

Readiness to Change Drinking Behavior in Female College Students*

DEBRA L. KAYSEN, PH.D.,[†] CHRISTINE M. LEE, PH.D., JOSEPH W. LABRIE, PH.D.,[†] AND SEAN J. TOLLISON, M.S.[†]

Department of Psychiatry and Behavioral Sciences, University of Washington, Box 354694, Seattle, Washington 98105

ABSTRACT. Objective: Motivational interviewing (MI) therapies are effective in reducing high-risk drinking in college populations. Although research supports efficacy of MI prevention strategies in reducing alcohol use, there are little data examining readiness to change (RTC), the underlying theoretical model of MI interventions. The purpose of the present study was to explore RTC variability and drinking behavior and whether MI increases RTC in an intervention group compared with controls. **Method:** Two-hundred eighty-five first-year female college students participated in the study. Present analyses focused on those students who consumed alcohol in the month before the study ($n = 182$). RTC was measured using the Readiness to Change Ruler. **Results:** Analyses were conducted using hierarchical linear modeling. There was significant variability in RTC: 71.86% of variance in RTC was between-

person differences, and 28.14% was within-person differences. Higher RTC was associated with lower intentions to drink and future drinking behavior. However, in weeks in which students drank more, they experienced a decrease in RTC. Based on the significant cross-level interaction, the intervention group had significantly higher RTC than controls. **Conclusions:** These results provided partial support for our hypotheses. The overall theoretical construct of RTC varies both across and within individuals. These results also offer support for the utility of MI-based prevention strategies in increasing RTC within individuals. However, we did not consistently find that these changes related to drinking changes. Findings provide support for both the construct of RTC and utility of MI interventions in changing these beliefs in female college students. (*J. Stud. Alcohol Drugs*, Supplement No. 16: 106-114, 2009)

COLLEGE STUDENTS CONSUME MORE ALCOHOL when compared with nonstudent peers (Lanza and Collins, 2006; Schulenberg and Maggs, 2002). However, there appear to be significant differences across college students in their assessment of their motivation to change their drinking behaviors (Vik et al., 2000). Motivation to change one's drinking has been identified as an important component of response to alcohol interventions (Vasilaki et al., 2006). Although increasing an individual's motivation to change is frequently a goal of treatment, little research has focused on the extent to which readiness to change (RTC) actually varies within individuals and how it responds to treatment. In the present article, we examine RTC both within and across individuals. We also examine the effects of a motivational interviewing (MI)-based treatment intervention on the relationship between RTC and drinking behavior and intentions.

College student alcohol use and prevention

Heavy drinking by college students is prevalent and, among some students, quite frequent. In the study by Johnston et al. (2007), more than 80% of college students reported consuming alcohol in the past year, with more than 40% reporting heavy episodic drinking (four drinks per occasion for women and five per occasion for men) at least once in the 2 weeks before the interview. Both immediate and longer term problems or resulting consequences, such as hangovers, blacking out, academic failure, injuries, and fatalities, are associated with heavy alcohol use (e.g., Hingson et al., 2005; Wechsler et al., 1994, 2000). Despite the late teens to early 20s being the developmental period with the highest lifetime and current prevalence rates of diagnosable alcohol-use disorders (Dawson et al., 2005), most students do not view their alcohol use as problematic and do not seek help for their alcohol use. Thus, college students are a group at substantial risk for alcohol-related problems.

There is a growing body of research suggesting that motivational-enhancement interventions may be efficacious for reducing alcohol use and negative consequences in the context of selective and indicated prevention for college students (Larimer and Cronce, 2002, 2007; Larimer et al., 2004). Motivational approaches, based on theoretical and clinical aspects from MI (Miller and Rollnick, 2002), are nonjudgmental and nonconfrontational in nature, and have the goal of enhancing intrinsic motivation to change behavior

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[†]Correspondence may be sent to Debra L. Kaysen at the above address or via email at: dkaysen@u.washington.edu. Joseph W. LaBrie is with the Department of Psychology, Loyola Marymount University, Los Angeles, CA. Sean J. Tollison is with the Department of Psychology, University of Washington, Seattle, WA.

by exploring and resolving ambivalence about change. MI can be used to promote contemplation, initiation, or maintenance of change across the stages of RTC (for a review, see Connors et al., 2001).

