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The role of social support in motivating reductions in alcohol use: A test of three models of social support in alcohol-impaired drivers

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Abstract

Background: Social support has been linked to many therapeutic benefits (e.g., treatment retention, reduced posttreatment relapse) for individuals with alcohol use disorder. However, the positive impacts of social support have not been well-understood in the context of alcohol-impaired driving. This article examines the role of social support in motivating those with histories of DWI arrest to reduce alcohol use by testing three major models of social support: the Main-Effects model, the Buffering model, and the Optimal Matching model.

Method: One hundred and nineteen participants with histories of DWI arrest were recruited from a correctional treatment facility ($n = 59$) and the local community ($n = 60$). Participants completed interviews to assess alcohol consumption, psychiatric/physical conditions, and psychosocial factors associated with drinking behavior (e.g., social support, alcohol-related problems, motivation to change). Hierarchical regression analyses were conducted to test the three models. Additionally, the relative magnitude of the effects of general and recovery-specific social support was compared based on the Cumming's (2004) approach of statistical inference of confidence intervals.

Results: Overall social support was positively associated with some motivation to change (i.e., importance of change, confidence in change) among alcohol-impaired drivers, supporting the Main-Effects model. However, the impact of overall social support on motivation to change was not moderated by alcohol-related problems of individuals arrested for DWI, which did not confirm the Buffering model. Lastly, recovery-specific social support, rather than general social support,

contributed to increasing motivation to reduce alcohol use, which supported the Optimal Matching model.

Conclusion: These findings highlight the benefits of social support (i.e., increased motivation to change alcohol use) for alcohol-impaired drivers. Regardless of the severity of alcohol-related problems of alcohol-impaired drivers, social support had direct positive impacts on motivation to change. In particular, the results underscore that social support can be more effective when it is matched to the recovery effort of individuals, which is consistent with the Optimal Matching model.

Keywords

Driving While Intoxicated; Driving Under the Influence; Social Support; Optimal Matching Model; Main-Effects Model

Driving while intoxicated (DWI) is still among the most intractable problems associated with alcohol use. Societal costs of DWI (e.g., medical cost, legal expenses, workplace losses, insurance administration, property damage, and loss of quality-of-life) was estimated to be \$236 billion in 2010 in the United States (Blincoe et al., 2015). After a significant decline in DWI-related traffic fatalities from 17,448 in 2001 to 10,228 in 2010 (NHTSA, 2002, 2012), progress in reducing DWI deaths has become stagnant since 2010. The proportion of DWI-related crashes remains stable at about 30% of fatal crashes (NHTSA, 2012, 2017a) and accounts for approximately 10,000 deaths annually (NHTSA, 2017b). Another alarming aspect of DWI is the prevalence of recidivism. About one of three DWI offenders recidivated within two years of their first DWI conviction (Brinkmann et al., 2002) and estimates indicate that 30% of people convicted of DWI had previous DWI arrests (Warren-Kigenyi and Coleman, 2014).

One challenge in preventing DWI recidivism is the fact that, in many cases, it is associated with psychiatric disorder. Alcohol Use Disorder (AUD) is prevalent among alcohol-impaired drivers where approximately 90% of DWI offenders have an AUD diagnosis (Lapham et al., 2001, McCutcheon et al., 2009) and individuals with severe alcohol dependence are more likely to recidivate (Nochajski and Stasiewicz, 2006, Simpson et al., 2004). Given the prevalence of AUD among DWI offenders, traditional approaches to reducing recidivism that rely on punitive sanctions (i.e., suspension or revocation of driver's license) and/or vehicle sanctions (e.g., installation of ignition interlock devices), have been limited in effectiveness (Voas and Fisher, 2001). A growing number of studies, therefore, have underscored the importance of cognitive/behavioral or psychosocial interventions for AUD for those with DWI histories (Brown et al., 2010, Ouimet et al., 2013). Implementation of these treatments may be informed by understanding the impact of psychosocial influences on the likelihood of drunk driving and ongoing alcohol use after DWI arrest.

One factor that increasingly has gained attention in the behavioral change literature has been social support. Social support has been identified as an important factor that plays a pivotal role enhancing the motivation to reduce alcohol use and subsequently reduce DWI recidivism (Dobkin et al., 2002, Stevens et al., 2015). Social support can be broadly defined as the emotional (e.g., reassurance, encouragement), informational (e.g., advice, direction),

or instrumental (e.g., financial aid, physical help) resources provided from individuals' social networks (Cohen, 2004, Gottlieb and Bergen, 2010). Previous work has suggested that social support is associated with reduced drinking or recovery from AUD. For example, analyses have reported that social support can reduce risky drinking behaviors by helping individuals positively cope with stress (Humphreys et al., 1999), mitigating depression and distress (Peirce et al., 2000), or by enhancing motivation for recovery (Hunter-Reel et al., 2010). In addition, emotional support such as encouragement for abstinence and reassurance of worth has been found to increase treatment retention and reduce posttreatment relapse of alcohol abusers (Dobkin et al., 2002, Longabaugh et al., 1993, Stevens et al., 2015).

However, the benefits of social support that have been reported in the literature on AUD treatment have not been well-examined in the unique context posed by being arrested for a DWI offense. Previous studies focused on the very limited aspects of social support such as social approval or disapproval and provided only anecdotal evidence regarding those with DWI: individuals without friends or families who discourage drinking and drunk driving are more likely to re-commit DWI offence (Carruth et al., 2016, Greenberg et al., 2004).

