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UNIVERSITY OF CALIFORNIA, SAN DIEGO

SAN DIEGO STATE UNIVERSITY

The Effects of Treatment Satisfaction and Therapeutic Dosage on
Adolescent Drinking Outcomes

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy

in

Clinical Psychology

by

Marya T. Schulte

Committee in Charge:

　　University of California, San Diego

　　　　Professor Sandra A. Brown, Chair
　　　　Professor Tamara Wall
　　　　Professor Mark Myers

　　San Diego State University

　　　　Professor Scott Roesch
　　　　Professor V. Robin Weersing

2009

The Dissertation of Marya T. Schulte is approved, and it is acceptable in quality and form

for publication on microfilm and electronically:

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Chair

University of California, San Diego

San Diego State University

2009

DEDICATION

I would like to dedicate this manuscript to my two favorite people: Ted and Molly. You

have taught me more in these past five years than any graduate program ever could. I

thank you for all the joy, laughter, and beautiful craziness that you both create; it has kept

me grounded and means more than you will ever know.

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ACKNOWLEDGEMENTS

I would like to acknowledge my dissertation committee and express my extreme gratitude for all of their support and guidance throughout this process. I would also like to give a special thanks to the various Brown lab members with whom I have worked over the past 4 years; I have learned many valuable lessons.

<p style="text-align: center;">CURRICULUM VITAE</p>

UNIVERSITY EDUCATION

2009 **Doctor of Philosophy**, Clinical Psychology
San Diego State University/University of California, San Diego
Joint Doctoral Program in Clinical Psychology
Experimental Psychopathology Track
Dissertation: The Effects of Treatment Satisfaction and Therapeutic Dosage on Adolescent Drinking Outcomes
Committee Chair: Sandra A. Brown, Ph.D.

2007 **Master of Science**, Clinical Psychology
San Diego State University/University of California, San Diego
Joint Doctoral Program in Clinical Psychology
Experimental Psychopathology Track
Master Thesis: Influencing Adolescent Social Perceptions of Alcohol Use to Facilitate Change through a School-Based Intervention
Committee Chair: Sandra A. Brown, Ph.D.

1999 **Bachelor of Science**, Psychology
University of California, San Diego
Minor: English Literature
Honor's Thesis: The Effects of Homogeneity on Mental Fatigue
Thesis Advisor: Nicholas Christianfeld, Ph.D.

AWARDS/POSITIONS

2009 Chief Intern, VA Long Beach Healthcare System
2007 San Diego State University Student Travel Award
2007 Research Society on Alcoholism Student Merit Award
2006, 2007, 2008 University of California, San Diego Student Travel Award
1995-1999 Provost's Honors, University of California, San Diego
1999 Highest Distinction in Psychology, University of California, San Diego
1999 Magna Cum Laude, University of California, San Diego

ASSOCIATIONS/MEMBERSHIPS

American Psychological Association, Division 50
Association of Behavioral and Cognitive Therapies
Research Society on Alcoholism

RESEARCH EXPERIENCE

Research Assistant
University of California, San Diego, Department of Psychology
La Jolla, CA
2004 – 2008
Principal Investigator:
    Sandra A. Brown, Ph.D., Professor, University of California, San Diego

-   Organized, coordinated, and implemented an alcohol prevention/intervention program at 6 San Diego County high schools
-   Assisted in the design and administration of annual school-wide surveys assessing substance use, school connectedness, nutrition, and school violence
-   Supervised upwards of 12 undergraduate interns who assist in various logistical and administrative tasks
-   Acted as a liaison between high school administrators and principal investigator
-   Monitored and maintained the collection of intake and follow-up data, analyzed data, wrote manuscripts, and presented findings at conferences

Research Assistant
SRI International
Menlo Park, CA
2001 – 2004
Principal Investigators:
    Adolf Pfefferbaum, M.D., Director, Neuroscience Program, SRI International and
                    Professor, Stanford University School of Medicine
    Edith V. Sullivan, Ph.D., Professor, Stanford University School of Medicine

-   Recruited and scheduled research participants
-   Administered and scored neuropsychological batteries (e.g., selected tests from Wechsler Abbreviated Scale of Intelligence, Wechsler Memory Scale - Revised, National Adult Reading Test (NART), Peabody Picture Vocabulary Test, Rey-Osterrieth Complex Figure, Trails A & B, Mini Mental Status Exam)
-   Operated human clinical Magnetic Resonance Imaging 1.5T and 3.0T systems to acquire structural and diffusion tensor imaging data
-   Managed behavioral data for longitudinal research studies funded by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and the National Institute on Aging (NIA)
    o   Projects focused on investigating the neurophysiological, neuroanatomical, and cognitive effects of alcohol use disorders, Alzheimer's disease, HIV infection, and normal aging

CLINICAL EXPERIENCE

Psychology Intern
Long Beach VA Healthcare System
Long Beach, CA
2008 – 2009

6-month Major Rotations:
Substance Abuse Treatment Center
Supervisor: Henry Benedict, Ph.D.
- Co-facilitate 2 process-oriented out-patient substance abuse psychotherapy groups, collaborate with supervisor on patient case conceptualization, and assist in formulating individual group members' treatment plans
- Formulate treatment plans and conduct individual out-patient psychotherapy

Post Traumatic Stress Disorder
Supervisor: Susan Houston, Ph.D.
- Co-facilitate process-oriented out-patient psychotherapy groups for combat related PTSD and Anger Management
- Co-facilitate harm reduction approach Seeking Safety group for dual diagnosis veterans with substance abuse and PTSD
- Formulate treatment plans and conduct individual out-patient psychotherapy

4-month Minor Rotations:
Chronic Pain/Post Traumatic Stress Disorder
Supervisor: Richard Hanson, Ph.D.
- Co-facilitate a Relaxation/Meditation group and Pain Management group, both aimed at increasing non-medicinal coping strategies for chronic pain
- Participate and collaborate with multidisciplinary team in the treatment planning for medical and psychological care for veterans with chronic pain
- Formulate treatment plans and conduct individual out-patient psychotherapy

Women's Mental Health Clinic
Supervisor: Lori Katz, Ph.D.
- Co-facilitate closed psychotherapy group (RENEW program) focused on processing post traumatic stress resulting from sexual trauma
- Co-facilitate process-oriented out-patient dual diagnosis substance abuse and PTSD therapy group for female veterans
- Formulate treatment plans and conduct individual out-patient psychotherapy with female veterans

Assessment & Psychotherapy
Supervisor: Kenneth Cole, Ph.D.
- Formulate treatment plans and conduct individual out-patient psychotherapy
- Co-facilitate ACT therapy group for anxiety and depression

- Administer, score, and interpret assessment instruments with the intention of utilizing results in case conceptualization, treatment planning, and monitoring therapeutic progress

Alcohol Interventionist
Project Options Alcohol High School Prevention/Intervention Program
La Jolla, CA
2005 – 2008
Supervisor: Sandra Brown, Ph.D.
- Administered manualized prevention/intervention based on the cognitive-behavioral and motivational enhancement approach to substance use disorders with adolescents in both group and individual formats at socio-economically and ethnically diverse schools across San Diego County
    o Prevention/intervention sessions include presenting information on and discussing perceived peer alcohol use versus accurate statistics, decision-making strategies in high-risk situations, communication errors and skills, stress management, and the impact of alcohol use expectancies

Psychology Trainee
VA San Diego Substance Abuse Mental Illness Program (SAMI)
La Jolla, CA
2007 – 2008
Supervisor: Susan Tapert, Ph.D.
- Conducted semi-structured interviews with out-patient veterans to determine presence of an Axis I diagnosis independent of the primary substance use disorder (SUD) and eligibility for the SAMI program
- Participated and collaborated with inter-disciplinary team to refine diagnoses and treatment plan
- Co-facilitated manualized therapy group for patients with anxiety disorder and SUD
- Co-facilitated manualized 12-Step Facilitation research therapy group for patients with mood disorder and SUD in randomized controlled trial comparing 12-Step Facilitation to Integrated Cognitive Behavioral Therapy
    o Both groups employed interventions such as thought challenging, examining the pros and cons of substance use and abstinence, mindfulness, progressive muscle relaxation, guided imagery, and building effective communication skills

Psychology Trainee
VA San Diego Alcohol and Drug Treatment Program (ADTP)
La Jolla, CA
2006 – 2007
Supervisors: Tamara Wall, Ph.D., & Shoshana Shea, Ph.D.
- Conducted semi-structured interviews with adult out-patient veterans with primary SUDs

- Co-facilitated out-patient process-therapy group, formulated treatment plans, monitored progress, and updated treatment plans accordingly
- Conducted in-patient didactic therapy groups in Stress Management, Interpersonal Communication, and Relapse Prevention

Psychology Trainee
San Diego State University Psychology Clinic
La Mesa, CA
2005 – 2006
Supervisors: Brenda Johnson, Ph.D., & Linda Gallo, Ph.D.
- Conducted structured and unstructured intake interviews with adult clients at a community-based psychology clinic
- Formulated and implemented treatment plans for individual psychotherapy from cognitive-behavioral and interpersonal perspectives
- Monitored and recorded therapeutic progress through the regular administration of self-report instruments (e.g., Beck Depression Inventory, Beck Anxiety Inventory, Brief Symptom Inventory) and progress notes

TEACHING EXPERIENCE

Guest Lecturer
Schulte, M.T. (2007, October). DSM-IV-TR: Alcohol Use Disorder Criteria and the Pros and Cons of Categorical Systems. Guest lecturer for undergraduate psychology course (Psychology 107: Substance Abuse Research), University of California, San Diego

Research Supervisor
Psychology 107: Substance Abuse Research (undergraduate course)
Assisted in the supervision of 10 to 12 student research interns per year. Assigned intern tasks and responsibilities, monitored performance, and provided regular group and individualized feedback

GRANTS AND FELLOWSHIPS

8/2004 - 7/2006 **Predoctoral Research Fellow, T32 AA013525**
     National Institute on Alcohol Abuse and Alcoholism
     San Diego State University Research Foundation
     Edward Riley, Ph.D., Training Grant Director

4/2008 – 10/2008 **Individual National Research Service Award, F31 AA017551-01**
     National Institute on Alcohol Abuse and Alcoholism
     University of California, San Diego
     Sandra A. Brown, Ph.D., Grant Mentor

PEER-REVIEWED PUBLICATIONS

Schulte, M.T. & Brown, S.A. (in preparation). Therapeutic alliance and mental health treatment outcomes among adolescents.

Brown, S.A., Harrell, J., Valentine, C., **Schulte, M.T.,** Monreal, T., & Kia-Keating, M. (in preparation). Is choice important in adolescent alcohol treatment?

McGee, E., Valentine, C., **Schulte, M.T.,** & Brown, S.A. (in review). Peer victimization and alcohol involvement among adolescents self-selecting into school-based alcohol intervention. *Addiction*

Schulte, M.T., Ramo, D.E., & Brown, S.A. (in review). Gender differences in factors influencing alcohol use and drinking progression among adolescents. *Clinical Psychology Review*

Monreal, T.K., Kia-Keating, M., **Schulte, M.T.,** & Brown, S.A. (in review). Perceptions of alcohol use in a high school-based intervention. *Journal of Alcohol and Drug Education*

Schulte, M.T., Monreal, T.K., Kia-Keating, M., & Brown, S.A. (in press). Influencing adolescent social perceptions of alcohol use to facilitate change through a school-based intervention. *Journal of Child and Adolescent Substance Abuse*

Kia-Keating, M., Brown, S.A., **Schulte, M.T.,** & Monreal, T.K. (in press). Adolescent satisfaction with brief motivational enhancement for alcohol use. *Journal of Behavioral Health Services and Research*

Anderson, K.G., Ramo, D.E., **Schulte, M.T.,** Cummins, K., & Brown, S.A. (2008). Impact of relapse predictors on psychosocial functioning of SUD youth one year after treatment. *Substance Abuse Journal, 29,* 97-106.

Anderson, K.G., Ramo, D.E., **Schulte, M.T.,** Cummins, K., & Brown, S.A. (2007). Substance use treatment outcomes for youth: Integrating personal and environmental predictors. *Drug and Alcohol Dependence, 88,* 42-48.

Brown, S.A., Anderson, K., **Schulte, M.T.,** Sintov, N.D., & Frissell, K.C. (2005). Facilitating youth self-change through school based intervention. *Addictive Behaviors, 30,* 1797-1810.

PROFESSIONAL PRESENTATIONS

Bacio, G., Kia-Keating, M., Valentine, C., **Schulte, M.T.,** & Brown, S.A. (2008, October). *Latino adolescent experiences of peer victimization, trauma, and*

depression: Comparisons by sex, immigrant generation, and national origin. Poster session presented at the annual meeting of the Society for Advancement of Chicanos and Native Americans in Science, Salt Lake City, UT.

Schulte, M.T., Bacio, G., Frissell, K., Kia-Keating, M., Monreal, T.K., & Brown, S.A. (2008, July). *Gender differences in treatment satisfaction and therapeutic dosage within high school-based voluntary intervention program.* Poster session presented at the annual meeting of the Research Society on Alcoholism, Washington, DC.

Valentine, C., Bacio, G., Monreal, T., **Schulte, M.T.,** & Brown, S.A. (2008, March). *Alcohol-related problems and expectancies of youth that self-select into a brief secondary prevention program.* Poster session presented at the biennial meeting of the Society for Research on Adolescence, Chicago, IL.

Monreal, T.K., Kia-Keating, M., **Schulte, M.T.,** & Brown, S.A. (2007, August). *Perceptions of alcohol use in a high school-based intervention.* Poster session presented at the annual meeting of the American Psychological Association, San Francisco, CA.

Schulte, M.T., Kia-Keating, M., Monreal, T.K., & Brown, S.A. (2007, July). *Does dose make a difference in brief intervention for adolescents?* Poster session presented at the annual meeting of the Research Society on Alcoholism, Chicago, IL.

Schulte, M.T., Kia-Keating, M., Monreal, T.K., & Brown, S.A. (2007, March). *Ethnic differences in health predictors of cigarette use among adolescents.* Poster session presented at the annual meeting of the Society for Research in Child Development, Boston, MA.

