Research Methods in Psychology (PSYC 235)

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Sex-Based Effects of Positive vs. Negative Message Framing on Intended Alcohol Use

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Widespread alcohol use in the United States has been a public health focus for centuries. In 2015, 86.4 percent of American adults reported that they drank alcohol at some point in their lifetime, 70.1 percent reported that they drank in the past year and 56 percent reported that they drank in the past month (Center for Behavioral Health Statistics and Quality, 2015). Though alcohol in moderation can have little to no detrimental effect on one's life, excessive drinking can be extremely harmful. Over 88,000 people die from alcohol-related causes per year, making alcohol a leading preventable cause of death (Centers for Disease Control and Prevention, 2013).

How can the United States fight against this ongoing epidemic of alcohol misuse? One possibility is through advertising and teaching users about the effects of alcohol on the body. In exploring the best teaching methods to encourage healthy behaviors, researchers have approached different types of message framing (Cho & Boster, 2008; Lee & Aaker, 2004). Gain-framed messaging emphasizes the positive effects of engaging in healthy behaviors, while loss-framed messaging highlights the negative effects of unhealthy behaviors. In a recent meta-analysis, Gallagher and Updegraff (2012) found that gain-framed messages were more likely than loss-framed messages to encourage people to engage in healthy prevention behaviors, such as skin cancer prevention, smoking cessation and physical activity. Since avoidance of excessive

drinking is also a health-related behavior, gain-framed teaching might be more effective in lowering intention to drink than would loss-framed teaching. A study by Gerend and Cullen (2008) did in fact show that among college students, gain-framed messaging led to lower alcohol use than did loss-framed messaging.

However, the effect of message framing on behavioral intentions may be different for certain populations and for different types of behaviors. In two experiments on skin cancer detection and prevention behaviors, Rothman, Salovey, Antone, Keough, and Martin (1993) found that women reacted differently than did men to message framing type when encouraged to engage in skin cancer-related behaviors. For detection behaviors, such as skin examination, negative framing was more effective than positive framing for women; for prevention behaviors, such as sunscreen use, positive framing was more effective than negative framing for women, and women were much more likely than men to engage in such behaviors overall. Meanwhile, men showed no difference between the two message framing types for detection as well as prevention behaviors. These results show that not only is there a difference between message framing effects on men and women, but that each message framing type can be more or less effective for different types of behaviors.

Men and women may show differences in the way they react to messages about alcohol misuse as well as to messages about skin cancer. In the Rothman et al. (1993) study, women reported being more concerned about developing skin cancer and perceived skin cancer risk as higher. This may have been due to their higher involvement and interest in the issue, causing them to process the provided information in a detailed, rather than superficial, manner, and to pay greater attention to framing type (Rothman et al., 1993). With this logic, gender would also influence reactions to message type for alcohol misuse, given that men and women are again

differently involved in this issue. Research shows that consequences of heavy alcohol use may be more negative for women than for men, especially in physical health-related domains. Women suffer alcohol-related physical illnesses at lower levels of exposure than men, and can also experience reproductive health problems due to excessive alcohol use. Also, some studies suggest that women show more cognitive and motor impairment with alcohol use than do men, and are more likely to be physically or sexually assaulted when using alcohol (Nolen-Hoeksema, 2004). Women aware of these risks may be fearful of the effects of excessive alcohol use. Therefore, one could say that women show higher involvement in the issue of alcohol misuse, and thus would be more differentially affected by messaging type than would be men.

Given these results, the present study aimed to explore the differential effects of message framing and sex on intended alcohol use. Participants were shown a short essay about alcohol's effects on the body, either describing the benefits of abstaining from excessive alcohol use (positive framing) or the negatives of alcohol overuse (negative framing). Due to the results of the Rothman et al. (1993) study, I predicted that female participants would show a greater decrease in intention to use alcohol than male participants after being shown either essay. Because Gallagher and Updegraff's (2012) study found that positive framing is more successful than negative framing in influencing prevention behaviors, I predicted that a positive rather than negative message would be more effective in lowering intention to drink. Additionally, it was anticipated that when separated by sex, positive teaching would be more effective than negative teaching for female participants, but it would show no difference among male participants.

