Impact of Pretreatment Change on Mechanism of Behavior Change Research: An Applied Example Using Alcohol Abstinence Self-Efficacy

EMILY T. NOYES, B.S.,[a] JACOB A. LEVINE, B.A.,[a] ROBERT C. SCHLAUCH, PH.D.,[a,*] CORY A. CRANE, PH.D.,[b] GERARD J. CONNORS, PH.D.,[c] STEPHEN A. MAISTO, PH.D.,[d] & RONDA L. DEARING, PH.D.[e]

[a]*Department of Psychology, University of South Florida, Tampa, Florida*
[b]*Biomedical Sciences Department, Rochester Institute of Technology, Rochester, New York*
[c]*Research Institute on Addictions, University at Buffalo, Buffalo, New York*
[d]*Department of Psychology, Syracuse University, Syracuse, New York*
[e]*Brene Brown Education and Research Group, Houston, Texas*

ABSTRACT. Objective: With the growing recognition that, for some, significant changes in drinking occur before the first treatment session (i.e., pretreatment change), researchers have called for the careful assessment of when change occurs and its potential impact on mechanism of behavior change (MOBC) research. Using a commonly hypothesized MOBC variable, alcohol abstinence self-efficacy, the primary aim of this study was to examine the effect of pretreatment change on the study of MOBCs. **Method:** Sixty-three individuals diagnosed with alcohol dependence were recruited to participate in a 12-week cognitive-behavioral treatment. Participants completed weekly assessments of self-efficacy and drinking behaviors. **Results:** Multilevel time-lagged regression models indicated that pretreatment change significantly moderated the effect of self-efficacy on the number of drinking days, such that among those higher on pretreatment change, higher self-efficacy ratings predicted lower rates of drinking days in the week until the next treatment session. In contrast, pretreatment change did not moderate the effect of self-efficacy on the rate of heavy drinking days. **Conclusions:** Results from the current study add to a small but growing body of research highlighting the importance of pretreatment change when studying MOBCs. Further, these results provide important insights into the conditions in which self-efficacy may play an important role in treatment outcomes. (*J. Stud. Alcohol Drugs, 79,* 223–228, 2018)

A GROWING BODY OF LITERATURE highlights that for some individuals significant changes in drinking occur before entering treatment for alcohol use disorder (AUD; i.e., pretreatment changes; Stasiewicz et al., 2013), challenging the assumption that the majority of drinking reduction occurs after beginning treatment (Willenbring, 2007). With the increased emphasis on better understanding the processes of change underlying AUD treatment effects (Longabaugh, 2007), greater attention is needed on how pretreatment change may affect the study of mechanisms of behavior change (MOBCs). The primary aim of this study was to examine the effect of pretreatment change on the study of MOBCs using a commonly studied variable, alcohol abstinence self-efficacy.

To date, six published studies have reported significant changes in drinking before the first formal treatment session (Connors et al., 2016; Epstein et al., 2005; Kaminer et al., 2008; Morgenstern et al., 2007; Penberthy et al., 2007; Stasiewicz et al., 2013). For example, Stasiewicz and colleagues (2013) found significant decreases in drinks per day and increases in percentage days abstinent during the month before beginning formal treatment. Furthermore, approximately half of participants demonstrated a rapid change in drinking during that same period, which accounted for the majority of total change in drinking outcomes by the end of treatment. Although assessment reactivity has been offered as an explanation, several studies report significant decreases before baseline assessments (e.g., Epstein et al., 2005; Penberthy et al., 2007), including up to 2 to 4 weeks before initiating a phone call with the study site (e.g., Stasiewicz et al., 2013). Of the two studies to examine correlates of pretreatment change, one found a positive relationship with alcohol problem severity (Penberthy et al., 2007), whereas another study found that pretreatment change was associated with greater negative affect and readiness to change but not related to problem severity, past treatment attempts, or alcohol abstinence self-efficacy measured at baseline (Stasiewicz et al., 2013).