Readiness to change: From precontemplation to maintenance

The theoretical construct of stages of change has been a useful contribution in providing a model for understanding behavioral changes (Velicer et al., 1998). Typically, readiness characterizes a stage, level, willingness, or motivation toward behavioral change, ranging along a continuum from not at all thinking about changing a behavior to actively changing or maintaining change. In relation to addictive behaviors, Prochaska et al. (1992) outline five stages of change: precontemplation, contemplation, preparation, action, and maintenance. Initially, these stages of change were conceptualized as a linear model but have been reconceptualized as a spiral model to account for relapse and regression to earlier stages of change (Prochaska et al., 1992).

Individuals in the *precontemplation* stage of change exhibit little or no desire to change and often are unaware of a problem associated with their behavior, even when there is information suggesting that there is a problem. *Contemplation* is evident when individuals recognize their behavior as a problem and begin to think about taking future actions to make a change. The individuals in this stage often exhibit the most ambivalence about changing and often question their ability to change (DiClemente and Velasquez, 2002). Change is initiated based on the value of change and the individual's perceived ability to do so (Rothman et al., 2004). The occurrence of change talk is evidence of movement from contemplation to preparation. *Preparation* involves making a commitment to change. This commitment is demonstrated in the individual's cognitive patterns and verbal behavior by moving from using less tentative language (e.g., "might") to more obliging language (e.g., "will"). *Action* is the stage of change in which an individual actually starts making behavioral and environmental changes related to the problem behavior. Change is maintained through experiences encountered as the change is implemented (Rothman et al., 2004). The stages-of-change model defines *maintenance* as the persistence of change for a period of 6 months.

Readiness to change: College student alcohol use

Despite the theoretical and clinical underpinnings for the proposed relationship between RTC and alcohol use, findings supporting this relationship are mixed, and results often vary by the timing of assessments or by the specific assessment instrument used (Carey et al., 1999).

When assessing RTC before the beginning of treatment, most studies examining RTC and drinking have found that

a higher level of readiness is related to more drinking and related problems. Students who are higher on overall RTC drink more and have more alcohol-related problems (Carey et al., 2007; Palfai et al., 2002). Stages-of-change subscales appear to correlate with alcohol use and problems in ways that are consistent with the transtheoretical model of change. Precontemplation scores are inversely related, whereas both contemplation and action scores are positively related to alcohol use and problems (Shealy et al., 2007). Students also differ in drinking and problem rates based on stage classification. Students classified into the precontemplation stage report drinking less and having fewer problems than those in the contemplation and action stages, and students classified into the contemplation stage report the highest rates of both drinking and related problems (Shealy et al., 2007; Vik et al., 2000). Of the research conducted to date, only one study has had contrary results. Although contemplation score was unrelated to alcohol use and related problems, Barnett et al. (2006) found that students whose self-report responses were classified as "not intending to change" drank more than those whose responses were classified as "intending to change." This difference in findings may have been the result of measurement (single-item vs multiple-item measures) or sampling (mandated students vs screened-in heavy drinkers) issues. Despite the finding to the contrary, results from cross-sectional research generally suggest that higher levels of readiness—in particular, higher levels of contemplation to change alcohol use—are related to more alcohol use and more alcohol-related problems.

Few studies have examined the relationship between RTC and intervention efficacy or the influence of an intervention on RTC status. After controlling for baseline drinking in their study, Palfai et al. (2002) found that RTC did not predict changes in drinking or problems after participation in an alcohol discussion group. Carey et al. (2007) conducted a supplementary analysis of data gathered from a randomized controlled trial of a brief motivational intervention for college drinking to examine moderators of intervention efficacy. Although higher baseline readiness predicted greater reductions in drinking from baseline to 1 month among all conditions, RTC was not found to be a moderator of intervention efficacy.

