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## Changes in coping moderate substance abuse outcomes differentially across behavioral treatment modality

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### Abstract

In this secondary data analytic study we examined whether the relationship between changes in coping and treatment outcome differed between women enrolled in either the Women's Recovery Group (N=29), a new manualized group treatment for women with substance use disorders, or Group Drug Counseling (N=7), an empirically supported mixed-gender group treatment. We examined subscales of the Ways of Coping questionnaire and found that while changes in coping did not differ significantly across treatment groups, the association of changes in coping with substance abuse outcome was related to treatment condition. Increases in problem focused coping were associated with decreased drinking days in WRG, but paradoxically with increased drinking days in GDC. For both groups, increases in wishful thinking were associated with increases in substance use, and increases in social support coping associated with decreases in use, but these associations were greater GDC. Our results highlight the importance of examining the impact of treatment modality on coping, as well as contextual factors that may help to explain the specific pattern of results.

### Keywords

coping behavior; human females; alcohol rehabilitation; drug rehabilitation; group psychotherapy; treatment outcomes

### Introduction

Effective coping is consistently cited as a key ingredient in relapse prevention, and as such, it has often been targeted as a component of treatment interventions.<sup>1</sup> Substance use itself is sometimes considered a maladaptive or avoidant coping strategy and may be used as such by those who go on to develop a substance use disorder (SUD). Therefore, much of the available research on coping and SUDs has focused on avoidant coping. Use of avoidant strategies in general has been linked to a variety of mental health problems including substance abuse and dependence.<sup>2-5</sup> More specifically, research has linked escape-avoidance coping to poorer substance abuse treatment outcomes, and suggested that escape-avoidance coping may act as a mediator of treatment outcome.<sup>3, 6</sup>

While escape avoidance is typically viewed as a specific form of emotion focused coping, researchers have demonstrated that individuals with SUDs rely more heavily on emotion focused coping in general, and utilize less problem focused coping than other populations.<sup>7,</sup>

<sup>8</sup> Use of additional strategies such as wishful thinking and self-blaming have been linked to greater use of substances post-treatment. <sup>9</sup>

Evidence also exists to suggest that there are important gender differences in coping that extend to SUD populations.<sup>10, 11</sup> For example, research has linked greater use of coping strategies involving negative thinking to alcohol dependent women.<sup>12</sup> Several studies have documented the importance of social support coping for women,<sup>13</sup> and increased use of social support from significant others supportive of abstinence has been linked to better substance use outcomes.<sup>14</sup> However, some studies have failed to find gender differences in use of social support for those receiving treatment for SUDs.<sup>15</sup> While Litman and colleagues did not find gender differences in coping behaviors, women reported social support coping to be more effective than did men.<sup>16</sup> Together, these results demonstrate the need for further research exploring the use and effectiveness of coping strategies including social support seeking across contexts, such as treatment modality.

Self-report measures are the most common approach used by researchers to study coping,<sup>17</sup> and several self-report measures have been developed or adapted for use with substance abusers.<sup>18, 19</sup> Currently, the method of measuring and categorizing coping is often study specific and no consensus exists.<sup>3, 5</sup> In some studies researchers have modified coping inventories by adding or deleting items based on the aims of the particular study, often measuring only avoidance coping.<sup>17</sup> Researchers interested in changes in coping as a mechanism of action have also highlighted the lack of integration between the field of coping research and studies of substance abuse treatment outcomes.<sup>20</sup> For example, despite being one of the most widely used and studied coping inventories,<sup>21</sup> few substance abuse treatment outcome studies have utilized the Ways of Coping Questionnaire<sup>22</sup> to measure coping strategies in SUD populations

Overall, while these studies utilizing coping inventories have provided useful insights, they often fail to take into account the dynamic and multifaceted nature of coping. Several studies suggest that post-treatment coping strategies may vary based on treatment modality, and certain coping strategies are associated with greater post-treatment substance use,<sup>23 9</sup> Yet we know of no other study that has examined the relationship between treatment modality, changes in coping, and substance use outcomes specifically among women.