Schulte, M.T., Monreal, T.K., Kia-Keating, M., & Brown, S.A. (2006, November). *Influencing social perceptions of substance use to facilitate change through a school-based intervention.* Poster session presented at the annual meeting of the Association of Behavioral and Cognitive Therapies, Chicago, IL.

Kia-Keating, M., **Schulte, M.T.,** Monreal, T.K., & Brown, S.A. (2006, October). *Adolescent satisfaction with brief motivational enhancement for alcohol use.* Poster session presented at the annual meeting of American Academy of Child and Adolescent Psychiatry, San Diego, CA.

Rosenbloom, M.J., O'Reilly, A., Sassoon, S.A., Raassi, C., **Schulte, M.,** Pfefferbaum, A., & Sullivan, E.V. (2005, June). *Story recall improves with abstinence in chronic alcoholic men and women.* Poster session presented at the annual meeting of the Research Society on Alcoholism, Santa Barbara, CA.

Sullivan, E.V., Rosenbloom, M.J., **Schulte, M.,** Sassoon, S.A., Kemper, C., Deresinski, S., & Pfefferbaum, A. (2004, February). *Ataxia in HIV infection when comorbid for alcoholism.* Poster session presented at the annual meeting of the International Neuroscience Society, Baltimore, MD.

Sassoon, S.A., O'Reilly, A., **Schulte, M.T.,** Rosenbloom, M.J., Pfefferbaum, A., & Sullivan, E.V. (2003, June). *Visuospatial construction and visual memory in alcoholism, HIV, and their comorbidity.* Poster session presented at the annual meeting of the Research Society on Alcoholism, Fort Lauderdale, FL.

ABSTRACT OF THE DISSERTATION

The Effects of Treatment Satisfaction and Therapeutic Dosage on

Adolescent Drinking Outcomes

by

Marya T. Schulte

Doctor of Philosophy in Clinical Psychology

University of California, San Diego, 2009

San Diego State University, 2009

Professor Sandra A. Brown, Chair

The current study examined the impact of non-specific treatment factors, therapeutic dosage and treatment satisfaction, on drinking behaviors and consequences among adolescents participating in a voluntary, high school-based alcohol intervention (N = 94). Path analysis served to test the primary model in which satisfaction and dosage were predicted to influence severity of alcohol use (i.e., number of binge drinking episodes and alcohol-related problems within the past 30 days) three months after initial intervention participation. Student attempts to reduce or quit drinking alcohol were proposed as an intervening variable in the model, accounting for part of the relationship between treatment variables and changes in alcohol involvement. In addition, student estimates of peer frequency of alcohol use were included in the model as a covariate to account for previous findings of the current intervention, which demonstrated that

reductions in perceived peer alcohol use were associated with decreased drinking. Two

theoretically-sound alternative models were also tested to determine which model best fit

the data. The model exhibiting the best relative fit included direct paths 1) from

treatment satisfaction and peer drinking estimates to 1-month alcohol quit attempts, and

2) direct paths from quit attempts and peer drinking estimates to 3-month binge drinking

episodes. Examination of path coefficients revealed three signficant relationships. First,

students reporting greater peer estimates of alcohol use at intake were more likely to

report at least one quit attempt at 1-month follow-up. Next, students who had a reported

quit attempt were more likely to report greater alcohol use severity two months later.

Finally, greater baseline alcohol use severity was associated with greater follow-up

alcohol use severity. Overall, it appears that adolescents self-selecting into an alcohol

intervention are likely to make change efforts early in treatment, with little change in quit

attempts between one and three months post-intake. Similarly, more did not mean better

in terms of therapeutic dosage or treatment satisfaction and drinking outcomes. These

findings suggest that adolescents voluntarily attending a school-based intervention are

able to effectively optimize their therapeutic dose and quickly utilize strategies taught in

session. Understanding how non-specific treatment factors affect change efforts and

drinking patterns can help tailor secondary interventions for adolescents with moderate

alcohol histories by maximizing engagement, motivation, and possibly future help-

seeking behaviors.

INTRODUCTION

Underage drinking continues to pose one of the greatest risks to the health and safety of America's youth due to the popularity of alcohol and the negative consequences resulting from teen use. Estimates indicate that 75% of high school students will report some experience with alcohol by graduation (Johnston, O'Malley, Bachman, & Schulenberg, 2006). Of further concern, over 25% of 12th graders report occasions of heavy drinking (i.e., five or more drinks) during the two-weeks prior to interview (Johnston, et al., 2006). This excessive alcohol involvement among youth presents a major public health concern. As a result of drinking, youth are at an increased risk for immediate problems, such as decreased academic performance, risky sexual behavior, and accidents or injuries. Further, alcohol use at such a young age has been shown to predict long-term consequences, ranging from lower academic attainment and more marital difficulties to decreased physical and mental health, and put teens at an increased risk for developing adult alcohol dependence (Brown & Tapert, 2004; Hussong & Chassin, 1994; O'Malley, Bachman, Johnston, & Schulenberg, 2004). Therefore, developing treatments that target youth in the early stages of drinking is necessary to reduce the severity of alcohol use and its associated problems.

A limited number of alcohol treatments have been aimed at targeting teen drinkers who do not meet clinical criteria for abuse or dependence. Moreover, few adolescents experiencing alcohol-related problems seek formal treatment due to the perception of negative stereotypes and lack of personal applicability (Ackard & Neumark-Sztainer, 2001). Although there have been primary and secondary interventions developed to address adolescent drinking before more formal and costly treatment is needed, many of

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these intervention efforts have fallen short (Hser et al., 2001; Pentz, 1998). The majority

of school-based interventions have taken a didactic approach, focusing on educating teens

about the negative physical and social outcomes of use, teaching basic resistance skills,

and promoting an overall message of abstinence. It has been suggested, however, that

these less formal routes of intervention may be developmentally inappropriate (Brown,

2001; Metrik, McCarthy, Frissell, MacPherson, & Brown, 2004), and in some cases may

result in rebellious attitudes and behaviors against the core program message of

abstinence (Marlatt & Witkiewitz, 2002). Additionally, treatments designed around an

adult model neglect the fact that most youth beginning to face problems with alcohol use

have experienced fewer or less severe consequences of drinking and are less likely to be

intrinsically motivated to participate in the treatment process than adults (Deas, Riggs,

Langenbucher, Goldman, & Brown, 2000). Thus, developing an age-appropriate, easily

accessible program is an essential next step within the area of adolescent alcohol abuse

treatment.

Self-Change Processes

Given this seemingly ill-fated trajectory of adolescent alcohol involvement, it

may be surprising that a significant proportion (approximately 20%) of teen drinkers

resolve alcohol problems during high school through their own attempts to reduce or

cease use independent of treatment (Brown, 2001; Fillmore, 1998; Sobell, Ellingstad, &

Sobell, 2000; Stice, Myers, & Brown, 1998). Identification of factors that underlie the

self-change efforts invoked by teens in their natural environment may increase the

effectiveness of intervention programs and motivate adolescents hesitant to seek more

formal treatment when needed (Brown, 2001). To facilitate understanding of these

strategies used by teens, change processes have been classified as either incidental or purposeful. Since adolescence is characterized by numerous social transitions, incidental change in the context of alcohol involvement describes reductions in use that are incidental to the environment and role transitions taking place within a developmental period (Brown, 2001; Watson & Sher, 1998). Differences in frequency and quantity of consumption, therefore, may occur because of new responsibilities and less access to alcohol or other substances (Yamaguchi and Kandel, 1985) rather than personal efforts on the part of youth.

In contrast to the unintentional de-escalation of use describing "spontaneous" remission, purposeful change focuses on the role of motivation in the change process. More specifically, motivated change invokes cognitive social learning theory (Bandura, 1986) to describe reductions in drinking through cognitive appraisal (e.g., perceived peer drinking norms) and evaluation processes (e.g., cessation expectancies; Klingemann, 1991; Metrik et al., 2004; Tucker, Vuchinich, & Gladsjo, 1991). Brown and colleagues (Brown, 2001; Metrik et al., 2004; Myers, Brown, & Kelly, 2000) explicated this process in a proposal based on a developmental social information processing model of youth efforts to change their behavior. The model purports that drinking decisions are the result of current cognitive and emotional states that are influenced by context and background. In this theoretical framework, teens choose whether or not to drink and whether or not to continue in a given situation based upon the integration of immediate circumstances (e.g., alcohol availability, motivational states, peer use, alcohol expectancies) and distal factors (e.g., biological risks, cultural beliefs). Interventions for youth must then recognize motivation as a crucial element in eliciting purposeful change. Since binge drinking is

often viewed as normal among teens, and their limited experience with severe physical and social consequences prevents the avoidance of these problems as reason to change drinking patterns (Myers et al., 2000; Peltier, Telch, & Coates, 1982), then successful change occurs only after a perceived need for change and personal resources are available to execute desired change efforts (Brown, 2001; Brown et al., 2005). The intervention examined focuses on enhancing desire and self-efficacy for self-change. The present study sought to understand more specifically the relations of some of the key components involved in eliciting change and preventing further escalation of problem use. Figures representing the three distinct models tested are presented.

The Primary Model (Figure 1) tested the hypothesis that treatment satisfaction and therapeutic dosage would directly influence drinking outcomes, with students reporting greater satisfaction and attendance exhibiting fewer problems and binge episodes 3-months post-intake. Moreover, the model predicted that a portion of this relationship would be accounted for by student attempts to reduce or cease alcohol use. Treatment satisfaction and therapeutic dosage are predicted to be associated, but the direction of this relationship is not specified in the model because each measure of engagement is likely to influence the other (Dearing, Barrick, Derman, & Walitzer, 2005). In consideration of previous findings with the current population, a direct path from peer frequency estimates to drinking outcomes was included to account for the impact of corrected peer estimates of frequency of peer alcohol use on adolescent alcohol involvement (Schulte, Monreal, Kia-Keating, & Brown, in press). Previous results indicated that students who demonstrated a reduction in estimates of how often their peers drank alcohol were more likely to decrease their number of binge episodes each

month, and average number of drinks and maximum number of drinks per drinking occasion. Finally, direct paths from demographics and baseline measures of drinking outcomes control for the impact these may have on 3-month follow-up measures of reported binge episodes and alcohol-related problems.

Figures 2 and 3 represent theoretically sound alternative models to understanding adolescent behavioral change and alcohol consumption. The first Alternative Model (Figure 2) tested the possibility that cut down/quit attempts were not the mechanism responsible for the relationship between non-specific treatment factors and drinking behaviors. While intervention components such as reduction strategies and coping skills offer students specific tools for making changes in drinking, satisfaction and dose may not be impacting attempts at effortful change. Instead, these more global factors may be influencing dangerous drinking and related problems through other motivational mechanisms indirectly related to alcohol use. More specifically, the relationship between treatment involvement and positive change may be better described in terms of incidental rather than purposeful change. As outlined above, many adolescents move out of problematic alcohol use because of environmental changes and role transitions (Brown, 2001; Watson & Sher, 1998). Thus, the relationship between satisfaction, dose, and outcome may be due to students having a safe environment to spend their lunch period, or evidence of their increased participation in and importance placed on school involvement.

The second Alternative Model (Figure 3) tested the hypothesis that satisfaction with treatment, and not number of sessions attended, was the primary factor in predicting positive change. Given the support for brief interventions with adolescents (Monti et al., 1999), therapeutic dosage was removed from the second alternative model because it was

hypothesized that students' "emotional" response to treatment alone may influence reported quit and reduction attempts. Additionally, a recent investigation of the target intervention found that corrected peer drinking estimates were related to decreased alcohol involvement (Schulte, Monreal, Kia-Keating, & Brown, in press). The inclusion of a direct path from peer frequency estimates to quit attempts was added in this model to examine whether quit attempts accounted for the relationship between beliefs about others' use and problematic drinking.

<u>Quit Attempts</u>

Motivation to change is a crucial element in the self-change process. As a construct, however, the cognitive and emotional appraisal of drinking-related decisions involves an individualized process beginning with considering change and resulting in behavioral modification aimed at altering alcohol consumption. The current project used self-reported number of quit attempts to assess the behavioral component of self-change. In a recent study conducted by Brown and colleagues (2005), participation in a secondary school-based alcohol intervention significantly increased the number of attempts students made to reduce or cease use among students who reported drinking anytime in their lives. Results indicated that the intervention was most effective in fostering self-change efforts among students reporting the heaviest alcohol use history (>50 use episodes), while it proved less effective in fostering attempts to cut down or quit alcohol use among those students with limited (<10 use episodes) or moderate (<50 use episodes) drinking histories. These results provide preliminary evidence that attending a secondary intervention can increase the number of personal change efforts made by heavy-drinking adolescents, thus suggesting quit attempts to be a potentially important intervening

variable between treatment involvement and outcome.

Treatment Satisfaction

The construct of treatment satisfaction is considered an important variable necessary for understanding and adapting treatment to fulfill the needs and wants of the consumer. The argument is that the greater "the extent to which services gratify the client's wants, wishes, or desires for treatment" (Lebow, 1983, p. 212), the more behavioral attempts for change, and the more positive the subsequent outcomes following treatment. The larger adult literature investigating the predictive power of treatment satisfaction points to a significant reduction in specific symptoms (Attkisson & Zwick, 1982; Pickett, Lyons, Polonus, Seymour, & Miller, 1995), as well as a number of nonsignificant results (Pekarik & Guidry, 1999; Pekarik & Wolff, 1996) for a variety of mental health disorders. Adult substance abuse research reveals a similar pattern of equivocal findings. A study investigating the satisfaction of adult substance users with their outpatient services failed to find a significant relationship between measures of treatment satisfaction and substance use outcome measures assessed at multiple follow-up time points (McLellan & Hunkeler, 1998). In a more recent study, however, Dearing et al. (2005) used path analytic techniques to evaluate the relationship among client engagement variables (i.e., client expectations, working alliance, and session attendance), treatment satisfaction, and alcohol use outcome variables. Results indicated good model fit with two drinking outcomes, number of days abstinent and number of drinks per drinking day posttreatment. The authors concluded that the large magnitude of the relationship between client satisfaction with treatment and subsequent outcome warrant further investigations focused on parsing apart which aspects of treatment involvement

are feeding into reported levels of satisfaction. In fact, Dearing and colleagues (2005) speculated that motivation may be a key component in understanding treatment engagement and predicting drinking outcomes.