Fromme and Corbin (2004) examined RTC in a randomized controlled trial assessing the efficacy of brief motivational interventions delivered to both a campus-wide recruitment sample and a disciplinary-referred sample. Student RTC was assessed with a 13-item version of the University of Rhode Island Change Assessment (Heesch et al., 2005). Those higher on RTC showed greater reductions in heavy drinking; the reduction was significantly greater if the student participated in a treatment condition. Interestingly, the intervention did not increase students' RTC in either group. These studies suggest that RTC status likely plays a role in the change process for college student drink-

ers. However, because of a lack of research in this area, it remains unclear if initial RTC status moderates treatment efficacy and changes as a result of treatment.

However, one difficulty with this body of literature is the contrast between how RTC is measured in the literature as compared with how it is described in the theoretical literature and used clinically (Littell and Girvin, 2002). As can be seen in the previous review, RTC is predominantly treated in the research literature as a relatively static and unchanging individual predictor of drinking behavior or of treatment outcomes. Some of this perception is a function of the research designs used to date; the preponderance of cross-sectional studies testing the relationship between RTC and drinking preclude measuring dynamic changes between variables, even if these are of conceptual interest. However, in the theoretical literature on RTC, change is viewed as a process that occurs over time (Velicer et al., 1998). RTC is viewed as something dynamic, that is affected by individual drinking consequences, and that then influences the likelihood of one modifying one's drinking behavior (Cox et al., 2000). RTC is also conceptualized as something that can be modified over the course of a therapy session, as a therapist helps to move someone from precontemplation to contemplation, for example (Amrhein et al., 2003). Given the theoretical basis of MI-based interventions, one of the central mediators in this treatment should be increasing RTC. However, the within-person variability of RTC has not been examined to date within the college-drinking literature. Examining intra-individual variability in RTC has both theoretical and clinical implications. Specifically, such an examination would help determine (1) intra-individual variability in RTC over relatively brief periods and (2) how changes in RTC are predicted by drinking experiences and how they predict drinking behavior.

Present study

Despite research demonstrating the effectiveness of MI-based interventions on college and data demonstrating that readiness to change one's drinking behavior may moderate treatment outcomes, little research has focused on whether motivation to change actually does vary within individuals, whether changes in RTC relate to future drinking behaviors, and whether interventions that are designed to increase RTC actually increase RTC and thereby affect drinking. Moreover, the majority of prior studies examine these relationships either cross-sectionally or over relatively long longitudinal intervals. Therefore, they cannot address the question of the degree of variability of readiness across shorter periods, such as days or weeks. The current research is designed to address these gaps in the literature by exploring the variability of RTC both within and across individuals over a 10-week period, with first-year female college students comprising the intervention group. We also examined whether there was

an association between within-person changes in readiness, and drinking intentions and behavior. Finally, we examined the role of a female-specific group motivational-enhancement intervention (described in detail elsewhere in this issue of the journal) on the relationship between readiness and drinking.

Method

Participants

Two-hundred eighty-five female students in their first year of college consented to participate in an intervention study. The intervention study sought to determine the efficacy of a brief motivational-enhancement intervention that incorporated a discussion of female-specific reasons for drinking. The intervention had previously been found to produce less-risky patterns of drinking across 10 weeks of follow-up (LaBrie et al., 2008). The present research sought to validate the previous findings with a new cohort while determining if the efficacy persisted through 6 months of follow-up. These results (i.e., the main effects of intervention) are reported elsewhere in this special issue (LaBrie et al., 2009).

The results reported in this article focus on the role of motivation to change drinking behavior or to affect the RTC drinking behavior. Of the 285 participants, 103 (36.1%) reported no alcohol use, and 182 (63.9%) reported at least one drink in the previous month. In this current study, analyses focused on RTC drinking behaviors, and thus only those women who consumed alcohol at least once in the month before the study were included. The exclusion of abstainers from analyses was necessary because the focus of this article was on RTC and weekly drinking patterns. The construct of RTC may not apply as well to abstainers. In addition, inclusion of nondrinkers would zero-inflate the model. The 182 women in this analysis represented the diverse fields of study offered at this midsize western university, including liberal arts (34.6%, $n = 63$), business (26.9%, $n = 49$), communications and fine arts (27.5%, $n = 50$), science and engineering (7.7%, $n = 14$), and film and television (3.3%, $n = 6$). Participants identified themselves as white (63.2%, $n = 115$), Hispanic/Latino (12.6%, $n = 23$), Asian/Pacific Islander (9.3%, $n = 17$), black (4.4%, $n = 8$), more than one race (9.9%, $n = 18$), or other/declined to state (1.6%, $n = 3$). The mean (SD) age of the students was 17.93 (0.31), and the majority reported living in on-campus housing (97.3%, $n = 177$).