The Women's Recovery Group (WRG) was designed as a new group therapy that combines single-gender group composition and women-focused content.<sup>24</sup> It is the first manual-based recovery group for women that is not specific for type of substance abused (e.g., opioids, alcohol, cocaine, etc.) or specific co-occurring psychiatric disorders (e.g., post-traumatic stress disorder, borderline disorder). The 12-weekly WRG sessions examine triggers to relapse with demonstrated relevance to treatment-seeking women with SUDs, including developing alternate coping strategies for triggers to substance use. In a Stage I randomized controlled trial comparing outcomes of women receiving WRG (n=29) to women receiving an empirically supported mixed-gender treatment Group Drug Counseling (GDC) (n=7), comparable reductions in substance use were achieved during the 12 week treatment. However, during the 6-month post-treatment follow-up, WRG members continued to reduce their substance use while GDC members did not.<sup>24</sup>

The present study was conducted as a secondary data analysis to examine changes in coping and outcomes among women receiving either WRG or GDC. We aimed to assess whether changes in coping during treatment, as measured by the Ways of Coping subscales<sup>25</sup>, were associated with substance use outcomes and whether these potential relationships differed based on treatment condition (WRG vs. GDC). Specifically, we hypothesized that WRG would

be more effective than GDC at increasing positive coping strategies, such as social support seeking, and decreasing more ineffective strategies such as wishful thinking.

## Methods

### Treatments

The Women's Recovery Group (WRG) is a new 12-session manual-based relapse-prevention group therapy that utilizes a cognitive-behavioral approach developed for this study by the principal investigator (SFG). A detailed description of the study design and WRG intervention are available (24). In short, WRG is delivered in a single-gender group format, and the content of the treatment focuses on issues of substance abuse directly related to women in recovery including, but not limited to, family relationships, the importance of self-care, and women's physical and mental health. The comparison treatment, Group Drug Counseling (GDC),<sup>26</sup> is an empirically supported group treatment delivered typically to mixed-gender groups with no explicit attention to gender-specific issues. Both groups use a 90 minute structured format and cover common recovery topics such as triggers to use, relapse prevention, use of self-help, among others.

### Participants

To be eligible for the study, participants had to be at least 18 years old, meet criteria for current substance dependence according to the DSM-IV, have used drugs or alcohol during the last 60 days, and be available for follow-up. Individuals with co-occurring bipolar, psychotic, or post-traumatic stress disorder were excluded. All subjects provided informed consent, and all procedures were in accordance with the standards of, and approved by, the Institutional Review Board of McLean Hospital.

Thirteen female participants were recruited for the pre-pilot phase of the WRG study. At the end of the pre-pilot round, the WRG manual was revised based on patient, counselor, and outside consultant feedback. However, such revisions were minimal and included some reworking and rewording of bulletin board materials and take home messages. The pilot phase included 23 female participants who were randomized either to WRG (N=16) or GDC (N=7). Data from pre-pilot and pilot rounds of WRG were collapsed for the purpose of the study.<sup>24</sup>

### Measures

Substance use was assessed at baseline, monthly during treatment (months 1-3) and post-treatment (months 4-6 and 9) using the Timeline Follow-Back technique.<sup>27</sup> This method uses a calendar to assist participants with recall of drug and alcohol use over a specified amount of time (i.e. 60 days before interview). Outcomes were represented in terms of drinking days, drinks per drinking day, and days of any substance used.