Method

Participants

Seventy-eight participants were recruited through Amazon's Mechanical Turk in exchange for small payments. After two participants were excluded due to failure to pass an attention check, 76 participants were used for the study. Of all participants, 37% were biologically female (n = 28) and 63% were biologically male (n = 48). There were 23 participants ages 18 to 27, 31 ages 28 to 37, 12 ages 38 to 47, 7 ages 48 to 57 and 3 age 58 or over.

Participants were assigned to one of two conditions. In the positive framing condition (n = 36), participants were shown an essay about the benefits of abstaining from excessive drinking. In the negative framing condition (n = 40), participants were shown an essay about the detrimental effects of excessive drinking.

Materials, Design and Procedure

This study used a 2 (Sex: male vs. female participants) X 2 (Teaching condition: positive vs. negative framing) between-subjects factorial design. It was distributed through Qualtrics, a form of research software designed for online data collection. The program randomly assigned participants to one of the two teaching conditions.

Upon receiving the survey, participants gave informed consent and answered demographic questions on biological sex and age. Then, they were asked to report their drinking habits through the Alcohol Use Disorders Identification Test Consumption (AUDIT-C), a 3-item modified version of the longer AUDIT screen for alcohol misuse (see Appendix A). (Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998). Next, all participants were told they would be shown a composition about some of the short- and long-term effects of drinking alcohol, after which they would have to answer questions about what they read (see Appendix B for essays).

Then, participants in the positive framing condition were shown an essay about the favorable effects of abstaining from excessive drinking. Participants in the negative framing condition were shown an essay with the same facts, but expressed in terms of the harmful effects of excessive drinking (e.g., "Too much alcohol can lead to obesity and high blood sugar, which can result in the development of diabetes" versus "Avoiding alcohol can also help maintain weight and keep blood sugar low, which protects against development of diabetes"). These essays were developed with information from the Centers for Disease Control and Prevention (CDC), Center for Behavioral Health Statistics and Quality (CBHSQ) and the National Institute on Alcohol Abuse and Alcoholism (NIAAA). The essays included statistics about alcohol use in the United States, short-term effects of use, long-term effects of use and effects on overall life quality. After reading the essay, all participants were shown an attention check. They were asked to select five sentences they recognized from a list of ten, the false ones being neutral facts about alcohol and its history. Two participants only selected one sentence from the list, showing they had either not completely read the essay or had misread the directions. Thus, they were excluded from the data set.

After reading the essay, participants filled out the AUDIT-C for their anticipated drinking behavior over the next few months (e.g., "How often do you expect to have a drink containing alcohol *in the next few months*?"). They were debriefed on the hypotheses and methods of the experiment and paid for participation.

Results

Before data analysis, participants' pre-teaching AUDIT-C scores were subtracted from their post-teaching AUDIT-C scores to create a single measure of change in AUDIT-C score (i.e., change in drinking intention). Also, pre-teaching AUDIT-C scores were converted into

corresponding drinking levels according to Bradley et al.'s (2007) study on the AUDIT-C: high-level drinkers were those who began with an AUDIT-C score of ≥3 (female) or ≥4 (male), while the rest of the participants were considered low-level drinkers. Finally, 11 participants whose original AUDIT-C scores were "0" (i.e., who were non-drinkers) were excluded from the analyses because there was no possibility that their future AUDIT-C scores could be any lower.

Results of a two-way ANOVA of the effects of sex and framing type on AUDIT-C difference scores showed that there was no significant main effect for sex, such that female participants (M = 0.70, SD = 1.02) did not differ from male participants (M = 0.48, SD = 1.11) in change in AUDIT-C scores, $F(1, 61) = 0.35$, $p = .558$. The main effect for framing type trended towards significance, as participants in the positive framing condition (M = 0.70, SD = 1.24) showed greater change in AUDIT-C scores than did participants in the negative framing condition (M = 0.41, SD = 0.88), $F(1, 61) = 2.22$, $p = .141$. This main effect was qualified by a marginally significant interaction effect, $F(1, 61) = 2.80$, $p = .100$.