With regard to drinking, the 182 participants reported consuming an average of 26.87 drinks in the month before intervention, drinking 3.94 drinks per episode, with an average of 6.02 drinks on the occasion of greatest use. Furthermore, although 36.8% reported no incidents of heavy episodic drinking (four or more drinks in a row) in the 2 weeks before entering the study, 22% reported having done

so once, 14.3% twice, 7.1% three times, 9.9% four times, and 9.6% five or more times.

Design and procedure

The summer before their first semester of college, all incoming first-year women ($N = 755$) received a letter asking them to participate in “a study on women’s values and attitudes toward drinking and health issues.” Students then received an email during the second week of classes containing information on how to participate in the study. If the student chose to participate, she clicked a link that directed her to an online baseline questionnaire, where she electronically “signed” a local institutional review board–approved informed consent form. At the end of the initial questionnaire, participants were asked to choose one of 26 group sessions that had been randomly assigned to either intervention or control conditions. Enrollment was on a first-come, first-served basis with participants blinded to condition status. Further enrollment was terminated after 5 days because all of the slots in the groups were taken. With respect to the 182 participants who drank in the month before the study, 104 were in the intervention condition and 78 were in the control condition. There were no demographic differences between participants in the control and intervention conditions on any demographic or drinking-related variables.

Besides completing the baseline survey and attending either an intervention or control group, participants completed weekly online diaries that assessed RTC, drinking during the previous 7 days, and intentions to drink each week for 10 weeks of follow-up. Of the 182 participants, 87.9% ($n = 160$) completed the baseline survey and all 10 weekly diaries. Participants received \$40 for completing the initial online questionnaire and attending their selected group, as well as \$10 per week for the 10 weeks of follow-up.

Measures

The baseline survey assessed demographic variables including age, ethnicity, and family income, as well as drinking-related variables.

Alcohol use. Baseline alcohol use over the past month was determined by participant completion of a 3-month Timeline Followback (TLFB; Sobell and Sobell, 1992) interview in their group session. TLFBs conducted in group settings produce data that are equivalent to those of TLFBs administered in an individual interview setting (LaBrie et al., 2005a; Pedersen and LaBrie, 2006). Baseline alcohol use was used for the purposes of this article to select those participants who had consumed alcohol over the previous month. For 10 weeks, participants used online drinking diaries to record the number of drinks consumed each day of the prior week, including the week before the intervention. These analyses used the total number of drinks consumed for the week.

Intentions to drink. In each weekly diary, participants were asked how many drinks per drinking occasion, on average, they intended to have in the next week.

Readiness to Change Ruler. RTC drinking behaviors were assessed by having participants select the position on a ruler that best described their current motivation level. The scale ranged from 0 (“I never think about my drinking”) to 5 (“I have decided to drink less”) to 10 (“My drinking has changed, I now drink less than before”). Previous work has shown this ruler to be comparable ($r = .77$) to the longer RTC questionnaire (Rollnick et al., 1992) in predicting behavioral intentions (LaBrie et al., 2005b).

Intervention sessions

Intervention groups were held near the end of the first month of the academic year and consisted of 8–12 students led by a doctoral-level clinician and a research assistant. Both facilitators were women with extensive training in MI. These sessions lasted approximately 2 hours and began with a TLFB to assess drinking behavior over the 3 months before the intervention. Next, the groups discussed the pros and cons of drinking, normative drinking data for women at the university, and how alcohol uniquely affects the female body. Personalized blood alcohol concentration cards were distributed to participants, and information about blood alcohol concentration was provided. Participants then engaged in an open-ended discussion about female-specific reasons for drinking. Finally, participants generated personal reasons for and against drinking less (decisional balance) and the set behavioral goals for their drinking during the next 30 days. For a further description of the intervention, see LaBrie et al. (2008, 2009—this supplement).

