

SELF-EFFICACY AND MOTIVATION FOR CONTROLLING DRINKING AND DRINKING/DRIVING: AN INVESTIGATION OF CHANGES ACROSS A DRIVING UNDER THE INFLUENCE (DUI) INTERVENTION PROGRAM AND OF RECIDIVISM PREDICTION

ELISABETH WELLS-PARKER, DERIC R. KENNE, KRIS L. SPRATKE, and
MARSHA T. WILLIAMS

Department of Psychology and Social Science Research Center, Mississippi State University

Abstract — Measures of (a) self-efficacy and (b) motivation to change (stage) for controlling drinking and drinking/driving were examined at the beginning and the end of a four-week intervention in a sample of 670 Driving Under the Influence (DUI) offenders in a court-mandated program. Hypotheses regarding stability of stage classifications over the course of intervention, and the relation between stage classification, stage scores, self-efficacy, and DUI recidivism were examined. Based on results of an earlier study it was expected that most offenders would be classified into the action stage at entry and that classifications would tend to remain stable from pretest to posttest. Action was the most frequent stage classification in both drinking and drinking/driving domains at both test periods, with precontemplation being the least frequent classification. When tracked over the four weeks, stage classifications for drinking and drinking/driving were stable for 74 to 89% of offenders in the two domains, respectively. As predicted, higher action and self-efficacy scores were related to lower recidivism, and action scores in the drinking/driving domain were the best early recidivism predictors among a predictor set that included traditional recidivism indicators. Drinking contemplators (i. e., those with the highest stage score on the contemplation scale) had higher recidivism rates than other drinking stage classifications. Implications for DUI intervention programs are discussed. © 2000 Elsevier Science Ltd.

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Motivation to change behavior and self-efficacy for changing those behaviors have been shown to be key concepts in transtheoretical approaches that are the basis for many intervention strategies (Miller & Rollnick, 1991), including interventions with Driving Under the Influence (DUI) offenders (Wells-Parker, Williams, Dill, & Kenne, 1998). Measures of motivation to change (stage of change) and self-efficacy for changing drinking/driving behavior were developed for use with DUI populations (Wells-Parker, Burnett, Dill, & Williams, 1997) and examined in the context of a transtheoretical approach to behavioral change for DUI offenders who had just entered in a court-ordered intervention program (Wells-Parker et al., 1998). Using this framework, measures for both motivation for change and self-efficacy were found to have potential for designing and evaluating DUI interventions to the extent that enhancing self-efficacy and motivation to change are necessary steps for reducing driving after drinking.

In these earlier studies, psychometric analysis showed that motivation for changing drinking/driving was conceptually and factorially distinct from self-efficacy for controlling drinking/driving, as well as from general measures of level of alcohol prob-

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Requests for reprints should be sent to Elisabeth Wells-Parker, Ph.D., Box 5287, SSRC, Mississippi State University, Mississippi State, MS 39762.

lems. However, results suggested that for most DUI offenders motivation and efficacy to control drinking were each highly related to the corresponding measures in the drinking/driving domain, suggesting that motivation and efficacy for controlling drinking are integral to changing drinking/driving behavior. Self-efficacy and action scales were found to be related to self-reported prior DUI arrests or to previous alcohol-involved crashes. When compared to previous studies of stages of change in populations that were not defined by a DUI event but were identified as having alcohol problems (e.g., Rollnick, Heather, Gold, & Hall, 1992), a higher proportion of DUI subjects were classified as being in the action stage of change for drinking and fewer subjects were classified as being in the precontemplation stage. Results for the drinking and driving domain (Wells-Parker et al., 1998) indicated that most offenders reported currently acting to change by reducing drinking/driving behaviors and relatively few offenders indicated that they felt no need to change drinking and driving behavior (e.g., low precontemplation scores). These results are somewhat surprising in view of a larger literature that suggests individuals in court-ordered interventions are usually in denial of problems with drinking or drinking/driving and therefore, would be expected to be precontemplators to the extent that precontemplation indicates problem denial. However, DUI offenders who were in the precontemplation stage had lower scores on problem indicators such as arrest Blood Alcohol Content (BAC), alcohol problem questionnaires, and prior offenses than those classified as actors or contemplators, while contemplators had the highest problem indicator scores. Because of the heterogeneity of the DUI population in regard to levels of drinking problems, precontemplators could include those individuals in the DUI population who actually have lower levels of problems with controlling drinking and avoiding drinking/driving (Wells-Parker et al., 1998).