Less is known, however, regarding how measures of satisfaction relate to and affect drug and alcohol-related outcome variables within an adolescent population. A study by Tetzlaff, Kahn, Godley, Godley, Diamond, and Funk (2005) on marijuana abusing or dependent adolescents within brief outpatient treatment interventions begins to address this gap in the literature. Tetzlaff et al. (2005) employed discriminant analysis to determine whether client satisfaction with treatment was predictive of posttreatment use at follow-up assessments, and additionally, whether it significantly predicted longer-term patterns of use. Results indicated that treatment satisfaction was not predictive of short-term or longitudinal patterns of marijuana use. The authors suggest that the role of treatment satisfaction is not irrelevant; rather, they purport that due to the multitude of factors that play a role in adolescent behavioral change, teasing out the unique predictive power is difficult. Similar to the adult study of Dearing et al. (2005), Tetzlaff and colleagues (2005) included motivation as an important predictor to consider when understanding changes in use for teens. Despite their null findings, they suggested that treatment satisfaction may have clinical relevance regarding larger public health service behaviors, such as continuation in treatment or future help-seeking.

More specific to the current project, a study of the target intervention examined the relationship between various client and intervention characteristics and ratings of treatment satisfaction (Kia-Keating, Brown, Schulte, & Monreal, in press). The most relevant findings from this previous investigation indicated that student satisfaction with

the intervention was positively correlated with total number of visits to the program, a finding consistent with the relationship specified within the current project's primary model.

Therapeutic Dosage

Ross, Frommelt, Hazelwood, and Chang's (1987) "process theory of satisfaction" (p.56) offers a basis for understanding the impact of dosage within treatment research by first unpacking the definition of treatment satisfaction into specific components. They characterize treatment satisfaction as an ongoing interaction between client expectations and experiences. Further, they propose that therapeutic dosage and treatment satisfaction are interrelated, with greater levels of satisfaction being associated with higher treatment attendance. The broader mental health treatment literature, however, does not provide consistent findings to support this view. Although a number of studies investigating treatment variables in outpatient settings indicate a small to moderate correlation between measures of satisfaction and attendance (Frank, Salzman, & Fergus, 1977; Kirchner, 1981, 1982; Willer & Miller, 1978), other studies examining this relationship have yielded nonsignificant results (Denner & Halprin, 1974; Larsen, Attkisson, Hargreaves, & Nguyen, 1979). While this relationship cannot be considered strong, it has proved useful in offering insight into how treatment variables interact with one another and account for changes in treatment mechanisms and outcomes. Dearing and colleagues (2005) purport that for substance use disorders, the link between treatment satisfaction and outcome is elucidated by the inclusion of such measures of client engagement. The lack of clarity regarding this construct only lends greater credence to the need for

additional investigations attempting to understand its relative importance and impact on a variety of treatment variables.

Length of participation in treatment is also purported to influence general measures of treatment outcome. The number of sessions attended in voluntary treatment is considered an indicator of the client's level of participation in the treatment process (Fiorentine, 2001). Previous studies of attendance in 12-Step groups for both adults and adolescents have revealed that the number of meetings attended was significantly related to more positive long-term outcomes (Kelly, et al., 2008; Kelly et al., 2000; Morgenstern, Labouvie, McCrady, & Kahler, 1997). Specifically, Kelly et al. (2000) found that adolescents successfully abstaining from alcohol use attended approximately twice as many meetings as their substance using counterparts. More recently, these researchers (Kelly et al., 2008) reported that early regular attendance was associated with better outcomes up to 8 years after treatment. This should not, however, be taken as evidence for endless treatment or an argument for lengthy and costly interventions. In fact, Miller's (2000) evaluation of treatment effects for brief alcohol interventions indicated that, while some form of counseling is indeed better than no intervention, there may be a threshold for treatment duration and drinking outcomes. Indeed, alcohol-related outcome measures for problem drinkers are similar for those attending brief as compared with extended treatments (Bien, Miller, & Tonigan, 1993; Miller, 1978; Miller, Taylor, & West, 1980), with number of sessions attended ranging from 5 to 25 across studies.

Thus, understanding the factors interrelated with session attendance and involved in eliciting positive change within a limited amount of time is imperative in the development and dissemination of effective adolescent alcohol interventions. It is of

further importance to examine the impact of therapeutic dosage within an adolescent population because less is known regarding the relative gains experienced by additional sessions attended for youth who have faced fewer consequences from drinking and are not required to participate in treatment. Furthermore, school-based interventions avoid confounding environmental variables, such as parental availability and willingness to provide transportation that can negatively impact adolescent treatment attendance.

Peer Perceptions

Consistent with Bandura's (1986) previously discussed cognitive social learning theory, normative feedback has proven an effective tool at reducing use in alcohol intervention programs with diverse populations (Far & Miller, 2003; Haines, Barker, & Rice, 2003; Haines & Spear, 1996). A recent study examining the target intervention found that corrected misperceptions regarding how often teens believe their peers consume alcohol is a significant factor in reducing problematic drinking (Schulte et al., in press). Here, student estimates of peer alcohol use were examined for two groups of alcohol users: those receiving the intervention and a control group with no intervention. Findings revealed that students who had participated in the alcohol intervention were more likely than those who had not attended to reduce their estimates of how often their peers drank alcohol. Moreover, students with corrected estimates of frequency of peer use demonstrated greater reductions in drinking (i.e., binge episodes, maximum number of drinks per occasion, average number of drinks per occasion) over the course of the academic year in comparison with students who did not display a decrease in their perceptions of peer alcohol involvement.

<u>Current Study</u>

The intervention investigated in the present study (Project Options) is a developmentally sensitive, multiple-format program that allows students to self-select into varying levels of engagement and privacy. The diversity of options invites a greater proportion of teens to seek assistance and learn strategies for better self-change outcomes, given that individual differences (i.e., age, gender, ethnicity, personality, family history of alcoholism) are factors involved in adolescent progression into alcohol abuse, as well as the methods used or pathways taken to move out of it (Brown, 1993; Brown, 2001; Watson & Sher, 1998). Thus, the current study evaluated a model of behavioral change that focused on non-specific treatment factors within a school-based intervention targeting teen drinkers. Although not the first study to examine treatment satisfaction as a predictor of substance use outcome variables (Tetzlaff et al., 2005), the current project's utilization of a community rather than clinical sample voluntarily seeking services within a school setting represents a novel addition to the literature.

The present investigation sought a systematic assessment of the stated treatment components within the context of an ongoing multi-format, developmentally focused alcohol intervention for youth. The study had four Specific Aims:

<u>Aim 1:</u> Examine changes in student attempts to reduce or quit drinking, number of binge episodes and alcohol-related problems, and estimates of perceived peer alcohol use over the course of intervention participation.

<u>Hypothesis 1:</u> Students will report more quit attempts at follow-up, while reported alcohol involvement and estimates of peer drinking will decrease from intake to follow-up.

Aim 2: Assess and compare overall model fit of the Primary Model and the two proposed Alternative Models with the 1- and 3-month measures of quit attempts as the intervening variable.

Hypothesis 2a: Models utilizing the 1-month measure of quit attempts will exhibit better overall model fit in comparison to those with the 3-month measure.

Hypothesis 2b: The Primary Model presented in Figure 1 will most accurately reflect the interrelationships among the target constructs.

Aim 3: Examine path coefficients to investigate the extent to which non-specific treatment factors affect reported quit attempts (at 1- versus 3-months) and short-term (3-month) outcomes (binge episodes and alcohol-related problems).

Hypothesis 3a: Attendance and satisfaction will be positively correlated.

Hypothesis 3b: Increased dosage and satisfaction will be positively related to number of quit attempts, which in turn will be associated with less alcohol use severity at 3-month follow-up.

Hypothesis 3c: Greater estimates of perceived peer use at both intake and follow-up will be associated with greater alcohol use severity at follow-up; however, non-specific treatment factors will be better predictors of quit attempts and alcohol use severity than either assessment of perceived peer use

METHODS

Participants

Participants consisted of 9th through 12th grade students (ages 14-19 years) attending six geographically, culturally, and socioeconomically diverse San Diego County schools at which Project Options was offered. Student body populations at each of the six schools ranged from 1450 to 3200 students. Approximately 10% of the total student body attended at least one session of the intervention during the school year.

Project Options was available to and welcomed all students; however, the present study selected youth with current alcohol use at time of intake (e.g., those reporting at least one alcoholic drink in the past 30 days) so that the impact of intervention variables on varying degrees of dangerous drinking behaviors could be detected. Although 179 students attending the intervention were classified as current drinkers (approximately 25%), only students who had completed their 3-month follow-up assessments were used in the current analyses. Students with and without completed follow-up assessments were compared to determine whether incompleteness was associated with demographics and drinking behaviors (Table 1). Students with completed follow-up assessments did not significantly differ from those without completed assessments based on demographics. For drinking characteristics, students who did not complete a follow-up assessment reported making more attempts to reduce or quit drinking in the past 30 days at the time of intake compared to students who later completed a 3-month assessment ($p < .01$). No significant differences were found between groups for other drinking variables. Untransformed means are presented in Table 1 for ease of comparison and interpretation.

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Procedure

All procedures conducted as part of the project from which the data were gathered were approved by the National Institute of Health (NIH), University of California, San Diego Committee for the Protection of Human Subjects, San Diego State University Committee for the Protection of Human Subjects, the school districts, and the six individual high schools. The study followed students participating in Project Options during the academic year over a period of approximately three months. Participation in the intervention was voluntary and employed parental consent procedures.

Informed Consent for Intervention. Parental consent procedures resulted in limited refusal (<2%) and a list of students not allowed voluntarily attendance at Project Options intervention was used to ensure only youth with parental permission participated in the sessions. Additionally, since data was collected from minors, youth assent was obtained during intake (see Frissell et al., 2005 for a detailed discussion of consent procedures).

Intervention. The intervention protocol was standardized and followed guidelines of a manual based on Motivational Interviewing (MI), Guided-Self-Change, and Peer Counseling techniques for treating substance use disorders. The intervention was conducted by trained graduate students, postdoctoral fellows, and research assistants with supervision and quality monitoring conducted on a weekly basis. Sessions were publicized via posters on campus, weekly school bulletins, parent newsletters, flyers, video classroom advertisements, and annual club fair days. Project Options was held once per week at each school during a lunch period (approximately 30 minutes) and was offered in conveniently located classrooms on campus. Because the intervention

occurred during the lunch period, food (i.e., pizza and water or juice) was provided to all participants. Due to the voluntary nature of the brief intervention, admission into Project Options was conducted on a rotating basis. Students were allowed a maximum of six sessions; however, there were no restrictions regarding when and which sessions they chose to attend.

Project Options was offered in three different formats (website, individual, group) to allow for varying degrees of social interaction and self-disclosure while maintaining consistency in content. Group meetings consisted of structured MI-based sessions in which students were encouraged to share thoughts and experiences with a group of approximately 10 peers. Group facilitators provided specific content and ensured that student comments remained relevant to the session protocol. When meeting one-on-one with an MI interventionist in the individual format, session topics were the same as for group but with greater flexibility in terms of individually based discussions. Finally, the website allowed students seeking a more private method of attaining comparable information to work independently at a self-selected pace on individual computers with an MI interventionist available for questions. The group, individual, and website meetings were each conducted in different classrooms to prevent contamination across formats.

The Project Options intervention is based on the developmental social information processing model (Brown, 2001) of drinking decisions and employed motivational enhancement techniques to elicit behavioral change. The session topics are designed to increase motivation to reduce or cease alcohol involvement through the implementation of behavioral skills targeting commonly used change strategies of teens and to assist

youth in generating resources for alternative behaviors. Table 2 provides a more detailed

description of session content

 Measures

There were three data sources for this study: 1) attendance tracking for

therapeutic dosage conducted by laboratory staff, 2) client satisfaction forms completed

at the end of each session, and 3) self-report forms assessing demographics, quit attempts,

and outcome variables at intake, 1-month, and 3-month time points. Self-report forms

were administered at these time points to gather information regarding student drinking

behaviors and attitudes at baseline prior to intervention participation, with limited

exposure to intervention, and with increased time for intervention participation and

implementation of change strategies respectively. Students received a $5 incentive (gift

certificates for music, clothing, movie, or restaurant stores) for form completion at their

initial and follow-up assessments.

Therapeutic Dosage. Project Options attendance was monitored for each student

through the use of a tracking sheet organized by subject ID (student initials and birth

month and date) at each school. Interventionists updated confidential tracking sheets

weekly to reflect current information regarding each participant's selected format, dates

of attendance, and target dates for follow-up assessments. Therapeutic dosage was

operationalized as the total number of sessions attended in-person, ranging from one to

six. Since the proposed models were tested with two different assessment time points of

the intervening variable (quit attempts), models utilizing the 1-month versus 3-month

measures of quit attempts included only sessions attended within their respective time

frames.

Treatment Satisfaction. This treatment satisfaction measure followed Lebow's (1983) description of satisfaction as a measure of how well the service provided fulfilled client wants and needs. Satisfaction with treatment was assessed at the end of each session with four questions measuring the helpfulness of the discussion, usefulness of the information, the style of the meeting, and the interventionist. The evaluation forms utilized a 5 point Likert-type scale (lower scores indicated better satisfaction) with approval ranging from "Yah Baby" to "No Way" for each of the following statements: "Today's discussion was helpful," "I liked this style/type of meeting," "I could use this information," and "The facilitator/leader was helpful." Each participant received an index score of treatment satisfaction by calculating an average satisfaction score per visit and then aggregating across visits to calculate an average total score. Congruent with the calculation of therapeutic dosage, only treatment satisfaction for sessions attended within the respective 1-month or 3-month time frame for the given model was used. Since personal experience over the course of treatment could vary, an aggregate score allowed for a more accurate measure of overall treatment satisfaction that might otherwise be lost if the operationalization were limited to one specific session (i.e., the first or last session attended). Furthermore, it provided the website format with a score comparable to the other formats even though it did not include a question assessing facilitator helpfulness.