Control sessions

Control sessions were also led by two facilitators, but there was no group discussion. Instead, each participant was asked to complete a 3-month TLFB independently, after which she received a packet of alcohol-related information specific to women. The sessions lasted approximately 30 minutes.

Results

Weekly diary descriptive statistics

The 182 participants reported drinking on 58.6% of the 10 weeks. The average number of standard drinks consumed per week was 5.45 (7.64), whereas the average number of drinks that individuals planned to drink on a drinking occasion was 2.98 (3.45). The average level of RTC across the 11 weeks was 2.97 (2.84). Figure 1 shows relative levels of past-week standard drinks and intentions to drink by RTC.

As shown in the figure, consumption and drinking intentions were relatively greater on weeks with midrange RTC. However, these patterns are informative only about averages of RTC and drinking. They do not address within-person associations.

Multilevel regressions

Analytic plan. Diary data are multilevel in nature. In our study, multiple assessments of RTC and drinking (within-person level, or Level 1) are nested within each person (between-person level, or Level 2). Intervention was a stable, person-level variable. Three week-level variables were measured repeatedly across the 10 weeks: RTC, total drinks, and drinking intentions. Multilevel models using hierarchical linear modeling (HLM; Raudenbush and Bryk, 2002) were used to analyze these multilevel diary data, nesting the week-level information (Level 1 \leq 11 cases per person; $n = 1,875$) within the stable person-level information (Level 2 = 1 case per person; $n = 182$). We used the HLM software of Raudenbush and colleagues (2004) in the analyses. To assess the within-person associations between prior week’s drinking

and RTC, the Level 1 model can be augmented to include time-varying predictors. Equation 1 examines the question of how past drinking relates to current readiness. In Equation 1, DRINK is the amount of alcohol person i consumed on week t ; b_{0i} is the predicted RTC for person i when RTC equals that person’s overall average readiness on week t ; b_{1i} is the within-person slope of the drink-RTC relationship for person i ; and e_{it} is a random residual component.

$$RTC_{it} = b_{0i} + b_{1i} (\text{DRINK}) + e_{it} \tag{1}$$

To examine the question of how current readiness relates to future drinking intentions, where INTENT is the amount of alcohol person i intended to drink the following week on week t ; b_{0i} is the predicted value of INTENT for person i when RTC equals the person’s overall average readiness on week t ; b_{1i} is the within-person slope of the RTC-intentions to drink relationship for person i ; and e_{it} is a random residual component.

$$\text{INTENT}_{it} = b_{0i} + b_{1i} (\text{RTC}) + e_{it} \tag{2}$$

To assess the within-person associations between RTC and future alcohol use, the same equation can be used in