The primary objective of the present paper is to investigate the relationship between social support and motivation to change alcohol use among alcohol-impaired drivers. Motivating patients to change alcohol use is fundamental to treatment outcomes such as prolonged abstinence and relapse prevention (DiClemente and Velasquez, 2002, Maisto et al., 2014, Rollnick, 2002). As Hunter-Reel et al. (2010) suggested in the review of the Witkiewitz and Marlatt's relapse model, social support such as encouragement for recovery and reinforcement of the abstinence may increase motivation to change. However, except the conceptualization of Hunter-Reel et al. (2010), the relationship between social support and motivation to change alcohol use has not been well-examined. This paper, therefore, focuses on investigating the role of social support in motivating alcohol-impaired drivers to reduce alcohol use. Especially, given the lack of previous research testing the association between social support and motivation to change among alcohol-impaired drivers, the current analysis tests three models of social support: (1) the Main-Effects model, (2) the Buffering model, and (3) the Optimal Matching model. Figure 1 presents conceptual relationships between social support and motivation to change that are suggested by each of the three models.

The Main-Effects model

First, the Main-Effects model posits that social support has overall beneficial impacts on physical or psychological well-being and health-related behaviors regardless of the stress level of individuals (Stroebe and Stroebe, 1996). Individuals can experience positive emotions such as a sense of belonging, feelings of security, and senses of mastery and control by having relationships with friends and family (Cohen, 1988, Uchino, 2004). These positive psychological states, in turn, may promote practices of positive health behaviors (e.g., alcohol abstinence, compliance to treatment regimen) (for review see Ertel et al., 2009). There is ample evidence that links the presence of social support directly to alcohol consumption (Booth et al., 1992, Rosenberg, 1983). In particular, social support from family and friends was found to promote positive coping strategies, motivating individuals to

pursue abstinence (Gordon and Zrull, 1991). Another study found that greater structural social support (i.e., stronger social integration) or family support was related to a lower risk of relapse (Havassy et al., 1991). Thus, based on the Main-Effects model, it is hypothesized that social support will be positively associated with the three fundamental motives regarding behavioral change (Berg-Smith et al., 1999): readiness to change (**Hypothesis 1a**), importance to change (**Hypothesis 1b**), and confidence in change (**Hypothesis 1c**) due to its beneficial impacts on physical or psychological well-being and health-related behaviors.

The Buffering model

The Buffering model conceptualizes that the primary benefit of social support is providing individuals with a buffer against harmful impacts of stressors (Cobb, 1976). While the Main Effects model assumes a general and direct positive association between social support and health outcomes, the Buffering model claims that the benefits of social support are dependent on the level of stress: at high levels of stress, social support can mitigate the deleterious effects of stressful life events, whereas it may not be related to the health outcomes of individuals under low stress (Cohen and Wills, 1985, Thoits, 2011). Therefore, previous studies have tested the Buffering model by examining how the impacts of social support on health outcomes was moderated by the level of stress (Cohen and McKay, 1984, Uchino, 2006).

In the context of AUD treatment, studies based on the Buffering model have documented that people with AUD can benefit from social support when they are under stress because stress-induced drinking decreases when individuals can receive strong social support for their emotional distress (Dobkin et al., 2002, Peirce et al., 2000). In a similar vein, DWI offenders in a high-stress context (i.e., more alcohol-related problems) may benefit more from the social support than those under less stressful conditions. Therefore, based on the Buffering model, this paper predicts that the positive impacts of social support on readiness to change (**Hypothesis 2a**), importance to change (**Hypothesis 2b**), and confidence in change (**Hypothesis 2c**) will be greater among people who have experienced a greater number of alcohol-related problems.

The Optimal Matching model

Finally, the Optimal Matching model argues that the impact of social support is contingent upon the relevance of the support to the needs of recipients. Since Cutrona (1990) introduced the model, studies have found that social support can be most effective when it is matched with the specific needs of recipients, while mismatched or unmatched social support may not be helpful or even have negative impacts on recipients (Cavallo et al., 2016, Cutrona and Russell, 1990, Reynolds and Perrin, 2004). In a similar vein, studies of AUD treatment have examined how different types of social support influence treatment outcomes. Beattie and Longabaugh (1997, 1999), for example, found that only tailored social support (e.g., encouragement for abstinence) was associated with reduced drinking and sustained abstinence, whereas general social support (e.g., having a friend/family to whom you can talk to or you can trust) was related to subjective well-being. Similarly, in the present investigation, recovery-specific support (e.g., support for encouraging recovery and

reassuring the meaning of recovery efforts) is distinguished from general social support. Therefore, based on the Optimal Matching model, it is hypothesized that impacts of recovery-specific social support on readiness to change (**Hypothesis 3a**), importance to change (**Hypothesis 3b**), and confidence in change (**Hypothesis 3c**) will be greater than general social support.