Intervention Self-Report Forms

As described above, students completed a self-report form during their first visit to the intervention, one month post-intake, and again three months post-intake. The intake form was completed in-person at the start of their first visit to Project Options. If participants attended the intervention at their 1- and 3-month follow-up dates, then they

were given another questionnaire to complete at that time in-person. Since, however, attendance was voluntary and variable, they were offered the opportunity to complete their follow-up assessments by either telephone or email. Permission to contact participants at a later date was obtained during the check-in procedure of their first visit to the intervention. Four contact attempts over the course of two weeks for each follow-up assessment were made before discontinuing (at which time contact information was destroyed). Questionnaire content was equivalent across mode of assessment.

Demographics. Demographic information was collected via the self-report forms and included gender, grade (9th – 12th), ethnicity, and school/intervention site. Students reported ethnicity by selecting from a list of NIH determined choices: American Indian/Alaskan Native, Asian American, Black/African American (non-Hispanic), Hispanic or Latino/Latina, Native Hawaiian/Pacific Islander, White (Caucasian/non-Hispanic), or "Other" (if none seem appropriate). If multiple options applied, students were instructed to choose the ONE ethnicity that "best describes you." Due to the large percentage of Caucasian students, ethnicity was dichotomized into Caucasian versus non-Caucasian. Large surveys of adolescent drinking indicate differences in alcohol use between Caucasian students and youth identifying themselves as ethnic minorities (Johnston et al., 2006). Intervention site was dummy-coded and included as a covariate to account for differences in alcohol involvement based on high school.

Quit Attempts. Self-report forms assessed whether or not students were making efforts to change their level of alcohol involvement. Students reported the number of attempts they had made to reduce or stop drinking in the past month by answering an open-ended question at 1-month and again at 3-month follow-up: "During the past 30

days: How many times have you tried to cut down or stop drinking alcohol?" Models were tested separately with 1-month and 3-month measures of quit attempts to determine when reduction and cessation efforts demonstrate the greatest impact on problematic drinking.

Behavioral Outcomes. The self-report measure administered at intake and 3-month follow-up assessment time points assessed drinking behaviors and related problems. Questions were based on items taken from well-established measures, namely, Monitoring the Future (Johnston, O'Malley, & Bachman, 1998) and Customary Drinking and Drug Use Record (Brown et al., 1998). Specifically, number of binge drinking episodes was assessed through an open-ended question: "During the past 30 days: How many times did you have 5 or more drinks (men)/4 or more drinks (women) of alcohol within a few hours?"

Six questions addressing alcohol-related problems inquired about the effects of use within the following domains based on prior factor analytic work with community samples: school, relationships, physical, and legal. At 3-month follow-up, students reported the number of times they had experienced each specific problem in the past 30 days. These individual measures of alcohol-related problems were then added together to provide each student with a score representing their total number of alcohol-related problems across all domains.

A measure of "alcohol use severity" was created to represent a composite score, or tally, of total number of binge drinking episodes and alcohol-related problems. Because the current sample was not taken from a clinical population mandated to treatment, their alcohol involvement and related problems were likely to be moderate and

restricted in range. Alcohol use severity, therefore, was used as the endogenous variable in the models tested in order to increase variability and account for the strong correlation between these two measures.

Peer Perceptions. As discussed previously, recent findings (Schulte et al., in press) provide evidence for the impact of corrected peer frequency estimates on drinking behaviors. Findings indicated that students who had corrected their estimates of how often, rather than how much, their peers drank alcohol were more likely to reduce their own alcohol involvement. Adolescent perceptions of peer use were measured at 1-month and 3-month follow-up by student estimates of how often they thought other students in their grade drank alcohol during the past 30 days: "How often do you think students in your grade drank alcohol last month? – average number of days." Estimates of peer use were therefore included in the three models to account for its influence on behavioral change. The 3-month measure of peer frequency of use estimates was used for models testing the impact of reduction/cessation efforts at 3-months on drinking outcomes. Conversely, models testing the impact of attempts to change alcohol involvement at the 1-month time point employed the 1-month measure of peer frequency of use estimates to determine whether adolescent perceptions and change efforts at the start of treatment were more influential over later problematic drinking behaviors than those observed later in treatment. The direct effect from peer drinking estimates to 1-month quit attempts hypothesized in the second Alternative Model (Figure 3) also necessitated the use of the 1-month measure to ensure that the endogenous variable was not measured before the predictor.

<u>Data Analysis Plan</u>

Path analysis by means of maximum likelihood estimation was used to examine

the hypothesized interrelationships among treatment satisfaction, therapeutic dosage, quit

attempts, and drinking-related outcomes using EQS software. It provided the most

parsimonious method of analyzing hypothesized models because it simultaneously

assesses overall model fit and path coefficients.

As displayed in Figure 1, the Primary Model specified direct paths from each of

the two independent variables, treatment satisfaction and therapeutic dosage, to alcohol

use severity and an indirect path from the independent variables to the drinking outcome

via an intervening variable, number of attempts to quit or reduce alcohol use.

Demographics, frequency estimates of peer alcohol use, and baseline alcohol use severity

were used as covariates in the model. Finally, it was hypothesized that treatment

satisfaction and dosage would be correlated, but no direction for this relationship was

specified.

The two Alternative Models represent variations of the primary model, with

Figure 2 omitting quit attempts and depicting only a direct relationship from treatment

satisfaction and dosage to alcohol use severity. The Alternative Model of Figure 3

includes quit attempts as an important process variable but removes therapeutic dose as a

predictor. Further, a direct path from peer alcohol use estimates to quit attempts was

added, proposing that perceptions of peer drinking influenced student attempts to cut

down or stop drinking.

<u>Goodness of Fit</u>. Evaluation of model fit was assessed using the Chi-square test,

Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and

Standardized Root Mean Square Residual (SRMR). The Chi-square likelihood ratio test

is considered to be a poor test of model fit because it is greatly affected by sample size,

number of variables in a model, the distribution of variables (i.e., multivariate normality

assumption), and omitted variables (see Tanaka, 1993); therefore, both the test statistic

and fit indices were examined. The RMSEA assesses how well the data would fit the

population parameters while accounting for variability in data and the number of

participants included in the analyses. CFI is a measure of improved fit of the target

model over the null model. SRMR is an absolute fit index, such that it is derived from

the obtained and implied covariance matrices rather than utilizing an alternative model

for comparison. Values greater than .95 for CFI, less than .06 for RMSEA, and less than

.08 for SRMR suggest good model fit (Byrne, 2001). Path coefficients were evaluated

for the proportion of variance explained by each of the variables included in the model.

Model Comparison. Six models were tested: the primary model and two

alternative models with the 3-month quit attempts measure, and again, with the 1-month

quit attempts measure. To compare each of the non-nested models proposed and their

variations, Akaike Information Criterion (AIC) was used to determine which model best

fit the data. AIC is a parsimony adjusted index which favors the model with the fewest

parameters and better fit in comparison to the other tested models (Kline, 2005).

Therefore, the model with the lowest AIC was chosen.

Power. Path analysis is considered a large sample technique, with increased

model complexity requiring a greater number of cases. Kline (2005) suggests a target

ratio of 10:1 for number of cases to free parameters in the model. However, a 5:1 ratio

may be more realistic for smaller samples and is considered acceptable. The trimmed

down models (i.e., models which have removed all demographic variables as predictors of outcome except for grade in school) estimated between 21 and 26 free parameters and were considered more stable than those which tested the full versions of the proposed models (i.e., all demographic variables included; free parameters ranging from 39 to 44). Decisions regarding which demographic characteristics remained versus were removed from the models are presented in more detail in the Preliminary Analyses section below. Due to greater statistical precision, the results for the trimmed models are presented and discussed.

RESULTS

Data Cleaning and Transformations

Variables were assessed for normality, homogeneity of variance, and linearity. Baseline alcohol-related problems, follow-up alcohol related problems, baseline estimates of peer drinking, follow-up estimates of peer drinking, and both baseline and follow-up composite scores of alcohol use severity were log transformed; both the 1-month and 3-month measures of therapeutic dosage were square-root transformed. Due to a large number of zeros, number of binge drinking episodes at intake, follow-up number of binge drinking episodes, and number of reported quit attempts at both follow-ups were dichotomized. After transformation, Mardia's coefficient was examined to confirm that each of the trimmed models tested met criteria for multivariate normality (all values < 1.96). The full models, containing all demographic variables as predictors of outcome, failed to meet multivariate normality.

Missing Data

Due to varying amounts of missing data in each of the endogenous variables (quit attempts, binge drinking episodes, alcohol-related problems), Full Information Maximum Likelihood (FIML) was used to address missingness when model testing. FIML is considered a theory-based approach to missing data and has demonstrated greater statistical efficiency than more conventional techniques such as pairwise deletion, listwise deletion, and mean-imputation (Wothke, 2000). FIML does not impute missing values; instead, it uses an algorithm to provide a maximum likelihood estimation using all available data (Acock, 2005).

Preliminary Analyses

      The relationship between each demographic variable and the outcome measure

was examined in order to determine whether significant differences in alcohol use

severity existed based on demographic characteristics. T-tests revealed no significant

differences for gender and ethnicity (ps > .05). An ANOVA tested for differences in

drinking outcome based on intervention site/high school and showed no significant

differences (p > .05). There was a significant difference in alcohol use severity based on

grade in school, F (3,59) = 3.02, p < .05. Students in the 11th grade reported the most

alcohol use severity (M = 5.31, SD = 6.06), while students in the 10th grade reported the

least (M = 1.38, SD = 2.42). Students in the 9th and 12th grade reported similar alcohol

use severity at 3-month follow-up assessment (9th: M = 3.13, SD = 3.76; 12th: M = 3.82,

SD = 7.03). Comparisons indicated that 11th graders significantly differed from 10th

graders t (35) = -3.22, p < .01, r = .29; however, there were no other significant

differences between grades for alcohol use severity at follow-up.

      Bivariate correlations were conducted on transformed values and are presented in

Table 4. The 1-month measures of treatment satisfaction and therapeutic dosage were

highly correlated with the 3-month measures of these same variables (treatment

satisfaction: r = .82, p < .01, and dosage: r = .79, p < .01) and indicated high stability

across assessment periods, with no significant differences between mean scores of

satisfaction or therapeutic dosage at 1- versus 3-months (p > .05). Similarly, the 1- and

3-month measures of quit attempts were significantly correlated (r = .40, p < .01), with

no significant difference in mean number of quit attempts between assessment periods (p

> .05). Furthermore, there was moderate to high correlation between intake measures of

binge drinking episodes, alcohol-related problems, and the composite score of alcohol use severity (ps < .01). The 3-month measures of these variables all demonstrated high correlation (ps < .01). As previously discussed, the alcohol use severity score was used as the target drinking outcome due to increased variability and its high correlation with each of the individual drinking behavior measures.

Specific Aim 1: Alcohol Involvement

Table 3 presents the means and standard deviations for all exogenous and endogenous variables included in the models, as well as values for binge drinking episodes and alcohol-related problems separately. Values presented in Table 3 are prior to transformation; endogenous variables include percent zeros. T-tests were conducted to determine whether there were statistical differences between students' reported alcohol involvement and perceptions at intake and 3-month follow-up. Project Options participants reported significantly less alcohol use severity, t (55) = 2.37, p < .05, r = .30, and alcohol-related problems, t (59) = 2.82, p < .01, r = .35 from intake to 3-month follow-up. There were no significant differences for: intake to 3-month follow-up for binge drinking episodes and peer drinking estimates; intake quit attempts and 1-month quit attempts; 1-month quit attempts and 3-month quit attempts; 1-month peer drinking estimates and 3-month peer drinking estimates (ps > .05).

While the current study focused on adolescents reporting at least one alcoholic drink in the past 30 days at the time of intake, hazardous alcohol use and the prevalence of alcohol-related problems is not at clinical levels. As such, not all students participating in the intervention who reported baseline drinking had also experienced a binge episode or related problem at baseline assessment. Students with more problematic

use at intake were therefore examined separately in terms of change efforts and alcohol

involvement from intake to follow-up. First, among students who had reported at least

one binge episode in the past 30 days at intake, 23.1% reported at least one quit attempt

at 1-month follow-up, and 27.5% reported a quit attempt at 3-month follow-up. For

students who reported an alcohol-related problem at intake, 12.2% reported a quit attempt

at 1-month follow-up, and 22.8% reported an attempt to quit or cut down drinking at 3-

month follow-up. When compared with students reporting no baseline binge drinking

episodes, students with at least one binge episode at intake were more likely to have

reported a quit attempt at 1-month follow-up ($\chi^2 = 5.19$, $df = 1$, $p < .05$). There were no

significant differences in likelihood to report a quit attempt at 3-months for students with

and without a binge episode at intake. Similarly, there were no significant differences in

whether or not students reported a quit attempt at 1- and 3-month follow-up between

students with and without at least one reported alcohol-related problem at intake (all ps >

.05).

Specific Aim 2: Overall Model Fit and Comparison

Quit Attempts at 1- versus 3-months. All three proposed models were tested with

alcohol use severity as the outcome. Each model was tested separately with the 1-month

measure of quit attempts, and again, with the 3-month measure of reported quit attempts.

Specific Aim 2 examined overall model fit for each model tested, with the first

hypothesis predicting better model fit with models utilizing the 1-month quit attempts

measure in comparison to those with the 3-month quit attempts as the intervening

variable. Chi-square values and descriptive fit indices for all models are presented in

Tables 5. While none of the models met criteria for statistical or good descriptive fit,

models including the early assessments of quit attempts, and consequently the restricted 1-month measure of satisfaction, dose, and peer drinking estimates, resulted in better comparative model fit. AIC values for the 1-month quit attempts models were lower than all of their 3-month model counterparts.

