25)</td>
<td>0.480, ns</td>
</tr>
</tbody>
</table>

*ns = not statistically significant
DISCUSSION

Demographic Information

Gender

In looking at demographic information only, the only significant and perhaps the most surprising result was that females in the study were more likely to be LTF than males. While these results could be due, in part, to the relatively small number of enrolled male participants compared to females, other longitudinal studies including adults and adolescents have found that males and non-white or Black males specifically, were more likely to drop out or be lost to follow-up than girls (Post et al, 2012 and Allred and Pallos, 2011). Further, other studies published have not found any significant gender differences among youth participants who are lost to follow-up (Siddiqui et al, 1996).

The issue of low recruitment and retention of females (and females of color specifically) has been given some attention in the literature. According to an article by Wallace and Bartlett in 2013, specific strategies in the literature have aimed at improving study retention among Black and Latina women participants. These included cultural appropriateness of the study itself including the demographics of the research staff and using culturally sensitive or relevant intervention materials, to addressing factors like transportation and safety, and
even improving communication and fostering trust between researcher and participant. The rationale behind these strategies focuses on the specific circumstances and attitudes that Black and Latina women in particular may face, which prevents them from being interested in participating in research, and remaining in studies. Some of these factors included a general distrust in the scientific/research or medical community, being the sole guardians or caretakers of children, or needing to take safety into consideration more than other populations of women (Wallace and Bartlett, 2013). Since the needs and attitudes of Black and Latina women may be different than other women who participate in research, it is possible there were other factors that we did not analyze that affected LTF among our female participants, who, given the overall racial and ethnic breakdown of our sample size, were mostly Black and Latina.

**Age**

Although we compared average age among those LTF versus those retained, we found no significant differences between the two. While some studies suggest younger age may be related to LTF, those studies analyzed LTF among adult populations only and not adolescents specifically (Blumenthal et al, 1995, de Graaf et al, 2013). Further, some of the longitudinal studies that have focused on youth and adolescents have not necessarily compared age within their sample or found age to be a significant predictor of LTF (Post et al, 2012, Winefield et al, 1990, Pappas et al, 1998, Aneshensel et al, 1989, and Brook et al, 1983).
Analyzing for specific age categories (15, 16, 17, 18, and 19 year olds) instead of comparing mean age may have also yielded different results.

**Race/ethnicity**

The results of our analysis showed no difference in race when comparing those participants who were retained versus those that were LTF. This is inconsistent with much of the existing literature that has shown that race can be a factor that affects LTF (de Graaf et al, 2013, Siddiqui et al, 1996, Psaty et al, 1994, and Aneshensel et al, 1989).

Some possible explanations for this observation can be attributable to the methodical follow-up procedure for the Real Talk study. Effective methods for retaining research participants in the literature include updating contact information periodically, providing participants with financial incentives, and making multiple attempts to contact subjects for data/survey completion (Robinson et al, 2007). In addition to providing financial incentives, some additional strategies for retaining adolescent participants in research studies also include collecting detailed contact information, sending post-card and telephone reminders for survey completion, and conducting telephone interviews (Boys et al, 2003). The procedural follow-up elements for the Real Talk study includes “locator checks,” financial incentives, multiple attempts for survey reminders, as well as post-card reminders and in-person home visits to complete the surveys.
themselves. These extensive follow-up procedures can therefore potentially mitigate the effects of LTF for our Black/African American participants.

**Alcohol Use**

One factor that was consistent with much of the literature involving LTF was alcohol use among youth and adults. Our results indicated that youth who did not frequently drink 6 or more drinks on one occasion were more likely to be retained. This is similar to the literature in that frequent alcohol use was correlated with a higher proportion of youth who were LTF (Post et al, 2012, Winefield et al, 1990, and Hansen et al, 1985). However, other studies measuring LTF among adolescents also found that those more likely to drop out of a study included those who reported low alcohol use or who were more likely to intend to use alcohol and not just frequent alcohol use (Pappas et al, 1998, Post et al, 2012, Ary et al, 1996, and Brook et al, 1983).

There are some potential reasons that we did not detect any significant difference among the retained participants versus those LTF when taking into account all questions pertaining to alcohol use. One is that the response type could be due to the demographics of our sample population and their relationship to traditional self-reported measures of alcohol use. For example, two qualitative studies on African American and Haitian adolescents and their attitudes towards
alcohol use showed that due to the varying cultural norms around drinking, many Black youth do not identify as being users of alcohol and thus may not report drinking or frequently drinking on surveys that employ quantitative measures on alcohol use (Strunin 2001 and Strunin and Demissie, 2001). For example, many Haitian youth did not articulate that they drank alcohol, but in their interviews, would mention drinking Kremas, a traditional Haitian sweet beverage containing alcohol that is consumed during special occasions or holidays, or with family (Strunin, 2001). Additionally, many African American youth did not refer to consumption of alcohol as “drinking,” rather “sipping” or “tasting.” There were also discrepancies among African American and Haitian youth around conceptualization of time periods and drinking so that some youth explained that they did not drink in the past 6 months, but drank in the past month, or did not drink in the past month, but drank in the past week. (Strunin, 2001). Strunin’s 2001 study also showed that there were higher rates of drinking among African American males compared to Haitian males and that a smaller proportion of African American adolescent females were likely to report ever having had a drink of alcohol compared to their male counterparts.