The Main-Effects and the Buffering models have been more extensively investigated and supported by empirical evidence, describing whether the positive impacts of social support can vary by the level of stress of individuals. Although it has been less-examined than the other two models, the Optimal Matching model suggests that the effectiveness of social support depends on the relevance of the provided support to the situations and the needs of individuals. However, as Flint et al. (1997) noted, establishing the superiority of one model may not be important. Instead, it is important to provide a more comprehensive and accurate understanding of the role of social support. Therefore, the three models are compared to each other to provide a more comprehensive test of the role of social support in the context of interventions for alcohol-impaired drivers.

METHODS

Participants

One hundred nineteen adults with a history of driving while intoxicated (DWI) arrests participated. Participants were recruited from two sources: a county residential correctional treatment facility (17 women and 42 men) and the community (21 women and 39 men). The residential correctional treatment facility is a special program for felony or misdemeanor offenders with substance abuse histories who failed to be abstinent from alcohol while on probation. This facility provides offenders with treatment, education, and counseling within a residential setting for court-ordered periods of 120–180 days, aiming to rehabilitate those with underlying alcohol and drug abuse that may contribute to criminal activity.

Community-recruited participants were solicited via advertisements “looking to assess the needs of individuals with alcohol-related driving offenses”, which were posted on Craigslist and local community notice boards. Inclusion criteria for both groups were: adults (ages 18 years or older), arrested for DWI at least once, and able to pass a basic medical screening at our clinic. Exclusion criteria include a history of serious mental illness (e.g. schizophrenia), a record of conviction for Title V offense (i.e., capital murder, human trafficking, and continuous sexual abuse of a young child), or positive breath alcohol at the time of screening or testing.

Participants from the county residential correctional facility were asked to attend an information session in which they were provided a detailed introduction to the program. Participants were tested within the facility, where most questionnaires were completed in groups of 17–22 adults. However, presence and severity of substance use disorder of each participant were assessed individually in an adjacent interview room. Participants from the community were provided information about the program and were tested individually within our clinic. The clinical diagnostic interview was conducted with participants. As compensation, all participants received \$100 for participation and those from the residential correctional treatment facility also received a 3-hour credit toward their community service

commitment. All participants provided written informed consent to participate in a needs assessment of adults with a history of DWI.

Ethics disclosure

The analyses reported here were part of an assessment of the psychological, clinical, and physical needs of alcohol-impaired drivers arrested in Bexar County, Texas. Analyses were conducted on de-identified electronic records to identify effective targets for intervention among those arrested for DWI in our community. All participants provided written informed consent to participate in the needs assessment. Our local institutional review board determined this analysis and dissemination through this publication is not regulated as research as defined by DHHS 45 CFR 46 or FDA 21 CFR 56.

Measures

Demographic characteristics.—A demographics questionnaire was developed by the researchers to collect information on age, sex, and race. Socioeconomic status was measured based on education level and the occupation of participants as well as co-habiting with a partner using the Hollingshead Four-Factor Index (FFI: Hollingshead, 1975). Alcohol and other substance use disorders were assessed using modules from the Structured Clinical Interview-Substance Abuse Module (SCID: First et al., 1995) based on the Diagnostic and Statistical Manual of Mental Disorders IV (DSM IV) criteria

Social support.—Social support was measured by the Social Support subscale from the Texas Christian University Short Form for Social Relations and Functioning (TCU SOCForm: Simpson et al., 2012). The TCU SOCForm is a 5-point scale that measures social support, along with hostility, risk-taking, and social desirability of individuals in the context of addiction treatment services. Of these, the Social Support subscale consists of 9-items (Cronbach's $\alpha = .77$) which asks the level of perceived social support. *Overall social support* was calculated by averaging the scores for these 9 items. In particular, two types of social support were distinguished: *Recovery-specific social support* and *General social support*. Of the 9-items of social support, 5 items focus on the perceived availability of social support which is directly related to the recovery of an individual from addiction (i.e., RSS: recovery-specific social support). Examples of RSS items include “you have people close to you who motivate and encourage your recovery” and “you have people close to you who expect you to make positive changes in your life” (Cronbach's $\alpha = .51$). On the contrary, the other 4 items assess the availability of support from his/her social relation that is not directly related to addiction or recovery (i.e., GSS: general social support). GSS can be represented by items such as “you have people close to you who can be always trusted” and “you have people close to you who can understand your situation and problems” (Cronbach's $\alpha = .77$).

Alcohol-related problems.—Alcohol-related problems were assessed using Alcohol Problem Scale (APS) adapted from the Marijuana Problem Scale (Stephens et al., 2000), a self-report assessment identifying areas in her/his life affected by marijuana use. Adapting MPS to the alcohol treatment context, the APS contains 19-items that represent potential deleterious impacts of alcohol use on social relationships, self-esteem, motivation/productivity, work/finances, physical health, memory impairment, and legal problems.

Participants were asked to indicate whether they had experienced a particular problem related to alcohol use for the past 30 days. APS score was calculated by counting the number of problems they had experienced (range 0–19).

Motivation to change.—Participants rated three visual analog scale “rulers” for their motivation to change (i.e., quit or reduce) their alcohol use, including dimensions such as readiness to change, importance of change, and confidence in change. *Readiness to change* was measured by asking participants “How ready are you to make a change (quit or cut down) in your use of alcohol” (1 = Not at all; 100 = Trying to change). *Importance of change* was indexed by asking them “How important is it that you achieve your goal of quitting or cutting down on alcohol use?” (1 = Not important at all; 100 = The most important thing in my life I would like to achieve now). Similarly, *confidence in change* was assessed by asking “How confident are you that you can achieve your goal of quitting or cutting down on your alcohol use?” (1 = I do not think I will achieve my goal; 100 = I think I will definitely achieve my goal). Previous studies have shown that these three rulers are useful and effective measures to assess motivation to change in the clinical context (Berg-Smith et al., 1999, Rollnick, 2002).