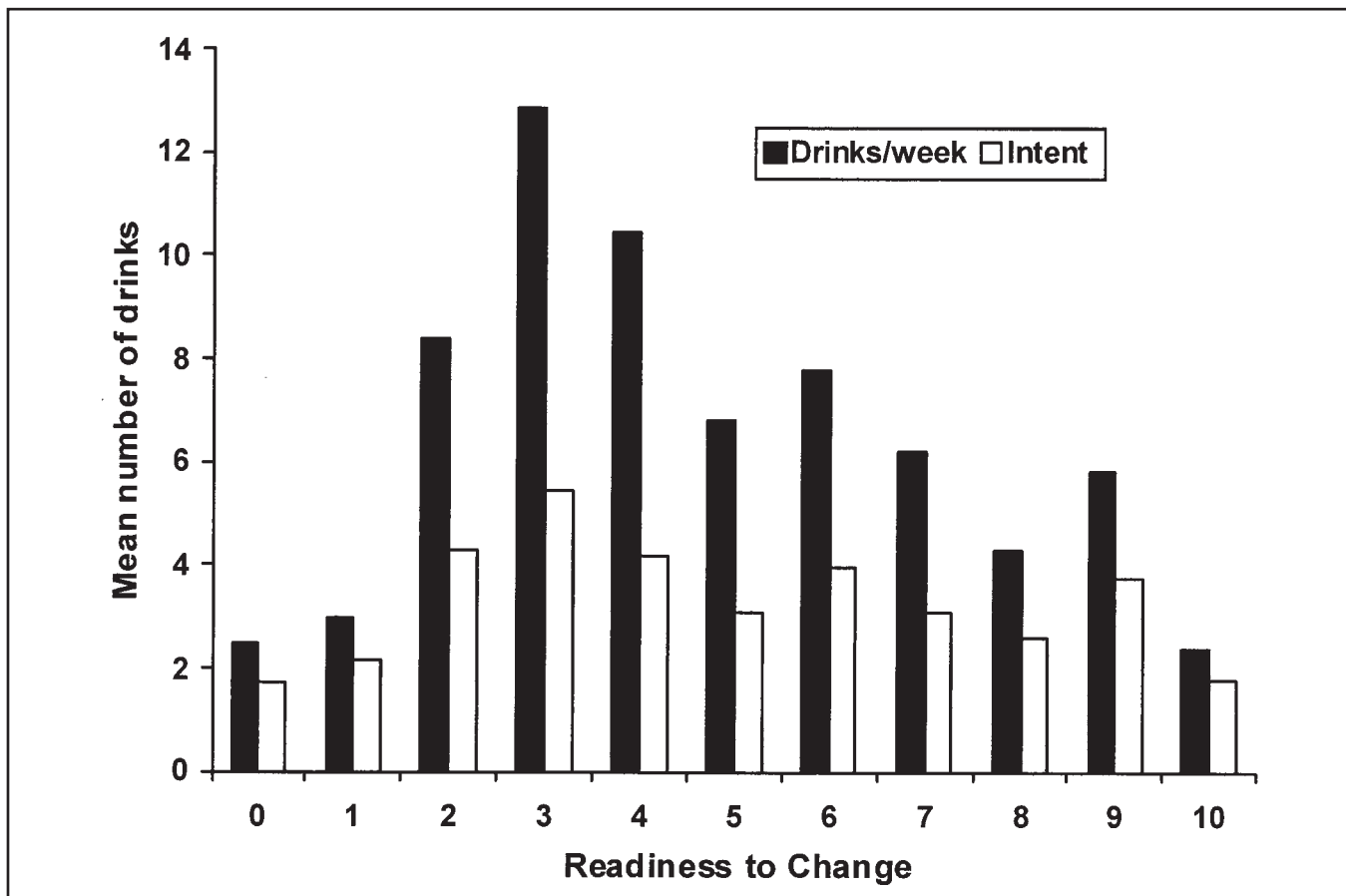


FIGURE 1. Readiness to change, drinks per week, and intentions to drink; 0 = “I’ve never needed to change my drinking”; 3 = “Sometimes I think about drinking less”; 5 = “I have decided to drink less”; 7 = “I am already trying to cut back on my drinking”; 10 = “My drinking has changed”

which RTC is examined as a function of alcohol use. However, because we wished to examine how RTC relates to future drinking, drinking was entered into the model as a Lag 1 predictor such that RTC at time $t - 1$ would be predicting drinking at time t . In these analyses, there were 10 or fewer Level 1 cases per person in the creation of the lagged variable, as a result of the loss of 1 week of observation.

Finally, to assess the moderating effects of the intervention on the within-person associations between drinking variables and RTC, Level 1 slopes were regressed on the Level 2 individual-differences variables. Equation 3 shows the intercept model (i.e., average RTC by intervention), and Equation 4 shows the Level 2 regression model predicting the Level 1 within-person association between drinking and RTC.

$$b_{0i} = \gamma_{00} + \gamma_{01} (\text{Intervention}) + u_{0i} \quad (3)$$

$$b_{1i} = \gamma_{10} + \gamma_{11} (\text{Intervention}) + u_{1i} \quad (4)$$

Weekly diary missing data

Of the 182 participants, 160 had complete data for all 10 weeks (88% complete data). There was no relationship between missing weekly data and intervention assignment. There was a significant correlation between missingness and average weekly drinking, with those who had missing observations drinking significantly more per week than those who did not ($r = .26, p < .01$). However, HLM is generally resilient to missing data because HLM weights each person's final within-person and intercept estimates (in part) according to the number of observations that person provides slope. Data from individuals with fewer days have less influence on the final results. This argues in favor of the use of HLM over more traditional repeated-measures types of analyses, which may be more vulnerable to the effects of missing data.