Based on this earlier examination of both motivational stage-of-change measures and self-efficacy measures for drinking and drinking/driving in a DUI sample, several hypotheses that were consistent with the transtheoretical model were developed (Wells-Parker et al., 1998). It was hypothesized, based on the theoretical model, that participants who complete a DUI intervention program would increase their level of action and self-efficacy for controlling drinking/driving, as well as move to a higher stage of change. However, initially high scores on the action scales within the DUI population could limit upward movement, and those who are already in the highest-scored, or "action" stage, would be expected to remain in this stage. Although the theoretical model of stage of change would suggest that precontemplators should move to a higher stage (e.g., contemplation or action), it is unclear whether such a prediction is appropriate within the DUI population since scores on the precontemplation scales used here are expected to be relatively low at program entry, and possibly reflect lower problem levels relative to offenders classified in other stages, particularly those classified as "contemplators." Several theoretical predictions regarding subsequent drinking/driving were clearly implied: both higher levels of self-efficacy and higher levels of actions to change drinking and drinking/driving behavior should be associated with lower levels of drinking/driving and thus, lower rates of DUI recidivism (Wells-Parker et al., 1998). These relationships were expected to hold even after accounting for other standard predictors of recidivism such as prior offenses, demographic characteristics, and indicators of drinking problems. Also based on findings of the earlier study that contemplators had higher levels of alcohol-problem indicators, it could be expected that high contemplation scores would be associated with recidivism, and that those offenders whose highest scores were on the contemplation scale (i. e.,

contemplators) should show the highest recidivism rates as compared to offenders in other stage classifications. As previously mentioned, the interpretation of “precontemplation scores” may be somewhat equivocal in the DUI population; however, to the extent that “precontemplators” include those offenders who actually have relatively low levels of alcohol and driving problems, then precontemplators might be expected to have relatively low recidivism rates.

In order to examine these hypotheses in the current study, changes in motivational stage scores and self-efficacy scores between the beginning and end of a 4-week court-mandated intervention, and relationship between recidivism, stage classification, and scores on stage-of-change and self-efficacy scales were examined in a sample of DUI offenders. Previous studies have not examined either how changes in drinking/driving-related motivational stages and self-efficacy for controlling drinking/driving across the course of a court-mandated intervention program, or whether stage of change and self-efficacy measures can predict subsequent DUI recidivism. Both the association of stage and self-efficacy measures with subsequent drinking/driving risk and the stability of scores across intervention programs have important implications for intervention design.

M E T H O D

As part of a larger intervention project, consenting offenders at ten locations in Mississippi completed questionnaires containing experimental scales following the participants' completion of the standard intake instrument (the Mortimer-Filkins questionnaire and general background information; Wells-Parker et al., 1998). The experimental questionnaires were administered during the first session and again at the end of the fourth session (posttest). Interventions consisted of traditional DUI education incorporating group activities, educational presentations and films, and group feedback on scores from a psychometric instrument designed to measure risk for drinking/driving (the Mortimer-Filkins questionnaire; Mortimer et al., 1981) as well as a combination of the group education program plus sessions of individual and group counseling using the Motivational Interviewing approach (Miller & Rollnick, 1991). Scales and items in the experimental questionnaire included items indicating efficacy to control drinking/driving (DDE; Wells-Parker et al., 1997), which were combined with three items from the efficacy-related factor of the Locus of Control over Drinking Scale (Donovan & O'Leary, 1978) to yield a composite efficacy to control drinking and drinking/driving measure (Wells-Parker et al., 1998); the Stages of Change for Drinking Scales (SCD [precontemplation, contemplation, and action]; Rollnick et al., 1992); and items denoting three stages of change with respect to drinking and driving (DRDV; Wells-Parker et al., 1998). Previous studies have shown that the self-efficacy measures, in which items focus on personal efficacy to change drinking and drinking behavior, are both conceptually and factorially distinct from the measures of motivational change, which focus on beliefs about whether behavior needs to be changed or whether problems exist with drinking and driving behaviors (precontemplation and contemplation) or whether action is being attempted to change drinking and driving (action) (Wells-Parker et al., 1997, 1998). Although contemplation and precontemplation drinking measures overlap to some extent general measures of self-reported levels of drinking problems (such as the Mortimer-Filkins), self-efficacy measures and action measures, especially in the drinking/driving domain, do not overlap in item content with the Mortimer-Filkins questionnaire. Demographic information and scores on the Mor-

timer-Filkins questionnaire were available from standard intake forms. BAC for one or more DUI offenses was available for 472 of the participants, either on the standard intake form, from court records, or from the official driving history record file.