Data analysis

Descriptive Statistics.—Descriptive statistics of Community and Correctional participants were tested using Chi-square analysis for categorical variables such as gender (0 = female; 1 = male) race (0 = minority; 1 = Caucasian), and alcohol use disorder (0 = no; 1 = yes) and two-tailed t-tests for other continuous variables (e.g., age, socio-economic status, the number of other substance use disorders, times of DWI conviction, overall social support, recovery-specific social support, general social support, alcohol problems, readiness to change, importance of change, and confidence in change).

Hierarchical Regression Analyses.—A series of regression analyses were conducted to test three models of the relationship between social support and change ratings for alcohol consumption. Dependent variables were measures of motivation to change: readiness to change (**Hypotheses 1a, 2a, 3a**), importance of change (**Hypotheses 1b, 2b, 3b**), and confidence in change (**Hypotheses 1c, 2c, 3c**). Control variables included age, race, socio-economic status, alcohol use disorder, other substance use disorder, the number of previous DWI convictions, and recruitment conditions. Independent variables were measures of social support (and alcohol problems (APS)).

(1). The Main-Effects vs. The Buffering Models. The first series of analyses examined whether the beneficial effect of social support on motivation to change was explained by the main effects of overall social support (i.e., the Main-Effects model) or it was moderated by level of alcohol-related problems (i.e., the Buffering model). To examine these, hierarchical regression analyses were performed following the analytic procedure described below in four blocks: (1) first, control variables were entered; (2) then overall social support was entered in the second block reflecting the main effect on motivation to change; (3) APS was entered in the third block; and (4) the interaction term of overall social support and APS was entered into the fourth step to examine the Buffering model. The Main effects model

(**Hypothesis 1a, 1b, 1c**) can be supported if only main effects of overall social support are significant and there are no interactions of social support and APS variables. In contrast, the Buffering model (**Hypothesis 2a, 2b, 2c**) will be confirmed when the interaction effects of overall social support and APS are significant.

(2). The Optimal-Matching Model.: This series of analyses examined the relative strength of the relationship of both general and recovery-specific social support with motivation to change. Using hierarchical regression, variables were entered in four blocks: (1) control variables were entered into the first; (2) then both recovery-specific social support and general social support were entered separately in the second block; (3) APS was entered in the third block; and (4) the interaction term of social support and APS was entered separately (i.e., recovery-specific social support $\times$ APS, general social support $\times$ APS) in the fourth block.

The relative magnitude of the effect of general and recovery-specific social support was compared following Cumming's (2014, 2009) approach of statistical inference from confidence intervals. For the analyses, the corresponding 95% confidence intervals for the standardized beta coefficients of each type of social support were estimated via bias-corrected bootstrapping (1,000 resamples) and the overlaps between confidence intervals were calculated. The Optimal-Matching model (**Hypothesis 3a, 3b, 3c**) interpretation would be statistically significantly supported if the beta coefficients of recovery-specific social support were less than 80% overlapping confidence intervals with general social support (one-tailed, $p < .05$).

Analyses were conducted using SPSS v.25 (IBM Corporation, 2017). The statistical significance of each model was validated by *F* test for analysis of variance at the 95% confidence level.

RESULTS

Descriptive Statistics

Participants were 119 adults with histories of DWI arrest(s). The majority of the sample was composed of men of white race and Hispanic ethnicity, who were on average about 36 years of age. Table 1 presents descriptive statistics of the Community and Correctional groups separately and combined.

Participants from the two recruitment sources differed on some, but not all demographic characteristics. There were no significant group differences in the distribution of gender, race, alcohol use disorder, age, or socioeconomic status. There were, however, significant group differences with the correctional group reporting relatively higher social support (Overall, General, and Recovery-Specific), alcohol-related problems (APS), motivation to change (Readiness, Importance, and Confidence) and the number of substance use disorder (other than alcohol).

Given the differences in the main predictors and outcome variables between recruitment groups, the group (i.e., participants from the facility and those from the community) was

included as a control variable in the analysis to rule out potential confounding effects of group on motivations to change. The correlation APS with AUD was low ($r = .20$) and as a result both these variables were included in variables in the regression analyses.

Three Models of Social Support on Motivation to Change

The Main-Effects Model: Direct effects of Overall Social Support.—The first series of analyses tested Hypothesis 1, predicting that general social support would be positively associated with motivation to change measures. Table 2 reports outcomes of the three hierarchical regressions models testing the main effects of social support on motivation to change (Block 2), after accounting for control variables (Block 1). This hypothesis was supported for importance of change ($\beta = .27, p < .01$; supporting **Hypothesis 1b**) and confidence in change ($\beta = .39, p < .001$; supporting **Hypothesis 1c**), but not with readiness to change ($\beta = .19, p = .07$; rejecting **Hypothesis 1a**).