Independent-samples t-tests showed that the interaction effect was obtained because male participants in the positive framing condition (M = 0.45, SD = 1.23) showed no significant difference in change in AUDIT-C scores from male participants in the negative framing condition (M = 0.50, SD = 1.01; $t(40) = 0.14$, $p = .886$), while female participants in the positive framing condition (M = 1.08, SD = 1.19) showed significantly greater change in AUDIT-C scores than female participants in the negative framing condition (M = 0.20, SD = 0.42; $t(21) = 2.22$, $p = .038$), as shown in Figure 1.

Exploratory analyses were carried out to consider the effects of teaching on high-level drinkers, as these participants represent the most important target population for alcohol use education. A paired-samples t-test, shown in Figure 2, revealed that high-level drinkers had

significantly lower AUDIT-C scores after reading the essays (M = 4.64, SD = 1.80) than they had before reading the essays (M = 5.30, SD = 1.59), $t(46) = 3.76$, $p < .001$. There was, however, no significant difference between the changes in AUDIT-C scores of high-level drinkers in the positive framing condition (M = 0.77, SD = 1.34) and those in the negative framing condition (M = 0.52, SD = 1.03), $t(45) = 0.69$, $p = .493$, as shown in Figure 3.

Population characteristics

Further analyses were conducted to ensure that population differences between conditions were not responsible for the differences found between framing types. As shown in Figure 4, an independent-samples t-test showed that the original AUDIT-C scores for female participants who were randomly assigned to the positive framing condition (M = 4.38, SD = 1.85) were significantly higher than those of the female participants in the negative framing condition (M = 2.70, SD = 1.57), $t(21) = 2.31$, $p = .031$. No such difference was found between the original AUDIT-C scores of the male participants in the positive condition (M = 4.85, SD = 2.23) and those in the negative condition (M = 4.55, SD = 2.09), $t(40) = 0.46$, $p = .650$. Because the female participants differed in drinking level across condition while the male participants did not, an independent-samples t-test was conducted to evaluate the effect of drinking level on change in AUDIT-C score for female participants only. The effect of drinking level trended towards significance, such that female participants who were low-level drinkers (M = 0.25, SD = 0.46) showed a smaller change in AUDIT-C score than did those who were high-level drinkers (M = 0.93, SD = 1.16), $t(21) = 1.58$, $p = .129$.

Discussion

The hypothesis that female participants would show a greater decrease in intention to use alcohol than men was unsupported; that is, participants of both sexes showed a similar decrease

in intention to use alcohol after teaching. However, positive framing was more effective than negative teaching for female participants, but showed no difference among male participants, supporting the hypothesis of the interaction. These findings suggest that though teaching in general has the same effect on different sexes, different framing types have unique effects depending on the person's sex.

In light of previous research, the finding that female participants were not more affected by teaching in general than were male participants was unexpected, but could be explained easily. In their study, Rothman et al. (1993) found that women were overall more likely to engage in prevention behaviors than men after teaching. However, these behaviors were related to the prevention of skin cancer, which may be related to women's health focus more than alcohol misuse. Protection from the sun can also combat aging, and women often view aging more negatively than do men due to its impact on appearance (Halliwell & Dittmar, 2003). The lack in overall gender difference for teaching effectiveness for alcohol misuse may have had to do with the specific health effects of alcohol, which were not related to appearance or aging. In the future, it will be important for researchers to establish whether particular health-related effects are more important to a certain gender and for what reason.