Although the underlying factors influencing pretreatment change are not well understood, findings that many reduce their drinking before formal treatment have implications for conceptualizing the role of treatment and MOBCs. It is possible that the action of MOBCs depends to some degree on one's level of pretreatment change. Inasmuch as pretreatment

Received: March 30, 2017. Revision: November 3, 2017.

This study was funded by National Institute on Alcohol Abuse and Alcoholism (NIAAA) Grant R21 AA017112 (Connors/Maisto). The development of this report was supported in part by NIAAA Grants K23-AA021768 (Schlauch) and 2K05 AA016928 (Maisto).

*Correspondence may be sent to Robert C. Schlauch at the Department of Psychology, University of South Florida, 4202 East Fowler Ave., Tampa, FL 33620, or via email at: rschlauch@usf.edu.

change represents the difference between initiating change during treatment (i.e., low pretreatment change) versus maintaining change (i.e., high pretreatment change), mechanisms of action may vary (e.g., Rothman, 2000). For example, in the main outcome study from which the current data were drawn, Connors et al. (2016) found that pretreatment change moderated the effect of therapeutic alliance, such that higher therapeutic alliance at the prior session was found to predict lower drinking among those with lower levels of pretreatment change only. These findings suggest that therapeutic alliance may play a significant role in the change process only for those initiating change during treatment (i.e., low pretreatment change).

The current study was designed to illustrate pretreatment change as a possible moderating variable in MOBC research, using self-efficacy as an example. Self-efficacy was chosen because it is one of the most studied variables within the alcohol use literature and has received considerable empirical support (see Adamson et al., 2009, and Kadden et al., 2011, for reviews), including evidence as an MOBC (e.g., Maisto et al., 2015; Witkiewitz et al., 2012). Self-efficacy is defined as a person's expectation or confidence in his or her ability to engage in a specific behavior in a particular context, with an emphasis placed on one's ability to engage in specific coping behaviors (Bandura & Locke, 2003). In the context of drinking reduction, a person with high self-efficacy would be better equipped to maintain his or her abstinence, or moderate consumption, by using effective coping strategies when faced with a challenging temptation or situation. As such, self-efficacy is highly relevant in multiple theories of behavior change, including Social Learning Theory (Bandura, 1977), Self-regulation Theory (Brown, 1998), Self-determination Theory (Deci & Ryan, 1985), the Transtheoretical Model (Prochaska & DiClemente, 1984), and Relapse Prevention (Witkiewitz & Marlatt, 2004). These theories highlight self-efficacy as a key protective factor in high-risk situations in which individuals are tempted to drink, with some researchers suggesting that self-efficacy is important for initiating change (e.g., Miller & Rollnick, 2002) and others for maintaining change (e.g., Witkiewitz & Marlatt, 2004).

Based on theory that processes may differ for initiating versus maintaining change behaviors (e.g., Rothman, 2000), including differing viewpoints on the role of self-efficacy in initiating versus maintaining changes in drinking, we hypothesized that pretreatment change would moderate the within-person effects of self-efficacy on drinking behavior during treatment. Specifically, a significant within-person effect of self-efficacy on drinking among those who have yet to initiate change (i.e., lower pretreatment change) would provide support for self-efficacy serving as an MOBC for initiating change. In contrast, a significant within-person effect of self-efficacy on drinking among those higher on pretreatment change would support self-efficacy as important for maintaining change.

Method

Participants

Sixty-three participants (female n = 20) seeking outpatient treatment for alcohol dependence were recruited from the community using local newspaper and radio advertisements (for participant flow chart, see Supplemental Materials, which appears as an online-only addendum to the article on the journal's website). Inclusion criteria included (a) 18–65 years of age; (b) meeting diagnostic criteria for current alcohol dependence according to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV; American Psychiatric Association, 1994); (c) living within commuting distance of the program site; and (d) having a minimum sixth grade reading level. Exclusion criteria included (a) meeting criteria for a current organic mental disorder or a psychotic disorder; (b) presenting with gross neurocognitive impairment; or (c) having been in substance abuse treatment during the previous 12 months (except for self-help groups).