The Buffering Model of Social Support: Interactions between Overall Social Support and Alcohol Problems.—**Hypothesis 2** predicted that the relationship of social support would be more strongly related to motivation to change: readiness to change (**Hypothesis 2a**); importance of change (**Hypothesis 2b**); and confidence in change (**Hypothesis 2c**) among those who had experienced more alcohol-related problems. This model included an interaction term of alcohol-related problems (APS) with overall social support, which yielded no significant relationship with readiness to change ($\beta = .03, p = .76$; rejecting **Hypothesis 2a**), importance of change ($\beta = .04, p = .66$; rejecting **Hypothesis 2b**), and confidence in change ($\beta = .10, p = .23$; rejecting **Hypothesis 2c**). This suggests that the relationship of social support with motivation was not stronger for those with more alcohol-related problems than those who had experienced less alcohol-related problems. Table 2 Block 4 reports outcomes of the three hierarchical regressions models testing the interaction effect of alcohol-related problems with social support on motivation to change (Block 4), after accounting for main effects of alcohol-related problems (Block 3) and social support (Block 2), as well as control variables (Block 1).

The Optimal Matching Model of Social Support: Differences between Recovery-Specific Social Support and General Social Support.—**Hypothesis 3** predicted that the relationship of social support with motivation to change would be relatively stronger for recovery-specific social support than for general social support. Indeed, recovery-specific social support was positively related to readiness to change ($\beta = .31, p < .01$), importance of change ($\beta = .29, p < .01$), and confidence in change ($\beta = .23, p < .05$), while there were no significant relationships observed with general social support (readiness to change $\beta = -.08, n.s.$; importance of change $\beta = .02, n.s.$; and confidence in change $\beta = .20, n.s.$; see Table 3 Block 2).

Further analysis was conducted to compare the relative magnitude of relationships of recovery-specific and general social support with motivation to change. These bootstrapping models (Figure 2) demonstrated that the standardized coefficient of recovery-specific social support was statistically significantly larger than that of general social support for readiness to change (**Hypothesis 3a**; upper bound estimate $< .263$) and for importance of change

(**Hypothesis 3b**; upper bound estimate $< .246$) but not for confidence in change (**Hypothesis 3c**; upper bound estimate $> .188$).

When considering the additive value of the Buffering model, above-and-beyond the Optimal Matching, there was a significant effect specific to readiness to change (Table 3, Block 4). General social support ($\beta = .23, p = .03$) was more strongly related to readiness to change among those who had experienced more alcohol-related problems. This is demonstrated in Figure 3, showing a positive linear increase in both general social support and readiness to change for those with higher ratings of alcohol-related problems (i.e., with 1+ SD APS rating, the solid line in figure 3). This was not the case for recovery specific social support ($\beta = -.21, p = .053$).

DISCUSSION

This manuscript describes the relationships between three models of social support with motivation to change alcohol use. These analyses indicated that: (1) overall social support was related to some motivation to change (i.e. importance and confidence, but not readiness to change), supporting the Main-Effects model; (2) alcohol-related problems did not interact with overall social support in relating to motivation to change which did not support the Buffering model; and (3) when considering different types of social support, it was recovery specific support, rather than general social support, that was related to motivation to change, supporting the Optimal Matching model.

The Presence of the Main Effects and the Lack of the Buffering Effects

The current investigation represents a systematic analysis of the relationship of social support with motivation to change drinking behavior among adults arrested for DWI offenses, and our findings suggest important practical implications. We have shown that overall social support has a beneficial impact on the motivation of those with histories of DWI arrest to change drinking behavior. Further, the positive associations between overall social support and motivation to change were irrespective of the stressful problems that were associated with alcohol use of individuals. Consequently, consistent with previous studies of social support effects on treatment retention and substance use recovery (e.g., Dobkin et al., 2002, Stevens et al., 2015), the results confirmed that social support exerts positive effects and directly impacts motivation to change among individuals with histories of DWI arrest.

One of the unexpected yet interesting findings of the current investigation was the absence of evidence for the Buffering model. Although results are mixed, prior literature has provided evidence supporting the Buffering model across various disease/disorder categories (for review see Thoits, 2011) including alcohol use disorder (Peirce et al., 1996, Segrin et al., 2016). However, the results of the current investigation mostly did not support the Buffering model except for one interaction effect of general social support and alcohol-related problems on readiness to change. One potential explanation for this discrepancy is the nature of DWI or harmful alcohol use. As Cobb (1976) noted, the Buffering model emphasizes the role of social support to protect individuals from the adverse effects of various stressful life events by facilitating “coping with crisis and adaptation to change” (p. 302). In the context of problematic drinking, the primary function of social support

according to the Buffering model is to help people under stress to develop positive or active coping strategies, instead of drinking (Measelle et al., 2006, Steptoe et al., 1996). Of course, many theoretical models posit that drinking can be a strategy for coping with stress (Amlung and MacKillop, 2014, Cooper et al., 1990). For those who have such a propensity to cope by drinking, social support may help them to adopt alternative coping strategies (e.g., talking to friends, engage in social activities) and to adapt themselves to the stresses. However, there are other motives to drink such as emotional enhancement and socialization (Cooper et al., 1992, Doyle et al., 2011). Individuals who drink for socialization, for example, drink more regardless of stress, especially when they have more friends who drink (Halim et al., 2012). Without consideration of the differences in drinking motives, the associations between social support, stress, and drinking motivation remain unclear.