Questionnaires were administered from April through December of 1996. Retained for analysis were sets of questionnaires that were complete—that included both pre- and posttest questionnaires for classes at each site. The sample included 670 consenting offenders, 20% of whom were female, 66% Caucasian, 30% African American, and 4% of other races. Of those with other ethnic backgrounds, 70% were American Indian, 15% were Hispanic, and the remainder did not specify a particular ethnic group. The median age of the sample was 32; 48% were less than 30 years of age, 46% were 30 to 49 years of age, and 6% were 50 or older. When scores for a scale were incomplete (e.g., questions were unanswered), the case was deleted for any analysis involving that scale; however, for purposes of triangulation, scores with averages substituted for missing data were added to the analysis to determine whether results were influenced by treatment of missing data. This sample was independent of samples used in previous research that examined motivational stages for DUI offenders in Mississippi (Wells-Parker et al., 1997, 1998). All participants in the current sample were adjudicated as first offenders; however, according to driver's history records, 122 offenders in the sample had prior DUI offenses. State of Mississippi driver's history records were checked for DUI arrests in September of 1997.

R E S U L T S

Classification by stage of change

Within each domain (drinking and drinking/driving) and within each time period (pretest and posttest) participants were classified into one of three stages (action, contemplation, or precontemplation) based on their highest stage score. When two adjacent stages were tied, the highest stage (e.g., contemplation when the tie was between precontemplation and contemplation, and action when the tie was between contemplation and action) was assigned based on precedents from other studies (Rollnick et al., 1992). Classification was also made by score pattern. Pure patterns (pure action, contemplation, or precontemplation) were assigned when there was an elevation above a mean neutral rating on a single stage score. Consistent mixed patterns consisted of elevations on two adjacent stages (e.g., action and contemplation, or contemplation and precontemplation). A mixed inconsistent pattern was assigned when action and precontemplation, but not contemplation, were elevated. Undifferentiated patterns involved either elevations on all stages or elevations on no stages.

Consistent with findings from our previous study (Wells-Parker et al., 1998), the action stage was the most common classification across both domains and both time periods. Over three quarters of participants were classified as actors in each domain and time period. The lowest percentage of actors were in the drinking domain at pretest (77%), and the highest percentage of actors were in the drinking/driving domain at posttest (83%). The least frequent classification was precontemplation ranging from 2.9% at pretest and 1.9% at posttest in the drinking/driving domain to 7.1% at pretest and 4.1% at posttest in the drinking domain. Contemplators in both domains ranged from 14% at pretest to 15% at posttest.

When domains were compared within the same time period, it was clear that individuals tended to be classified into the same stage for both drinking and for drinking/driving. At either testing period, over three quarters of participants were classified

into equivalent drinking and drinking/driving stages with the most common stage classification difference, accounting for an additional 15 to 20% of the sample at either testing period, being actors in one domain classified as contemplators in the other domain.

Similar trends were noted when stage classifications for each domain were compared across time periods: 74% of participants were consistent from pre- to posttest for drinking stage classification, and 89% were consistent for drinking/driving stage at pre- and posttest. The most common difference across time was for contemplators to become actors (9%) or for actors to become contemplators (7–8%). It was rare in both domains for actors or contemplators at pretest to become precontemplators at posttest ($\leq 2\%$ of total). However, in each domain over 70% of pretest precontemplators were classified as contemplators or actors at posttest. Overall, in the drinking domain about 14% elevated their stage from pre- to posttest (primarily from contemplation to action), and 10% decreased their stage, most often from action to contemplation. In the drinking/driving domain, 12% increased their stage (primarily from contemplation to action), and 9% decreased their stage, most often from action to contemplation.