Primary Model versus Alternative Models. In addition to comparing model fit for models utilizing the 1- versus 3-month measures of quit attempts, the second hypothesis of Specific Aim 2 purported that the Primary Model presented in Figure 1 would most accurately reflect the interrelationships among the target constructs. While the Primary Model predicted that quit attempts partially explained the relationship between the non-specific treatment factors and alcohol use severity at follow-up, the first Alternative Model proposed only direct effects from the exogenous to the endogenous variables; quit attempts was not included in the model. The second Alternative Model does not include therapeutic dosage as an exogenous variable, nor does it indicate a direct path from treatment satisfaction to drinking outcomes; however, it does specify an additional path from peer drinking estimates to reported quit attempts. Again, chi-square values and fit indices were examined for each model to determine overall model fit. AIC values were evaluated for model comparison. All values are presented in Table 5. Although none of the models met criteria for good statistical or descriptive fit, the second Alternative Model with the 1-month quit attempts measure had the lowest AIC value and demonstrated relatively better model fit in comparison to all other tested models.

Specific Aim 3: Path Coefficients

Path coefficients, interpreted as regression coefficients, were examined to determine the proportion of variance accounted for by each path within the model. The

R^2 for 1-month quit attempts was .07, indicating that approximately 7% of the variance in reported reduction and cessation efforts was predicted by this model. The model predicted 27% of alcohol use severity at follow-up, based on R^2. The direct effect from baseline estimates of peer alcohol use to quit attempts was statistically significant (β = .24, $p < .05$); students who reported greater frequency estimates of peer drinking at intake were more likely to report a quit attempt at 1-month follow-up. There was also a significant relation between 1-month quit attempts and alcohol use severity at 3-month follow-up (β = .29, $p < .05$). Students who reported at least one quit attempt at 1-month were more likely to report greater alcohol use severity 3-months post-intake. Lastly, alcohol use severity at intake was significantly associated with alcohol use severity at 3-month follow-up (β = .40, $p < .05$). Those who reported greater severity of alcohol use during the 30 days prior to beginning treatment were more likely to report greater severity at the 3-month assessment. All other paths were nonsignificant (ps > .05). Standardized path coefficients for all relations specified in the model and R^2 values are presented in Figure 4.

As described above, two variations of each of the six models tested (i.e., the three proposed models with the 1-month quit attempts measure and again with quit attempts at 3-months) was examined: 1) with only grade (trimmed models), and 2) with all demographic variables included (full models) as predictors of alcohol use severity at 3-months. Although the larger literature supports a relationship between drinking behaviors and ethnicity and gender among adolescents (Johnston et al., 2006), the current study's sample did not indicate that male and Caucasian students drank significantly more than their female and non-Caucasian counterparts. In addition, intervention site was

examined for its possible influence on drinking outcome; however, high schools did not

significantly differ in alcohol involvement. So while overall model fit and path

coefficients were presented and discussed in detail for the trimmed models, path

coefficients for the full models were also examined for general trends regarding

relationships between variables. Precise interpretation is cautioned due to the increased

number of estimated parameters and subsequent decrease in power.

Overall, the full models displayed a similar pattern to the trimmed models in

terms of goodness-of-fit for the models testing 1- versus 3-month quit attempts as the

intervening variable. The models with 1-month quit attempts had lower AIC values in

comparison to those using the 3-month measure. Across models, baseline estimates of

peer drinking was most consistently associated with alcohol use severity at follow-up;

students who reported greater estimates of frequency of peer alcohol at intake were more

likely to have greater alcohol use severity at the 3-month assessment. Although not as

reliable across the six models as peer estimates reported at intake, students' perceptions of

peer drinking at follow-up demonstrated a relatively consistent association with quit

attempts and alcohol use severity. Students with greater peer estimates at follow-up were

more likely to report at least one quit attempt; moreover, those with greater peer drinking

estimates at follow-up were more likely to have greater alcohol use severity at follow-up.

DISCUSSION

<u>Summary of Findings</u>

This investigation examined the relationship between treatment satisfaction and therapeutic dosage within a brief alcohol intervention and the impact of these non-specific treatment factors on reported number of attempts to cut down or quit alcohol use and drinking-related outcomes. Three theoretically-based models depicting the interrelationships among these variables were proposed, with the Primary Model presented in Figure 1 hypothesized to be most representative of the impact of non-specific treatment factors on self-change and alcohol involvement. Furthermore, each of the models was tested using 3-month assessments for the exogenous variables, and then again restricting these measures to only 1-month post-intake assessments. All models were compared to determine which best fit the data. Consistent with expectations, models utilizing the 1-month measures demonstrated better model fit; however, the second Alternative Model (Figure 3) rather than the Primary Model had comparatively better overall fit and accounted for 27% of the variance in 3-month post-intake alcohol use severity.

Path coefficients for the best-fitting model were then examined to understand more specifically the relationships between variables within the model. Three paths were statistically significant. Greater estimates of peer drinking at intake were associated with an increased likelihood of making a quit attempt at 1-month follow-up. Subsequently, students reporting at least one quit attempt at 1-month were more likely to report greater alcohol use severity at 3-month follow-up. Finally, alcohol use severity at intake was positively associated with alcohol use severity at follow-up. While the lack of

significance for the path from satisfaction to quit attempts was contrary to the

hypothesized importance of non-specific treatment factors, the significance of perceived

peer use (Schulte et al., in press) and change efforts (Brown et al., 2005) is consistent

with previous investigations of the target intervention.

Although not a focus of the current study, it is important to note the exclusion of

demographic variables due to lack of significant differences between male and female

adolescents, between Caucasian and non-Caucasian students, and among the various

intervention sites. Large surveys of adolescent alcohol use indicate greater drinking rates

for boys in comparison to girls, and among Caucasian adolescents when compared to

African American and Latino youth (Johnston et al., 2006). Moreover, school was

considered as a possible demographic predictor of alcohol involvement due to differences

in socio-economic status, geographic location, and general school "culture." Since each

of these variables was not significantly related to alcohol use severity at follow-up,

trimmed down models were tested for improved power and reliability. Both the

voluntary nature of the intervention and the inclusion criteria of the current project (i.e.,

students had to report at least one alcoholic drink in the past 30 days at intake) are

believed to account for the greater homogeneity in hazardous drinking observed in this

study's sample in comparison to the consistent trends in demographic differences found

in larger, epidemiological studies.

Specific Aim 1: Alcohol Involvement

Within this sample of high school students who were self-selected participants of

the Project Options intervention and had reported past month alcohol use at intake,

hazardous alcohol involvement (as measured by total number of binge drinking episodes

and alcohol-related problems) differed significantly from intake to follow-up assessment. However, assertions regarding the degree to which intervention participation impacted these reductions cannot be made without a non-intervention control group. Adolescent drinking behaviors are influenced by many external factors (e.g., holidays, exams, school dances), thereby creating natural fluctuations in drinking patterns and subsequent problems (Brown, 2001). While these results cannot be attributed entirely to purposeful self-change, they are consistent with previous investigations of the Project Options intervention and therefore provide some preliminary support for the utility of secondary school-based alcohol interventions (Schulte et al., in press).

The current project also sought to investigate the role of student attempts at reducing or ceasing alcohol use early versus later in treatment. Toward this aim, the percentage of students reporting change efforts and the mean number of attempts to cut down or quit are relevant. While the percentage of students reporting attempts to change drinking behaviors increased somewhat from one to three months, the average number of quit attempts remained relatively unchanged. These findings, combined with the previous investigation of change efforts among Project Options students (Brown et al., 2005) and the overall reduction in problematic use observed from intake to 3-month follow-up in the current sample, suggest that students who may have become "successful" at reducing their alcohol involvement no longer perceive the need to make effortful change attempts. In other words, students who start out with little to moderate alcohol use and who have later reduced their drinking to a more personally-deemed acceptable level will report fewer attempts since they no longer need to try to cut down or quit. Moreover, a greater proportion of students who had reported a binge episode at

intake reported making a reduction or quit attempt after one month of intervention participation in comparison with students reporting no baseline binge drinking. Furthermore, the entire sample, as well as those with a reported baseline binge episode or problem, showed a small increase in the percentage of students indicating at least one quit attempt from 1-month to 3-months post-intake. These findings suggest that increased exposure to information and reduction strategies provide more students with the tools and time necessary to employ personal change efforts.

Specific Aim 2: Overall Model Fit and Comparison

Path analysis has the benefit of assessing overall model fit by solving multiple equations simultaneously for theory-based models; however, good model fit is not necessarily indicative of large effects or that the "best" model identified is the best one that could be constructed. Three theoretically-based models, each assessing variations of the interrelationships among variables and iterations of drinking outcomes, were included in the current study to account for the possibility of equivalent models.

Quit Attempts at 1- versus 3-months. Although the 1-month measure of reduction/cessation attempts has the advantage of temporal precedence in terms of prediction, four weeks is a small window for students to attend the voluntary intervention and gain a complete picture of full therapeutic dosage. Conversely, the 3-month measure of quit attempts allows for the maximum amount of time for student participation in the intervention (i.e., therapeutic dosage and treatment satisfaction scores); however, only cross-sectional analyses are possible because both quit attempts and drinking outcomes were measured at the same follow-up. Examining both sets of models allowed for a comparison of the impact of early intervention factors (i.e., 1-month therapeutic dosage,

1- month treatment satisfaction, 1-month peer drinking estimates) and attempts at behavioral modification (i.e., 1-month quit attempts) on longer-term drinking outcomes with the measurement of these same treatment variables assessed throughout the course of participation. Although conclusions regarding how these early measures influence later drinking outcomes are limited by small effect sizes between particular variables, these general findings suggest that understanding how various components of alcohol interventions affect adolescent attempts to change deleterious drinking can be effectively modeled with information gathered towards the start of treatment.

Primary versus Alternative Models. The second hypothesis of Specific Aim 2 purported that the Primary Model would produce the best model fit in comparison to the two proposed alternatives. While some practical issues are likely to have affected model fit, such as the increased power due to fewer estimated parameters in the second Alternative Model, other theoretical characteristics of the Primary Model may have prevented it from best representing the data. First, the impact of both non-specific treatment factors and specific treatment content (corrected peer perceptions of alcohol use) on drinking behaviors at follow-up may be better modeled using reported quit attempts as an intervening variable in each of these processes. It appears that reduction and quit attempts represent a key mechanism in the self-change process; however, the roles of satisfaction and dosage remain ambiguous in terms of how they relate to both change efforts and drinking outcomes. The better model fit of Alternative Model 2 suggests that variables assessing student engagement in treatment may not be directly affecting outcome as originally thought. For adolescents exhibiting enough internal motivation to voluntarily attend an alcohol intervention during lunch period, willingness

to change deleterious drinking patterns may be in place long before intervention participation begins. The Primary Model may have therefore overestimated the degree to which in treatment satisfaction measures and a count of session attendance could accurately measure true "engagement" for these teens. As such, the better fitting model's fewer direct effects specified between non-specific factors and outcome, along with the increased importance in peer drinking estimates, suggests that content may be of greater significance when modeling treatment process and response for a community sample of adolescents.

Specific Aim 3: Path Coefficients

Individual path coefficients provide more specific information as to the degree to which non-specific treatment factors, attempts at behavioral change, and alcohol involvement interact and influence each other. Although only few of the paths indicated a statistically significant relationship, nonsignificant path coefficients are also useful in understanding the relationship between variables given a particular sample.

Treatment Satisfaction and Therapeutic Dosage. The absence of therapeutic dosage in the best-fitting model (see Figure 4) warrants discussion regarding the relationship between dose and satisfaction, and more importantly, the utility of this construct in predicting treatment outcome. While a significant correlation between 3-month measures of therapeutic dosage and satisfaction, and 1-month satisfaction and 3-month dosage was supported (see Table 4), more did not mean "better" for either in terms of predicting quit attempts or drinking outcomes. It may be that students discontinue attending Project Options once they have acquired the information and tools they sought, and for many, this occurs within a few visits. Previous research indicates that significant

behavioral change is possible with very limited exposure when the material presented is relevant and applicable (Miller, 2000; Monti et al., 1999). Moreover, the voluntary nature of the program may facilitate this brief framework given that students seeking such services are less ambivalent about learning and utilizing strategies that promote positive coping. Although previous work by Kelly and colleagues (2000) on substance abusing teens indicated that greater 12-step meeting attendance was associated with better posttreatment substance use outcome, differences in degree of problematic use, consequences resulting from use, and coping skills in place prior to meeting attendance between their clinical sample and the current study's community sample of teens may account for the reduced need for and impact of additional sessions.

Quit Attempts. The very small and nonsignificant relationship between treatment satisfaction and student attempts at self-change may also be reflective of the voluntary and community based nature of this program. There was little variation in satisfaction scores both within and between the 1- and 3-month assessment points, with the majority of students reporting high satisfaction. Although the instrument used to assess satisfaction within the current study included the elements presented by Lebow (1983), it was not a standardized measure and may have failed to capture certain facets, and therefore variability, of this already ambiguous construct. As purported by Dearing and colleagues (2005), "satisfaction" itself may be a proxy for a variety of client engagement variables. Even with the inclusion of specific measures assessing client expectations, working alliance, and session attendance, 58% of the variance in treatment satisfaction was unaccounted for in Dearing et al.'s (2005) study of adult outpatients. Given that, the current project measured only four components of satisfaction (with only one question

assessing each component), it is possible that a larger latent variable describing "student engagement in treatment" in terms therapeutic dosage, therapeutic alliance, expectations, satisfaction with services, and baseline motivation for change would help clarify how each of these constructs interact with one another, and in turn, better determine their impact on treatment outcome.