The Ways of Coping is a self-report measure which was designed to capture a broad range of behavioral and cognitive strategies that individuals may use to cope with stressful situations.<sup>25</sup> The revised version, one of the most widely used coping inventories was administered.<sup>21</sup> Participants were asked to reflect on a significant stressor that they have faced within the previous week, and indicate the extent to which they used the strategies listed. The measure contains 67 items that are rated on a Likert scale ranging from 0, indicating that the strategy was not used, to 4, indicating that the strategy was used a great deal. Responses are grouped into 8 subscales defined as problem-focused coping, wishful thinking, seeking social support, detachment, focusing on the positive, self-blame, tension reduction, and keep to self.<sup>25</sup> This inventory was administered at baseline and at the end-of-treatment (e.g., month 3) assessment.

## Statistical Analysis

For each coping subscale, independent sample T-tests were first used to test for potential baseline differences across treatment groups. An analysis of covariance (ANCOVA) was then conducted for each subscale to examine whether within-treatment changes in the subscale differed significantly across the two treatment groups. Lastly, to test whether changes in coping had a differential effect on substance use outcomes based on treatment condition, we tested for a two-way interaction of change in coping and treatment group predicting outcome during the follow-up phase using a mixed model analysis of variance (MMANOVA) for each coping subscale.

The MMANOVA framework models the means per group over the respective longitudinal time period as well as the variance and correlation between the repeated measures over the assessments, accounting for the longitudinal nature of the data. This framework requires near normality in the outcome measures, which is achieved when the substance use outcome measures are defined as the changes from baseline.<sup>28</sup> More detail about this approach can be found in Greenfield et al.<sup>24</sup> For each coping subscale, chance scores were also calculated by subtracting coping at end of treatment (month 3) from baseline. Statistical significance of the two-way interaction between change in coping and treatment group would indicate, on-average, the relationship between change in coping and outcome differs between treatments.

To assist in the interpretation of the interaction between change in coping and substance use during follow-up, we estimated the average substance use outcome during the follow-up phase, per subject. Per treatment, we then correlated the change in coping with this average outcome. With five coping scales, three outcomes, and two treatments, this resulted in 30 correlation coefficients. We strictly report the correlation coefficients as descriptives of the relationship and do not focus on the statistical significance of each, due to the multiple correlations involved.

We recognized that the limited sample size of the control group, especially with the correlation derivation described above, may be suspect due to restricted range, extreme values, or influential observation. For the MMANOVA model, where the statistical significance was assessed, we performed model diagnostics to inspect for outliers/extreme values and influential observations. We classified substantial outliers based on the residual for each data point. The residual is the difference in the observed data to the model based predicted value. We identified outliers where the standardized difference (i.e. standardized residual) is in excess of 2 in absolute value. Influential observations are based on the DFFITS statistic. The DFFITS statistic compares the standardized difference in the predicted value for a data point when it is included and excluded in the analysis. When this difference is large it shows the fit of the model is dependent on the single data point. Influential observations are identified when the DFFITS is in excess of 1. For our analyses, we saw no outliers or influential observations. All analyses were conducted in SAS 9.1.3, and Type I error rate was set at 0.05.

## Results

### Patient Characteristics

Demographics of the sample have been reported previously.<sup>24</sup> To summarize, the age of the participants ranged from 23 to 67 with a mean age of 58.3 years ( $SD = 7.18$ ) for women in GDC and of 45.0 years ( $SD = 10.73$ ) for women in WRG. This age difference was statistically significant; therefore, age was included as a covariate in all analyses. Participants were predominantly well-educated and white; one participant was Native American. All participants had graduated from high school and 86.2% of those in WRG and 85.7% of those in GDC had attained a college degree. Among WRG women, 41.4% were married as were 42.9% of GDC women.

Of women in WRG, 86.2% met criteria for alcohol dependence while the remaining 13.8% met criteria for cannabis, cocaine, or stimulant dependence. All of the women in GDC were alcohol dependent. Co-occurring disorders were common, including mood disorders (37.9% WRG, 42.9% GDC), anxiety disorders (31.0% WRG, 42.9% GDC), and Axis II personality disorders (34.5% WRG, 57.1% GDC). None of these additional variables differed significantly across treatment condition and, therefore, were not controlled for during analysis.