The majority of participants were White (74.6%; 20.6% African American, 3.2% American Indian/Alaska Native, and 1.6% Hispanic) and had a mean age of 48.3 (*SD* = 10.6) years. More than half of participants (53.0%) reported part-time or full-time employment (21.7% unemployed, 10.0% disabled, 14.3% retired), 35.0% were currently married, and 36.7% had previously received outpatient treatment for alcohol problems more than 12 months ago. Participants reported 31.7% (*SD* = 28.7) days abstinent and 59.0% (*SD* = 29.7) heavy drinking days during the 6-month period before baseline assessment.

Measures

Demographic characteristics, marital status, employment, and substance abuse treatment history were obtained using a comprehensive background questionnaire administered during the initial baseline assessment.

Client Session Report. Item 4 of the Client Session Report (CSR; Project MATCH Research Group, 1993), "How confident are you about not drinking during the upcoming week?" was used as an indicator of self-efficacy to assess the primary aims of this study. Participants rated this item on a 5-point Likert scale ranging from 1 (*not at all confident*) to 5 (*completely confident*). Single-item self-efficacy assessments have demonstrated high correlations with multi-item questionnaires and have been shown to predict relapse to use posttreatment (e.g., Hoeppner et al., 2011).

Timeline Followback. The Timeline Followback (TLFB; Sobell & Sobell, 1992) is a calendar-based retrospective recall interview of daily alcohol use. The TLFB was used to estimate alcohol consumption during the 6-month period before baseline assessment, as well as the number of drink-

Table 1. Summary of results for self-efficacy predicting drinking outcomes (full models)

	No. of drinking days			No. of heavy drinking days		
Self-efficacy	*b*	*SE*	*p*	*b*	*SE*	*p*
Intercept	-1.330	0.100	<.001	-2.063	0.151	<.001
Time	0.054	0.010	<.001	0.078	0.017	<.001
Prior self-efficacy	0.075	0.063	.242	-0.194	0.088	.031
Random effects variances	Var.	χ^2	*p*	Var.	χ^2	*p*
Intercept	2.446	859.080	<.001	2.396	643.886	<.001
Time	0.011	129.498	<.001	0.038	245.126	<.001
Prior self-efficacy	0.381	228.928	<.001	0.391	130.297	<.001
Level 1, *e*	0.532	–	–	0.516	–	–
Self-Efficacy × Pretreatment Change	*b*	*SE*	*p*	*b*	*SE*	*p*
Intercept	-1.553	0.122	<.001	-2.341	0.151	<.001
Intercept × Pretreatment Change	1.241	0.128	<.001	1.243	0.146	<.001
Time	0.046	0.011	<.001	0.086	0.021	<.001
Time × Pretreatment Change	0.001	0.009	.908	-0.026	0.028	.342
Prior Self-Efficacy	-0.147	0.075	.054	-0.144	0.103	.167
Prior Self-Efficacy × Pretreatment Change	0.389	0.092	<.001	-0.120	0.119	.320
Random effects variances	Var.	χ^2	*p*	Var.	χ^2	*p*
Intercept	1.807	686.921	<.001	1.892	393.214	<.001
Time	0.010	123.281	<.001	0.040	242.066	<.001
Prior self-efficacy	0.304	197.629	<.001	0.415	132.191	<.001
Level 1, *e*	0.540	–	–	0.518	–	–

Notes: No. = number; *b* = unstandardized estimate; *SE* = standard errors; *p* = *p* value; var. = random effects variance; χ^2 = chi-square test. Heavy drinking days were defined as four or more standard drinks for women and five or more standard drinks for men (National Institute on Alcohol Abuse and Alcoholism, 2004).

ing days and heavy drinking days occurring in the 12-week treatment period.

Procedure

Individuals responding to the advertisements were screened via a brief telephone interview and provided a description of the treatment program. Eligible participants were scheduled for a baseline appointment during which informed consent was obtained, alcohol dependence diagnosis was assessed, and additional questionnaires were completed. All participants received 12 weeks of standard cognitive behavioral therapy (CBT; Kadden et al., 1992) for alcohol dependence (60-minute sessions). At the end of each treatment session, participants completed several assessments, including the CSR. Drinking was assessed at the end of each session and at both baseline and posttreatment via the TLFB. Participants included in the analyses attended an average of 9.43 (*SD* = 3.51) treatment sessions. For more details, see Connors et al. (2016).