When elevation patterns were examined the most common patterns within both domains and at both time periods were elevations on both contemplation and action, with no elevation on precontemplation. This pattern accounted for over half of all patterns. The second most common pattern was elevation on the action stage only. Together these two patterns accounted for between 76% (pretest drinking domain) and 87% (posttest drinking and driving) of all patterns. Among the least common patterns, especially at posttest, were elevations on either precontemplation alone (a “pure precontemplation” pattern) or contemplation and precontemplation only, with these patterns accounting for less than 1.5% of all patterns for drinking and driving at either time; less than 3% of drinking posttest patterns; and about 5% of drinking pretest patterns. Elevations on contemplation only (a “pure contemplation” pattern) accounted for from 1.9% of pretest patterns in the drinking/driving domain to 3.7% of drinking patterns. Undifferentiated and inconsistent patterns accounted for 14 to 16% of all patterns.

Recidivism, SCD, and efficacy

Recidivism and stage classification. Because of the small number of precontemplators, the precontemplation and action classifications were combined for recidivism comparisons to the contemplation classification. Drinking contemplators showed significantly higher recidivism rates than did drinking precontemplators and drinking actors at posttest follow up (Table 1). Between-group comparisons in the drinking/driving domain were not significant.

Classification into a particular stage could result from having only a marginally higher score on the corresponding stage scale; therefore, patterns of stage score elevations were also examined with respect to recidivism. None of the five consistently pure drinking precontemplators (those who had above neutral elevations only on precontemplation at both times) recidivated. Only a single participant—a nonrecidivist who was also a consistently pure drinking precontemplator—showed a pure drinking/driving precontemplation pattern at both pre- and posttest. None of the six participants who showed pure posttest precontemplation patterns in either domain recidivated. A single recidivist showed a pure drinking pretest precontemplation pattern, but showed a pure contemplation pattern in both domains by posttest. All other recidivists who were ever classified as precontemplators showed either undifferentiated patterns (ele-

Table 1. Recidivism by motivation stages

	Precontemplation		Contemplation		Action		Contrast contemplation vs. action and precontemplation	
	Drinking	Drinking/ driving	Drinking	Drinking/ driving	Drinking	Drinking/ driving	Drinking	Drinking/ driving
Recidivism								
Pre	8%	13%	10%	8%	6%	7%	1.18	.60
	(3/38)	(2/16)	(8/76)	(7/84)	(25/417)	(28/547)	(529)	(545)
Post	5%	10%	12%	7%	5%	6%	1.73	.33
	(1/22)	(1/10)	(9/75)	(6/86)	(23/437)	(28/469)	(532)*	(563)

Note. Dfs were adjusted if group variances differed significantly. Because of the small numbers for precontemplation, action and precontemplation were collapsed for comparisons.

* $p < .05$.

vations on either none or all scales) or inconsistent patterns (elevations on both precontemplation and action), and stage classification based on undifferentiated or inconsistent patterns may be relatively meaningless.

In contrast to pure precontemplators, two of three consistently pure contemplators in the drinking/driving domain recidivated, and one of four consistently pure contemplators in the drinking domain recidivated. Two of 53 consistently pure drinking domain actors (3.7%) and 2 of 31 (6.4%) of consistently pure drinking/driving actors recidivated. However, the small numbers of pure patterns, especially for precontemplation and contemplation stages, preclude definitive statistical comparisons.

By far the most common pattern for recidivists and nonrecidivists alike was an elevation on both contemplation and action, which indicated both acknowledgement of a problem and current attempts to take action with regard to the problem. In the drinking domain 41% of recidivists and 43% of nonrecidivists showed this pattern at both times, while over 70% of both recidivists and nonrecidivists showed this pattern at least once in the drinking domain. In the drinking/driving domain, 55% of nonrecidivists and 67% of recidivists showed the elevated contemplation/action pattern at both pre- and posttest while 67% and 83% of nonrecidivists and recidivists respectively, showed this pattern at least once.

Recidivism and scale scores. Scale scores tended to be highly intercorrelated with intercorrelations between corresponding stage scales scores in the drinking/driving domains exceeding .6 at both pre- and posttest. Therefore drinking/driving posttest stage scores were examined first and then drinking posttest; drinking/driving pretest and drinking pretest scores were consecutively substituted. Table 2 shows mean scale scores by recidivism status. Drinking/driving action scores differed significantly between recidivists and nonrecidivists at posttest, and similar results were found when either pretest drinking/driving action scores or posttest drinking action scores were substituted. Self-efficacy scores consistently differed between recidivists and nonrecidivists. Differences between nonrecidivists and recidivists on contemplation and precontemplation scales did not consistently achieve significance.