Consistent with Specific Aim 3, there was a significant relationship between quit attempts and alcohol use severity. The impact of reduction and cessation efforts at 1-month on 3-month alcohol use severity, however, was not in the hypothesized direction. It was purported that students who reported at least one quit attempt at 1-month were less likely to report binge episodes and alcohol-related problems at the subsequent follow-up assessment. In contrast, these results suggest that students who are attempting to make changes in their alcohol involvement early in treatment are more likely to engage in risky drinking two months later. Since there was a significant reduction in mean alcohol use severity from intake to 3-month follow-up, it appears that the positive association between 1-month quit attempts and 3-month binge episodes may be indicative of students with more problematic use requiring more time and change attempts to succeed in reducing their drinking. These results are consistent with previous findings in which Project Options students classified as "frequent" drinkers (used alcohol on 51 or more occasions in lifetime) were significantly more likely to report that they had made an attempt to reduce or quit use in the past year (Brown et al., 2005). Furthermore, use of a control group in the previous study indicates that students with the greatest alcohol involvement are more likely to employ change efforts after even just one intervention session compared to those with less drinking experience. Similar to cut down and quit

attempts research for smoking (Centers for Disease Control and Prevention, 2006), these results suggest that multiple attempts over a longer period of time may be necessary for adolescents with more alcohol experience.

Peer Perceptions. The third hypothesis of Specific Aim 3 predicted that both baseline and follow-up measures of student estimates of peer drinking would be positively related to drinking behaviors. It was also posited that the impact of perceived peer use would demonstrate a weaker relationship with alcohol involvement than non-specific treatment factors. While the only significant path with a measure of peer drinking estimates was the relationship between greater baseline estimates and increased likelihood of making a quit attempt at1-month follow-up, this relationship was much stronger than that of treatment satisfaction and quit attempts.

Average estimates of peer use did not significantly differ from intake to 1- or 3-month follow-up; however, there was a small, nonsignificant decrease from the intake to 1-month assessment. This small change may be indicative of students attempting to "normalize" their own drinking frequency by making quit attempts during that first month of participation. Previous studies examining Project Options found that students attending the intervention were more likely to make a quit or reduction attempt (Brown et al., 2005). Additionally, corrected peer drinking estimates were found to be related to reductions in personal alcohol use (Schulte et al., in press). Together, these findings suggest that adolescents are amenable to not only correcting their misperceptions about drinking, but are also willing and able to integrate intervention information into purposeful change attempts very early in treatment. This also may simply be the result of most students receiving the majority of their exposure to intervention information within

the first month of participation, with students most likely attending the session on normative feedback during this time. However, these reductions are not statistically significant and do not appear to be stable. The 3-month follow-up estimates of peer alcohol use are almost identical to those reported at intake. Furthermore, peer drinking estimates at intake and follow-up were not related to alcohol use severity, nor did 1-month peer estimates demonstrate a significant relationship with quit attempts. It seems that students begin the intervention with motivation to change their beliefs and behaviors regarding alcohol use for themselves and others, but early change is difficult to sustain.

Covariates. The direct effect from alcohol use severity at intake to alcohol use severity at follow-up was significant. Students who reported more problematic alcohol involvement at baseline assessment were more likely to again report more severity of use three months post-intake. The tally of baseline binge episodes and alcohol-related problems were used as covariate in order to control for differences in 3-month alcohol use severity based on variations in degree of hazardous drinking prior to the start of intervention participation. While the strength of the relationship between intake and follow-up assessments may not be surprising, it does illustrate the influence that differing levels of alcohol use at baseline, or drinking categories of regular use prior to intervention, can have on the change process and therefore subsequent outcome. As observed in the previous studies of Project Options described earlier, more frequent drinkers made more quit attempts (Brown et al., 2005) and experienced the largest decrease in personal use over the course of the academic year (Schulte et al., in press) as compared to students reporting light or moderate use. Together, these findings support the utility of examining drinking involvement at intake as a possible moderator when

modeling the impact of treatment factors on drinking outcomes within community samples of adolescent drinkers.

Finally, the path from grade in school was not a significant predictor of 3-month alcohol use severity. Although the preliminary analyses of demographic variables showed a significant difference in means among the four grade levels, there was no significant relationship between grade and drinking outcomes in the model. A recent review article examining developmental issues in alcohol treatment response studies found that only three studies of adolescent alcohol treatment used a developmental proxy (age or grade) as a predictor of treatment outcome (Wagner, 2008). The author notes that although relying exclusively on developmental demarcations such as grade can neglect the importance of core developmental processes, the complete omission of developmental measures limits the ability of research to inform treatment for a period of development that is most vulnerable to behavioral, emotional, and cognitive changes that impact the progression of problematic alcohol use (Guo, Collins, Hill, & Hawkins, 2000; Wagner, 2008). Thus, although not significant, grade should still be considered useful when investigating differences in treatment response among youth.

Limitations and Future Directions

A number of strengths of the current project should be noted, including the comparison of early and cumulative treatment satisfaction, examination of the impact of change efforts measured early versus later in treatment, assessment of an understudied population of teen drinkers, and utilization of an efficient data analysis procedure for examining multiple relationships among variables. Even with these advantages, however, certain caveats limit interpretation. First, 73% of the variance was unaccounted

for in alcohol use severity at follow-up. Secondly, while the model approached good fit, it did not meet criteria statistically or descriptively. Thus, interpretation of these results should be done so with caution.

The current study's sample size was just adequate for path analysis; however, the findings require confirmation with a larger and new sample of students. Furthermore, the current sample size did not allow for model invariance testing with subgroups, such as gender, ethnicity, or grade. Moreover, while students selected for this study were all "current drinkers," variations in baseline experience with alcohol and alcohol-related problems may differentially affect engagement in the intervention, the need for change, and as a result, change attempts and outcomes. The examination of drinking subgroups has already produced significant results with this population and intervention (Brown et al., 2005), making this an important moderator in terms of understanding which groups are most affected and when. Just as greater severity of substance use has been associated with increased likelihood of treatment attendance and group affiliation among substance abusing teens (Kelly, Myers, & Brown, 2002), the role and degree of treatment engagement may differ based on other characteristics such as gender, developmental status, and cultural identity and should be examined.

When modeling causality, the issue of time and measurement must be considered. The 1-month measure of quit attempts has the advantage of preceding the measurement of the 3-month assessment of alcohol use severity, yet there is overlap in the measurement of treatment satisfaction and dosage with change efforts during the first month post-intake. True causality would require distinct and separate time periods for assessment to establish temporal precedence. Furthermore, future studies examining

various follow-up time points could better illustrate the amount of time necessary for behavioral attempts at change to show the greatest impact on alcohol use. Replication studies assessing these constructs at different time points could provide insight into how the change process in treatment occurs by identifying when interventions produce the most benefit.

Inclusion of additional non-specific treatment factors, such as initial expectations for treatment, baseline motivation, and working alliance, would facilitate our understanding of how these universal treatment processes influence treatment retention and outcome. While there was significant decrease in alcohol use severity from intake to follow-up, the effect size of this reduction in hazardous drinking is small and demonstrated no relationship with the proposed treatment factors. Omitted variables in path models can lead to misspecification and reduced predictive power. Thus, it is necessary to consider what other treatment components are producing positive behavioral change. Student expectations about the intervention and its usefulness at baseline were not assessed but may contribute to the processing and utilization of skills taught in session. Dearing and colleagues (2005) purport that client expectations at the start of treatment interact with processes during the course of treatment that affect satisfaction, and subsequently, influence drinking outcomes. For a voluntary program such as Project Options, student expectations about the services prior to participation may provide greater insight into motivation for attendance, applicability or perceived need for such services, and likelihood of employing learned skills. Baseline expectations could, therefore, not only assist in predicting satisfaction, but could also help explain some of the variance in attempts made at changing drinking behaviors. Future studies are needed

to more closely examine the critical point or threshold for therapeutic dosage and successful change within an adolescent population choosing to attend an alcohol intervention because high motivation for treatment may affect engagement and outcome.

Working alliance also demonstrated a strong relationship with satisfaction in the Dearing et al. (2005) study with adults in alcohol treatment. In fact, alliance demonstrated the greatest association with treatment satisfaction from among the three proposed predictors. While the current study's measure of satisfaction included a question measuring student appraisal of the group or individual interventionist, it was intended to measure an aspect of student satisfaction with services received rather than the participant's perceived connection with the interventionist and/or other group members. Given the consistent findings in meta-analytic studies supporting this non-specific treatment factor as a significant predictor of successful outcome (Horvath & Symonds, 1991; Martin, Graske, & Davis, 2000; Shirk & Karver, 2003), its inclusion would likely yield greater prediction of drinking outcomes. Research specifically investigating alcohol treatment has shown that working alliance is a strong predictor of active participation in treatment as well as long-term reductions in alcohol involvement, even after controlling for alcohol history and previous treatment experience (Conners, Carroll, DiClemente, Longabaugh, & Donovan, 1997).

In addition to the inclusion of participant expectations and working alliance, a more precise assessment of quit attempts could also assist in producing a larger proportion of explained variance in outcome. While the connection between attempting to reduce one's drinking and observing an actual decrement in consumption is logical, what is actually understood as a "quit attempt" may vary considerably from person to

person. Moreover, the nature of the attempt made may produce more or less effect on drinking behaviors. For instance, some adolescents may consider participation in the intervention itself evidence of a reduction attempt, whereas for others, effortful change may be defined more by major adjustments in regard to the people and places associated with drinking. Because this construct of "quit attempt" may encompass a spectrum of behavioral modification, greater precision in measurement could serve to elucidate its relationship with subsequent alcohol involvement. Previous research on adolescent definitions for quitting, stopping, and cutting down smoking found that different definitions for stopping smoking were associated with smoking history and motivation to quit (MacPherson, Myers, Johnson, 2006). As an intervening variable, or mechanism by which treatment factors produce change in alcohol involvement in the current model, questions measuring the number of reduction or cessation attempts that were categorized as avoidance strategies (e.g., not going to parties where there would be alcohol), positive coping (e.g., talking to a friend instead of drinking to cope with negative affect), or increased monitoring (e.g., setting a limit and counting drinks) could facilitate common understanding of terminology as well as better identify which cut down and quit techniques are most successful. Reported attempts to reduce or stop drinking appear to be an important construct in modeling volitional efforts in teen drinking, but less ambiguity in its operationalization would improve interpretation within and across studies.

Implications for Treatment

The findings presented have potential implications and applications for developmentally-focused alcohol programs targeting teens who are already intrinsically

motivated to participate in treatment but may need additional skills and support to make active attempts for reducing alcohol involvement. Although not a part of the final best-fitting model, understanding the strong relationship between treatment satisfaction and therapeutic dosage is useful for voluntary treatments focused on increasing retention and engagement. Given the significant correlation between greater 1-month treatment satisfaction and increased attendance measured at the later follow-up, positive experiences with mental health services during adolescence could be important in predicting future help-seeking behaviors.

Combined with previous findings, the significant relationship between quit attempts and hazardous drinking behaviors at follow-up indicates that participation in the program and exposure to specific session content is associated with both cut down/quit attempts and alcohol involvement (Brown et al., 2005; Schulte et al., in press). The current sample represents a community-based population, thereby highlighting the importance of content and skills for youth self-selecting into an alcohol intervention. While MI and CBT approaches appear to be satisfactory to most students, preliminary examination of drinking status and preferred session content indicate that student satisfaction differs by session when current alcohol involvement is considered (Keating et al., in press). It is, therefore, important to provide information that is applicable to all drinking levels. Since even very brief interventions can elicit positive change (Miller, 2000; Monti, et al., 1999), school-based interventions need to work on diminishing the stereotypes of "alcohol programs" presented by the media so that teens with an array of alcohol experience who are interested in learning new skills will be motivated to first attend, actively engaged while present, and in turn, willing to apply the information and

strategies learned.

Overall, these findings mark the beginning of our understanding of the relationship among non-specific treatment factors and successful drinking outcomes for adolescents voluntarily seeking services. Given the deleterious consequences of problematic drinking starting in youth (e.g., Brown & Tapert, 2004; O'Malley et al., 2004), further investigations into which global factors of alcohol programs are most effective and for whom will serve to improve both the utilization of services by teens and the efficiency of treatment by service providers.

APPENDIX

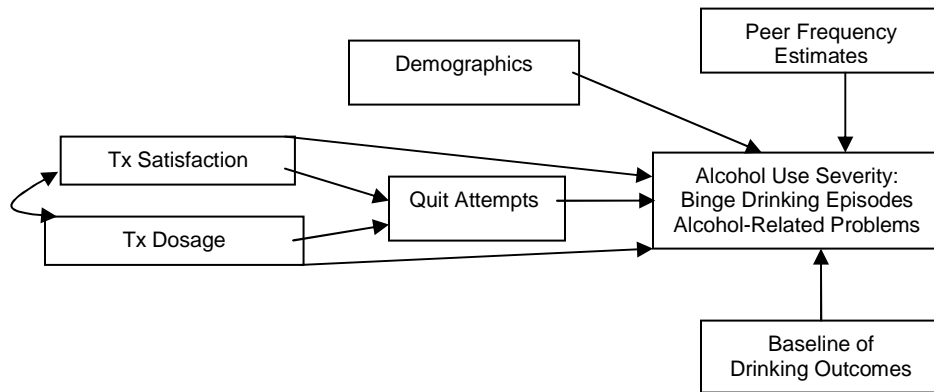Figure 1. Primary conceptual process model of adolescent alcohol intervention outcomes
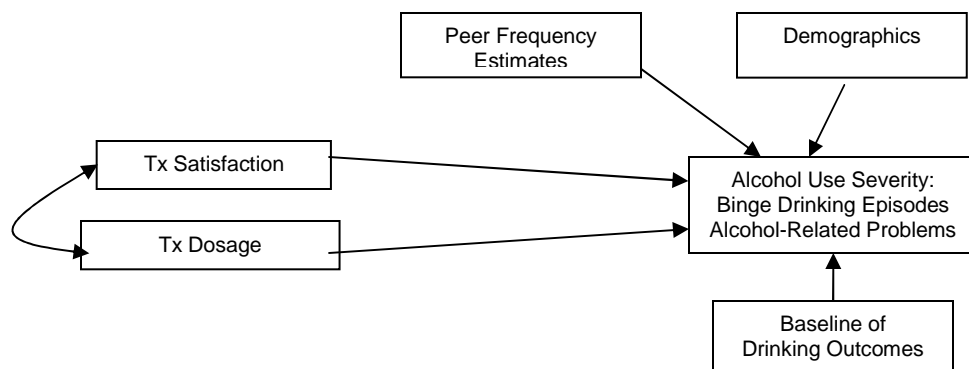
Figure 2. Alternative process model of adolescent alcohol intervention outcomes:
Quit attempts removed as an intervening variable
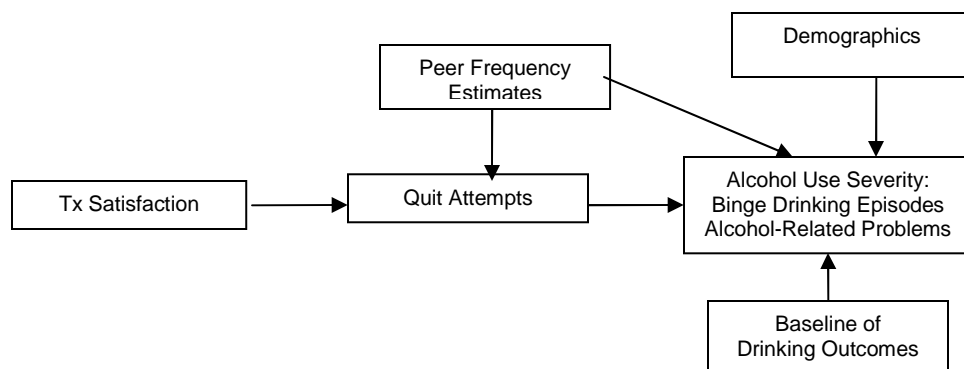
Figure 3. Alternative process model of adolescent alcohol intervention outcomes:
Therapeutic dosage removed as an exogenous variable and a path from peer frequency
estimates to quit attempts added

Table 1. Demographic and baseline past 30 day alcohol use characteristics for students
with and without completed 3-month follow-up assessments.