These findings from qualitative literature have implications for our analysis in that while we found no significant differences between participants who were retained versus LTF for the first two questions about alcohol use, we may have found different results had we stratified the analysis by gender/sex, race, or asked
about alcohol use differently. For example, since Strunin’s 2001 qualitative study found that some Black youth did not consider some of the drinks that they consumed to be alcohol, one way in which we could have asked participants about alcohol use is asking them if they ever drink beverages containing alcohol, and list specific examples, like Kremas. Lastly, there may be a stronger relationship between LTF and alcohol use than our results demonstrated due to the possible underreporting of drinking among Black youth.

**Marijuana Use**

Our results on marijuana use and LTF were inconsistent with some of the prior literature as well, in that we did not observe any significant difference between marijuana use and LTF (Siddiqui et al, 1996, Winefield et al, 1990, and Hansen et al, 1985). However, in numerous instances in the literature, LTF has been attributed in part to substance use in general, or use of “illicit” drugs, smoking tobacco, or co-occurrence of drug use and not just marijuana specifically (Post et al, 2012, Pappas et al, 1998, Winefield et al, 1990, and Brook et al, 1983).

While we may attribute the lack of statistical significance for marijuana use and LTF in our study to the extensive follow-up procedure of the Real Talk study, it may be possible that analyzing concurrent use of marijuana and other substances may have yielded different results. Some of the literature suggests
that there is a growing number of Black youth—males in particular—who are using more marijuana and alcohol concurrently. This usage can then have distinct sequelae (Green et al, 2016, Lanza et al, 2015, and Pacek et al, 2012). Since we only analyzed differences between those retained versus those LTF for marijuana use, we may have found different results if we had looked at the interaction between marijuana and alcohol use, or if the survey questions asked about concurrent drug use specifically. Therefore, the need for specific language around concurrent alcohol and marijuana use is something that could be changed for subsequent studies.

**High school completion**

While our results did not indicate any significant difference in LTF for those who did not complete high school, we did not look at the attitudes surrounding education or educational attainment. On the questionnaires, there is a section that asks about school attitudes, however since this section contains 12 questions with categorical responses (strongly disagree, disagree, agree, and strongly agree), we did not include this in our analysis, but it is something that should be analyzed in future studies. For much of the literature, LTF is affected by many variables relating to educational attainment like academic achievement, being achievement oriented, perceived performance at school, and truancy (Winefield et al, 1990, Brook et al, 1983, and Post et al, 2012). Thus, our
measure of high school completion may not have given a complete picture of educational attainment and its effects on LTF. Further, some studies have shown that there is a close relationship between educational attainment and substance use. Therefore a better prediction of substance use may be made by measuring variables like truancy or academic achievement (Strong et al, 2016 and Maynard et al, 2012). In other words, since both substance use and educational attainment appear to be mediating variables, it may be necessary to look at both together to determine meaningful results.

**Limitations**

Some limitations of this study include a limited sample size, which could mask meaningful relationships due to a lack of statistical power. Another limitation of this study is that there may have been other confounders that we did not look at or analyze, that may have also contributed to LTF among our sample. Lastly, since all of the variables we measured were obtained from self-reported data, it may have limited our findings pertaining to alcohol and marijuana use, due to data misclassification.
**Future directions**

Some possible future directions for further research include doing a more detailed analyses to examine differences between responses pertaining to the variables of interest (alcohol and marijuana use), or by stratifying data by gender or race. Stratifying data by race may help account for some of the important differences around alcohol attitudes and use as well as concurrent use of alcohol and marijuana among Black youth specifically. Further research is also needed to determine if there are other factors that contribute to the higher LTF rates among Black and Latina female participants. For example, asking future participants about their initial attitudes about research or other questions related to their parent/guardian status could address the negative perceptions that Black and Latina female participants may have about research and possibly improve study retention of these populations. Lastly, it may be important for future LTF studies among adolescents to measure educational attainment more precisely. For this, a future study will need to ask questions about substance use in a way that accounts for the increasing concurrent use of certain drugs and cultural differences and norms of alcohol/substance use among different youth populations.
Concluding remarks