### Reliability of Ways of Coping Subscales

Cronbach's alphas were used to assess the reliability of each of the 8 subscales. These reliability estimates ranged from 0.01 for tension-reduction to 0.86 for wishful thinking. The tension-reduction scale included a question on drinking or using drugs or medication as a way of coping, which likely did not match well with the other items for this population (including exercising or resting or taking a vacation). To increase the likelihood that findings are not attributable to spurious results or potential type I error, we restricted our analyses to subscales which were deemed reliable based on Cronbach's alphas of greater than .65. Alphas in this range are equivalent to those reported for the measure.<sup>25</sup> These included: problem-focused coping (.70), wishful thinking (.86), seeking social support (.73), focusing on the positive (.68), and self-blame (.67).

### Changes in coping scale scores

Information regarding changes in subscale scores is reported in Table 1. Overall, mean changes were relatively small, however much variation existed, which is reflected in the range and standard deviation values. Women in WRG reported using significantly more social support at baseline than those in GDC ( $t = 2.73$ ,  $df = 29$ ,  $p = 0.01$ ); however, change scores in social support seeking did not differ significantly across treatments. No additional baseline differences existed. Changes in only one scale, focus on the positive, exhibited marginally significant differences across treatment, with WRG women exhibiting on average greater change scores for this scale than those in GDC ( $t = 2.03$ ,  $df = 29$ ,  $p = 0.052$ ).

### Changes in coping scale scores, treatment condition, and outcome

While change scores did not appear to vary significantly by treatment condition, significant two-way interactions between change scores and treatment condition were found for 3 of the 5 of the subscales. These results are presented in Table 2. Overall, changes in coping appeared to have a stronger association with outcomes for those in GDC than for those in WRG. Examining the subscales specifically, for those in GDC, an increase in problem focused coping within treatment corresponded to an increase in drinking days from baseline. For women in WRG this pattern was reversed; increases in problem focused coping within treatment corresponded with decreased drinking days, but this association was smaller than in GDC. Both changes in wishful thinking and seeking social support subscales exhibited relationships with drinks per drinking day and days of any substance use that also differed based on treatment condition. For women in WRG, increases in wishful thinking corresponded with an increase in days of any substance use. However, for women in GDC, increases in wishful thinking corresponded to increases in both days of any substance use and drinks per drinking day that were larger than those in WRG. Similarly, increases in seeking social support were slightly correlated with decreases in drinks per drinking day and days of any substance use for those in WRG, while these correlations were greater for those in GDC.

### Conclusion

In this secondary analysis, we found that while changes in coping did not differ significantly among women randomized to either single gender versus mixed gender SUD treatment, the relationship between changes in certain types of coping and treatment outcomes were

dependent on treatment condition. We also replicated the findings of several other studies investigating the relationship between coping and substance use (e.g., 9, 14). More specifically, we found that increases in social support were associated with improvements in two out of the three measurements of substance use during the study's 6 month follow-up period. Changes in wishful thinking were also associated with these two outcome measures. As expected, increased use of this coping strategy was correlated with increased substance use.

While these findings are generally consistent with the existing literature, the correlation between increases in problem focused coping and increases in drinking days found in the GDC group was unexpected. In the WRG group this association was in the expected direction with an increase in problem focused coping associated with a decrease in drinking days, but the magnitude of the association was smaller in WRG than GDC. The strengths of these associations are greater in GDC than in WRG for all three scales, suggesting that treatment condition may play an important role in the relationship between changes in coping style and treatment outcomes. Several perspectives on coping may help to explain both the differences in the strength of these associations across treatment condition, as well as the unexpected relationship found between problem focused coping and substance use outcomes.