Importance of the Optimal Matching Model

Another theoretical implication of our results is that the positive associations between social support and motivation to change were mostly explained by recovery-specific social support, rather than general social support. Considering that the Optimal Matching model has received less empirical support in other health contexts (Burleson and MacGeorge, 2002, Cutrona and Suhr, 1994), these findings seem to be even more intriguing and suggest another possible difference between alcohol-impaired drivers and the general population of substance use disorder. In particular, our results, along with previous findings (e.g., Beattie and Longabaugh, 1999, Nelson et al., 1999), suggest that the distinction between recovery-specific social support and general social support is pertinent to individuals arrested for DWI offense. Unlike other chronic health problems, drinking alcohol is a behavior which involves social interactions and can be influenced by personal relationships (Rehm et al., 1996). As shown in the literature, some types of social relationships (e.g., having heavy-drinking friends) may have no positive effects on problem drinking (Mulia et al., 2008) and, in some cases, can even exacerbate drinking problems (Wood et al., 2001). Therefore, to enhance motivation to change among alcohol-impaired drivers, it may be relatively more important to identify beneficial types of social relationships (e.g., friends/family who disapprove of drinking and driving or encourage recovery efforts) and to provide social support that is relevant to the rehabilitation of them. If confirmed by other research, these findings may suggest the importance of assessing the social support networks in the determination of post-arrest or conviction restrictions upon alcohol-impaired drivers.

It is also worth discussing that our results confirmed the effectiveness of emotional aspects of social support (e.g., encouragement and reassurance) to motivate people with histories of DWI arrest to change their alcohol use behavior. The authors of the Optimal Matching model (Cutrona and Russell (1990), claimed that major or seemingly uncontrollable life events like serious disease and life-transitions can influence different domains of a person's life (e.g., financial status, interpersonal relationships, physical capability). Social support is understood to contribute to the optimal psychological and physical adaptation of a person when it is adequately matched to each of these domains. In particular, uncontrollable events tend to elicit the need for social support that helps emotion-focused coping (e.g., encouragement, esteem support, reassurance) (Uchino, 2004). Consistent with these arguments, the current results show that recovery-specific social support focusing on

emotional dimensions was effective to encourage psychological adaptation (i.e., increased motivation to change) of alcohol-impaired drivers.

However, the current investigation did not examine other types (e.g., financial, physical, information) of social support that might be considered in the context of the Optimal Matching model. DWI and accompanying sanctions can lead to major changes in diverse domains of life such as loss of job, limitations of mobility, and financial burdens. DWI offenders with complex difficulties may be in need of different types of support. For example, a study investigating alcohol use as a response to financial stress found that tangible support (e.g., money, food) had buffering effects on the stress-drinking relationship, whereas emotional support such as appraisal and sense of belonging did not (Peirce et al., 1996). Although the current results showed that recovery-specific social support, in general, was a stronger predictor of motivation to change than was general social support, further studies should investigate the needs of alcohol-impaired drivers and examine how sub-type of recovery-specific social support (e.g., tangible aid, information/advice, emotional support) is associated with motivation to change among individuals with different needs.

Methodological Limitations

In addition to the aforementioned issues for theoretical consideration, there are some methodological limitations to this investigation. It has been documented that motivation to change is associated with treatment seeking and retention as well as long-term posttreatment outcomes like abstinence and recidivism (DiClemente and Velasquez, 2002, De Leon, 1993, Melnick et al., 1997). However, due to the lack of behavioral and longitudinal data, the present investigation could not examine how social support influenced drinking and driving behaviors of those with histories of DWI arrest. Future research may extend the models to explain the relationships among social support, motivation to change, and DWI recidivism.

It is also noteworthy that this paper used the alcohol-related problems scale (APS) as a proxy measure of the level of stress. This approach was based on the following rationales: first, previous studies that have shown a strong relationship between stress and alcohol-related problems (Geisner et al., 2004, Kuntsche et al., 2005); second, in the process of behavioral changes among people with DWI history, those who are undergoing more alcohol-related problems would need more help from others to deal with the problems (George and Tucker, 1996), thereby making social support more beneficial for them as the Buffering hypothesis suggests. Nevertheless, admittedly APS is not designed to directly measure level of stress. Future studies would need to consider traditional measures for stress and examine the relationship between stress and social support.

Practical Implications

Despite the limitations, this investigation provides some practical implications. The findings of the current investigation emphasize the importance of social support in increasing motivation to change drinking behavior among adults arrested for DWI offenses. Specifically, the results suggest that social support is more effective when it is relevant to the behavioral/cognitive change of alcohol-impaired drivers. Indeed, DWI offenders and recidivists, in particular, often express concerns about their social environment such as lack