Data analytic strategy

To examine our hypothesis, multilevel time-lagged regression analyses were conducted. Data included self-efficacy collected at the end of each treatment session (i.e., 12 sessions). Drinking data from the within-treatment TLFB assessments (i.e., collected at the end of each treatment session) were based on the number of days between treatment sessions; therefore, intervals varied from person to person. First, reports of drinking outcomes were predicted from temporally prior reports of self-efficacy, controlling for time. Prior reports of self-efficacy were entered into the models centered on the person's own mean to examine how changes around the person's own mean predicted drinking outcomes. Further, all predictors were entered as random effects and models were estimated with an overdispersed Poisson distribution (via the restricted penalized quasi-likelihood estimator) with variable exposure (i.e., number of days between sessions), providing estimates of drinking rates per day. The addition of an overdispersion parameter adds an "error term that increases the variance compared to the variance implied by the normal Poisson model" (Hox, 2010, p. 155), thereby correcting for violations of this assumption.

To examine the effect of pretreatment change on self-efficacy predicting drinking, all models were examined with pretreatment change as a level two moderator (grand mean centered). Pretreatment change was calculated as the percentage change in drinking (for each outcome, drinking days and heavy drinking days) based on the average weekly drinking (i.e., 7-day intervals) before the pretreatment window (4 weeks before first treatment session) and the rate of drinking during the 7-day interval before the first treatment session. These time points were selected based on previous work suggesting that individuals may begin to change their drinking approximately 1 month before their first treatment session (see Stasiewicz et al., 2013). Specifically, the average weekly drinking before the pretreatment window was subtracted

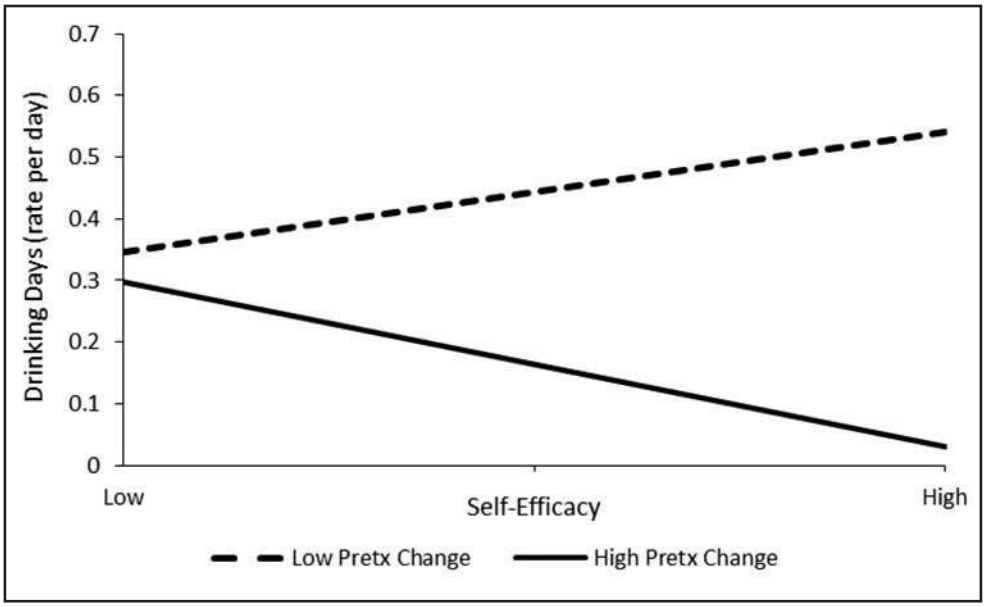

FIGURE 1. Self-Efficacy × Pretreatment Change predicting number of drinking days at Session 1 (time = 0). High and low values of pretreatment change were graphed at the 15th (lower values = higher pretreatment change) and 85th percentiles. Pretx = pretreatment.

from the rate of drinking during the week before Treatment Session 1 and then divided by the average weekly drinking before the pretreatment window (negative values = decreases in drinking). For significant interactions, simple slopes for self-efficacy were examined by re-centering the pretreatment change variable at the 15th and 85th percentiles.