Given the complex, multi-faceted nature of coping, the Ways of Coping Questionnaire specifically, and other coping inventories more generally, may not capture all possible coping mechanisms related to substance use and recovery. Researchers have argued that coping measures operationalize coping in a narrow way, and the structure of coping remains contested.<sup>29, 30</sup> While our results suggest multiple coping mechanisms are related to substance use outcomes following treatment, it is also important to examine related factors which may be influencing the relationship between changes in coping and treatment outcome.

Researchers have highlighted the importance of examining the events, cognitions, and behaviors leading up to a stressful event.<sup>31-33</sup> Whereas coping strategies have been conceptualized as deliberate actions taken amidst the stressful event, these anticipatory coping mechanisms are more likely to be automatically generated. Some individuals may have developed effective ways of managing the precursors of stressful situations, making conclusions drawn from the examination of effortful responses amidst a stressful episode potentially misleading.<sup>30</sup> Therefore, in the present study, the differences in the magnitude of the relationship between changes and coping and outcome found across treatment condition may be a result of differences or improvements in automatic or anticipatory coping patterns across groups. These potential differences were not adequately captured within the questionnaire.

Examining the timing and effectiveness of coping strategies is also important<sup>30</sup>, such as whether the strategy was used before or after stressor and which specific method or perspective was taken. Unfortunately, some questions from the inventory may also be too broad or ambiguous to capture these aspects of the coping process. For example, one checklist item asks the degree to which the respondent "analyzed the problem in order to understand it better." The effectiveness of this approach depends on the specific target of the respondent's analysis, the strategy of analysis utilized, and the ability of the respondent to develop and carry out a plan of action following such analysis. While women in WRG and GDC may have both engaged in "analyzing the problem", they may have been focusing on a different aspect of their substance use, using different tools or perspectives, and may have been more or less able to make changes as a result of their insights. Research in other fields supports this view, suggesting that situational and individual characteristics influence whether problem focused coping is a beneficial or harmful coping strategy.<sup>34, 35</sup> Exploring these factors may help to explain the association between increased use of problem focused coping and increased substance use, which was found in the GDC but not WRG group.

Elements of treatment that differed between these two conditions may have also had important influences on the relevance or effectiveness of coping strategies. In addition to providing women-focused content, previous research suggests that the all women's composition of WRG was likely to increase comfort among group members.<sup>36</sup> WRG also stressed the need for self-care including the importance of seeking appropriate care and treatment for any co-occurring psychiatric or medical disorders and the importance developing a network of those supportive of sobriety.<sup>37</sup> These differences between the GDC and WRG atmosphere and composition could have enhanced the positive effects of changes in coping on treatment outcomes, or made the specific coping strategies less relevant if anticipatory coping processes were utilized.

For example, while both women in WRG and GDC may have sought out the social support of their fellow group members, the support provided in WRG may have been more relevant or effective than the support provided in GDC. In a study conducted by Litman and Stapleton,<sup>16</sup> baseline scores on the Coping Behaviors Inventory were not predictive of post-treatment follow-up; however, scores on several scales of a measure which asks participants to indicate the degree to which the same coping behaviors have been effective were predictive. Differences in group atmosphere and composition may also have required GDC group members to actively seek out additional social supports outside of the group in order to successfully reduce their substance use.<sup>38, 39</sup>

When the Ways of Coping was first developed, Folkman and Lazarus<sup>25</sup> highlighted the importance of examining coping over time, as they argued that coping is a dynamic process that is influenced by situational and personal characteristics. Our findings support this view, and also highlight the importance of examining treatment modality as one potential explanation for the differing findings across studies of coping among SUD populations. A recent review of the reliability of the Ways of Coping also underlines the importance of reporting reliability coefficients for individual subscales as well as the importance of examining reliability across certain populations such as women, both of which were addressed in the current study<sup>21</sup>.