Though the main effect of framing type trended towards significance, it was qualified by the interaction effect. In other words, the framing type had no effect on male participants, even though positive framing was more effective than negative framing for female participants. Yet Gallagher and Updegraff's (2012) meta-analysis showed that gain-framed messages were overall more likely than loss-framed messages to encourage engagement in prevention behaviors, which is incongruent with the current study. As the meta-analysis did not consider gender or sex as a potential mediator for such health-related behaviors, it did not test for an interaction effect

involving sex. Thus, the main effect of teaching found by the meta-analysis could be qualified by an interaction effect that simply was not examined.

The marginally significant interaction between sex and framing type found in the current study could have been due to female participants' high issue involvement, as it was by Rothman et al. (1993). However, since there was no significant difference in change in intention to drink between female and male participants overall, this is unlikely the case. Rather, this may have been due to difference in issue involvement among different drinking levels. As shown by the data, the original AUDIT-C scores of the female participants who were assigned to the positive framing condition higher than the scores of those who were assigned to the negative framing condition. Also, the main effect of drinking level on change in AUDIT-C score trended towards significance, suggesting that drinking level may have some role in change in AUDIT-C score. Since the difference in drinking level between framing conditions was not found in the male participants, drinking level was a confounding variable in the study and could have accounted for the difference in efficacy of framing type. Another run of the study, with more participants, would be necessary to eliminate this confound or to discover if a combination of sex and drinking level was responsible for the interaction of sex and framing condition.

Another limitation of the current study is that it measured intention to drink, not actual future drinking behavior. A recent meta-analysis on behavioral intention showed that a medium-to-large change in intention only leads to a small-to-medium change in actual behavior (Webb & Sheeran, 2006). Thus, the current study does not reveal if teaching is effective at all on actual behavioral change, let alone if behaviors are different depending on framing type. A longitudinal study could follow participants over time to examine if teaching was effective in changing people's drinking behavior, not simply their intention to drink. Additionally, such a study could

include multiple teaching sessions in order to establish a clear difference between teaching types over time. This study would be more relevant to public health and the prevention of alcohol misuse, as it is actual drinking behavior, not intention to drink, which causes detrimental health effects.

References

Bradley, K. A., DeBenedetti, A. F., Volk, R. J., Williams, E. C., Frank, D., & Kivlahan, D. R. (2007). AUDIT-C as a brief screen for alcohol misuse in primary care. *Alcohol Clin Exp Res*, *31*(7), 1208-1217.

Bush, K., Kivlahan, D. R., McDonell, M. B., Fihn, S. D., & Bradley, K. A. (1998). The AUDIT alcohol consumption questions (AUDIT-C): An effective brief screening test for problem drinking. *Archives of Internal Medicine, 158*(16), 1789-1795.

Center for Behavioral Health Statistics and Quality. (2015). *2015 National Survey on Drug Use and Health: Detailed Tables*. Retrieved from Substance Abuse and Mental Health Services Administration: http://www.samhsa.gov

Centers for Disease Control and Prevention. (2013). *Alcohol-Related Disease Impact (ARDI)*. Retrieved from http://www.cdc.gov/ARDI

Cho, H., & Boster, F. J. (2008). Effects of gain versus loss frame antidrug ads on adolescents. *Journal of Communication, 58*(3), 428-446.

Gallagher, K. M., & Updegraff, J. A. (2012). Health message framing effects on attitudes, intentions, and behavior: A meta-analytic review. *Annals of Behavioral Medicine*, *43*(1), 101-116.

Gerend, M. A., & Cullen, M. (2008). Effects of message framing and temporal context on college student drinking behavior. *Journal of Experimental Social Psychology, 44*(4), 1167-1173.

Halliwell, E., & Dittmar, H. (2003). A Qualitative Investigation of Women's and Men's Body Image Concerns and Their Attitudes Toward Aging. *Sex Roles, 49*(11), 675-684.

Lee, A. Y., & Aaker, J. L. (2004). Bringing the frame into focus: The influence of regulatory fit on processing fluency and persuasion. *Journal of Personality and Social Psychology, 86*(2), 205-218.

Nolen-Hoeksema, S. (2004). Gender differences in risk factors and consequences for alcohol use and problems. *Clinical Psychology Review, 24*(8), 981-1010.