While the results of this study align with much of the literature in the past 15 years regarding frequent alcohol use and LTF, it also demonstrated changes since the 1980s. Most of the results demonstrated few significant differences among participants who were retained versus those who were LTF. While these results may indicate that the Real Talk study’s randomization and extensive follow-up procedure is effective at minimizing potential biases and threats to validity, there needs to be further analysis and research to examine potential confounders to ensure the data’s reliability.
REFERENCES


CURRICULUM VITAE

GABRIELA VELASQUEZ

Address: 108 Jersey St. Apt 15
Boston, MA 02215

Year of Birth: 1987

Education: Boston University
Master in Medical Sciences and Public Health, dual degree candidate, 2016
Bachelor of Science in Human Physiology and Minor in French (2010)

Relevant Work and Research Experience:

Research Assistant for Real Talk-Boston University School of Public Health, Community Health Sciences Dept. (2015-2016)

Duties:
▪ Screen and enroll adolescent patients at the Adolescent Outpatient Clinic and Pediatric Emergency Department at Boston Medical Center for “Real Talk” which is a randomized control trial that uses a brief motivational interview style intervention for teen dating violence perpetration in Boston
▪ Conduct the brief intervention on randomized participants
▪ Assist with data analysis and data entry

Student Success Jobs Program Coordinator-Brigham and Women’s Hospital, Center for Community Health and Health Equity (2010-2014)

Duties:
▪ Helped run an after-school internship program for 85 urban Boston high school youth
▪ interacted with over 60 Brigham and Women’s Hospital departments and their respective supervisors and staff who served as mentors for the students to ensure a positive internship experience for all participants
▪ Addressed any challenges that arose among students and mentors and helped streamline resources for student participants by communicating with community partners including school administrators, Boston Private Industry Council career specialists, partnering youth-serving agencies throughout Boston, and parents and families of student participants.

▪ Coordinated and assisted with all components of the program, including hiring, monthly seminars, college scholarships, tutoring, event planning, and evaluation.

**Youth Programs Intern**-Brigham and Women’s Hospital, Center for Community Health and Health Equity (2009)

**Duties:**
▪ helped with programmatic elements of an internship program for urban Boston high school youth, the Student Success Jobs Program
▪ provided program support for over 4 different youth programs including tasks like mentoring, creating and planning health and life-skills seminars, database entry, administrative assistance, and program evaluation.

**Medical Spanish Interpreter**-Beth Israel Deaconess Medical Center (2007-2010)

**Duties:**
▪ Interpreted appointments between Spanish-speaking patients and health care providers and clinicians in over 7 different clinics throughout the hospital.
▪ Made daily appointment confirmation calls to Spanish patients in a hospital that has about 25,000 interactions with Spanish patients per year.

**Health Educator Volunteer**-Peer Health Exchange, Boston University Chapter (2008-2010)

**Duties:**
▪ Taught high school freshman in over 10 different Boston Public Schools one-hour workshops.
▪ Trained to teach Nutrition and Physical Activity and Abusive Relationships workshops.
**Health Career Connection Summer Intern**-Brigham and Women’s Hospital, Center for Community Health and Health Equity (2009)

**Duties:**
- Worked in 4 departments within the Center including a domestic violence intervention program, youth programs, women’s health programs, and health equity programs
- Helped compile information around youth services and violence prevention programs in Boston for the purpose of a needs assessment conducted by the hospital for its new city-wide initiative on infant mortality, the Birth Equity Initiative
- Developed and presented 5 educational seminars to Boston high school youth participants of a summer internship program, Project TEACH
- In charge of organizing a presentation and tour of the department to all fellow Boston summer interns in the program

**First-Year Student Outreach Project Coordinator**-Boston University’s Community Service Center (2008)

**Duties:**
- In charge of 1 of the 9 components of a 600-person volunteer program that runs at the end of every summer for incoming students
- Also in charge of training up to 150 volunteer undergraduate staff members on leadership building and one of the nine issue areas, disabilities
- Prepared and presented a day of education for over 75 incoming BU freshman about disabilities and working with people with disabilities

**Undergraduate Lab Assistant**-Boston University, Introductory Biology Course, Bio 107 (2009)

**Duties:**
- Assisted the lab teaching assistant with lab modules’ set-up and student activities
- Presented one lab module on chemical communication to one class comprised of undergraduate students in Biology 107

**Other:** Fluent in Spanish; Certified Youth Worker through Health Resources in Action’s BEST Initiative Youth Worker Certificate
Project (2011); Trained in Basic Psychological First Aid and Post Traumatic Stress Management through the International Center for Disaster Resilience (2012); participated in Public Health Week through Boston University’s School of Public Health for two years (2008 and 2009); volunteered in 4 different programs during college through the Community Service Center at Boston University (2006-2009)