Results

Results indicated that prior self-efficacy was significantly associated with the number of heavy drinking days (b = -0.194, SE = 0.088, p = .031), such that higher self-efficacy predicted lower rates of heavy drinking (see Table 1 for a summary). In contrast, prior self-efficacy did not predict the number of drinking days (b = 0.075, SE = 0.063, p = .242).

Further examination of prior self-efficacy predicting the number of drinking days revealed that pretreatment change moderated such effects (b = 0.389, SE = 0.092, p < .001; see Table 1 and Figure 1). Follow-up analyses revealed a significant simple slope for self-efficacy on the number of drinking days among those higher on pretreatment change (b = -0.460, SE = 0.132, p < .001) but not those lower on pretreatment change (b = 0.089, SE = 0.062, p = .158). Specifically, higher self-efficacy ratings predicted lower rates of drinking days during the interval between treatment sessions among those higher on pretreatment change. Pretreatment change did not moderate the effect of prior self-efficacy on the rate of heavy drinking days (b = -0.120, SE = 0.148, p = .421).

For additional results, including bivariate correlations, analyses examining changes in self-efficacy, and multi-level models for drinking predicting self-efficacy (i.e., reciprocal analyses), see online supplemental materials.

Discussion

With the growing recognition that, for some, significant changes in drinking occur before the first treatment session, greater attention is needed on how pretreatment change may affect the study of MOBCs. Results of the current study suggest that pretreatment change may help identify for whom and when treatment process variables such as self-efficacy are important. Incorporation of pretreatment change in the analysis of MOBC research may help clarify mixed findings in the literature and identify which process variables are important for initiating versus maintaining change during treatment. In this regard, greater attention to the timing and frequency of assessments for both drinking and proposed mechanisms are crucial to the interpretation of MOBC findings. Researchers should closely track when changes occur, as the timing of change will influence the conclusions drawn in MOBC research. Future research would benefit from considering pretreatment change when evaluating MOBC and treatment outcomes, and study methodology should consider assessments that capture drinking and mechanisms before, during, and after treatment (Witkiewitz et al., 2015).

Findings from the current study may also provide new directions for the study of self-efficacy. Specifically, higher self-efficacy at the end of the previous session predicted fewer drinking days among those with higher pretreatment change, suggesting that self-efficacy may play a greater role in maintaining change during treatment when compared

with initiating change. Such findings are consistent with the notion that self-efficacy may be modified in part by past experiences, including successful change, to influence future behavior. Indeed, posttreatment self-efficacy has been found to be a better predictor of drinking when compared with pretreatment self-efficacy, suggesting that the action of self-efficacy on drinking outcomes may depend on a certain level of prior success (Maisto et al., 1999).

In contrast, the lack of an interaction between pretreatment change and self-efficacy predicting the number of heavy drinking days was unexpected. It is possible that self-efficacy may be a more robust predictor of heavier drinking episodes versus any drinking and thereby is less influenced by other factors (in this case, pretreatment change). This would be consistent with previous studies finding significant relations between self-efficacy and quantity, but not frequency, of alcohol consumption (e.g., Blume et al., 2003; Solomon & Annis, 1990; see Kadden & Litt, 2011, for a review). Alternatively, the different patterns of pretreatment change for the number of drinking days compared with heavy drinking days may also account for these findings. Specifically, inspection of the pretreatment change variables indicated that approximately 57% of participants reduced their number of drinking days and 75% reduced their heavy drinking days (i.e., negative values on the pretreatment change variables). Because most participants entered treatment with some reductions in overall heavy drinking days, the relation between self-efficacy and heavy drinking may be less influenced by the degree of change than whether any change occurred. Future research is needed to fully understand these differential effects.