Rothman, A. J., Salovey, P., Antone, C., Keough, K., & Martin, C. D. (1993). The influence of message framing on intentions to perform health behaviors. *Journal of Experimental Social Psychology, 29*(5), 408-433.

Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin, 132*(2), 249-268.

Figures

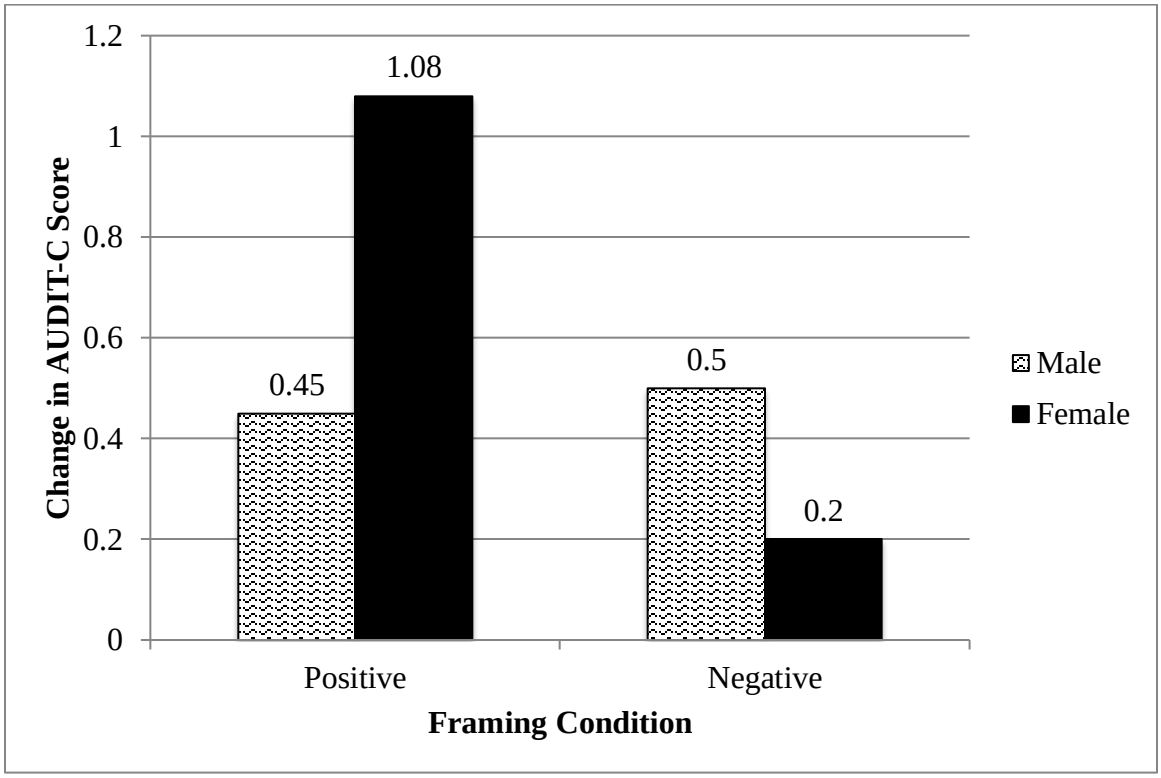

Figure 1. Change in AUDIT-C score as a function of framing condition and sex.