Recidivism predictors. A stepwise discriminant function analysis with recidivism as the dependent variable included as predictors all pretest SCD scores, self-efficacy

Table 2. Stages of change and self-efficacy scores for DUI recidivists and nonrecidivists

	Action						
	Action		Contemplation		Precontemplation		
	Drinking DR	Drinking/driving DR/DRV	Drinking DR	Drinking/driving DR/DRV	Drinking DR	Drinking/driving DR/DRV	
<i>M (SD) n</i>	<i>M (SD) n</i>	<i>M (SD) n</i>	<i>M (SD) n</i>	<i>M (SD) n</i>	<i>M (SD) n</i>	<i>M (SD) n</i>	
Pretest							
Nonrecidivists	4.1 (.8) 535	4.3 (.7) 536**	3.4 (.8) 522	3.6 (.9) 534	2.4 (.8) 534	2.3 (.8) 545	3.9 (.5) 507**
Recidivists	3.9 (.8) 39	4.1 (.7) 39	3.5 (.8) 36	3.7 (.9) 38	2.5 (.7) 38	2.3 (.8) 38	3.7 (.6) 35
	<i>t</i> (572) = 1.45	<i>t</i> (573) = 2.12*	<i>t</i> (556) = .79	<i>t</i> (570) = .44	<i>t</i> (570) = .07	<i>t</i> (581) = .25	<i>t</i> (540) = 2.41**
Posttest							
Nonrecidivists	4.2 (.7) 547**	4.4 (.6) 546**	3.6 (.8) 536*	3.7 (.9) 545	2.2 (.7) 540	2.2 (.8) 553	3.9 (.5) 527**
Recidivists	4.0 (.7) 36	4.2 (.7) 36	3.8 (.7) 33	3.9 (.7) 38	2.3 (.7) 37	2.1 (.7) 37	3.7 (.4) 36
	<i>t</i> (571) = 2.23**	<i>t</i> (580) = 2.37**	<i>t</i> (567) = 1.60*	<i>t</i> (580) = 1.02	<i>t</i> (575) = .79	<i>t</i> (588) = .83	<i>t</i> (561) = 2.38**

p* ≤ .05, *p* ≤ .01.

scores, prior DUI offenses, scores on the Mortimer-Filkins questionnaire, and gender (the latter three being traditionally associated with recidivism). Only the action scale in the drinking/driving domain and prior offenses entered the equation, $F(1, 435) = 8.344$; $F(2, 434) = 6.14$, $p < .01$. Similar results were obtained (a) when scores at posttest were substituted, (b) when change scores were included as potential predictors, and (c) when the analysis was limited to offenders under 30 years of age.

DISCUSSION

DUI offenders tended to be classified into the same stage for both drinking and for drinking/driving, and to remain in the same stage from pretest to posttest. Most participants started as actors in both domains and remained as actors at posttest. The most common movement between pre- and posttest was either for contemplators to become actors or for actors to become contemplators. However, because the most common pattern throughout the analyses was for participants to have elevated scores on both contemplation and action, small changes in the relative values of contemplation and action scales may account for most of the apparent movement between pre- and posttest, and may be relatively meaningless. As expected, mean scores on action and self-efficacy measures were near the maximum, and regression toward the mean tendencies would tend to limit any upward movement on these scales.

Regarding recidivism prediction, higher action and self-efficacy scores were both modestly associated with lower recidivism risk. The best predictor of recidivism among the SCD scales, self-efficacy, and traditional recidivism indicators such as prior offenses, was the drinking and driving action scale. In terms of drinking stage classification, contemplators had higher recidivism rates than the other two stages combined, although no significant relationship was found between drinking/driving stage and recidivism. Although not definitive because of small numbers, when pure drinking/driving contemplation patterns were examined, two of three participants who showed the pure pattern at both pre- and posttest recidivated. Similarly the small number of precontemplators, particularly in the drinking/driving domain, precluded definitive conclusions about the relationship between precontemplation stage classification and recidivism. However, the observation that the small number of consistently pure precontemplators (those with elevations on precontemplation at both times) tended not to recidivate suggests that consistently pure precontemplation patterns with no other stage elevations, may be associated with reduced recidivism risk and be the pattern that is most logically shown by the true social drinker who on a rare occasion exceeded the limit. On the other hand, pure contemplation patterns in which an offender acknowledges problems but is taking no action to change behavior could be a "cry" for help. Although the rarity of these pure patterns precludes definitive conclusions in the current study and suggests limitations on the utility of pure patterns for individual assessment, the relationship between recidivism and consistently pure contemplation and precontemplation patterns is theoretically relevant, and should be examined in larger samples.