	Completed F/Up (n=94)	Without F/Up (n=85)
Gender (%)		
Male	59.6	56.5
Female	40.4	43.5
Grade (%)		
9th	21.3	22.4
10th	36.2	43.5
11th	28.7	22.4
12th	13.8	11.8
Ethnicity (%)		
Caucasian	58.5	54.8
Hispanic American	11.7	17.9
African American	7.4	6.0
Asian American	11.7	11.9
Pacific Islander	1.1	1.2
Mixed-Other	9.6	7.1
Alcohol Use (at Intake)		
30 Day Use	3.3(3.6)	3.9(5.6)
Quit Attempts**	0.4(0.9)	1.3(4.9)
Alcohol Problems	4.2(6.4)	4.7(7.6)
Binge Episodes	1.4(2.6)	1.7(5.0)

Note. ** = $p < .01$

Table 2. Project Options session content

Session	Title	Content
1	Normative Feedback	- Provide school-specific use rates - Discussion of why youth overestimate and common methods employed by teens to reduce or cease use
2	Outcome Expectancies	- Discussion of actual effects of alcohol versus results of alcohol expectancies on behaviors while drinking
3	Stress and Coping	- Discussion of consequences resulting from substance use as a coping strategy - Match healthy coping strategies to target stressor
4	Progression of Problematic Use	- Discussion of how experimental use can lead to problem use and alcohol-related consequences
5	Behavioral Management	- Learning to identify risky situations, develop a plan appropriate for that situation, and evaluate the effectiveness of the plan
6	Communication Skills	- Identifying communication errors that lead to conflict and developing more effective techniques

Table 3. Descriptives for variables included in the path models and percentages of students reporting zero for endogenous variables.

Variable	Mean	SD	Range	% zero
Therapeutic Dosage for 3-mo	2.41	1.60	1-6	
Treatment Satisfaction for 3-mo	1.77	0.51	1-3.13	
Therapeutic Dosage for 1-mo	1.83	1.10	1-5	
Treatment Satisfaction for 1-mo	1.70	0.53	1-3.13	
Alcohol Severity at Intake	5.80	8.38	0-46	
Alcohol Severity at 3-mo	3.22	4.93	0-24	
Alcohol-Related Problems at Intake	4.16	6.35	0-35	25.3
Alcohol-Related Problems at 3-mo	1.72	2.60	0-13	48.4
Binge Episodes at Intake	1.40	2.60	0-15	56.0
Binge Episodes at 3-mo	1.04	2.48	0-15	69.9
Peer Frequency Estimates at Intake	7.85	6.92	1-30	
Peer Frequency Estimates at 1-mo	6.10	4.61	0-30	
Peer Frequency Estimates at 3-mo	7.95	6.32	0-25	
Quit Attempts at 1-mo	0.44	1.75	0-10	88.7
Quit Attempts at 3-mo	0.40	0.98	0-5	83.1

Table 4. Correlations among variables included in the path models.

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.	Gender	-																	
2.	Grade	.19	-																
3.	Ethnicity	.27**	.13	-															
4.	1-mo Treatment Satisfaction	.03	.14	-.04	-														
5.	1-mo Therapeutic Dosage	-.03	-.29**	-.09	-.18	-													
6.	3-mo Treatment Satisfaction	.08	.17	.10	.82**	-.11	-												
7.	3-mo Therapeutic Dosage	-.03	-.24*	-.03	-.24*	.79**	-.25*	-											
8.	1-mo Quit Attempts	-.14	-.13	-.15	-.12	.01	-.16	-.05	-										
9.	3-mo Quit Attempts	.07	-.19	-.09	-.05	.13	-.06	.06	.40**	-									
10.	Intake Peer Perceptions	-.17	-.04	-.21*	-.22*	.13	-.26*	.10	.26*	.13	-								
11.	1-mo Peer Perceptions	-.01	-.14	-.11	-.06	-.09	-.16	-.003	.10	-.03	.34**	-							
12.	3-mo Peer Perceptions	-.07	-.002	-.09	-.19	.01	-.25*	.07	-.06	.14	.42**	.33**	-						
13.	Intake Binge Drinking Episodes	.08	.04	-.08	-.08	-.06	.04	-.14	.28*	.19	.09	.03	-.08	-					
14.	3-month Binge Drinking Episodes	.12	.15	.08	.01	-.03	.01	-.001	.26*	.28**	.02	.17	.04	.20	-				
15.	Intake Alcohol Related Problems	-.06	.12	-.05	.11	-.04	.05	-.08	.05	.06	.38**	.07	.27	.42**	.24*	-			
16.	3-month Alcohol Related Problems	.04	.03	-.13	.11	-.17	-.005	-.15	.35*	.25	.22	.18	-.03	.20	.52**	.31*	-		
17.	Intake Alcohol Use Severity	-.01	.09	-.04	.08	-.02	.08	-.08	.16	.15	.34**	.12	.22	.63**	.26*	.94**	.40**	-	
18.	3-month Alcohol Use Severity	.13	.12	-.009	.16	-.16	.07	-.17	.34*	.30*	.19	.15	-.02	.26*	.77**	.41**	.88**	.46**	-

Note. * indicates $p \geq .05$ and ** indicates $p \geq .01$

Table 5. Chi-square and descriptive fit index values for each of the three proposed models utilizing 1- and 3-month quit attempts measure as the intervening variable, alcohol use severity as the outcome, and grade as the only demographic variable included as a covariate.

Model	χ^2	CFI	SRMR	RMSEA	AIC
3-Month Quit Attempts:					
Primary Model	52.54	.474	.128	.129	16.54
Alternative Model 1	45.53	.441	.133	.140	17.53
Alternative Model 2	45.58	.465	.129	.146	19.58
1-Month Quit Attempts:					
Primary Model	44.61	.645	.106	.096	8.61
Alternative Model 1	37.87	.586	.108	.108	9.89
Alternative Model 2	31.33	.741	.098	.087	5.33

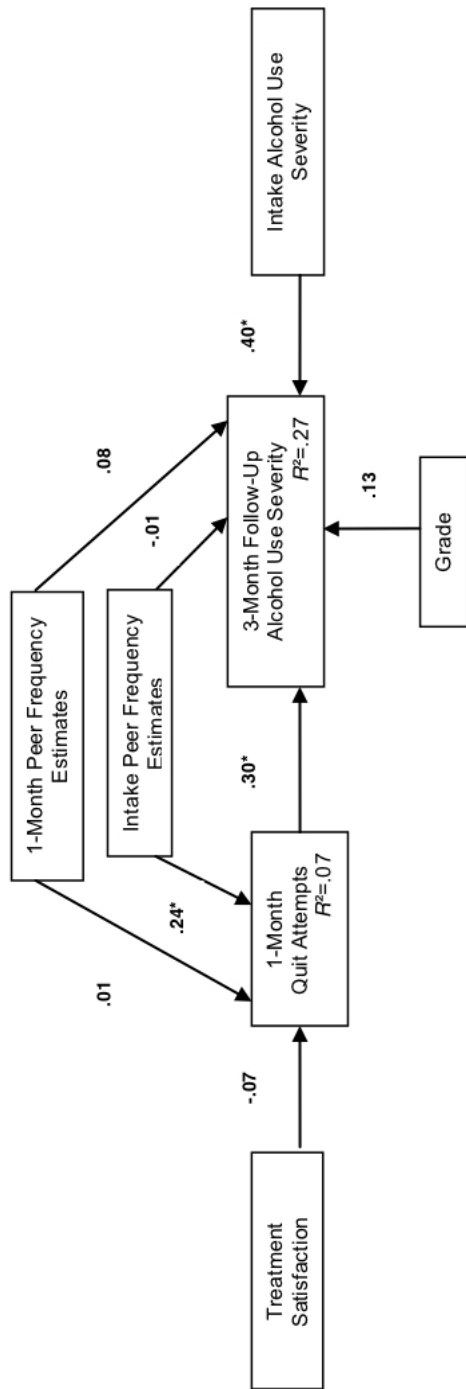*Note:* All χ^2 values are $p < .01$

Figure 4. Path analytic model with standardized path coefficients and R^2 values: Alternative Model 2 with 1-month quit attempts.

Note: * $p < .05$

REFERENCES

Ackard, D.M., & Neumark-Sztainer, D. (2001). Health care information sources for
    adolescents: Age and gender differences on use, concerns, and needs. *Journal of
    Adolescent Health, 29,* 170-176.

Acock, A.C. (2005). Working with missing values. *Journal of Marriage and Family, 67,*
    1012-1028.

Attkisson, C.C., & Zwick, R. (1982). The client satisfaction questionnaire: Psychometric
    properties and correlations with service utilization and psychotherapy outcome.
    Evaluation and Program Planning, 5, 233-237.

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory.
    Englewood Cliffs, NJ: Prentice-Hall.

Barkin, S., Smith, K. S., & DuRant, R. (2002). Social skills and attitudes associated with
    substance use behaviors among young adolescents. *Journal of Adolescent Health,
    30,* 448-454.

Bien, T.H., Miller, W.R., & Tonigan, J.S. (1993). Brief interventions for alcohol
    problems: A review. *Addictions, 88,* 315-336.

Brown, S.A. (1993). Recovery patterns in adolescent substance abuse. In J.S. Baer, G.A.
    Marlatt, R.J. McMahon (Eds.), *Addictive behaviors across the life span:
    Prevention, treatment, and policy issues* (pp. 161-183). Thousand Oaks, CA: Sage
    Publications, Inc.

Brown, S.A. (2001). Facilitating change for adolescent alcohol problems: A multiple
    options approach. In E.F. Wagner & H.B. Waldron (Eds.), *Innovations in
    adolescent substance abuse interventions* (pp. 169-187). Amsterdam,
    Netherlands: Pergamon/Elsevier Science Inc.

Brown, S.A., Anderson, K., Schulte, M.T., Sintov, N.D., & Frissell, K.C. (2005).
    Facilitating youth self-change through school based intervention. *Addictive
    Behaviors, 30,* 1797-1810.

Brown, S.A., Meyer, M.G., Lippke, L., Tapert, S.F., Stewart, D.G. & Vik, P.W. (1998).
    Psychometric evaluation of the customary drinking and drug use record (CDDR):
    A measure of adolescent alcohol and drug involvement. *Journal of Studies on
    Alcohol, 59,* 427-438.

Brown, S.A. & Tapert, S.F. (2004). Adolescence and the trajectory of alcohol use: Basic
    to clinical studies. In R.E. Dahl & L.P. Spear (Eds.), *Adolescent brain
    development: Vulnerabilities and opportunities, Volume 1021 of the Annals of the*

New York Academy of Sciences (pp. 234-244).

Byrne, B. 2001. *Structural Equation Modeling with AMOS: Basic Concepts, Applications and Programming*. Mahwah, NJ: Lawrence Erlbaum Associates.

Connors, G.J., Carroll, K.M., DiClemente, C.C., Longabaugh, R., & Donovan, D.M. (1997). The therapeutic alliance and its relationship to alcoholism treatment participation and outcome. *Journal of Consulting and Clinical Psychology, 65,* 588-598.

Centers for Disease Control and Prevention (2006). Tobacco use among adults – United States, 2005. *Morbidity and Mortality Weekly Report, 55,* 1145-1148.

Cook, T.D. & Campbell, D.T. (1979). *Quasi-experimentation: Design and analysis issues for field studies.* Boston: Houghton Mifflin.

D'Amico, E.J., McCarthy, D.M., Metrik, J., & Brown, S.A. (2004). Alcohol-related services: Prevention, secondary intervention and treatment preferences of adolescents. *Journal of Child and Adolescent Substance Abuse, 14(2),* 61-80.

Darkes, J., & Goldman, M.S. (1998). Expectancy challenging and drinking reduction: Process and structure in the alcohol expectancy network. *Experimental and Clinical Psychopharmacology, 6(1),* 64-76.

Dearing, R.L., Barrick, C., Dermen, K.H., & Walitzer, K.S. (2005). Indicators of client engagement: Influences on alcohol treatment satisfaction and outcomes. *Psychology of Addictive Behaviors, 19,* 71-78.