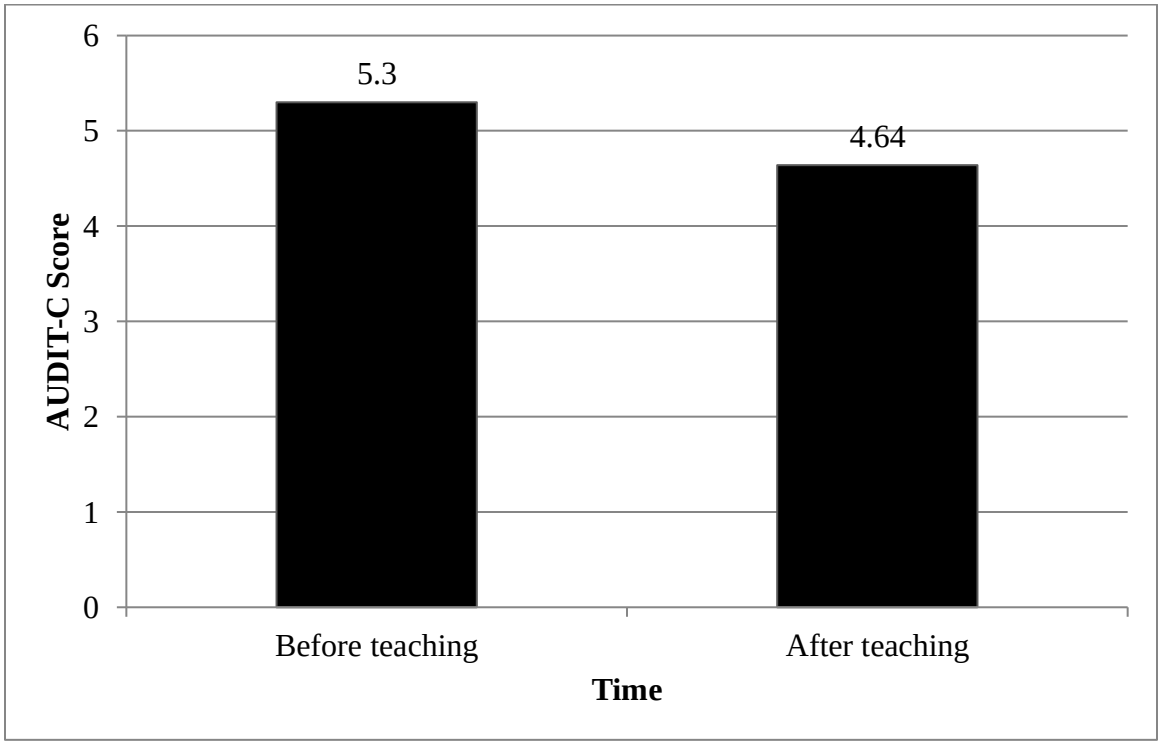

Figure 2. AUDIT-C scores before and after teaching for high-level drinkers.