Results from the current study have implications for developing successful DUI intervention strategies. For example, the observation that most offenders are classified into the action stage and have elevations on both contemplation and action scores but have low precontemplation (denial of problem) scores has potential for planning program content. These results suggest that most of the DUI offenders both acknowledged problems with drinking and drinking/driving and indicated that they were at-

tempting to take actions to change drinking and driving behaviors from the very beginning of the intervention. This suggests the need to focus much of the intervention's content on examining the feasibility, effectiveness, and sustainability of those actions rather than on convincing most offenders that they have problems, as might be done in traditional alcohol interventions. Although it is possible that response pressures of a court-mandated program are partially responsible for the high action and low precontemplation scores (Wells-Parker et al., 1998), it is also possible that most offenders recognize a need to change, if not drinking then at least drinking/driving behavior, and believe that they are taking corrective action, whether those actions are court mandated (e.g., elimination or [more realistically] reduction of driving exposure because of licensing sanctions) or short-term choices (e.g., avoidance of drinking locations that require driving). Conceptually, the fact that higher action and self-efficacy scores are associated with lower recidivism rates suggests the importance of confident action to reduce risk of subsequent drinking/driving events. However, the fact that most recidivists had relatively high action and self-efficacy scores suggests that confident attempts to control drinking and to avoid future drinking and driving events are not enough. Actions must be effective and sustainable. For the majority of offenders, it appears important to encourage them early in the intervention process to state what they think they are doing to control drinking and to avoid drinking/driving, and to initiate a realistic examination of actions and plans, as well as to facilitate the development of skills and supporting lifestyle changes and choices that realistically facilitate those behaviors. This strategy is consistent with motivational interviewing and motivational enhancement therapy (Miller & Rollnick, 1991).

It should be noted that specific item wording, differences in DUI populations, and different contexts for administration could influence results. A recent study by Wiczorek, Callahan, and Morales (1997) examined motivational stages using the University of Rhode Island Change Assessment Scale (URICA) in a sample of DUI offenders. While the instruments used in the current study contain items specific to either drinking behavior or drinking/driving behavior (e.g., action items denoting current attempts to actually change drinking or drinking/driving habit; precontemplation items denoting no perceived need to change or think about changing drinking or drinking/driving behaviors), items in the URICA do not refer to specific behaviors such as drinking or drinking/driving. Items in the URICA refer generally to problems that might require therapeutic intervention, although general instructions in the Wiczorek et al. (1997) study were to focus on drinking and driving. As compared to the current study, Wiczorek et al. (1997) found that a larger proportion of offenders were classified as precontemplators and a smaller proportion were classified as actors based on the URICA. Although proportions of stage classifications differed between studies, our studies using specific drinking and drinking/driving items and the study using the URICA's general items consistently tended to find that those classified as precontemplators had generally lower levels on alcohol-problem indicators, and that contemplators had generally higher levels. Wiczorek et al. (1997) found that precontemplators had lower scores on a series of alcohol-problem indicators and fewer prior treatment experiences than did those in other stages, while those classified as contemplators had higher levels of problems. Similarly, in our previous study (Wells-Parker et al., 1998) drinking precontemplators had lower levels of alcohol-problem indicators while drinking contemplators had higher levels, and in the current study drinking contemplators had higher recidivism rates than either of the other stage classifications. Based on their findings, Wiczorek et al. (1997) questioned whether traditional treat-

ment paradigms, which may focus on reducing “denial,” are appropriate for many DUI offenders. Their conclusions are in accord with our suggestions, based on the results of the current study, that there is a need to focus on current behaviors and plans to control drinking and avoid drinking/driving—a strategy which may differ from the focus of some standard alcohol treatment regimens, but which has been incorporated into many DUI interventions (Wells-Parker, Bangert-Drowns, McMillen, & Williams, 1995).

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