of social support and negative social influence from their social networks (e.g., encouragement of drinking, approval of drunken driving) (Carruth et al., 2016, Greenberg et al., 2004, Nelson et al., 1999). Alcohol treatment interventions involving community self-help (i.e., Alcoholic Anonymous) attempt to build social support networks through peer-support. While this form of social support group has been demonstrated to be an effective option to prevent relapse in some patients (Kelly, 2017), many AUD patients avoid these types of support because of privacy concerns, lack of beliefs in necessity or benefits of social support groups, and practical/financial impediments (e.g., money, time, mobility) (Tucker et al., 2004). Therefore, clinicians may need to offer formal recovery-specific social support treatment based on the needs and social environment of clients. For example, social support-focused treatments such as family-involved therapy and technology-implemented support treatment can be effective options. Family-involved therapy can help the recovery of problem drinkers by increasing the understanding of negative effects of alcohol use among family members as well as patients and promoting family members to provide patients with ongoing social support for the recovery (for review see O'Farrell and Clements, 2012). Recent studies of technology-implemented support treatment for AUD have shown that social support delivered through smartphones is effective in providing patients with timely-relevant and continuous support (Moon, 2017). In addition, individuals with AUD who actively participate in virtual social support groups and exchanges of social support among peers are more likely to have better treatment outcomes such as a longer sustained abstinence, lower distress, and reduced relapse (Moon, 2017, Kornfield et al., 2017). In summary, coupled with the social support-focused treatments, clinicians and healthcare practitioners may increase the motivation to change alcohol use among alcohol-impaired drivers and achieve better treatment outcomes.

Conclusion

The present investigation contributed to our understanding of the role of social support to motivate change among alcohol-impaired drivers. By comparing the three major models of social support, our findings have important implications for treatment intervention and/or for offender restriction or monitoring of recidivism risk. In addition, this paper illustrated the importance of recovery-specific social support to motivate alcohol-impaired drivers to change alcohol use. Further investigations of the complex relationships among drinking motives, different types of social support, and motivational/behavioral adjustment of alcohol-impaired drivers are required to provide a more comprehensive understanding of the role of social support, thereby developing more effective interventions for those with histories of DWI arrests.

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Figure 1.

Conceptual associations between social support and motivation to change

Figure 2.

Relative magnitude of coefficients of recovery-specific (RSS) and general social support (GSS)

Note. ^a The values were calculated by adding half of 80% of the overlapping CIs to the lower bound estimates of the variables with the greater standardized betas. In the event that the upper bound estimates of the variables with the smaller standardized betas are smaller than these values, the overlapping CIs are smaller than 80%, confirming that the betas are statistically different from each other ($p < .05$, one-tailed)

RSS = recovery-specific social support; GSS = general social support

Figure 3.
Plot of interaction effects of general social support and alcohol-related problems on readiness to change

Table 1.

Descriptive statistics of adults with DWI histories recruited from the community or residential correctional treatment facility

	Total	Community (n=60)	Correctional facility(n=59)	χ^2 (df, n)
Gender (Male)	68.1%	65.0%	71.2%	$\chi^2_{(1, 119)} = 0.52$
Race (White)	79.0%	75.0%	83.1%	$\chi^2_{(1, 119)} = 1.16$
Alcohol Use Disorder (Yes)	96.6%	96.7%	96.6%	$\chi^2_{(1, 119)} = 0.00$
	Mean (S.D.)	Mean (S.D.)	Mean (S.D.)	t_{df}
Age	36.45 (10.50)	37.02 (11.33)	35.88 (9.64)	$t_{117} = -0.58$
Socio-economic level ^a	31.59 (11.22)	32.41 (11.56)	30.73 (10.89)	$t_{117} = -0.81$
Substance Use Disorder ^b	0.97 (1.19)	0.07 (.94)	1.24 (0.94)	$t_{103.38} = 2.50^*$
DWI convictions (more than 1)	1.70 (1.12)	1.53 (1.16)	1.88 (1.05)	$t_{115} = 1.68$
Overall social support	4.21 (0.59)	4.08 (0.62)	4.35 (0.53)	$t_{117} = 2.64^{**}$
Recovery-specific social support	4.19 (0.61)	4.01 (0.63)	4.32 (0.56)	$t_{117} = 2.25^*$
General social support	4.24 (0.72)	4.08 (0.79)	4.40 (0.61)	$t_{117} = 2.41^*$
Alcohol Problem Scale	8.72 (5.88)	6.52 (5.81)	10.97 (5.08)	$t_{117} = 4.45^{***}$
Readiness to Change	8.64 (2.34)	7.68 (2.87)	9.59 (0.95)	$t_{70.51} = 4.86^{***}$
Importance of Change	8.38 (2.53)	7.03 (2.93)	9.73 (0.83)	$t_{67.18} = 6.80^{***}$
Confidence in Change	8.84 (1.96)	8.11 (2.47)	9.57 (0.79)	$t_{69.76} = 4.32^{***}$

Note.

* $p < .05$ ** $p < .01$ *** $p < .001$

^a Socio-economic level was measured by Hollingshead's Four-Factor Index of Socioeconomic Status, which ranges from 8 to 66. A person with a score lower than 30 is considered as being in low socioeconomic status.

^b Substance abuse disorder is the number of psychiatric disorders related to substances (e.g., sedative, cannabis, stimulant, opioid, cocaine, hallucinogen, and so on) excluding alcohol

Table 2.