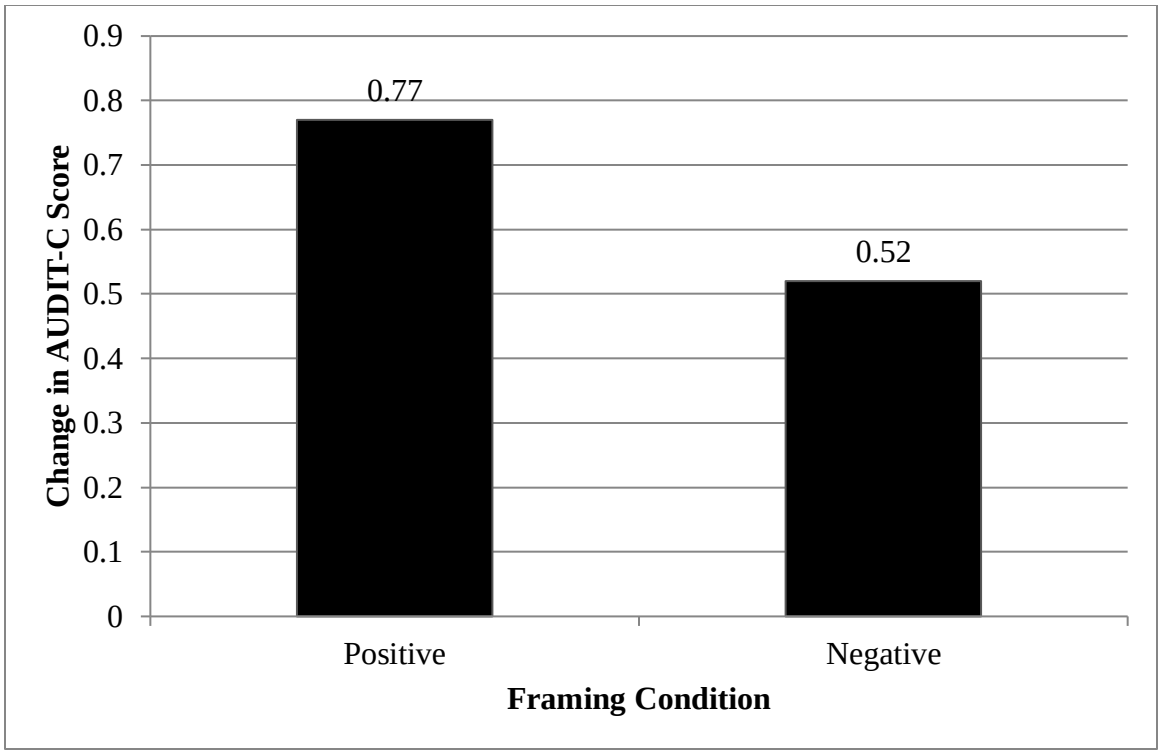

Figure 3. Change in AUDIT-C score as a function of framing condition for high-level drinkers (not significant).

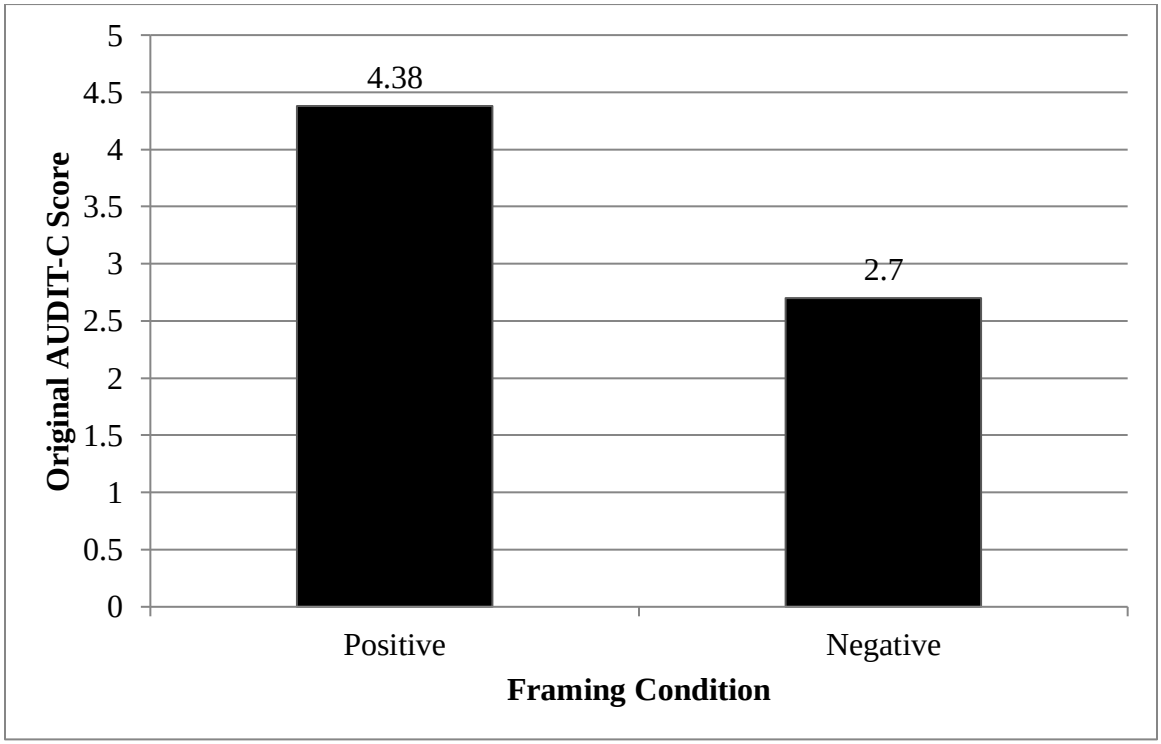

Figure 4. Original AUDIT-C scores for female participants by condition.