The small sample size, particularly in GDC, is an obvious limitation of this study. However, several sources point to the value of conducting such analyses despite this limitation. The Institute of Medicine<sup>40</sup> provides guidelines to maximize information from small trials in order to obtain more reliable and valid results. They recommend several statistical approaches including the use of repeated measures. When the within subject correlation is properly incorporated, the repeated measures analysis takes full advantage of all information obtained from each subject, thereby greatly increasing statistical power over methods that compare groups univariately.<sup>41</sup> Additionally, Clarke and Wheaton<sup>42</sup> showed that, when using repeated measures designs, only a small bias in estimates of standard errors when the number of participants per group is 5 or more. As a rule of thumb, Van Voorhis and Morgan<sup>43</sup> recommend a minimum of 7 participants per group in the assessment of group differences, which matches with the number of participants in the smaller treatment condition (GDC). Finally, as previously reported we observed no substantial outliers or influential observations.

Our results reinforce the importance of treating coping as a multidimensional construct. They also suggest that coping may have an important interactive effect with treatment approach, where changes in coping may not vary based on treatment condition but the effect that changes in coping has on outcomes may be dependent on treatment condition. Overall, we found that changes in coping had less of an effect on outcome for women participating in a women's specific treatment for SUDs, indicating that such treatment may provide additional supports that make coping strategies more effective or less central to the recovery process. For women participating in mixed gender treatment, changes in certain types of coping, including wishful thinking and seeking social support, were associated with positive outcomes while changes in problem focused coping were not. This suggests that focus on changing coping strategies may

be a more central benefit of the mixed gender treatment context, but that more attention should be paid to the specific strategies utilized by participants as well as their effectiveness. Taken together, further study of contextual factors that may influence the use and effectiveness of coping strategies is necessary, and should take into account treatment modality.

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**Table 1**

Within-treatment changes in coping separated by treatment condition (WRG vs. GDC)

Ways of Coping Subscale	WRG (n=29)		GDC (n=7)		P Value
	Mean $\pm$ SD	Range	Mean $\pm$ SD	Range	
Problem-focused coping	0.07 $\pm$ 7.29	-14 - 11	-0.80 $\pm$ 5.12	-9 - 5	0.28
Wishful thinking	-2.31 $\pm$ 4.67	-10 - 7	0.60 $\pm$ 4.34	-5 - 7	0.75
Seeking Social Support	-0.12 $\pm$ 4.09	-7 - 10	0.00 $\pm$ 4.69	-6 - 4	0.39
Focusing on the Positive	0.92 $\pm$ 3.12	-7 - 6	-1.80 $\pm$ 2.49	-4 - 2	0.06
Self-blame	-1.33 $\pm$ 2.72	-9 - 3	1.00 $\pm$ 4.30	-3 - 7	0.19

**Table 2**

Two-way interactions between within-treatment changes in coping and treatment condition (WRG vs. GDC)

Ways of Coping Subscale	Drinking Days	Drinks per Drinking Day	Days Used Any Substance
	FValue	FValue	FValue
Problem-focused coping	6.04*	.43	.71
Wishful thinking	3.25	3.95*	5.75*
Seeking Social Support	.51	3.47*	4.55*
Focusing on the Positive	.16	.04	.38
Self-blame	.77	.05	.96

\* • p&lt;.05

**Table 3**

Correlation coefficients of within treatment change in coping and change in substance use outcomes separated by treatment condition (WRG vs. GDC)

Ways of Coping Subscale	Drinking Days		Drinks per Drinking Day		Days Used Any Substance	
	WRG	GDC	WRG	GDC	WRG	GDC
Problem-focused coping	-0.28	0.62	-0.26	0.28	-0.33	0.20
Wishful thinking	0.26	0.79	-0.04	0.71	0.23	0.84
Seeking Social Support	-0.13	-0.38	-0.11	-0.71	-0.14	-0.74
Focusing on the Positive	-0.22	0.04	-0.41	-0.14	-0.39	0.03
Self-blame	-0.09	0.04	-0.18	-0.09	-0.07	-0.30