There are limitations of this study that should be considered in interpreting its findings. First, self-efficacy is likely a multidimensional construct and although the focus was on abstinence self-efficacy between sessions, other dimensions of self-efficacy may be missed by the use of the single-item measure. Second, the current study examined the session-to-session relations between self-efficacy and drinking during treatment, thus providing information about intermediate rather than end-of-treatment or posttreatment outcomes. Third, the current study was a secondary data analysis of a study designed to examine therapeutic alliance on drinking; thus, conclusions drawn about the role of self-efficacy as an MOBC should be interpreted within this context. Finally, CBT was the only treatment approach that participants received, and the lack of other treatment conditions limit conclusions one can draw on CBT's effects on both self-efficacy and/or pretreatment change.

In summary, findings from this study contribute to the body of literature highlighting the importance of pretreatment change in the study of alcohol treatment outcomes and MOBCs. Continued exploration of the role of pretreatment change in MOBC research, as well as identification of the factors associated with pretreatment change, provide multiple avenues for investigators concerned with the treatment of alcohol problems.

References

Adamson, S. J., Sellman, J. D., & Frampton, C. M. (2009). Patient predictors of alcohol treatment outcome: A systematic review. *Journal of Substance Abuse Treatment, 36,* 75–86. doi:10.1016/j.jsat.2008.05.007

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191–215. doi:10.1037/0033-295X.84.2.191

Bandura, A., & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. *Journal of Applied Psychology, 88,* 87–99. doi:10.1037/0021-9010.88.1.87

Blume, A. W., Schmaling, K. B., & Marlatt, A. G. (2003). Predictors of change in binge drinking over a 3-month period. *Addictive Behaviors, 28,* 1007–1012. doi:10.1016/S0306-4603(01)00287-8

Brown, J. M. (1998). Self-regulation and the addictive behaviors. In W. R. Miller & N. Heather (Eds.), *Treating addictive behaviors* (2nd ed., pp. 61–73). New York, NY: Plenum Press.

Connors, G. J., Maisto, S. A., Schlauch, R. C., Dearing, R. L., Prince, M. A., & Duerr, M. R. (2016). Therapeutic alliances predict session by session drinking behavior in the treatment of alcohol use disorders. *Journal of Consulting and Clinical Psychology, 84,* 972–982. doi:10.1037/ccp0000130

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior.* New York, NY: Plenum Press.

Epstein, E. E., Drapkin, M. L., Yusko, D. A., Cook, S. M., McCrady, B. S., & Jensen, N. K. (2005). Is alcohol assessment therapeutic? Pretreatment change in drinking among alcohol-dependent women. *Journal of Studies on Alcohol, 66,* 369–378. doi:10.15288/jsa.2005.66.369

Hoeppner, B. B., Kelly, J. F., Urbanoski, K. A., & Slaymaker, V. (2011). Comparative utility of a single-item versus multiple-item measure of self-efficacy in predicting relapse among young adults. *Journal of Substance Abuse Treatment, 41,* 305–312. doi:10.1016/j.jsat.2011.04.005

Hox, J. J. (2010). *Multilevel analysis: Techniques and applications* (2nd ed.). New York, NY: Routledge.

Kadden, R., Carroll, K., Donovan, D., Monti, P., Abrams, D., Litt, M., & Hester, R. (1992). *Cognitive-behavioral coping skills therapy manual.* Rockville, MD: National Institute on Alcohol Abuse and Alcoholism.

Kadden, R. M., & Litt, M. D. (2011). The role of self-efficacy in the treatment of substance use disorders. *Addictive Behaviors, 36,* 1120–1126. doi:10.1016/j.addbeh.2011.07.032

Kaminer, Y., Burleson, J. A., & Burke, R. (2008). Can assessment reactivity predict treatment outcome among adolescents with alcohol and other substance use disorders? *Substance Abuse, 29,* 63–69. doi:10.1080/08897070802093262

Longabaugh, R. (2007). The search for mechanisms of change in behavioral treatments for alcohol use disorders: A commentary. *Alcoholism: Clinical and Experimental Research, 31, Supplement 3,* 21s–32s. doi:10.1111/j.1530-0277.2007.00490.x

Maisto, S. A., Carey, K. B., & Bradizza, C. M. (1999). Social learning theory. In K.E. Leonard & H.T. Blane (Eds.), *Psychological theories of drinking and alcoholism* (2nd ed.). New York, NY: Guilford Press.