Test of the Main-Effects and the Buffering models predicting motivation to change

	Readiness to change ^a				Importance of change ^b				Confidence in change ^c			
	B	S.E.	Beta	p	B	S.E.	Beta	p	B	S.E.	Beta	p
Block 1: Control variables												
Age	.04	.02	.17	.099	.05	.02	.21	.029	.05	.02	.28	.005
Gender	.61	.49	.12	.216	-.03	.50	-.01	.946	.40	.40	.09	.320
Race (Minority=0, Caucasian=1)	.17	.53	.03	.749	.20	.55	.03	.722	-.33	.43	-.07	.455
SES	.01	.02	.04	.665	-.03	.02	-.14	.110	-.01	.02	-.07	.431
AUD	.46	1.15	.04	.688	.72	1.18	.05	.542	-.06	.93	-.01	.945
Other SUD	.16	.18	.08	.381	.12	.19	.05	.542	.22	.15	.13	.136
Times of DWI conviction	-.25	.22	-.12	.260	-.22	.23	-.10	.325	-.28	.18	-.16	.115
Group (community=1; Facility=2)	1.70	.49	.36	.001	2.19	.50	.43	.000	1.32	.39	.33	.001
R ² (F)	.239 (4.03) ***				.307 (5.71) ***				.198 (3.19) **			
Block 2. Main effect ^d												
Overall social support	.76	.42	.19	.072	1.18	.43	.27	.007	1.33	.34	.39	.000
R ² (F)	.019 (2.66)				.041 (6.50) *				.116 (17.27) ***			
Block 3. Alcohol problems												
Alcohol problem scale (APS)	.04	.04	.10	.351	.05	.04	.11	.262	-.03	.04	-.08	.434
R ² (F)	.007 (.89)				.008 (1.30)				.004 (.59)			
Block 4. Buffering effect ^e												
Social support * Alcohol Problems	.02	.06	.03	.758	.03	.06	.04	.660	.06	.05	.10	.226
R ² (F)	.001 (.01)				.001 (.20)				.010 (1.48)			
Final model fit												
R ² (F)	.265 (3.28) ***				.358 (5.08) ***				.328 (4.45) ***			

Note.

* p<.05

** p<.01

*** p<.001

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^aReadiness to change is an outcome measure for Hypothesis 1a and Hypothesis 2a
^bImportance of change is an outcome measure of Hypothesis 1b and Hypothesis 2b
^cConfidence in change is an outcome measure of Hypothesis 1c and Hypothesis 2c

^dBlock 2 is entered to test main-effects of social support on readiness to change (Hypothesis 1a), importance of change (Hypothesis 1b), and confidence in change (Hypothesis 1c)
^eBlock 4 is entered to test buffering effect of social support on readiness to change (Hypothesis 2a), importance of change (Hypothesis 2b), and confidence in change (Hypothesis 2c)

Table 3.

Test of the Optimal Matching model predicting motivation to change

	Readiness to change ^a			Importance of change ^b			Confidence in change ^c					
	B	S.E.	Beta	p	B	S.E.	Beta	p	B	S.E.	Beta	p
Block 1: Control variables												
Age	.03	.02	.15	.141	.05	.02	.20	.044	.05	.02	.28	.007
Gender	.29	.48	.06	.547	-.24	.51	-.04	.634	.42	.41	.10	.305
Race (Minority=0, Caucasian=1)	.24	.54	.04	.652	.21	.56	.03	.711	-.39	.46	-.08	.399
SES	.00	.02	.01	.883	-.04	.02	-.16	.071	-.01	.02	-.07	.417
AUD	.31	1.11	.03	.780	.61	1.17	.04	.600	-.06	.94	-.01	.949
Other SUD	.14	.18	.07	.432	.10	.19	.05	.582	.23	.15	.14	.131
Times of DWI conviction	-.19	.22	-.09	.380	-.17	.23	-.08	.453	-.27	.19	-.15	.156
Group (community=1; Facility=2)	1.76	.47	.37	.000	2.23	.50	.43	.000	1.30	.40	.33	.002
R ² (F)	.239 (4.03) ***				.307 (5.71) ***				.198 (3.19) **			
Block 2. Main effects ^d												
Recovery-specific social support	1.22	.45	.31	.008	1.25	.48	.29	.010	.78	.38	.23	.045
General social support	-.27	.36	-.08	.456	.07	.38	.02	.849	.55	.31	.20	.075
R ² (F)	.044 (3.13) *				.053 (4.23) *				.116 (8.52) ***			
Block 3. Alcohol problems												
Alcohol problem scale (APS)	.05	.04	.12	.237	.06	.04	.13	.262	-.03	.04	-.09	.411
R ² (F)	.007 (.92)				.008 (1.30)				.004 (.59)			
Block 4. Buffering effects ^e												
Recovery-specific social support * APS	-.14	.07	-.21	.053	-.08	.08	-.10	.318	.06	.06	.11	.321
General social support * APS	.12	.06	.23	.030	.08	.06	.14	.169	.01	.05	.01	.905
R ² (F)	.038 (.01)				.013 (.99)				.012 (.86)			
Final model fit												
R ² (F)	.328 (3.67) ***				.382 (4.65) ***				.330 (3.71) ***			

Note.

* p<.05

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- ^aReadiness to change is an outcome measure for Hypothesis 3a
- ^bImportance of change is an outcome measure of Hypothesis 3b
- ^cConfidence in change is an outcome measure of Hypothesis 3c
- ^dBlock 2 is entered to test optimal matching of social support on readiness to change (H3a), importance of change (H3b), and confidence in change (H3c)
- ^eBlock 4 is entered to explore potential buffering effects of sub-types of social support on readiness to change (H3a), importance of change (H3b), and confidence in change (H3c)