Readiness to change and drinking. We first examined the question of whether RTC varied within-person. Overall, there was significant variability in RTC, indicating that, on average, across 11 weeks, students do report periods of thinking of reducing their drinking. By dividing the variance into within- and between-subjects components using the equation, Intraclass correlation = $\tau_{00} / (\tau_{00} + \sigma^2)$, 28.1% of the variance in RTC was within-person difference and 71.9% was between-person differences. Thus, although approximately two thirds of the variance in RTC was between people, about one third of the variance explained was within individuals.

We then examined how past drinking related to current RTC. Drinking was regressed on the weeks' RTC (Equation 1). There was a significant effect for both the intercept ($b = 2.99, p < .01$) and the slope ($b = -.03, p < .01$), indicating that there was a .03 decrease in RTC for each unit of increase in drinking. On weeks when students drank more than they

typically do, they experienced a slight decrease in readiness to change their drinking.

We next examined the question of how RTC relates to intentions to drink and future drinking behavior. RTC was regressed on drinking intentions (Equation 2) and the next week's drinking (drink lagged). For drinking intentions, there was a significant effect for both the intercept ($b = 3.08, p < .01$) and the slope ($b = -.12, p < .01$), indicating that for each unit of increase in RTC, there was a .12 decrease in drinking intentions. In other words, on weeks when RTC is higher than their average RTC, students intend to drink less in the future. There was a significant effect for both the intercept ($b = 5.61, p < .01$) and the slope ($b = -.29, p < .01$) for future drinking, indicating that there was a .29 decrease in drinking for each unit of increase in RTC. In other words, on weeks when RTC was higher than their average RTC, students drank less the following week.

Intervention effects on drinking and readiness to change. We examined the relationships among drinking, RTC, and intervention by looking at the effects of RTC on drinking in the previous week, on intentions to drink in the next week, and for actual drinking in the next week (see Table 1). As can be seen in Table 1, the intervention was associated with RTC. Those in the intervention group reported significantly higher RTC than controls across all weeks. In addition, there was a significant interaction between the intervention and past week's drinking in predicting RTC. On average weeks of drinking, the intervention group was higher in RTC than controls. The control group endorses relatively stable levels of RTC. However, on weeks when the intervention group drank more than their average amount, they reported thinking about changing their drinking less. There was no significant interaction between the intervention and other measures of readiness and drinking.

TABLE 1. Multilevel regression results for readiness to change, previous week drinking, intentions to drink, and following week drinking, by intervention

| Variable | B (SE) |
|--|---------------------------|
| Readiness to change, b_{it} | |
| Intercept, γ_{00} | 2.44 (0.27) [†] |
| Intervention, γ_{0i} | 0.98 (0.36) [†] |
| Last week drinking slope, γ_{10} | 0.00 (0.01) |
| Last Week Drinking \times Intervention, γ_{11} | -0.05 (0.01) [†] |
| Drinking intentions, b_{it} | |
| Intercept, γ_{00} | 3.07 (0.31) [†] |
| Intervention, γ_{0i} | 0.02 (0.42) |
| Readiness to change slope, γ_{10} | -0.12 (0.07) |
| Readiness to Change \times Intervention, γ_{11} | -0.01 (0.08) |
| Next week drinking, b_{it} | |
| Intercept, γ_{00} | 5.53 (0.69) [†] |
| Intervention, γ_{0i} | 0.14 (0.92) |
| Readiness to change slope, γ_{10} | -0.06 (0.17) |
| Readiness to Change \times Intervention, γ_{11} | -0.34 (0.20) |

[†] $p < .01$.

Discussion

It is clear that, although college students may drink more and experience more negative consequences from drinking than many other populations, there is variability in drinking behaviors both across college students and within an individual student (Cho, 2006; LaBrie et al., 2009—this supplement). Various key theories and clinical interventions focus on RTC as a crucial mechanism of behavior change and a key therapeutic target (Miller and Rollnick, 2002). However, few studies have focused on intra-individual variability in RTC and drinking behavior. The current study sought to determine whether and under what circumstances RTC varies within individuals and how this is influenced by and influences drinking behavior in a sample of college students enrolled in a treatment-outcome study. We generally found support for bidirectional relationships between changes in RTC and drinking. In addition, our findings suggest that a brief motivational intervention does differentially affect RTC in relation to controls but may not directly translate to changes in drinking behavior.