Maisto, S. A., Roos, C. R., O'Sickey, A. J., Kirouac, M., Connors, G. J., Tonigan, J. S., & Witkiewitz, K. (2015). The indirect effect of the therapeutic alliance and alcohol abstinence self-efficacy on alcohol use and alcohol-related problems in Project MATCH. *Alcoholism: Clinical and Experimental Research, 39,* 504–513. doi:10.1111/acer.12649

Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change.* New York, NY: Guilford Press.

Morgenstern, J., Irwin, T. W., Wainberg, M. L., Parsons, J. T., Muench, F., Bux, D. A., Jr., . . . Schulz-Heik, J. (2007). A randomized controlled trial of goal choice interventions for alcohol use disorders among men who have sex with men. *Journal of Consulting and Clinical Psychology, 75,* 72–84. doi:10.1037/0022-006X.75.1.72

Penberthy, J. K., Ait-Daoud, N., Breton, M., Kovatchev, B., DiClemente, C. C., & Johnson, B. A. (2007). Evaluating readiness and treatment seeking effects in a pharmacotherapy trial for alcohol dependence. *Alcoholism: Clinical and Experimental Research, 31,* 1538–1544. doi:10.1111/j.1530-0277.2007.00448.x

Prochaska, J. O., & DiClemente, C. C. (1984). *The transtheoretical approach: Crossing the traditional boundaries of therapy.* Malabar, FL: Krieger.

Project MATCH Research Group. (1993). Project MATCH: Rationale and methods for a multisite clinical trial matching patients to alcoholism treatment. *Alcoholism: Clinical and Experimental Research, 17,* 1130–1145. doi:10.1111/j.1530-0277.1993.tb05219.x

Rothman, A.J. (2000). Toward a theory-based analysis of behavioral maintenance. *Health Psychology, 19,* 64–69.

Sobell, L. C., & Sobell, M. B. (1992). Timeline follow-back: A technique for assessing self-reported ethanol consumption. In J. Allen & R. Litten (Eds.), *Measuring alcohol consumption* (pp. 41–72). Totowa, NJ: Humana Press.

Solomon, K. E., & Annis, H. M. (1990). Outcome and efficacy expectancy in the prediction of post-treatment drinking behaviour. *British Journal of Addiction, 85,* 659–665. doi:10.1111/j.1360-0443.1990.tb03528.x

Stasiewicz, P. R., Schlauch, R. C., Bradizza, C. M., Bole, C. W., & Coffey, S. F. (2013). Pretreatment changes in drinking: Relationship to treatment outcomes. *Psychology of Addictive Behaviors, 27,* 1159–1166. doi:10.1037/a0031368

Willenbring, M. L. (2007). A broader view of change in drinking behavior. *Alcoholism: Clinical and Experimental Research, 31, Supplement 3,* 84s–86s. doi:10.1111/j.1530-0277.2007.00501.x

Witkiewitz, K., Donovan, D. M., & Hartzler, B. (2012). Drink refusal training as part of a combined behavioral intervention: Effectiveness and mechanisms of change. *Journal of Clinical and Consulting Psychology, 80,* 440-449. doi:10.1037/a0026996

Witkiewitz, K., Finney, J. W., Harris, A. H., Kivlahan, D. R., & Kranzler, H. R. (2015). Recommendations for the design and analysis of treatment trials for alcohol use disorders. *Alcoholism: Clinical and Experimental Research, 39,* 1557–1570. doi:10.1111/acer.12800

Witkiewitz, K., & Marlatt, G. A. (2004). Relapse prevention for alcohol and drug problems: That was Zen, this is Tao. *American Psychologist, 59,* 224–235. doi:10.1037/0003-066X.59.4.224