Appendix A

AUDIT-C (Alcohol Use Disorders Identification Test Consumption)

1. How often do you have a drink containing alcohol?

    Response choices: Never (0 points), Monthly or less (1 points), Two to four times a month (2 points), Two to three times a week (3 points), Four or more times a week (4 points)

2. How many drinks containing alcohol do you have on a typical day when you are drinking?

    Response choices: 1 or 2 (0 points), 3 or 4 (1 points), 5 or 6 (2 points), 7 to 9 (3 points), 10 or more (4 points)

3. How often do you have six or more drinks on one occasion?

    Response choices: Never (0 points), Less than monthly (1 points), Monthly (2 points), Weekly (3 points), Daily or almost daily (4 points)

Appendix B

Condition: Positive framing

Alcoholic beverages have been popular among humans since their existence in ancient Egyptian societies. Today, alcohol is still widely used. According to the 2015 National Survey on Drug Use and Health (NSDUH), 86.4 percent of people ages 18 or older reported that they drank alcohol at some point in their lifetime; 70.1 percent reported that they drank in the past year; and 56.0 percent reported that they drank in the past month.

Using alcohol in little to moderate amounts, or not at all, can have a variety of benefits. In the short-term, avoiding excessive alcohol use can prevent injuries, such as motor vehicle crashes, falls, drownings and burns. It can also prevent violence, such as intimate partner

violence and homicide, and risky sexual behaviors, such as unprotected sex. Moreover, avoiding binge drinking can prevent alcohol poisoning, as well as hangover and vomiting.

In the long-term, staying away from excessive alcohol use can be beneficial to one's health. A diet low in alcohol can reduce risk for high blood pressure, heart disease, stroke and digestive problems; cancer of the breast, mouth, throat, esophagus, liver and colon; learning and memory problems such as dementia; and alcohol dependence. Avoiding alcohol can also help maintain weight and keep blood sugar low, which protects against development of diabetes. It can also lead to better mental health, social interactions and productivity. Additionally, less alcohol means reduced cholesterol and liver fat, better sleep quality and improved ability to concentrate.

Clearly, steering clear of excessive alcohol use can protect against severe mental and physical health problems in the short-term as well as long-term. The benefits of little or moderate alcohol use, as opposed to binge drinking, can mean a better quality of life for the user as well as surrounding friends and family.

Condition: Negative framing

Alcoholic beverages have been popular among humans since their existence in ancient Egyptian societies. Today, alcohol is still widely used. According to the 2015 National Survey on Drug Use and Health (NSDUH), 86.4 percent of people ages 18 or older reported that they drank alcohol at some point in their lifetime; 70.1 percent reported that they drank in the past year; and 56.0 percent reported that they drank in the past month.

Excessive alcohol use can have a variety of costs. In the short-term, excessive drinking can cause injuries, such as motor vehicle crashes, falls, drownings and burns. It can also lead to violence, such as intimate partner violence and homicide, and risky sexual behaviors, such as

unprotected sex. Moreover, binge drinking can result in alcohol poisoning, as well as hangover and vomiting.

In the long-term, excessive alcohol use can be detrimental to one's health. A diet high in alcohol can increase risk for high blood pressure, heart disease, stroke and digestive problems; cancer of the breast, mouth, throat, esophagus, liver and colon; learning and memory problems such as dementia; and alcohol dependence. Too much alcohol can lead to obesity and high blood sugar, which can result in the development of diabetes. It can also worsen mental health, social interactions and productivity. Additionally, more alcohol means increased cholesterol and liver fat, poorer sleep quality and worsened ability to concentrate.

Clearly, excessive alcohol use can lead to severe mental and physical health problems in the short-term as well as long-term. The costs of excessive or binge drinking, as opposed to little or moderate alcohol use, can lead to a poorer quality of life for the user as well as surrounding friends and family.