Deas, D., Riggs, P., Langenbucher, J., Goldman, M., & Brown, S. (2000). Adolescents are not adults: Developmental considerations in alcohol users. *Alcoholism: Clinical and Experimental Research, 24*, 232-237.

Denner, B., & Halprin, F. (1974). Measuring consumer satisfaction in a community outpost. *American Journal of Community Psychology, 2,* 13-22.

Far, J.M. & Miller, J.A. (2003). The small groups norms-challenging model: Social norms interventions with targeted high-risk groups. In H.W. Perkins (Ed.), *The social norms approach to preventing school and college age substance abuse* (pp. 111-132). San Francisco, CA: Jossey-Bass.

Fillmore, K. M. (1988). Alcohol use across the life course: A critical review of 70 years of international longitudinal research. Toronto, Ontario: Addiction Research Foundation.

Fiorentine, R. (2001). Counseling frequency and the effectiveness of out-patient drug

treatment: Revisiting the conclusion that "more is better." *American Journal of Drug & Alcohol Abuse, 27,* 617-631.

Frank, R., Salzman, K., & Fergus, E. (1977). Correlates of consumer satisfaction with outpatient therapy assessed by postcards. *Community Mental Health Journal, 13,* 37-45.

Frissell, K.C., McCarthy, D.M., D'Amico, E.J., Metrik, J., Ellingstad, T.P., & Brown, S.A. (2005). The impact of consent procedures on reported levels of adolescent alcohol use. *Psychology of Addictive Behaviors, 18(4),* 307-315.

Graham, J. W., Marks, G., & Hansen, W. B. (1991). Social influence processes affecting adolescent substance use. *Journal of Applied Psychology, 76,* 291-298.

Gou, J., Collins, L.M., Hill, K.G., & Hawkins, J.D. (2000). Developmental pathways to alcohol abuse and dependence in young adulthood. *Journal of Studies on Alcohol, 61,* 799-808.

Haines, M.P., Barker, G.P., & Rice, R. (2003). Using social norms to reduce alcohol and tobacco use in two Midwestern high schools. In H.W. Perkins (Ed.), *The social norms approach to preventing school and college age substance abuse* (pp. 235-246). San Francisco, CA: Jossey-Bass.

Haines, M.P. & Spear, A. F. (1996). Changing the perception of the norm: A strategy to decrease binge drinking among college students. *Journal of American College Health, 45,* 134-140.

Horvath, A. & Symonds, R.D. (1991). Relation between working alliance and outcome in psychotherapy: A meta-analysis. *Journal of Counseling Psychology, 38,* 139-149.

Hser, Y. I., Grella, C. E., Hubbard, R. L., Hsieh, S. C., Fletcher, B. W., Brown, B. S., & Anglin, M. D. (2001). An evolution of drug treatments for adolescents in 4 US cities. *Archives of General Psychiatry, 58,* 689-695.

Hussong, A.M., & Chassin, L. (1994). The stress-negative affect model of adolescent alcohol use: Disaggregating negative affect. *Journal of Studies on Alcohol, 55,* 707-718.

Jacobs, J. E. & Johnston, K. E. (2005). "Everyone else is doing it:" Relations between bias in base-rate estimates and involvement in deviant behaviors. In J.E. Jacobs & P.A. Klaczynski (Eds.), *The development of judgment and decision making in children and adolescents* (pp. 157-179). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (1998). National survey results on drug use from the Monitoring the Future Study, 1975-1997 (Vol. 1; Secondary school students). Bethesda, MD: National Institute on Drug Abuse.

Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E. (2006). Monitoring the Future national results on adolescent drug use: Overview of key findings, 2005 (NIH Publication No. 06-5882). Bethesda, MD: National Institute on Drug Abuse

Kelly, J.F., Brown, S.A., Abrantes, A., Kahler, C.W., Myers, M. (2008). Social recovery model: An 8-year investigation of adolescent 12-step group involvement following in-patient treatment. *Alcoholism: Clinical and Experimental Research, 32,* 1-11.

Kelly, J.F., Myers, M.G., & Brown, S.A. (2000). A multivariate process model of adolescent 12-step attendance and substance use. *Psychology of Addictive Behaviors, 24(4),* 376-389.

Kelly, J.F., Myers, M.G., & Brown, S.A. (2002). Do adolescents affiliate with 12-step groups? A multivariate process model of effects. *Journal of Studies on Alcohol, 63,* 293-305.

Kia-Keating, M., Schulte, M.T., Monreal, T.K., & Brown, S.A. (in press). Adolescent satisfaction with brief motivational enhancement for alcohol use.

Kirchner, J.H. (1981). Patient feedback on satisfaction with direct services received at a community mental health center: A two year study. *Psychotherapy: Theory, Research, and Practice, 18,* 359-364.

Kirchner, J.H. (1982). Patient feedback on satisfaction with direct services received at a community mental health center: A partial replication. *Psychotherapy: Theory, Research, and Practice, 19,* 43-47.

Kline, R.B. (2005). *Principles and practice of structural equation modeling* (2nd Edition). New York: The Guilford Press.

Klingemann, H. K. (1991). The motivation for change from problem alcohol and heroin use. *British Journal of Addictions, 86,* 727-744.

Larsen, D., Attkisson, C., Hargreaves, W., & Nguyen, T. (1979). Assessment of client/patient satisfaction: Development of a general scale. *Evaluation and Program Planning, 2,* 197-207.

Lebow, J.L. (1983). Research assessing consumer satisfaction with mental health treatment: A review of the findings. *Evaluation and Program Planning, 6,* 211-236.

Loehlin, J.C. (1992). *Latent variable models.* Hillsdale, NJ: Lawrence Erlbaum Publishers.

MacPherson, L., Myers, M.G., & Johnson, M. (2006). Adolescent definitions of change in smoking behavior: An investigation. *Nicotine Tobacco Research, 8,* 683-687.

Marlatt, G. A., & Witkiewitz, K. (2002). Harm reduction approaches to alcohol use: Health promotion, prevention, and treatment. *Addictive Behaviors, 27*, 867-886.

Marks, G., Graham, J. W., & Hansen, W. B. (1992). Social projection and social conformity in adolescent alcohol use: A longitudinal analysis. *Personality and Social Psychology Bulletin, 18,* 96-101.

Martin, D.J., Graske, J.P., & Davis, M.K. (2000). Relation of the therapeutic alliance with outcome and other variables: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 68,* 438-450.

McLellan, A.T., & Hunkeler, E. (1998). Patient satisfaction and outcomes in alcohol and drug abuse treatment. *Psychiatric Services, 49,* 573-575.

Metrik, J., McCarthy, D.M., Frissell, K.C., MacPherson, L., & Brown, S.A. (2004). Adolescent alcohol reduction and cessation expectancies. *Journal of Studies on Alcohol, 65(2),* 217-226.

Miller, W. R. (2000). Rediscovering fire: Small interventions, large effects. *Psychology of Addictive Behaviors, 14,* 6-18.

Miller, W.R. (1978). Behavioral treatment of problem drinkers: A comparative outcome study of three controlled drinking therapies. *Journal of Consulting and Clinical Psychology, 46,* 74-86.

Miller, W.R., & Rollnick, S. (2002). *Motivational Interviewing: Preparing people to change* (2nd Edition). New York: The Guilford Press.

Miller, W.R., Taylor, C.A., & West, J.C. (1980). Focused versus broad spectrum behavior therapy for problem drinkers. *Journal of Consulting and Clinical Psychology, 48,* 590-601.

Monti, P. M., Colby, S. M., Barnett, N. P. et al. (1999). Brief intervention for harm reduction with alcohol-positive older adolescents in a hospital emergency department. *Journal of Consulting and Clinical Psychology, 67,* 989-994.

Monti, P.M., & Rosenhow, D.J. (1999). Coping-skills training and cue exposure therapy in the treatment of alcoholism. *Alcoholism Research and Health, 23(2),* 107-115.

Morgenstern, J., Labouvie, E., McCrady, B.S., & Kahler, C.W. (1997). Affiliation with Alcoholics Anonymous after treatment: A study of its therapeutic effects and mechanisms of action. *Journal of Consulting & Clinical Psychology, 65,* 768-777.

Myers, M. G., Brown, S. A., & Kelly, J. F. (2000). A cigarette smoking intervention for substance abusing adolescents. *Journal of Cognitive and Behavioral Practice, 7,* 64-82.

O'Malley, P.M., Bachman, J.G., Johnston, L.D., & Schulenberg, J. (2004). Studying the transition from youth to adulthood: Impacts on substance use and abuse. In J.S. House, F.T. Juster, R.L. Kahn, H. Schuman, & E. Singer (Eds.), *A telescope on society: Survey research and social science at the University of Michigan and beyond* (pp. 305-329). Ann Arbor, MI: The University of Michigan Press.

Ott, C. H. & Doyle, L. H. (2005). An evaluation of the small group norms challenging model: Changing substance use misperceptions in five urban high schools. *High School Journal 88,* 45-55.

Pekarik, G., & Guidry, L.L. (1999). Relationship of satisfaction to symptom change, follow-up adjustment, and clinical significance in private practice. *Professional Psychology: Research and Practice, 30,* 474-478.

Pekarik, G., & Wolff, C.B. (1996). Relationship of satisfaction to symptom change, follow-up adjustment, and clinical significance. *Professional Psychology: Research and Practice, 27,* 202-208.

Peltier, B., Telch, M. J., & Coates, T. J. (1982). Smoking cessation with adolescents: A comparison of recruitment strategies. *Addictive Behaviors, 7,* 71-73.

Pentz, M.A. (1998). Costs, benefits, and cost-effectiveness of comprehensive drug abuse prevention. In W.J. Bukoski, & R.I. Evans (Eds.), *Cost-benefit/cost effectiveness research of drug abuse prevention: Implications for programming and policy.* Rockville, MD: National Institute of Drug Abuse. Research Monograph 176.

Perkins, H. W. & Craig, D. W. (2003). The imaginary lives of peers: Patterns of substance use and misperceptions of norms among secondary school students. In H.W. Perkins (Ed.), *The social norms approach to preventing school and college substance abuse* (pp. 209-223). San Francisco, CA: Jossey-Bass.

Pickett, S.A., Lyons, J.S., Polonus, T., Seymour, T., & Miller, S.I. (1995). Factors predicting patients' satisfaction with managed mental health care. *Psychiatric Services, 46,* 722-723.

Ross, C.K., Frommelt, G., Hazelwood, L., & Chang, R.W. (1987). The role of expectations in patient satisfaction with medical care. *Journal of Health Care Marketing, 7,* 16-26.

Schulte, M.T., Bacio, G., Frisell, K., Kia-Keating, M., Monreal, T.K., & Brown, S.A. (2008, July). *Gender differences in treatment satisfaction and therapeutic dosage within high school-based voluntary alcohol intervention.* Poster session presented at the annual meeting of the Research Society on Alcoholism, Washington, DC.

Schulte, M.T., Monreal, T.K., Kia-Keating, M., & Brown, S.A. (in press). Influencing social perceptions of substance use to facilitate change through a school-based intervention. *Journal of Child and Adolescent Substance Abuse*

Shirk, S.R., & Karver, M. (2003). Prediction of treatment outcome from relationship variables in child and adolescent therapy: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 71,* 452-464.

Sobell, L. S., Ellingstad, T. P., & Sobell, M. B. (2000). Natural recovery from alcohol and drug problems: Methodological review of the research and suggestions for futures. *Addiction, 95,* 749-764.

Stevens, J. (1996). *Applied multivariate statistics for the social sciences.* Mahwah, NJ: Lawrence Erlbaum Publishers.

Stice, E., Myers, M.G., & Brown, S.A. (1998). A longitudinal grouping analysis of adolescent substance use escalation and de-escalation. *Psychology of Addictive Behaviors, 12,* 14-27.

Tanaka, J.S. (1993). Multifaceted conceptions of fit in structural equation models. In K.A. Bollen & J.S. Long (Eds.), *Testing structural equation models.* Newbury Park, CA: Sage.

Tetzlaff, B.T., Kahn, J.H., Godley, S.H., Godley, M.D., Diamond, G.S., & Funk, R.R. (2005). Working alliance, treatment satisfaction, and relapse among adolescents participating in outpatient treatment for substance use. *Psychology of Addictive Behaviors, 19,* 199-207.

Thombs, D. L., Wolcott, B. J., & Farkash, L. G. (1997). Social context, perceived norms, and drinking behavior in young people. *Journal of Substance Abuse, 9,* 257-267.

Tucker, J. A., Vuchinich, R. E., & Gladsjo, J. A. (1991). Environmental influences on relapse in substance use disorders. *International Journal of Addictions, 25,* 1017-1050.

Wagner, E.F. (2008). Developmentally informed research on the effectiveness of clinical trials: A primer for assessing how developmental issues may influence treatment responses among adolescents with alcohol use problems. *Pediatrics, 121,* 337-347.

Wagner, E.F., Myers, M.G., & Brown, S.A. (1994). Adolescent substance abuse treatment. In L. VandeCreek, S. Knapp, & T.L. Jackson (Eds.), *Interventions in clinical practice: A source book* (pp. 97-121). Sarasota, Fl: Professional Resources Press.

Watson, A.L., & Sher K.J. (1998). Resolution of alcohol problems without treatment: Methodological issues and future directions of natural recovery research. *Clinical Psychology: Science and Practice, 5*, 1-18.

Willer, R.D., & Miller, G.H. (1978). On the relationship of client satisfaction to client characteristics and outcome of treatment. *Journal of Clinical Psychology, 34,* 157-160.

Wothke, W. (2000). Longitudinal and multi-group modeling with missing data. In T.D. Little, K.U. Schnabel, & J. Baumert (Eds.), *Modeling longitudinal and multilevel data: Practical issues, applied approaches, and specific examples* (pp. 1-24). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Yamaguchi, K. & Kandel, D. B. (1985). On the resolution of role incompatibility: A life event history analysis of family roles and marijuana use. *American Journal of Sociology, 90,* 1284-1325.