Previous literature has found contradictory findings regarding the impact of alcohol consumption on changes in motivation to change drinking behavior. The present study found that higher than average past drinking was associated with reductions in RTC, as is consistent with those studies that have found that higher alcohol consumption is associated with lower motivation to change drinking (Barnett et al., 2006). This is in contrast with studies finding that higher drinking is associated with higher RTC and that contemplators may have the strongest relationships between RTC and heavy drinking (Palfai et al., 2002; Shealy et al., 2007; Vik et al., 2000). Visual analysis of Figure 1 is more consistent with that body of literature in which highest drinking and intentions to drink were associated with those individuals in the contemplation stage. It is possible that some of these differences may be the result of examining the data based on within-person differences (how their drinking and readiness influence each other) as opposed to between-person differences. In addition, these differences also may be attributable to the temporal sequencing of events, because findings were notably different when we examined the question of whether readiness to change drinking appears to affect behavior. Consistent with the transtheoretical stages of change model (Prochaska et al., 1992), we found that, on weeks when an individual's RTC was higher than their own personal average, those students both intended to, and actually did, drink less the following week. This provides support for both the concept of variability in thoughts about changing drinking behavior and that this variability in an individual's motivation to change can change drinking. Moreover, the present findings may provide a window into understanding these differences and suggest the need for more complex modeling of the drinking to motivation relationship.

In general, our study found that our MI intervention did appear to be increasing RTC but that the relationship within the treatment condition between RTC and changes in drinking was less clear. As predicted, the MI intervention was associated with higher RTC in the intervention group than in controls. Thus, an MI intervention did increase student's reported motivation to change, on average. This is in contrast to findings that MI interventions may not affect RTC in college students (Fromme and Corbin, 2004). In addition, there was a significant interaction between the intervention and past week's drinking in predicting RTC. Interestingly, control participants demonstrated little variation in their motivations to change drinking. For the intervention participants, average weeks of drinking were associated with higher motivation to change compared with controls, but weeks of higher drinking were associated with lower motivation to change their drinking behavior. This is consistent with the findings of Barnett and colleagues (2006) that higher alcohol consumption is associated with lower intentions to change heavy drinking. Based on our findings, it appears that changes in RTC affect drinking intentions and future drinking behavior independent of receiving an MI-based intervention.

Despite the strengths of the present study, findings should be considered in light of the study limitations. This sample was restricted to female students only, which may limit the generalizability to other populations given that women appear to be more likely in general to consider changing their alcohol use (Barnett et al., 2006). The outcome measure of RTC was the readiness ruler. The advantage of this scale is that it is anchored to alcohol use specifically and provides a continuous measure of RTC. However, this does limit our ability to discuss more RTC generally. Also, the study did not include a no-monitoring control condition. It is possible that merely the frequent assessment of drinking behavior and motivations to change may have increased readiness and decreased drinking. This could have decreased our ability to find differential relationships between RTC and drinking in the treatment versus control comparisons. This suggests a need for future studies to include these types of more intensive longitudinal measurement coupled with the inclusion of a minimal assessment control group.

Despite these limitations, the current results have implications for interventions developed for college drinking. Overall, our results are generally supportive of the transtheoretical model of change. These results suggest within-person changes in thinking about drinking behavior were associated with actual changes in future drinking behavior. Identifying these windows of opportunity within individual students may be a crucial component of college drinking prevention programs. Moreover, based on our findings, it may be that treatment providers do not necessarily need to identify those students in the contemplation stage but instead may need to identify those students who are demonstrating the greatest amount of change in their motivation regarding their drink-

ing and provide them with interventions to help them make behavioral changes (Dimeff et al., 1999; Miller and Rollnick, 2002). Future research will need to examine further predictors of intra-individual variation in RTC, including negative consequences of drinking and alcohol expectancies (Blume et al., 2006; McNally and Palfai, 2001; Smith and Tran, 2007).

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